

## Phase PA-1,2,3 Constructed

Water-shed	Reference File Name	Source	Exhibit Name/No	Appendix
S26	RUXXEV19	PA-3&4 ROMP (2019)	Exhibit 7 – Phase PA-1, -2, -3 Constructed Rational Method Hydrology Map	F.1
S26	3OXXEVRL	PA-3&4 ROMP Revision 1 (2023)	Exhibit 1 – PA-3 Development Local Hydrology Map	B.5
S26	0610403X	Ranch Plan ROMP (2013)	Figure 10-3 - PA-4 Existing Topography	P
S26	0610404X	Ranch Plan ROMP (2013)	Figure 10-3 - PA-4 Existing Topography	P
S26	0610405X	Ranch Plan ROMP (2013)	Figure 10-3 - PA-4 Existing Topography	P
S26	0610406X	Ranch Plan ROMP (2013)	Figure 10-3 - PA-4 Existing Topography	P
S27	RUXXEV26	PA-3&4 ROMP Revision 1 (2023)	Exhibit 7 – Phase PA-1, -2, -3 Constructed Rational Method Hydrology Map	F.1
S27	3CXXEVRL	PA-3&4 ROMP Revision 1 (2023)	Exhibit 7 – Phase PA-1, -2, -3 Constructed Rational Method Hydrology Map	B.5
S28	RUXXEV27	PA-3&4 ROMP Revision 1 (2023)	Exhibit 7 – Phase PA-1, -2, -3 Constructed Rational Method Hydrology Map	F.1
S28	0610501X	Ranch Plan ROMP (2013)	Figure 10-4 - PA-5 Existing Topography	P
S29	RUXXEV28	PA-3&4 ROMP Revision 1 (2023)	Exhibit 7 – Phase PA-1, -2, -3 Constructed Rational Method Hydrology Map	F.1
S29	E502XXX	Ranch Plan ROMP (2013)	Figure 10-4 - PA-5 Existing Topography	P
S29	E503XXX	Ranch Plan ROMP (2013)	Figure 10-4 - PA-5 Existing Topography	P
S29	E504XXX	Ranch Plan ROMP (2013)	Figure 10-4 - PA-5 Existing Topography	P
S29	3BXXEVRL	PA-3&4 ROMP Revision 1 (2023)	Exhibit 1 – PA-3 Development Local Hydrology Map	B.5
S33	S31XX	SJC Watershed Study (2013)	Figure 2A – Rational Method Model Basin ID	P
S33	S32XX	SJC Watershed Study (2013)	Figure 2A – Rational Method Model Basin ID	P
S33	3AXXEVRL	PA-3&4 ROMP (2019)	Exhibit 1 – PA-3 Development Local Hydrology Map	B.5
S33	RUXXEV29	PA-3&4 ROMP Revision 1 (2023)	Exhibit 7 – Phase PA-1, -2, -3 Constructed Rational Method Hydrology Map	F.1
S34	RUXXEV33	PA-3&4 ROMP Revision 1 (2023)	Exhibit 7 – Phase PA-1, -2, -3 Constructed Rational Method Hydrology Map	F.1
S34	0610505X	Ranch Plan ROMP (2013)	Figure 10-4 - PA-5 Existing Topography	P
S34	0610506X	Ranch Plan ROMP (2013)	Figure 10-4 - PA-5 Existing Topography	P
S34	2PXXEVBB	PA-2 ROMP (2014)	Exhibit 2 – PA-2 Development Local Hydrology Map	P
S34	0610507X	Ranch Plan ROMP (2013)	Figure 10-4 - PA-5 Existing Topography	P
S34	RUXXEV36	PA-3&4 ROMP (2019)	Exhibit 7 – Phase PA-1, -2, -3 Constructed Rational Method Hydrology Map	F.1
S34	0506101X	PA-1 ROMP (2006)	Exhibit F - PA-1 Hydrologic Map for Proposed Condition	P
S34	0610508X	Ranch Plan ROMP (2013)	Figure 10-4 - PA-5 Existing Topography	P
S36	S35XX	Ranch Plan ROMP (2013)	Figure 2A – Rational Method Model Basin ID	P
S36	P201XX	Ranch Plan ROMP (2013)	Figure 10-5 - PA-1 Proposed Topography	P
S36	2PXXEVAA	PA-2 ROMP (2014)	Exhibit 2 – PA-2 Development Local Hydrology Map	P
S37	RUXXEV34	PA-3&4 ROMP Revision 1 (2023)	Exhibit 7 – Phase PA-1, -2, -3 Constructed Rational Method Hydrology Map	F.1
S37	0506102X	PA-1 ROMP (2006)	Exhibit F - PA-1 Hydrologic Map for Proposed Condition	P
S37	0506103X	PA-1 ROMP (2006)	Exhibit F - PA-1 Hydrologic Map for Proposed Condition	P
S37	0506104X	PA-1 ROMP (2006)	Exhibit F - PA-1 Hydrologic Map for Proposed Condition	P
S37	0506105X	PA-1 ROMP (2006)	Exhibit F - PA-1 Hydrologic Map for Proposed Condition	P
S37	0506106X	PA-1 ROMP (2006)	Exhibit F - PA-1 Hydrologic Map for Proposed Condition	P
S38	RUXXEV37	PA-3&4 ROMP Revision 1 (2023)	Exhibit 7 – Phase PA-1, -2, -3 Constructed Rational Method Hydrology Map	F.1
S39	RUXXEV38	PA-3&4 ROMP Revision 1 (2023)	Exhibit 7 – Phase PA-1, -2, -3 Constructed Rational Method Hydrology Map	F.1

1. Appendix P includes files approved as part of previous reports. All other files can be found in their respective appendices, please refer to the 4<sup>th</sup> column for their location.
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## Phase PA-1,2,3,4 Constructed

Water-shed	Reference File Name	Source	Exhibit Name/No	Appendix
S26	RUXXEV19	PA-3&4 ROMP (2019)	Exhibit 8 – Phase PA-1, -2,-3 -4 Constructed Rational Method Hydrology Map	E.1
S26	3OXXEVRL	PA-3&4 ROMP Revision 1 (2023)	Exhibit 1 – PA-3 Development Local Hydrology Map	B.4
S26	4EXXEVRL	PA-3&4 ROMP Revision 1 (2023)	Exhibit 2 – PA-4 Development Local Hydrology Map	B.4
S26	4FXXEVRL	PA-3&4 ROMP Revision 1 (2023)	Exhibit 2 – PA-4 Development Local Hydrology Map	B.4
S27	RUXXEV26	PA-3&4 ROMP Revision 1 (2023)	Exhibit 8 – Phase PA-1, -2,-3 -4 Constructed Rational Method Hydrology Map	E.1
S27	3CXXEVRL	PA-3&4 ROMP Revision 1 (2023)	Exhibit 1 – PA-3 Development Local Hydrology Map	B.4
S28	RUXXEV27	PA-3&4 ROMP Revision 1 (2023)	Exhibit 8 – Phase PA-1, -2,-3 -4 Constructed Rational Method Hydrology Map	E.1
S28	0610501X	Ranch Plan ROMP (2013)	Figure 10-4 - PA-5 Existing Topography	P
S29	RUXXEV28	PA-3&4 ROMP Revision 1 (2023)	Exhibit 8 – Phase PA-1, -2,-3 -4 Constructed Rational Method Hydrology Map	E.1
S29	E502XXXX	Ranch Plan ROMP (2013)	Figure 10-4 - PA-5 Existing Topography	P
S29	E503XXXX	Ranch Plan ROMP (2013)	Figure 10-4 - PA-5 Existing Topography	P
S29	E504XXXX	Ranch Plan ROMP (2013)	Figure 10-4 - PA-5 Existing Topography	P
S29	3BXXEVRL	PA-3&4 ROMP Revision 1 (2023)	Exhibit 1 – PA-3 Development Local Hydrology Map	B.4
S33	S31XXX	SJC Watershed Study (2013)	Figure 2A – Rational Method Model Basin ID	P
S33	S32XXX	SJC Watershed Study (2013)	Figure 2A – Rational Method Model Basin ID	P
S33	3AXXEVRL	PA-3&4 ROMP (2019)	Exhibit 1 – PA-3 Development Local Hydrology Map	B.4
S33	RUXXEV29	PA-3&4 ROMP Revision 1 (2023)	Exhibit 8 – Phase PA-1, -2,-3 -4 Constructed Rational Method Hydrology Map	E.1
S34	RUXXEV33	PA-3&4 ROMP Revision 1 (2023)	Exhibit 8 – Phase PA-1, -2,-3 -4 Constructed Rational Method Hydrology Map	E.1
S34	0610505X	Ranch Plan ROMP (2013)	Figure 10-4 - PA-5 Existing Topography	P
S34	0610506X	Ranch Plan ROMP (2013)	Figure 10-4 - PA-5 Existing Topography	P
S34	2PXXEVBB	PA-2 ROMP (2014)	Exhibit 2 – PA-2 Development Local Hydrology Map	P
S34	0610507X	Ranch Plan ROMP (2013)	Figure 10-4 - PA-5 Existing Topography	P
S34	RUXXEV36	PA-3&4 ROMP (2019)	Exhibit 8 – Phase PA-1, -2,-3 -4 Constructed Rational Method Hydrology Map	E.1
S34	0506101X	Ranch Plan ROMP (2013)	Exhibit F - PA-1 Hydrologic Map for Proposed Condition	P
S34	0610508X	Ranch Plan ROMP (2013)	Figure 10-4 - PA-5 Existing Topography	P
S36	S35XXX	Ranch Plan ROMP (2013)	Figure 2A – Rational Method Model Basin ID	P
S36	P201XXXX	Ranch Plan ROMP (2013)	Figure 10-5 - PA-2 Proposed Topography	P
S36	2PXXEVAA	PA-2 ROMP (2014)	Exhibit 2 – PA-2 Development Local Hydrology Map	P
S37	RUXXEV34	PA-3&4 ROMP Revision 1 (2023)	Exhibit 8 – Phase PA-1, -2,-3 -4 Constructed Rational Method Hydrology Map	E.1
S37	0506102X	Ranch Plan ROMP (2013)	Exhibit F - PA-1 Hydrologic Map for Proposed Condition	P
S37	0506103X	Ranch Plan ROMP (2013)	Exhibit F - PA-1 Hydrologic Map for Proposed Condition	P
S37	0506104X	Ranch Plan ROMP (2013)	Exhibit F - PA-1 Hydrologic Map for Proposed Condition	P
S37	0506105X	Ranch Plan ROMP (2013)	Exhibit F - PA-1 Hydrologic Map for Proposed Condition	P
S37	0506106X	Ranch Plan ROMP (2013)	Exhibit F - PA-1 Hydrologic Map for Proposed Condition	P
S38	RUXXEV37	PA-3&4 ROMP Revision 1 (2023)	Exhibit 8 – Phase PA-1, -2,-3 -4 Constructed Rational Method Hydrology Map	E.1
S39	RUXXEV38	PA-3&4 ROMP Revision 1 (2023)	Exhibit 8 – Phase PA-1, -2,-3 -4 Constructed Rational Method Hydrology Map	E.1

1. Appendix P includes files approved as part of previous reports. All other files can be found in their respective appendices, please refer to the 4<sup>th</sup> column for their location.
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## Ultimate

Water-shed	Reference File Name	Source	Exhibit Name/No	Appendix
S26	RUXXEV19	PA-3&4 ROMP (2019)	Exhibit 9 – Ultimate Constructed Rational Method Hydrology Map	G.1
S26	3OXXEVRL	PA-3&4 ROMP Revision 1 (2023)	Exhibit 1 – PA-3 Development Local Hydrology Map	B.6
S26	4EXXEVRL	PA-3&4 ROMP Revision 1 (2023)	Exhibit 2 – PA-4 Development Local Hydrology Map	B.6
S26	4FXXEVRL	PA-3&4 ROMP Revision 1 (2023)	Exhibit 2 – PA-4 Development Local Hydrology Map	B.6
S27	RUXXEV26	PA-3&4 ROMP Revision 1 (2023)	Exhibit 9 – Ultimate Constructed Rational Method Hydrology Map	G.1
S27	3CXXEVRL	PA-3&4 ROMP Revision 1 (2023)	Exhibit 1 – PA-3 Development Local Hydrology Map	B.6
S28	RUXXEV27	PA-3&4 ROMP Revision 1 (2023)	Exhibit 9 – Ultimate Constructed Rational Method Hydrology Map	G.1
S28	P501XXXX	Ranch Plan ROMP (2013)	Figure 10-8 – PA-5 Proposed Topography	P
S29	RUXXEV28	PA-3&4 ROMP Revision 1 (2023)	Exhibit 9 – Ultimate Constructed Rational Method Hydrology Map	G.1
S29	P503XXXX	Ranch Plan ROMP (2013)	Figure 10-8 – PA-5 Proposed Topography	P
S29	P504XXXX	Ranch Plan ROMP (2013)	Figure 10-8 – PA-5 Proposed Topography	P
S29	3BXXEVRL	PA-3&4 ROMP Revision 1 (2023)	Exhibit 1 – PA-3 Development Local Hydrology Map	B.6
S33	S31XXX	SJC Watershed Study (2013)	Figure 2A – Rational Method Model Basin ID	P
S33	S32XXX	SJC Watershed Study (2013)	Figure 2A – Rational Method Model Basin ID	P
S33	3AXXEVRL	PA-3&4 ROMP (2019)	Exhibit 1 – PA-3 Development Local Hydrology Map	B.6
S33	RUXXEV29	PA-3&4 ROMP Revision 1 (2023)	Exhibit 9 – Ultimate Constructed Rational Method Hydrology Map	G.1
S34	RUXXEV33	PA-3&4 ROMP Revision 1 (2023)	Exhibit 9 – Ultimate Constructed Rational Method Hydrology Map	G.1
S34	P505XXXX	Ranch Plan ROMP (2013)	Figure 10-8 – PA-5 Proposed Topography	P
S34	P506XXXX	Ranch Plan ROMP (2013)	Figure 10-8 – PA-5 Proposed Topography	P
S34	2PXXEVBB	PA-2 ROMP (2014)	Exhibit 2 – PA-2 Development Local Hydrology Map	P
S34	P507XXXX	Ranch Plan ROMP (2013)	Figure 10-8 – PA-5 Proposed Topography	P
S34	RUXXEV36	PA-3&4 ROMP (2019)	Exhibit 9 – Ultimate Constructed Rational Method Hydrology Map	G.1
S34	0506101X	Ranch Plan ROMP (2013)	Exhibit F - PA-1 Hydrologic Map for Proposed Condition	P
S34	P508XXXX	Ranch Plan ROMP (2013)	Figure 10-8 – PA-5 Proposed Topography	P
S36	S35XXX	Ranch Plan ROMP (2013)	Figure 2A – Rational Method Model Basin ID	P
S36	P201XXXX	Ranch Plan ROMP (2013)	Figure 10-5 - PA-2 Proposed Topography	P
S36	2PXXEVAA	PA-2 ROMP (2014)	Exhibit 2 – PA-2 Development Local Hydrology Map	P
S37	RUXXEV34	PA-3&4 ROMP Revision 1 (2023)	Exhibit 9 – Ultimate Constructed Rational Method Hydrology Map	G.1
S37	0506102X	PA-1 ROMP	Exhibit F - PA-1 Hydrologic Map for Proposed Condition	P
S37	0506103X	PA-1 ROMP	Exhibit F - PA-1 Hydrologic Map for Proposed Condition	P
S37	0506104X	PA-1 ROMP	Exhibit F - PA-1 Hydrologic Map for Proposed Condition	P
S37	0506105X	PA-1 ROMP	Exhibit F - PA-1 Hydrologic Map for Proposed Condition	P
S37	0506106X	PA-1 ROMP	Exhibit F - PA-1 Hydrologic Map for Proposed Condition	P
S38	RUXXEV37	PA-3&4 ROMP Revision 1 (2023)	Exhibit 9 – Ultimate Constructed Rational Method Hydrology Map	G.1
S39	RUXXEV38	PA-3&4 ROMP Revision 1 (2023)	Exhibit 9 – Ultimate Constructed Rational Method Hydrology Map	G.1

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2. Red text indicates the part of the file name that varies based on storm event.

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2012 Advanced Engineering Software (aes)  
Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 2-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P02EVAA.DAT  
TIME/DATE OF STUDY: 14:35 11/14/2013

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.806
- 2) 10.00; 1.204
- 3) 15.00; 0.925
- 4) 20.00; 0.762
- 5) 25.00; 0.659
- 6) 30.00; 0.585
- 7) 40.00; 0.504
- 8) 50.00; 0.447
- 9) 60.00; 0.390
- 10) 90.00; 0.330
- 11) 120.00; 0.270
- 12) 180.00; 0.210
- 13) 360.00; 0.150
- 14) 1200.00; 0.080

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

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FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 571.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.305  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.528  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	-	0.80	0.60	0.200	0	7.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 1.01  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 1.01

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FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 7.31  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.528  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.60	0.200	-
USER-DEFINED	-	1.00	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.170  
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 4.24  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 5.25

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FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.528  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.60	0.200	-
USER-DEFINED	-	1.00	0.60	0.100	-



USER-DEFINED - 2.60 0.60 0.200 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA (ACRES) = 2.60 SUBAREA RUNOFF (CFS) = 3.30  
 EFFECTIVE AREA (ACRES) = 6.70 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.19  
 TOTAL AREA (ACRES) = 6.7 PEAK FLOW RATE (CFS) = 8.55

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 FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62  
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 571.00 DOWNSTREAM ELEVATION (FEET) = 530.50  
 STREET LENGTH (FEET) = 1215.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.22  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.35  
 HALFSTREET FLOOD WIDTH (FEET) = 10.74  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.17  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.48  
 STREET FLOW TRAVEL TIME (MIN.) = 4.85 Tc (MIN.) = 12.16

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.084  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.200	-
USER-DEFINED	-	2.40	0.60	0.100	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.135  
 SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 3.34  
 EFFECTIVE AREA (ACRES) = 10.40 AREA-AVERAGED Fm (INCH/HR) = 0.10  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA (ACRES) = 10.4 PEAK FLOW RATE (CFS) = 9.20

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.35 HALFSTREET FLOOD WIDTH (FEET) = 10.27  
 FLOW VELOCITY (FEET/SEC.) = 4.05 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.40  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1542.00 FEET.

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 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.16  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.084  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.40	0.60	0.200	-
USER-DEFINED	-	18.20	0.60	0.100	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.119  
 SUBAREA AREA (ACRES) = 22.60 SUBAREA RUNOFF (CFS) = 20.58  
 EFFECTIVE AREA (ACRES) = 33.00 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.13  
 TOTAL AREA (ACRES) = 33.0 PEAK FLOW RATE (CFS) = 29.79

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.16  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.084  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.20	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.100	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198  
 SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 5.47  
 EFFECTIVE AREA (ACRES) = 39.30 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA (ACRES) = 39.3 PEAK FLOW RATE (CFS) = 35.25

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 530.50 DOWNSTREAM (FEET) = 522.00  
 FLOW LENGTH (FEET) = 837.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.2 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.04  
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 35.25  
 PIPE TRAVEL TIME (MIN.) = 1.54 Tc (MIN.) = 13.70  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2379.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.70  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.997  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED - 15.30 0.60 0.100 -  
 USER-DEFINED - 0.70 0.60 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.133  
 SUBAREA AREA (ACRES) = 16.00 SUBAREA RUNOFF (CFS) = 13.22  
 EFFECTIVE AREA (ACRES) = 55.30 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA (ACRES) = 55.3 PEAK FLOW RATE (CFS) = 45.43

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 522.00 DOWNSTREAM (FEET) = 473.00  
 FLOW LENGTH (FEET) = 568.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.1 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 21.84  
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 45.43  
 PIPE TRAVEL TIME (MIN.) = 0.43 Tc (MIN.) = 14.13  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2947.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.13  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.973  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	0.500	-
USER-DEFINED	-	0.50	0.60	0.100	-
USER-DEFINED	-	13.00	0.60	0.850	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.820  
 SUBAREA AREA (ACRES) = 15.90 SUBAREA RUNOFF (CFS) = 6.89  
 EFFECTIVE AREA (ACRES) = 71.20 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA (ACRES) = 71.2 PEAK FLOW RATE (CFS) = 51.11

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 127.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 473.00 DOWNSTREAM (FEET) = 435.00  
 FLOW LENGTH (FEET) = 588.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.4 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 19.74  
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 51.11  
 PIPE TRAVEL TIME (MIN.) = 0.50 Tc (MIN.) = 14.63

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 100.00 TO NODE 121.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 577.00 DOWNSTREAM (FEET) = 574.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.438  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.392  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	-	0.60	0.60	0.200	0	8.44

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF (CFS) = 0.69  
 TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 0.69

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 574.00 DOWNSTREAM ELEVATION (FEET) = 557.00  
 STREET LENGTH (FEET) = 221.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.14  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.30  
 HALFSTREET FLOOD WIDTH (FEET) = 7.78  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.54  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.67  
 STREET FLOW TRAVEL TIME (MIN.) = 0.66 Tc (MIN.) = 9.10  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.312  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.200	-
USER-DEFINED	-	7.90	0.60	0.200	-
USER-DEFINED	-	4.10	0.60	0.400	-
USER-DEFINED	-	2.20	0.60	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.257  
SUBAREA AREA (ACRES) = 14.30 SUBAREA RUNOFF (CFS) = 14.90  
EFFECTIVE AREA (ACRES) = 14.90 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.26  
TOTAL AREA (ACRES) = 14.9 PEAK FLOW RATE (CFS) = 15.54

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.35 HALFSTREET FLOOD WIDTH (FEET) = 10.74  
FLOW VELOCITY (FEET/SEC.) = 6.35 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.25  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 551.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 557.00 DOWNSTREAM ELEVATION (FEET) = 527.00  
STREET LENGTH (FEET) = 317.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 19.79  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.37  
HALFSTREET FLOOD WIDTH (FEET) = 11.45  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.26  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.66  
STREET FLOW TRAVEL TIME (MIN.) = 0.73 Tc (MIN.) = 9.83  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.224

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED	-	0.20	0.60	0.320	-
USER-DEFINED	-	4.50	0.60	0.400	-
USER-DEFINED	-	0.70	0.60	0.200	-
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	3.50	0.60	0.350	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.352  
SUBAREA AREA (ACRES) = 9.30 SUBAREA RUNOFF (CFS) = 8.48  
EFFECTIVE AREA (ACRES) = 24.20 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.29

TOTAL AREA (ACRES) = 24.2 PEAK FLOW RATE (CFS) = 22.85

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.38 HALFSTREET FLOOD WIDTH (FEET) = 12.23  
FLOW VELOCITY (FEET/SEC.) = 7.47 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.85  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 123.00 = 868.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 527.00 DOWNSTREAM ELEVATION (FEET) = 496.00  
STREET LENGTH (FEET) = 315.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.70  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.40  
HALFSTREET FLOOD WIDTH (FEET) = 13.24  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.87  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.14  
STREET FLOW TRAVEL TIME (MIN.) = 0.67 Tc (MIN.) = 10.50  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.176

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED	-	2.90	0.60	0.400	-
USER-DEFINED	-	1.40	0.60	0.350	-
USER-DEFINED	-	4.00	0.60	0.400	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	2.70	0.60	0.350	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387  
SUBAREA AREA (ACRES) = 11.40 SUBAREA RUNOFF (CFS) = 9.68  
EFFECTIVE AREA (ACRES) = 35.60 AREA-AVERAGED Fm (INCH/HR) = 0.19  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.32  
TOTAL AREA (ACRES) = 35.6 PEAK FLOW RATE (CFS) = 31.49

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.41 HALFSTREET FLOOD WIDTH (FEET) = 13.95  
FLOW VELOCITY (FEET/SEC.) = 8.16 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.36  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 124.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 10.50
RAINFALL INTENSITY(INCH/HR) = 1.18
AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA(ACRES) = 35.60
TOTAL STREAM AREA(ACRES) = 35.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 31.49

\*\*\*\*\*
FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 317.00
ELEVATION DATA: UPSTREAM(FEET) = 699.00 DOWNSTREAM(FEET) = 610.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.111
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.311
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"OPEN BRUSH" - 1.50 0.60 1.000 0 9.11
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.96
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 0.96

\*\*\*\*\*
FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 575.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 206.00 CHANNEL SLOPE = 0.1699
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.222
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.80 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.75
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.65
AVERAGE FLOW DEPTH(FEET) = 0.35 TRAVEL TIME(MIN.) = 0.74
Tc(MIN.) = 9.85
SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 1.57
EFFECTIVE AREA(ACRES) = 4.30 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.3 PEAK FLOW RATE(CFS) = 2.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.40 FLOW VELOCITY(FEET/SEC.) = 5.03
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 523.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 548.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.1350
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.175
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.30 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.26
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.96
AVERAGE FLOW DEPTH(FEET) = 0.47 TRAVEL TIME(MIN.) = 0.67
Tc(MIN.) = 10.52
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 1.71
EFFECTIVE AREA(ACRES) = 7.60 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 7.6 PEAK FLOW RATE(CFS) = 3.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.50 FLOW VELOCITY(FEET/SEC.) = 5.23
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 723.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 548.00 DOWNSTREAM(FEET) = 524.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 318.00 CHANNEL SLOPE = 0.0755
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.107
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.30 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.46
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.35
AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 1.22
Tc(MIN.) = 11.74

SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 1.05  
EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 4.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.59 FLOW VELOCITY (FEET/SEC.) = 4.32  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 1041.00 FEET.

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FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 524.00 DOWNSTREAM (FEET) = 515.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 94.00 CHANNEL SLOPE = 0.0957  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.089

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.33

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.97

AVERAGE FLOW DEPTH (FEET) = 0.60 TRAVEL TIME (MIN.) = 0.32

Tc (MIN.) = 12.06

SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 1.63

EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 5.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.62 FLOW VELOCITY (FEET/SEC.) = 5.15

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 1135.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 507.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 207.00 CHANNEL SLOPE = 0.0386  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.039

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.63

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.86

AVERAGE FLOW DEPTH (FEET) = 0.81 TRAVEL TIME (MIN.) = 0.89  
Tc (MIN.) = 12.95  
SUBAREA AREA (ACRES) = 8.30 SUBAREA RUNOFF (CFS) = 3.28  
EFFECTIVE AREA (ACRES) = 21.90 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 21.9 PEAK FLOW RATE (CFS) = 8.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.85 FLOW VELOCITY (FEET/SEC.) = 3.98

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 1342.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 507.00 DOWNSTREAM (FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 338.00 CHANNEL SLOPE = 0.0207  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.946

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	0.400	-
USER-DEFINED	-	13.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.91

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.35

AVERAGE FLOW DEPTH (FEET) = 1.04 TRAVEL TIME (MIN.) = 1.68

Tc (MIN.) = 14.63

SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 4.48

EFFECTIVE AREA (ACRES) = 36.00 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 36.0 PEAK FLOW RATE (CFS) = 11.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.06 FLOW VELOCITY (FEET/SEC.) = 3.38

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 1680.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 137.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 500.00 DOWNSTREAM (FEET) = 496.00  
FLOW LENGTH (FEET) = 726.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 14.9 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 5.50

ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 11.30

PIPE TRAVEL TIME (MIN.) = 2.20 Tc (MIN.) = 16.83

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

```

*****
FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 16.83
RAINFALL INTENSITY(INCH/HR) = 0.87
AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 36.00
TOTAL STREAM AREA(ACRES) = 36.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.30

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 31.49 10.50 1.176 0.60( 0.19) 0.32 35.6 100.00
2 11.30 16.83 0.865 0.60( 0.60) 1.00 36.0 130.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 42.79 10.50 1.176 0.60( 0.35) 0.58 58.1 100.00
2 32.82 16.83 0.865 0.60( 0.40) 0.66 71.6 130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 42.79 Tc(MIN.) = 10.50
EFFECTIVE AREA(ACRES) = 58.05 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 71.6
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

*****
FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 444.00
FLOW LENGTH(FEET) = 888.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.46
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 42.79
PIPE TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 11.30
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 125.00 = 3294.00 FEET.

*****
FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

```

*****
MAINLINE Tc(MIN.) = 11.30
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.132
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.60 0.400 -
USER-DEFINED - 7.50 0.60 0.400 -
USER-DEFINED - 0.10 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.407
SUBAREA AREA(ACRES) = 8.60 SUBAREA RUNOFF(CFS) = 6.87
EFFECTIVE AREA(ACRES) = 66.65 AREA-AVERAGED Fm(INCH/HR) = 0.34
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.56
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 47.73

*****
FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 444.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 27.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.18
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 47.73
PIPE TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 12.50
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 12.50
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.065
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.30 0.60 0.200 -
USER-DEFINED - 0.70 0.60 0.400 -
USER-DEFINED - 0.90 0.60 0.100 -
USER-DEFINED - 0.60 0.60 0.350 -
USER-DEFINED - 0.40 0.60 0.200 -
USER-DEFINED - 0.20 0.60 0.400 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.225
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 5.94
EFFECTIVE AREA(ACRES) = 73.75 AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 87.3 PEAK FLOW RATE(CFS) = 49.66

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN.) = 12.50
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.065
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.60     0.100   -
USER-DEFINED        -         0.10     0.60     0.350   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225
SUBAREA AREA(ACRES) = 0.20   SUBAREA RUNOFF(CFS) = 0.17
EFFECTIVE AREA(ACRES) = 73.95   AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 87.5     PEAK FLOW RATE(CFS) = 49.82

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*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1
-----

```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

```

=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.50
RAINFALL INTENSITY(INCH/HR) = 1.06
AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.53
EFFECTIVE STREAM AREA(ACRES) = 73.95
TOTAL STREAM AREA(ACRES) = 87.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 49.82

```

```

*****
FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21
-----

```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

```

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 557.00   DOWNSTREAM(FEET) = 546.00

```

```

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.105
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.673
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS   Tc
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          -         0.50     0.60     0.100   0    6.11
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 0.73
TOTAL AREA(ACRES) = 0.50   PEAK FLOW RATE(CFS) = 0.73

```

```

*****
FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62
-----

```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

```

UPSTREAM ELEVATION(FEET) = 546.00   DOWNSTREAM ELEVATION(FEET) = 488.00
STREET LENGTH(FEET) = 671.00   CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

```

```

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

```

```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

```

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.70

```

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.24
HALFSTREET FLOOD WIDTH(FEET) = 4.16
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.31
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.26
STREET FLOW TRAVEL TIME(MIN.) = 2.10   Tc(MIN.) = 8.21

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* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.420
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50     0.60     0.200   -
USER-DEFINED        -         0.90     0.60     0.100   -
USER-DEFINED        -         3.90     0.60     0.350   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
SUBAREA AREA(ACRES) = 5.30   SUBAREA RUNOFF(CFS) = 5.93
EFFECTIVE AREA(ACRES) = 5.80   AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 5.8     PEAK FLOW RATE(CFS) = 6.54

```

```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) = 6.59
FLOW VELOCITY(FEET/SEC.) = 5.62   DEPTH*VELOCITY(FT*FT/SEC.) = 1.58
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1001.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 8.21
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.420
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         14.60    0.60     0.200   -
USER-DEFINED        -         1.10     0.60     0.100   -
USER-DEFINED        -         4.30     0.60     0.350   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.227
SUBAREA AREA(ACRES) = 20.00   SUBAREA RUNOFF(CFS) = 23.10
EFFECTIVE AREA(ACRES) = 25.80   AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 25.8     PEAK FLOW RATE(CFS) = 29.65

```

```

*****
FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 488.00 DOWNSTREAM ELEVATION(FEET) = 460.00
STREET LENGTH(FEET) = 371.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.03
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.45
HALFSTREET FLOOD WIDTH(FEET) = 15.82
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.62
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 3.39
STREET FLOW TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 9.02
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.322
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.60 0.200 -
USER-DEFINED - 10.00 0.60 0.200 -
USER-DEFINED - 1.70 0.60 0.200 -
USER-DEFINED - 0.50 0.60 0.100 -
USER-DEFINED - 1.00 0.60 0.350 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.207
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 14.77
EFFECTIVE AREA(ACRES) = 39.50 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 39.5 PEAK FLOW RATE(CFS) = 42.14

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.68
FLOW VELOCITY(FEET/SEC.) = 7.87 DEPTH*VELOCITY(FT*FT/SEC.) = 3.62
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1372.00 FEET.

*****
FLOW PROCESS FROM NODE 113.00 TO NODE 126.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.29

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ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 42.14
PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 9.53
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 1872.00 FEET.

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 9.53
RAINFALL INTENSITY(INCH/HR) = 1.26
AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.23
EFFECTIVE STREAM AREA(ACRES) = 39.50
TOTAL STREAM AREA(ACRES) = 39.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 42.14

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 49.82 12.50 1.065 0.60( 0.32) 0.53 74.0 100.00
1 34.30 18.98 0.795 0.60( 0.36) 0.60 87.5 130.00
2 42.14 9.53 1.260 0.60( 0.14) 0.23 39.5 110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 90.08 9.53 1.260 0.60( 0.24) 0.40 95.9 110.00
2 84.63 12.50 1.065 0.60( 0.25) 0.42 113.5 100.00
3 59.01 18.98 0.795 0.60( 0.29) 0.48 127.0 130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 90.08 Tc(MIN.) = 9.53
EFFECTIVE AREA(ACRES) = 95.91 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 127.0
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 435.00
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.35
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.08

```

PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 9.97  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.97  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.208  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.60 0.200 -  
USER-DEFINED - 5.10 0.60 0.400 -  
USER-DEFINED - 0.30 0.60 0.100 -  
USER-DEFINED - 0.10 0.60 0.850 -  
USER-DEFINED - 0.80 0.60 0.200 -  
USER-DEFINED - 0.80 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.366  
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 6.94  
EFFECTIVE AREA(ACRES) = 103.71 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.40  
TOTAL AREA(ACRES) = 134.8 PEAK FLOW RATE(CFS) = 90.31

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.97  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.208  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.10 0.60 0.400 -  
USER-DEFINED - 0.30 0.60 0.100 -  
USER-DEFINED - 1.50 0.60 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 3.95  
EFFECTIVE AREA(ACRES) = 108.61 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 139.7 PEAK FLOW RATE(CFS) = 94.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\*\*\*\* MAIN STREAM CONFLUENCE DATA \*\*\*\*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 94.26 9.97 1.208 0.60( 0.24) 0.41 108.6 110.00  
2 89.30 12.93 1.040 0.60( 0.25) 0.42 126.2 100.00  
3 61.92 19.47 0.779 0.60( 0.29) 0.48 139.7 130.00

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 51.11 14.63 0.946 0.60( 0.18) 0.29 71.2 100.00  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 140.95 9.97 1.208 0.60( 0.22) 0.37 157.1 110.00  
2 140.05 12.93 1.040 0.60( 0.23) 0.38 189.1 100.00  
3 133.31 14.63 0.946 0.60( 0.23) 0.39 200.9 100.00  
4 102.00 19.47 0.779 0.60( 0.25) 0.42 210.9 130.00  
TOTAL AREA(ACRES) = 210.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 140.95 Tc(MIN.) = 9.967  
EFFECTIVE AREA(ACRES) = 157.12 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 210.9  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 370.00  
FLOW LENGTH(FEET) = 500.20 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 21.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 33.67  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 140.95  
PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 10.22  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.10 = 4750.20 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.10 TO NODE 127.20 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 353.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 595.30 CHANNEL SLOPE = 0.0218  
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.079  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.60 0.100 -  
USER-DEFINED - 0.10 0.60 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 142.60

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.91  
 AVERAGE FLOW DEPTH (FEET) = 0.57 TRAVEL TIME (MIN.) = 2.02  
 Tc (MIN.) = 12.23  
 SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 3.30  
 EFFECTIVE AREA (ACRES) = 160.72 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA (ACRES) = 214.5 PEAK FLOW RATE (CFS) = 140.95  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.56 FLOW VELOCITY (FEET/SEC.) = 4.91  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.20 = 5345.50 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.20 TO NODE 127.30 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 353.00 DOWNSTREAM (FEET) = 340.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 476.00 CHANNEL SLOPE = 0.0273  
 CHANNEL BASE (FEET) = 50.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.50  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.995

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 142.30  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.27  
 AVERAGE FLOW DEPTH (FEET) = 0.53 TRAVEL TIME (MIN.) = 1.51  
 Tc (MIN.) = 13.74

SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 2.69  
 EFFECTIVE AREA (ACRES) = 163.92 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36  
 TOTAL AREA (ACRES) = 217.7 PEAK FLOW RATE (CFS) = 140.95  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.52 FLOW VELOCITY (FEET/SEC.) = 5.27  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.30 = 5821.50 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.30 TO NODE 13569.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 340.00 DOWNSTREAM (FEET) = 338.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 506.00 CHANNEL SLOPE = 0.0040  
 CHANNEL BASE (FEET) = 150.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.50  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.823

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.100	-

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.80 0.60 0.100 -  
 USER-DEFINED - 0.60 0.60 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 142.12  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 1.92  
 AVERAGE FLOW DEPTH (FEET) = 0.49 TRAVEL TIME (MIN.) = 4.40  
 Tc (MIN.) = 18.14

SUBAREA AREA (ACRES) = 3.40 SUBAREA RUNOFF (CFS) = 2.33  
 EFFECTIVE AREA (ACRES) = 167.32 AREA-AVERAGED Fm (INCH/HR) = 0.21  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.35  
 TOTAL AREA (ACRES) = 221.1 PEAK FLOW RATE (CFS) = 140.95  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.49 FLOW VELOCITY (FEET/SEC.) = 1.92  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 13569.00 = 6327.50 FEET.

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 221.1 TC (MIN.) = 18.14  
 EFFECTIVE AREA (ACRES) = 167.32 AREA-AVERAGED Fm (INCH/HR) = 0.21  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.355  
 PEAK FLOW RATE (CFS) = 140.95

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	140.95	18.14	0.823	0.60 ( 0.21)	0.35	167.3	110.00
2	140.05	21.10	0.739	0.60 ( 0.22)	0.37	199.3	100.00
3	133.31	22.95	0.701	0.60 ( 0.22)	0.37	211.1	100.00
4	102.00	28.72	0.604	0.60 ( 0.24)	0.40	221.1	130.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2012 Advanced Engineering Software (aes)  
Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 2-YR ULTIMATE EV DECEMBER 2013 MCHANDOO/TMULI \*  
\*\*\*\*\*

FILE NAME: 2P02EVBB.DAT  
TIME/DATE OF STUDY: 16:38 12/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.819
- 2) 10.00; 1.213
- 3) 15.00; 0.930
- 4) 20.00; 0.765
- 5) 25.00; 0.661
- 6) 30.00; 0.587
- 7) 40.00; 0.505
- 8) 50.00; 0.448
- 9) 60.00; 0.390
- 10) 90.00; 0.336
- 11) 120.00; 0.281
- 12) 180.00; 0.227
- 13) 360.00; 0.170
- 14) 1200.00; 0.116

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00  
ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 543.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.596  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.504  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.80	0.60	0.100	56	7.60

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 1.04  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 1.04

\*\*\*\*\*  
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 543.00 DOWNSTREAM ELEVATION(FEET) = 523.00  
STREET LENGTH(FEET) = 502.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.91  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.33  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.86  
STREET FLOW TRAVEL TIME(MIN.) = 1.93 Tc(MIN.) = 9.53  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.270

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.200	-
USER-DEFINED	-	1.30	0.60	0.100	-



USER-DEFINED - 0.30 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.261  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 1.80  
 EFFECTIVE AREA(ACRES) = 2.60 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 2.68

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.24 HALFSTREET FLOOD WIDTH(FEET) = 4.14  
 FLOW VELOCITY(FEET/SEC.) = 3.71 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.89  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 810.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.53  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.270  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	1.40	0.60	0.100	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.53  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 4.20

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 2 USED)<<<<

UPSTREAM ELEVATION(FEET) = 523.00 DOWNSTREAM ELEVATION(FEET) = 468.00  
 STREET LENGTH(FEET) = 987.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.69  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.29  
 HALFSTREET FLOOD WIDTH(FEET) = 6.48  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.67  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.34  
 STREET FLOW TRAVEL TIME(MIN.) = 3.52 Tc(MIN.) = 13.05  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.040  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.500	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.60	0.60	0.500	-
USER-DEFINED	-	1.90	0.60	0.100	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 2.08  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 7.27

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.50 0.60 0.500 -  
 USER-DEFINED - 2.40 0.60 0.100 -  
 USER-DEFINED - 1.30 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.426  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 2.97  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 6.34

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 6.89  
 FLOW VELOCITY(FEET/SEC.) = 4.77 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.41  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 1797.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 468.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.38  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.30  
 HALFSTREET FLOOD WIDTH(FEET) = 7.91  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.91  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.49  
 STREET FLOW TRAVEL TIME(MIN.) = 3.32 Tc(MIN.) = 16.37  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.885

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.500	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.60	0.60	0.500	-
USER-DEFINED	-	1.90	0.60	0.100	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 2.08  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 7.27

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.84
FLOW VELOCITY(FEET/SEC.) = 4.89 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.48
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2774.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.37
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.885
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.30 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 0.33
EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 7.60

\*\*\*\*\*
FLOW PROCESS FROM NODE 204.00 TO NODE 218.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 343.00
STREET LENGTH(FEET) = 1228.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.47

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.32
HALFSTREET FLOOD WIDTH(FEET) = 8.72
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.86
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.55
STREET FLOW TRAVEL TIME(MIN.) = 4.22 Tc(MIN.) = 20.59
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 0.500 -
USER-DEFINED - 0.50 0.60 0.100 -
USER-DEFINED - 0.40 0.60 1.000 -
USER-DEFINED - 0.70 0.60 0.500 -

USER-DEFINED - 1.50 0.60 0.100 -
USER-DEFINED - 0.80 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 1.74
EFFECTIVE AREA(ACRES) = 16.60 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 16.6 PEAK FLOW RATE(CFS) = 7.85

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 8.41
FLOW VELOCITY(FEET/SEC.) = 4.76 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.49
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.59
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.20 0.60 0.500 -
USER-DEFINED - 0.10 0.60 0.100 -
USER-DEFINED - 0.20 0.60 0.500 -
USER-DEFINED - 0.10 0.60 0.100 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450
SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 0.70
EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 8.54

\*\*\*\*\*
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 20.59
RAINFALL INTENSITY(INCH/HR) = 0.75
AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.39
EFFECTIVE STREAM AREA(ACRES) = 18.20
TOTAL STREAM AREA(ACRES) = 18.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.54

\*\*\*\*\*
FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 268.00

ELEVATION DATA: UPSTREAM(FEET) = 514.00 DOWNSTREAM(FEET) = 511.50

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.724  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.489

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	-	2.30	0.60	0.500	56	9.27
APARTMENTS	-	0.40	0.60	0.200	56	7.72

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.456  
SUBAREA RUNOFF(CFS) = 2.95  
TOTAL AREA(ACRES) = 2.70 PEAK FLOW RATE(CFS) = 2.95

\*\*\*\*\*  
FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 511.50 DOWNSTREAM ELEVATION(FEET) = 503.00  
STREET LENGTH(FEET) = 503.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.85  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 9.72  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.82  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.95  
STREET FLOW TRAVEL TIME(MIN.) = 2.97 Tc(MIN.) = 10.70  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.174

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	0.60	0.60	0.200	-
USER-DEFINED	-	6.20	0.60	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.475  
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 5.76  
EFFECTIVE AREA(ACRES) = 9.90 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.47  
TOTAL AREA(ACRES) = 9.9 PEAK FLOW RATE(CFS) = 7.95

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.21  
FLOW VELOCITY(FEET/SEC.) = 3.02 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.10  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 771.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.70  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.174  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	0.200	-
USER-DEFINED	-	0.30	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.350	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.281  
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 1.18  
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 9.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 503.00 DOWNSTREAM ELEVATION(FEET) = 476.00  
STREET LENGTH(FEET) = 423.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.57  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 8.91  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.30  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.71  
STREET FLOW TRAVEL TIME(MIN.) = 1.33 Tc(MIN.) = 12.03  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.098

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.350	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.454  
SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 0.89  
EFFECTIVE AREA (ACRES) = 12.40 AREA-AVERAGED Fm (INCH/HR) = 0.27  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.45  
TOTAL AREA (ACRES) = 12.4 PEAK FLOW RATE (CFS) = 9.26

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.32 HALFSTREET FLOOD WIDTH (FEET) = 8.78  
FLOW VELOCITY (FEET/SEC.) = 5.24 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.68  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.03  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.098  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.60 0.200 -  
USER-DEFINED - 0.20 0.60 0.500 -  
USER-DEFINED - 0.30 0.60 0.100 -  
USER-DEFINED - 3.30 0.60 0.350 -  
USER-DEFINED - 0.20 0.60 0.200 -  
USER-DEFINED - 0.40 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.332  
SUBAREA AREA (ACRES) = 4.90 SUBAREA RUNOFF (CFS) = 3.97  
EFFECTIVE AREA (ACRES) = 17.30 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.42  
TOTAL AREA (ACRES) = 17.3 PEAK FLOW RATE (CFS) = 13.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.03  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.098  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.40 0.60 0.100 -  
USER-DEFINED - 8.10 0.60 0.350 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.276  
SUBAREA AREA (ACRES) = 11.50 SUBAREA RUNOFF (CFS) = 9.65  
EFFECTIVE AREA (ACRES) = 28.80 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36  
TOTAL AREA (ACRES) = 28.8 PEAK FLOW RATE (CFS) = 22.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 476.00 DOWNSTREAM ELEVATION (FEET) = 460.00  
STREET LENGTH (FEET) = 789.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 22.88

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.47  
HALFSTREET FLOOD WIDTH (FEET) = 16.99  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.13  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.92  
STREET FLOW TRAVEL TIME (MIN.) = 3.19 Tc (MIN.) = 15.21  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.923  
SUBAREA AREA (ACRES) = 0.00 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 28.80 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36  
TOTAL AREA (ACRES) = 28.8 PEAK FLOW RATE (CFS) = 22.88  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.47 HALFSTREET FLOOD WIDTH (FEET) = 16.99  
FLOW VELOCITY (FEET/SEC.) = 4.13 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.92  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1983.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 15.21  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.923  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.00 0.60 0.500 -  
USER-DEFINED - 6.40 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 14.40 SUBAREA RUNOFF (CFS) = 8.07  
EFFECTIVE AREA (ACRES) = 43.20 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.41  
TOTAL AREA (ACRES) = 43.2 PEAK FLOW RATE (CFS) = 26.41

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 460.00 DOWNSTREAM ELEVATION (FEET) = 419.00  
STREET LENGTH (FEET) = 529.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.45  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.41  
HALFSTREET FLOOD WIDTH (FEET) = 13.87  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.18  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.95  
STREET FLOW TRAVEL TIME (MIN.) = 1.23 Tc (MIN.) = 16.44

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.882  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.20 0.60 0.500 -  
USER-DEFINED - 2.80 0.60 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 2.10  
EFFECTIVE AREA (ACRES) = 47.20 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.41  
TOTAL AREA (ACRES) = 47.2 PEAK FLOW RATE (CFS) = 26.93

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.41 HALFSTREET FLOOD WIDTH (FEET) = 13.71  
FLOW VELOCITY (FEET/SEC.) = 7.19 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.93  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 2512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.44  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.882  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.60 0.500 -  
USER-DEFINED - 4.10 0.60 0.500 -  
USER-DEFINED - 0.70 0.60 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 2.94  
EFFECTIVE AREA (ACRES) = 52.80 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.42  
TOTAL AREA (ACRES) = 52.8 PEAK FLOW RATE (CFS) = 29.86

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.44  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.882  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.60 0.500 -  
USER-DEFINED - 4.10 0.60 0.500 -  
USER-DEFINED - 2.50 0.60 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 3.93  
EFFECTIVE AREA (ACRES) = 60.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43  
TOTAL AREA (ACRES) = 60.3 PEAK FLOW RATE (CFS) = 33.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 419.00 DOWNSTREAM ELEVATION (FEET) = 405.00  
STREET LENGTH (FEET) = 174.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 33.80  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.43  
HALFSTREET FLOOD WIDTH (FEET) = 15.04  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.63  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.29  
STREET FLOW TRAVEL TIME (MIN.) = 0.38 Tc (MIN.) = 16.82

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.870  
SUBAREA AREA (ACRES) = 0.00 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 60.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43  
TOTAL AREA (ACRES) = 60.3 PEAK FLOW RATE (CFS) = 33.80  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.43 HALFSTREET FLOOD WIDTH (FEET) = 15.04  
FLOW VELOCITY (FEET/SEC.) = 7.63 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.29  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 2686.00 FEET.

```

*****
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 372.00
FLOW LENGTH(FEET) = 395.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.97
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 33.80
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 17.15
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 3081.00 FEET.
*****
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.15
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.859
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.60 0.500 -
USER-DEFINED - 1.00 0.60 0.500 -
USER-DEFINED - 1.00 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 1.11
EFFECTIVE AREA(ACRES) = 62.50 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 62.5 PEAK FLOW RATE(CFS) = 33.80
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.15
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.859
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.60 0.500 -
USER-DEFINED - 6.90 0.60 0.500 -
USER-DEFINED - 0.20 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 5.33
EFFECTIVE AREA(ACRES) = 73.10 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 73.1 PEAK FLOW RATE(CFS) = 38.97
*****
FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31

```

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 343.00
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.70
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 38.97
PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 17.76
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 3688.00 FEET.
*****
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.76
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.839
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.60 0.500 -
USER-DEFINED - 0.40 0.60 0.400 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.443
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.36
EFFECTIVE AREA(ACRES) = 73.80 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 73.8 PEAK FLOW RATE(CFS) = 38.97
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 17.76
RAINFALL INTENSITY(INCH/HR) = 0.84
AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.44
EFFECTIVE STREAM AREA(ACRES) = 73.80
TOTAL STREAM AREA(ACRES) = 73.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 38.97
** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 8.54 20.59 0.753 0.60( 0.23) 0.39 18.2 200.00
2 38.97 17.76 0.839 0.60( 0.27) 0.44 73.8 210.00
*****
RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

```



\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	47.51	17.76	0.839	0.60 ( 0.26)	0.43	89.5	210.00
2	41.64	20.59	0.753	0.60 ( 0.26)	0.43	92.0	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 47.51 Tc(MIN.) = 17.76  
EFFECTIVE AREA(ACRES) = 89.50 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 92.0  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 343.00 DOWNSTREAM(FEET) = 326.50  
FLOW LENGTH(FEET) = 734.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.25  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 47.51  
PIPE TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 18.68  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 219.00 = 4736.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.68

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.809

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	0.30	0.60	0.400	-
USER-DEFINED	-	0.60	0.60	0.100	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.90	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 1.25  
EFFECTIVE AREA(ACRES) = 92.40 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 94.9 PEAK FLOW RATE(CFS) = 47.51

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.68

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.809

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.31  
EFFECTIVE AREA(ACRES) = 93.00 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 95.5 PEAK FLOW RATE(CFS) = 47.51

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 326.50 DOWNSTREAM(FEET) = 325.00  
FLOW LENGTH(FEET) = 161.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.29  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 47.51  
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 18.97  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 220.00 = 4897.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.97

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.799

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.90	0.60	0.500	-
USER-DEFINED	-	3.60	0.60	0.400	-
USER-DEFINED	-	18.40	0.60	0.500	-
USER-DEFINED	-	4.30	0.60	0.400	-
USER-DEFINED	-	0.50	0.60	0.500	-
USER-DEFINED	-	6.90	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462  
SUBAREA AREA(ACRES) = 38.60 SUBAREA RUNOFF(CFS) = 18.14  
EFFECTIVE AREA(ACRES) = 131.60 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 134.1 PEAK FLOW RATE(CFS) = 63.04

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 245.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 315.00
FLOW LENGTH(FEET) = 1019.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 26.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.42
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 63.04
PIPE TRAVEL TIME(MIN.) = 1.63 Tc(MIN.) = 20.60
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

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*****
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 20.60
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp    Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.40    0.60    0.400  -
USER-DEFINED         -         0.40    0.60    0.100  -
USER-DEFINED         -         0.30    0.60    1.000  -
USER-DEFINED         -         0.40    0.60    0.400  -
USER-DEFINED         -         0.40    0.60    0.100  -
USER-DEFINED         -         1.00    0.60    0.400  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 1.37
EFFECTIVE AREA(ACRES) = 134.50 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 137.0 PEAK FLOW RATE(CFS) = 63.04
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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```

*****
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

```

MAINLINE Tc(MIN.) = 20.60
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp    Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.90    0.60    0.100  -
USER-DEFINED         -         0.20    0.60    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.264
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 0.59
EFFECTIVE AREA(ACRES) = 135.60 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 138.1 PEAK FLOW RATE(CFS) = 63.04
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

```

=====
MAINLINE Tc(MIN.) = 20.60
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp    Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         1.10    0.60    0.500  -
USER-DEFINED         -         0.30    0.60    0.400  -
USER-DEFINED         -         0.10    0.60    0.100  -
USER-DEFINED         -         0.30    0.60    0.500  -
USER-DEFINED         -         1.40    0.60    0.400  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.434
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 1.42
EFFECTIVE AREA(ACRES) = 138.80 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 141.3 PEAK FLOW RATE(CFS) = 63.04
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 10
-----

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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3<<<<
=====

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*****
FLOW PROCESS FROM NODE 220.50 TO NODE 221.00 IS CODE = 21
-----

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

```

```

INITIAL SUBAREA FLOW-LENGTH(FEET) = 251.00
ELEVATION DATA: UPSTREAM(FEET) = 551.00 DOWNSTREAM(FEET) = 547.00

```

```

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.785
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.239
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp    Ap    SCS  Tc
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE"    -         3.10    0.60    0.200  56  9.79
RESIDENTIAL
"1 DWELLING/ACRE"    -         3.10    0.60    0.100  56  9.79
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.150
SUBAREA RUNOFF(CFS) = 6.41
TOTAL AREA(ACRES) = 6.20 PEAK FLOW RATE(CFS) = 6.41

```

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*****
FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

```

```

ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 542.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0130
CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.000

```

MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 5.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.132  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.200	-
USER-DEFINED	-	3.70	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.163  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.60  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.92  
 AVERAGE FLOW DEPTH (FEET) = 0.21 TRAVEL TIME (MIN.) = 1.64  
 Tc (MIN.) = 11.43  
 SUBAREA AREA (ACRES) = 4.70 SUBAREA RUNOFF (CFS) = 4.38  
 EFFECTIVE AREA (ACRES) = 10.90 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.16  
 TOTAL AREA (ACRES) = 10.9 PEAK FLOW RATE (CFS) = 10.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.23 FLOW VELOCITY (FEET/SEC.) = 4.17  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 222.00 = 637.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<<

=====

UPSTREAM ELEVATION (FEET) = 542.00 DOWNSTREAM ELEVATION (FEET) = 531.00  
 STREET LENGTH (FEET) = 1146.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.44  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.46  
 HALFSTREET FLOOD WIDTH (FEET) = 16.84  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.83  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.31  
 STREET FLOW TRAVEL TIME (MIN.) = 6.74 Tc (MIN.) = 18.17  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.825

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.50	0.60	0.200	-
USER-DEFINED	-	2.90	0.60	0.200	-
USER-DEFINED	-	0.70	0.60	0.100	-
USER-DEFINED	-	2.60	0.60	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.292  
 SUBAREA AREA (ACRES) = 17.70 SUBAREA RUNOFF (CFS) = 10.36  
 EFFECTIVE AREA (ACRES) = 28.60 AREA-AVERAGED Fm (INCH/HR) = 0.14  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 28.6 PEAK FLOW RATE (CFS) = 17.54

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.48 HALFSTREET FLOOD WIDTH (FEET) = 17.77  
 FLOW VELOCITY (FEET/SEC.) = 2.91 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.40  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 223.00 = 1783.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 62

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<<

=====

UPSTREAM ELEVATION (FEET) = 531.00 DOWNSTREAM ELEVATION (FEET) = 520.00  
 STREET LENGTH (FEET) = 702.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 20.95  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.47  
 HALFSTREET FLOOD WIDTH (FEET) = 17.30  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.65  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.72  
 STREET FLOW TRAVEL TIME (MIN.) = 3.20 Tc (MIN.) = 21.37  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.736

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	0.200	-
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	6.40	0.60	0.200	-
USER-DEFINED	-	3.70	0.60	0.100	-
USER-DEFINED	-	0.70	0.60	0.350	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175  
 SUBAREA AREA (ACRES) = 12.00 SUBAREA RUNOFF (CFS) = 6.82  
 EFFECTIVE AREA (ACRES) = 40.60 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.22  
 TOTAL AREA (ACRES) = 40.6 PEAK FLOW RATE (CFS) = 22.07

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.48 HALFSTREET FLOOD WIDTH (FEET) = 17.62  
 FLOW VELOCITY (FEET/SEC.) = 3.72 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.78  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 224.00 = 2485.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 463.00
FLOW LENGTH(FEET) = 1760.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.54
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 22.07
PIPE TRAVEL TIME(MIN.) = 2.34 Tc(MIN.) = 23.71
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 225.00 = 4245.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.71
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.688
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.20 0.60 0.200 -
USER-DEFINED - 0.10 0.60 0.500 -
USER-DEFINED - 0.30 0.60 0.350 -
USER-DEFINED - 6.80 0.60 0.200 -
USER-DEFINED - 0.10 0.60 0.500 -
USER-DEFINED - 2.00 0.60 0.350 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.235
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 5.66
EFFECTIVE AREA(ACRES) = 52.10 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 52.1 PEAK FLOW RATE(CFS) = 25.95

\*\*\*\*\*

FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.71
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.688
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.40 0.60 0.500 -
USER-DEFINED - 0.90 0.60 0.350 -
USER-DEFINED - 5.20 0.60 0.500 -
USER-DEFINED - 0.80 0.60 0.350 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.481
SUBAREA AREA(ACRES) = 13.30 SUBAREA RUNOFF(CFS) = 4.78
EFFECTIVE AREA(ACRES) = 65.40 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.28

TOTAL AREA(ACRES) = 65.4 PEAK FLOW RATE(CFS) = 30.73

\*\*\*\*\*

FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 425.00
FLOW LENGTH(FEET) = 639.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.07
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 30.73
PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 24.34
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 226.00 = 4884.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 226.00 TO NODE 226.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.34
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.675
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.90 0.60 0.200 -
USER-DEFINED - 2.90 0.60 0.500 -
USER-DEFINED - 6.30 0.60 0.200 -
USER-DEFINED - 6.00 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 7.60
EFFECTIVE AREA(ACRES) = 83.50 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.29
TOTAL AREA(ACRES) = 83.5 PEAK FLOW RATE(CFS) = 37.56

\*\*\*\*\*

FLOW PROCESS FROM NODE 226.00 TO NODE 243.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 653.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.55
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 37.56
PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 25.00
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 243.00 = 5537.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 25.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.661  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.90 0.60 0.200 -  
 USER-DEFINED - 1.60 0.60 0.500 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
 SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 1.93  
 EFFECTIVE AREA(ACRES) = 88.00 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 88.0 PEAK FLOW RATE(CFS) = 38.47

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 25.00  
 RAINFALL INTENSITY(INCH/HR) = 0.66  
 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.29  
 EFFECTIVE STREAM AREA(ACRES) = 88.00  
 TOTAL STREAM AREA(ACRES) = 88.00  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 38.47

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 547.50

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.751  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.364  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 APARTMENTS - 0.60 0.60 0.200 56 8.75  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 0.67  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.67

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 547.50 DOWNSTREAM(FEET) = 541.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 802.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 3.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.093  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.20 0.60 0.200 -  
 USER-DEFINED - 5.90 0.60 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.52  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.96  
 AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 3.37  
 Tc(MIN.) = 12.13  
 SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 5.66  
 EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 6.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.82 FLOW VELOCITY(FEET/SEC.) = 4.59  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1132.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 541.00 DOWNSTREAM(FEET) = 533.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 849.00 CHANNEL SLOPE = 0.0094  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.953  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 14.90 0.60 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.19  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.71  
 AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 2.48  
 Tc(MIN.) = 14.60  
 SUBAREA AREA(ACRES) = 14.90 SUBAREA RUNOFF(CFS) = 11.97  
 EFFECTIVE AREA(ACRES) = 21.60 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 21.6 PEAK FLOW RATE(CFS) = 17.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.18 FLOW VELOCITY(FEET/SEC.) = 6.24  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1981.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN.) = 14.60
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.953
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.60   0.400  -
USER-DEFINED        -         0.20   0.60   0.200  -
USER-DEFINED        -         1.80   0.60   0.100  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.124
SUBAREA AREA(ACRES) = 2.10   SUBAREA RUNOFF(CFS) = 1.66
EFFECTIVE AREA(ACRES) = 23.70   AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.11
TOTAL AREA(ACRES) = 23.7   PEAK FLOW RATE(CFS) = 18.97

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*****
FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN.) = 14.60
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.953
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40   0.60   0.100  -
USER-DEFINED        -         0.10   0.60   0.400  -
USER-DEFINED        -         1.30   0.60   0.100  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.117
SUBAREA AREA(ACRES) = 1.80   SUBAREA RUNOFF(CFS) = 1.43
EFFECTIVE AREA(ACRES) = 25.50   AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.11
TOTAL AREA(ACRES) = 25.5   PEAK FLOW RATE(CFS) = 20.40

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*****
FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 537.00 DOWNSTREAM(FEET) = 510.00
FLOW LENGTH(FEET) = 513.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.62
ESTIMATED PIPE DIAMETER(INCH) = 18.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.40
PIPE TRAVEL TIME(MIN.) = 0.58   Tc(MIN.) = 15.19
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2494.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.19
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.924

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         9.40   0.60   0.400  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.40   SUBAREA RUNOFF(CFS) = 5.79
EFFECTIVE AREA(ACRES) = 34.90   AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 34.9   PEAK FLOW RATE(CFS) = 25.52

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.19
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.924
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70   0.60   0.200  -
USER-DEFINED        -         2.50   0.60   0.400  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.356
SUBAREA AREA(ACRES) = 3.20   SUBAREA RUNOFF(CFS) = 2.05
EFFECTIVE AREA(ACRES) = 38.10   AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 38.1   PEAK FLOW RATE(CFS) = 27.57

```

```

*****
FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

```

```

ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 478.00
FLOW LENGTH(FEET) = 474.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.60
ESTIMATED PIPE DIAMETER(INCH) = 21.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 27.57
PIPE TRAVEL TIME(MIN.) = 0.45   Tc(MIN.) = 15.64
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 2968.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

```

MAINLINE Tc(MIN.) = 15.64
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.909
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.70   0.60   0.200  -
USER-DEFINED        -         1.60   0.60   0.400  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

```



SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297  
SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 2.17  
EFFECTIVE AREA (ACRES) = 41.40 AREA-AVERAGED Fm (INCH/HR) = 0.12  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.21  
TOTAL AREA (ACRES) = 41.4 PEAK FLOW RATE (CFS) = 29.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	478.00	DOWNSTREAM (FEET) =	471.00
FLOW LENGTH (FEET) =	473.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	27.0 INCH PIPE IS	18.6 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	10.02		
ESTIMATED PIPE DIAMETER (INCH) =	27.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	29.23		
PIPE TRAVEL TIME (MIN.) =	0.79	Tc (MIN.) =	16.42
LONGEST FLOWPATH FROM NODE	230.00 TO NODE	236.00 =	3441.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.42  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.883  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.60	0.200	-
USER-DEFINED	-	7.10	0.60	0.400	-
USER-DEFINED	-	2.70	0.60	0.200	-
USER-DEFINED	-	1.10	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
SUBAREA AREA (ACRES) = 12.30 SUBAREA RUNOFF (CFS) = 7.74  
EFFECTIVE AREA (ACRES) = 53.70 AREA-AVERAGED Fm (INCH/HR) = 0.14  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.23  
TOTAL AREA (ACRES) = 53.7 PEAK FLOW RATE (CFS) = 36.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.42  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.883  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.60	0.200	-
USER-DEFINED	-	5.40	0.60	0.500	-
USER-DEFINED	-	1.00	0.60	0.400	-
USER-DEFINED	-	0.60	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.378

SUBAREA AREA (ACRES) = 9.90 SUBAREA RUNOFF (CFS) = 5.85  
EFFECTIVE AREA (ACRES) = 63.60 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.25  
TOTAL AREA (ACRES) = 63.6 PEAK FLOW RATE (CFS) = 41.86

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	471.00	DOWNSTREAM (FEET) =	468.00
FLOW LENGTH (FEET) =	283.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	33.0 INCH PIPE IS	22.5 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	9.68		
ESTIMATED PIPE DIAMETER (INCH) =	33.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	41.86		
PIPE TRAVEL TIME (MIN.) =	0.49	Tc (MIN.) =	16.91
LONGEST FLOWPATH FROM NODE	230.00 TO NODE	237.00 =	3724.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.91  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.867  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.10	0.60	0.200	-
USER-DEFINED	-	0.60	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.218  
SUBAREA AREA (ACRES) = 6.70 SUBAREA RUNOFF (CFS) = 4.44  
EFFECTIVE AREA (ACRES) = 70.30 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.25  
TOTAL AREA (ACRES) = 70.3 PEAK FLOW RATE (CFS) = 45.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	468.00	DOWNSTREAM (FEET) =	461.00
FLOW LENGTH (FEET) =	698.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	33.0 INCH PIPE IS	24.5 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	9.58		
ESTIMATED PIPE DIAMETER (INCH) =	33.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	45.38		
PIPE TRAVEL TIME (MIN.) =	1.21	Tc (MIN.) =	18.12
LONGEST FLOWPATH FROM NODE	230.00 TO NODE	238.00 =	4422.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN.) = 18.12
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.827
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         8.40     0.60     0.200    -
USER-DEFINED        -         0.60     0.60     0.500    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.220
SUBAREA AREA(ACRES) = 9.00      SUBAREA RUNOFF(CFS) = 5.63
EFFECTIVE AREA(ACRES) = 79.30   AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 79.3      PEAK FLOW RATE(CFS) = 48.47

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*****
FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 18.12
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.827
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.10     0.60     0.200    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 2.10      SUBAREA RUNOFF(CFS) = 1.34
EFFECTIVE AREA(ACRES) = 81.40   AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 81.4      PEAK FLOW RATE(CFS) = 49.80

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*****
FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 461.00 DOWNSTREAM(FEET) = 440.00
FLOW LENGTH(FEET) = 582.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.87
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 49.80
PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 18.73
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 5004.00 FEET.

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*****
FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 18.73
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.807
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN

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USER-DEFINED        -         5.00     0.60     0.200    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 5.00      SUBAREA RUNOFF(CFS) = 3.09
EFFECTIVE AREA(ACRES) = 86.40   AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 86.4      PEAK FLOW RATE(CFS) = 51.42

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*****
FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31
-----

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 418.00
FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.47
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 51.42
PIPE TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 19.44
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 5654.00 FEET.

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*****
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 19.44
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.784
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         5.30     0.60     0.200    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 5.30      SUBAREA RUNOFF(CFS) = 3.17
EFFECTIVE AREA(ACRES) = 91.70   AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 91.7      PEAK FLOW RATE(CFS) = 52.79

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*****
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 19.44
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.784
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20     0.60     0.200    -
USER-DEFINED        -         0.20     0.60     0.100    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186
SUBAREA AREA(ACRES) = 1.40      SUBAREA RUNOFF(CFS) = 0.85
EFFECTIVE AREA(ACRES) = 93.10   AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24

```

TOTAL AREA (ACRES) = 93.1 PEAK FLOW RATE (CFS) = 53.63

\*\*\*\*\*  
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.44  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.784  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.20 0.60 0.200 -  
USER-DEFINED - 0.70 0.60 0.600 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.347  
SUBAREA AREA (ACRES) = 1.90 SUBAREA RUNOFF (CFS) = 0.98  
EFFECTIVE AREA (ACRES) = 95.00 AREA-AVERAGED Fm (INCH/HR) = 0.14  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24  
TOTAL AREA (ACRES) = 95.0 PEAK FLOW RATE (CFS) = 54.62

\*\*\*\*\*  
FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 418.00 DOWNSTREAM (FEET) = 404.00  
FLOW LENGTH (FEET) = 1279.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.9 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.46  
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 54.62  
PIPE TRAVEL TIME (MIN.) = 2.04 Tc (MIN.) = 21.47  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 241.00 = 6933.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.47  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.734  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.60 0.200 -  
USER-DEFINED - 1.20 0.60 0.100 -  
USER-DEFINED - 6.30 0.60 0.850 -  
USER-DEFINED - 4.60 0.60 0.600 -  
USER-DEFINED - 1.60 0.60 0.200 -  
USER-DEFINED - 4.00 0.60 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.488  
SUBAREA AREA (ACRES) = 18.80 SUBAREA RUNOFF (CFS) = 7.47  
EFFECTIVE AREA (ACRES) = 113.80 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.28  
TOTAL AREA (ACRES) = 113.8 PEAK FLOW RATE (CFS) = 57.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.47  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.734  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.90 0.60 0.850 -  
USER-DEFINED - 10.80 0.60 0.600 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.666  
SUBAREA AREA (ACRES) = 14.70 SUBAREA RUNOFF (CFS) = 4.43  
EFFECTIVE AREA (ACRES) = 128.50 AREA-AVERAGED Fm (INCH/HR) = 0.20  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.33  
TOTAL AREA (ACRES) = 128.5 PEAK FLOW RATE (CFS) = 62.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 404.00 DOWNSTREAM (FEET) = 403.00  
FLOW LENGTH (FEET) = 66.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 12.24  
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 62.30  
PIPE TRAVEL TIME (MIN.) = 0.09 Tc (MIN.) = 21.56  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 6999.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.56  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.732  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.40 0.60 0.200 -  
USER-DEFINED - 16.40 0.60 0.200 -  
USER-DEFINED - 1.30 0.60 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.193  
SUBAREA AREA (ACRES) = 19.10 SUBAREA RUNOFF (CFS) = 10.60  
EFFECTIVE AREA (ACRES) = 147.60 AREA-AVERAGED Fm (INCH/HR) = 0.19  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31  
TOTAL AREA (ACRES) = 147.6 PEAK FLOW RATE (CFS) = 72.69

\*\*\*\*\*  
FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 1270.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.46
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 72.69
PIPE TRAVEL TIME(MIN.) = 2.24 Tc(MIN.) = 23.80
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 23.80
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.686
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.60 0.200 -
USER-DEFINED - 2.00 0.60 0.850 -
USER-DEFINED - 2.80 0.60 0.200 -
USER-DEFINED - 1.50 0.60 0.100 -
USER-DEFINED - 0.10 0.60 0.350 -
USER-DEFINED - 1.10 0.60 0.850 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.421
SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 3.31
EFFECTIVE AREA(ACRES) = 156.10 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 156.1 PEAK FLOW RATE(CFS) = 72.69
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
-----

```

```

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 23.80
RAINFALL INTENSITY(INCH/HR) = 0.69
AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA(ACRES) = 156.10
TOTAL STREAM AREA(ACRES) = 156.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 72.69

```

```

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 38.47 25.00 0.661 0.60( 0.18) 0.29 88.0 220.50
2 72.69 23.80 0.686 0.60( 0.19) 0.32 156.1 230.00

```

```

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

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** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 111.15 23.80 0.686 0.60( 0.18) 0.31 239.9 230.00
2 107.52 25.00 0.661 0.60( 0.18) 0.31 244.1 220.50

```

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 111.15 Tc(MIN.) = 23.80
EFFECTIVE AREA(ACRES) = 239.90 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 244.1
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 244.00 IS CODE = 31
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```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 394.00 DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 849.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.03
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 111.15
PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 24.39
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 244.00 = 9118.00 FEET.

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*****
FLOW PROCESS FROM NODE 244.00 TO NODE 244.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 24.39
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.674
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 0.200 -
USER-DEFINED - 1.70 0.60 0.500 -
USER-DEFINED - 0.30 0.60 0.850 -
USER-DEFINED - 0.80 0.60 0.500 -
USER-DEFINED - 0.10 0.60 0.850 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.537
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 0.95
EFFECTIVE AREA(ACRES) = 242.90 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 247.1 PEAK FLOW RATE(CFS) = 111.15
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 244.00 TO NODE 245.00 IS CODE = 31
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```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 315.00
FLOW LENGTH(FEET) = 777.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.30
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 111.15
PIPE TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 25.10
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

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*****
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 25.10
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.660
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.60 0.500 -
USER-DEFINED - 0.20 0.60 0.850 -
USER-DEFINED - 0.20 0.60 0.500 -
USER-DEFINED - 0.10 0.60 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631
SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 0.20
EFFECTIVE AREA(ACRES) = 243.70 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 247.9 PEAK FLOW RATE(CFS) = 111.15
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 11
-----
>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<
=====

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\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	111.15	25.10	0.660	0.60( 0.19)	0.31	243.7	230.00
2	107.52	26.30	0.642	0.60( 0.19)	0.31	247.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	63.04	20.60	0.753	0.60( 0.26)	0.44	138.8	210.00
2	55.57	23.54	0.691	0.60( 0.26)	0.44	141.3	200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	172.21	20.60	0.753	0.60( 0.22)	0.36	338.8	210.00

2	166.72	23.54	0.691	0.60( 0.22)	0.36	369.9	200.00
3	162.60	25.10	0.660	0.60( 0.22)	0.36	385.0	230.00
4	156.65	26.30	0.642	0.60( 0.21)	0.36	389.2	220.50

TOTAL AREA(ACRES) = 389.2

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 172.21 Tc(MIN.) = 20.597
EFFECTIVE AREA(ACRES) = 338.80 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 389.2
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

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*****
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 12
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>>>>CLEAR MEMORY BANK # 3 <<<<
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*****
FLOW PROCESS FROM NODE 245.00 TO NODE 246.00 IS CODE = 31
-----

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 306.00
FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 37.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.39
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 172.21
PIPE TRAVEL TIME(MIN.) = 0.67 Tc(MIN.) = 21.27
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 246.00 = 10514.00 FEET.

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*****
FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 21.27
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.739
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.90 0.60 0.500 -
USER-DEFINED - 0.30 0.60 0.400 -
USER-DEFINED - 2.50 0.60 0.500 -
USER-DEFINED - 0.70 0.60 0.400 -
USER-DEFINED - 9.10 0.60 0.350 -
USER-DEFINED - 2.80 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.410
SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 7.23
EFFECTIVE AREA(ACRES) = 355.10 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 405.5 PEAK FLOW RATE(CFS) = 172.21
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.27  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.739  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.60	0.60	0.400	-
USER-DEFINED	-	7.40	0.60	0.350	-
USER-DEFINED	-	0.30	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.375  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 4.30  
 EFFECTIVE AREA(ACRES) = 364.40 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA(ACRES) = 414.8 PEAK FLOW RATE(CFS) = 172.21  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 246.00 TO NODE 247.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 306.00 DOWNSTREAM(FEET) = 300.00  
 FLOW LENGTH(FEET) = 185.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.93  
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 172.21  
 PIPE TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 21.41  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 247.00 = 10699.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.41  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.736  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.400	-
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	1.30	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.413  
 SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 0.88  
 EFFECTIVE AREA(ACRES) = 366.40 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA(ACRES) = 416.8 PEAK FLOW RATE(CFS) = 172.21  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.41  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.736  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.80	0.60	0.400	-
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.365  
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 1.21  
 EFFECTIVE AREA(ACRES) = 369.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA(ACRES) = 419.4 PEAK FLOW RATE(CFS) = 172.21  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 247.00 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 271.00  
 FLOW LENGTH(FEET) = 859.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.78  
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 172.21  
 PIPE TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 22.10  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.10  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.721  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	0.400	-
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	2.60	0.60	0.400	-
USER-DEFINED	-	1.00	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356  
 SUBAREA AREA(ACRES) = 4.80 SUBAREA RUNOFF(CFS) = 2.19

EFFECTIVE AREA (ACRES) = 373.80 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
TOTAL AREA (ACRES) = 424.2 PEAK FLOW RATE (CFS) = 172.21  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 22.10  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.721  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.60 0.400 -  
USER-DEFINED - 0.30 0.60 0.100 -  
USER-DEFINED - 0.10 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.367  
SUBAREA AREA (ACRES) = 0.90 SUBAREA RUNOFF (CFS) = 0.41  
EFFECTIVE AREA (ACRES) = 374.70 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
TOTAL AREA (ACRES) = 425.1 PEAK FLOW RATE (CFS) = 172.21  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 22.10  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.721  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.500 -  
USER-DEFINED - 0.70 0.60 0.400 -  
USER-DEFINED - 2.20 0.60 0.500 -  
USER-DEFINED - 1.80 0.60 0.400 -  
USER-DEFINED - 0.20 0.60 0.350 -  
USER-DEFINED - 3.20 0.60 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.466  
SUBAREA AREA (ACRES) = 8.20 SUBAREA RUNOFF (CFS) = 3.26  
EFFECTIVE AREA (ACRES) = 382.90 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
TOTAL AREA (ACRES) = 433.3 PEAK FLOW RATE (CFS) = 172.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 22.10  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.721  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 5.70 0.60 0.400 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400  
SUBAREA AREA (ACRES) = 5.70 SUBAREA RUNOFF (CFS) = 2.47  
EFFECTIVE AREA (ACRES) = 388.60 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
TOTAL AREA (ACRES) = 439.0 PEAK FLOW RATE (CFS) = 174.72

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 22.10  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.721  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 6.40 0.60 1.000 -  
USER-DEFINED - 1.40 0.60 1.000 -  
USER-DEFINED - 0.60 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 0.92  
EFFECTIVE AREA (ACRES) = 397.00 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.38  
TOTAL AREA (ACRES) = 447.4 PEAK FLOW RATE (CFS) = 175.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
ELEVATION DATA: UPSTREAM (FEET) = 413.04 DOWNSTREAM (FEET) = 405.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.928  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.585  
SUBAREA Tc AND LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
CONDOMINIUMS - 0.20 0.60 0.350 56 7.70  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" - 0.10 0.60 0.200 56 6.93  
CONDOMINIUMS - 0.10 0.60 0.350 56 7.70  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.312  
SUBAREA RUNOFF (CFS) = 0.50  
TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 0.50

```

*****
FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 405.00 DOWNSTREAM ELEVATION(FEET) = 385.00
STREET LENGTH(FEET) = 587.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.84
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.21
HALFSTREET FLOOD WIDTH(FEET) = 2.41
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.75
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.77
STREET FLOW TRAVEL TIME(MIN.) = 2.61 Tc(MIN.) = 9.54
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.269
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.20 0.60 0.100 -
USER-DEFINED - 0.60 0.60 0.350 -
USER-DEFINED - 0.10 0.60 0.850 -
USER-DEFINED - 0.10 0.60 0.200 -
USER-DEFINED - 0.30 0.60 0.100 -
USER-DEFINED - 0.40 0.60 0.350 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.224
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 2.76
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 3.15

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 5.47
FLOW VELOCITY(FEET/SEC.) = 3.41 DEPTH*VELOCITY(FT*FT/SEC.) = 0.89
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 917.00 FEET.

*****
FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 385.00 DOWNSTREAM(FEET) = 378.50
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

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DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.24
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.15
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 9.87
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1079.00 FEET.

*****
FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.87
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.229
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.10 0.60 0.100 -
USER-DEFINED - 1.30 0.60 0.100 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 2.53
EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.18
TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 5.56

*****
FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 378.50 DOWNSTREAM(FEET) = 348.50
FLOW LENGTH(FEET) = 637.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.25
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.56
PIPE TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 10.90
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 1716.00 FEET.

*****
FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.90
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.162
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.60 0.500 -
USER-DEFINED - 1.70 0.60 0.100 -
USER-DEFINED - 1.00 0.60 0.350 -
USER-DEFINED - 0.10 0.60 0.500 -
USER-DEFINED - 0.70 0.60 0.100 -
USER-DEFINED - 0.40 0.60 0.350 -

```



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.240  
 SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 4.12  
 EFFECTIVE AREA(ACRES) = 10.00 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.20  
 TOTAL AREA(ACRES) = 10.0 PEAK FLOW RATE(CFS) = 9.35

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 348.50 DOWNSTREAM(FEET) = 306.00  
 FLOW LENGTH(FEET) = 944.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.60  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 9.35  
 PIPE TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 12.26  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.26  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.085

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.60	0.500	-
USER-DEFINED	-	0.40	0.60	0.400	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	1.50	0.60	0.500	-
USER-DEFINED	-	1.90	0.60	0.400	-
USER-DEFINED	-	2.00	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
 SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 5.76  
 EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.16  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.27  
 TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 14.42

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.26  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.085

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.40	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.100	-

USER-DEFINED - 6.70 0.60 0.200 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.199  
 SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 9.73  
 EFFECTIVE AREA(ACRES) = 28.50 AREA-AVERAGED Fm(INCH/HR) = 0.14  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 28.5 PEAK FLOW RATE(CFS) = 24.15

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.26  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.085  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 1.35  
 EFFECTIVE AREA(ACRES) = 31.60 AREA-AVERAGED Fm(INCH/HR) = 0.19  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 25.51

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 12.26  
 RAINFALL INTENSITY(INCH/HR) = 1.09  
 AREA-AVERAGED Fm(INCH/HR) = 0.19  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.31  
 EFFECTIVE STREAM AREA(ACRES) = 31.60  
 TOTAL STREAM AREA(ACRES) = 31.60  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 25.51

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 400.00 TO NODE 420.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 300.40  
 ELEVATION DATA: UPSTREAM(FEET) = 312.80 DOWNSTREAM(FEET) = 310.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.115  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.441  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.50	0.60	0.100	56	8.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 0.62  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.62

\*\*\*\*\*  
FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 307.00  
STREET LENGTH(FEET) = 266.50 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 67.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 62.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.93

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.25

HALFSTREET FLOOD WIDTH(FEET) = 5.27

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.15

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.55

STREET FLOW TRAVEL TIME(MIN.) = 2.06 Tc(MIN.) = 10.18

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.203

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.62

EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.06

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 1.13

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 6.12

FLOW VELOCITY(FEET/SEC.) = 2.20 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.59

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.00 = 566.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.00 TO NODE 421.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 307.00 DOWNSTREAM(FEET) = 305.50

FLOW LENGTH(FEET) = 105.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 4.23  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 1.13  
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 10.59  
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.10 = 671.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
=====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 10.59

RAINFALL INTENSITY(INCH/HR) = 1.18

AREA-AVERAGED Fm(INCH/HR) = 0.06

AREA-AVERAGED Fp(INCH/HR) = 0.60

AREA-AVERAGED Ap = 0.10

EFFECTIVE STREAM AREA(ACRES) = 1.10

TOTAL STREAM AREA(ACRES) = 1.10

PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.13

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	25.51	12.26	1.085	0.60( 0.19)	0.31	31.6	300.00
2	1.13	10.59	1.180	0.60( 0.06)	0.10	1.1	400.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	25.49	10.59	1.180	0.60( 0.18)	0.31	28.4	400.00
2	26.54	12.26	1.085	0.60( 0.18)	0.31	32.7	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 26.54 Tc(MIN.) = 12.26

EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31

TOTAL AREA(ACRES) = 32.7

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 426.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 305.50 DOWNSTREAM(FEET) = 301.00

FLOW LENGTH(FEET) = 261.40 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.19

ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 26.54

PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 12.69

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.10 = 2921.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.69

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.061

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400

SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.15

EFFECTIVE AREA(ACRES) = 32.90 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31

TOTAL AREA(ACRES) = 32.9 PEAK FLOW RATE(CFS) = 26.54

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.20 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 289.00

FLOW LENGTH(FEET) = 448.56 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 12.28

ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 26.54

PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 13.29

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.20 = 3369.96 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.20 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.29

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.027

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.400	-
USER-DEFINED	-	0.30	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400

SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 0.35

EFFECTIVE AREA(ACRES) = 33.40 AREA-AVERAGED Fm(INCH/HR) = 0.19

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31

TOTAL AREA(ACRES) = 33.4 PEAK FLOW RATE(CFS) = 26.54

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.30 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 289.00 DOWNSTREAM(FEET) = 282.00

FLOW LENGTH(FEET) = 260.45 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 12.30

ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 26.54

PIPE TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 13.65

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.30 = 3630.41 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.30 TO NODE 426.30 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.65

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.007

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.400	-
USER-DEFINED	-	0.80	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400

SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 0.76

EFFECTIVE AREA(ACRES) = 34.50 AREA-AVERAGED Fm(INCH/HR) = 0.19

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31

TOTAL AREA(ACRES) = 34.5 PEAK FLOW RATE(CFS) = 26.54

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.30 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 271.00

FLOW LENGTH(FEET) = 411.44 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 12.28

ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 26.54

PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 14.21

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 14.21

RAINFALL INTENSITY(INCH/HR) = 0.97

AREA-AVERAGED Fm(INCH/HR) = 0.19

AREA-AVERAGED Fp (INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.31  
EFFECTIVE STREAM AREA (ACRES) = 34.50  
TOTAL STREAM AREA (ACRES) = 34.50  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 26.54

\*\*\*\*\*  
FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----

INITIAL SUBAREA FLOW-LENGTH (FEET) = 233.60  
ELEVATION DATA: UPSTREAM (FEET) = 306.50 DOWNSTREAM (FEET) = 301.80

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.882  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.712

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.60	0.100	56	5.88
COMMERCIAL	-	0.20	0.60	0.100	56	5.88

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF (CFS) = 0.59  
TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 0.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 426.00 TO NODE 427.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 301.80 DOWNSTREAM ELEVATION (FEET) = 294.00  
STREET LENGTH (FEET) = 478.70 CURB HEIGHT (INCHES) = 8.0  
STREET HALF WIDTH (FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 51.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 0.99  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.25  
HALFSTREET FLOOD WIDTH (FEET) = 5.25  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.29  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.58  
STREET FLOW TRAVEL TIME (MIN.) = 3.48 Tc (MIN.) = 9.36

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.290

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN

USER-DEFINED - 0.20 0.60 0.100 -  
USER-DEFINED - 0.50 0.60 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 0.78  
EFFECTIVE AREA (ACRES) = 1.10 AREA-AVERAGED Fm (INCH/HR) = 0.06  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 1.22

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.27 HALFSTREET FLOOD WIDTH (FEET) = 6.15  
FLOW VELOCITY (FEET/SEC.) = 2.36 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.63  
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 427.00 = 712.30 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 427.00 TO NODE 428.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 294.00 DOWNSTREAM ELEVATION (FEET) = 286.00  
STREET LENGTH (FEET) = 300.80 CURB HEIGHT (INCHES) = 8.0  
STREET HALF WIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 55.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.46  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.26  
HALFSTREET FLOOD WIDTH (FEET) = 5.91  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.97  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.79  
STREET FLOW TRAVEL TIME (MIN.) = 1.69 Tc (MIN.) = 11.05

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.154

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA (ACRES) = 0.50 SUBAREA RUNOFF (CFS) = 0.49  
EFFECTIVE AREA (ACRES) = 1.60 AREA-AVERAGED Fm (INCH/HR) = 0.06  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
TOTAL AREA (ACRES) = 1.6 PEAK FLOW RATE (CFS) = 1.57

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.27 HALFSTREET FLOOD WIDTH (FEET) = 6.24  
FLOW VELOCITY (FEET/SEC.) = 2.99 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.81  
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 428.00 = 1013.10 FEET.

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*****
FLOW PROCESS FROM NODE 428.00 TO NODE 429.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STANDARD CURB SECTION USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 286.00 DOWNSTREAM ELEVATION(FEET) = 276.00
STREET LENGTH(FEET) = 242.40 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.76
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.26
HALFSTREET FLOOD WIDTH(FEET) = 5.70
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.73
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.97
STREET FLOW TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 12.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.092
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.40 0.60 0.100 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.37
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 1.86

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 6.02
FLOW VELOCITY(FEET/SEC.) = 3.69 DEPTH*VELOCITY(FT*FT/SEC.) = 0.98
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 429.00 = 1255.50 FEET.

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*****
FLOW PROCESS FROM NODE 429.00 TO NODE 429.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 12.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.092
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.60 0.400 -
USER-DEFINED - 1.50 0.60 0.400 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 1.53

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EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 3.39

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*****
FLOW PROCESS FROM NODE 429.00 TO NODE 248.00 IS CODE = 31
-----

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 273.00
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.58
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.39
PIPE TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 12.35
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 248.00 = 1355.50 FEET.

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*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====

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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 12.35
RAINFALL INTENSITY(INCH/HR) = 1.08
AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.25
EFFECTIVE STREAM AREA(ACRES) = 4.00
TOTAL STREAM AREA(ACRES) = 4.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.39

```

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	25.49	12.55	1.069	0.60( 0.19)	0.31	30.2	400.00
1	26.54	14.21	0.975	0.60( 0.19)	0.31	34.5	300.00
2	3.39	12.35	1.080	0.60( 0.15)	0.25	4.0	425.00

```

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

```

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	28.79	12.35	1.080	0.60( 0.18)	0.30	33.7	425.00
2	28.84	12.55	1.069	0.60( 0.18)	0.30	34.2	400.00
3	29.55	14.21	0.975	0.60( 0.18)	0.31	38.5	300.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 29.55 Tc(MIN.) = 14.21
EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31

```

TOTAL AREA (ACRES) = 38.5  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 11

-----  
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\*\*\*\*  
\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	28.79	12.35	1.080	0.60 ( 0.18)	0.30	33.7	425.00
2	28.84	12.55	1.069	0.60 ( 0.18)	0.30	34.2	400.00
3	29.55	14.21	0.975	0.60 ( 0.18)	0.31	38.5	300.00

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*  
\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	175.64	22.10	0.721	0.60 ( 0.23)	0.38	397.0	210.00
2	166.96	25.06	0.660	0.60 ( 0.23)	0.38	428.1	200.00
3	164.10	26.63	0.637	0.60 ( 0.23)	0.38	443.2	230.00
4	158.68	27.84	0.619	0.60 ( 0.22)	0.38	447.4	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	198.55	12.35	1.080	0.60 ( 0.22)	0.37	255.6	425.00
2	199.04	12.55	1.069	0.60 ( 0.22)	0.37	259.6	400.00
3	200.69	14.21	0.975	0.60 ( 0.22)	0.37	293.6	300.00
4	195.72	22.10	0.721	0.60 ( 0.23)	0.38	435.5	210.00
5	184.76	25.06	0.660	0.60 ( 0.22)	0.37	466.6	200.00
6	181.03	26.63	0.637	0.60 ( 0.22)	0.37	481.7	230.00
7	174.95	27.84	0.619	0.60 ( 0.22)	0.37	485.9	220.50

TOTAL AREA (ACRES) = 485.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 200.69 Tc (MIN.) = 14.206  
EFFECTIVE AREA (ACRES) = 293.65 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
TOTAL AREA (ACRES) = 485.9  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 12

-----  
>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 249.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 271.00 DOWNSTREAM (FEET) = 261.00

FLOW LENGTH (FEET) = 345.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.5 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 20.78  
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 200.69  
PIPE TRAVEL TIME (MIN.) = 0.28 Tc (MIN.) = 14.48  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 10

-----  
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 429.00 TO NODE 430.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
ELEVATION DATA: UPSTREAM (FEET) = 271.00 DOWNSTREAM (FEET) = 262.70

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.459  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.642  
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.60	0.100	56	6.46
COMMERCIAL	-	0.40	0.60	0.100	56	6.46

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF (CFS) = 0.85  
TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 0.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

-----  
UPSTREAM ELEVATION (FEET) = 262.70 DOWNSTREAM ELEVATION (FEET) = 258.98  
STREET LENGTH (FEET) = 345.60 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 51.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.19  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.28

HALFSTREET FLOOD WIDTH (FEET) = 6.94  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.96  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.55  
 STREET FLOW TRAVEL TIME (MIN.) = 2.94 Tc (MIN.) = 9.40  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.286  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.50	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 0.66  
 EFFECTIVE AREA (ACRES) = 1.20 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 1.2 PEAK FLOW RATE (CFS) = 1.32

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.29 HALFSTREET FLOOD WIDTH (FEET) = 7.44  
 FLOW VELOCITY (FEET/SEC.) = 1.99 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.58  
 LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.00 = 675.60 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.00 TO NODE 431.10 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 258.98 DOWNSTREAM (FEET) = 258.00  
 FLOW LENGTH (FEET) = 91.03 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.4 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.02  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 1.32  
 PIPE TRAVEL TIME (MIN.) = 0.38 Tc (MIN.) = 9.77  
 LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.10 = 766.63 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 9.77  
 RAINFALL INTENSITY (INCH/HR) = 1.24  
 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.10  
 EFFECTIVE STREAM AREA (ACRES) = 1.20  
 TOTAL STREAM AREA (ACRES) = 1.20  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 1.32

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 410.00 TO NODE 440.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<<  
 =====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 299.70  
 ELEVATION DATA: UPSTREAM (FEET) = 312.69 DOWNSTREAM (FEET) = 310.80

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.196  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.432  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.40	0.60	0.100	56	8.20

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 0.49  
 TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 0.49

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 61  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 310.80 DOWNSTREAM ELEVATION (FEET) = 306.50  
 STREET LENGTH (FEET) = 299.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 55.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 0.70  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.23  
 HALFSTREET FLOOD WIDTH (FEET) = 3.83  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.17  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.50  
 STREET FLOW TRAVEL TIME (MIN.) = 2.29 Tc (MIN.) = 10.49  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.185

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.41  
 EFFECTIVE AREA (ACRES) = 0.80 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 0.8 PEAK FLOW RATE (CFS) = 0.81

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.24 HALFSTREET FLOOD WIDTH (FEET) = 4.58

FLOW VELOCITY(FEET/SEC.) = 2.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.52  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 441.00 = 598.70 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 306.50 DOWNSTREAM ELEVATION(FEET) = 299.00  
STREET LENGTH(FEET) = 341.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.08  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.25  
HALFSTREET FLOOD WIDTH(FEET) = 4.95  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.68  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.66  
STREET FLOW TRAVEL TIME(MIN.) = 2.13 Tc(MIN.) = 12.61

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.065

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.54  
EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.06  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 1.27

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 5.65  
FLOW VELOCITY(FEET/SEC.) = 2.71 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.71  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 442.00 = 940.30 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 299.00 DOWNSTREAM ELEVATION(FEET) = 288.50  
STREET LENGTH(FEET) = 390.10 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.50  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.27  
HALFSTREET FLOOD WIDTH(FEET) = 5.95  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.03  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.81  
STREET FLOW TRAVEL TIME(MIN.) = 2.14 Tc(MIN.) = 14.76  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.944

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.48  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.06  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 1.59

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 6.25  
FLOW VELOCITY(FEET/SEC.) = 3.02 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.82  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 443.00 = 1330.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 443.00 TO NODE 444.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 288.50 DOWNSTREAM ELEVATION(FEET) = 281.00  
STREET LENGTH(FEET) = 272.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.74  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.28  
HALFSTREET FLOOD WIDTH(FEET) = 6.54  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.11  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.86



STREET FLOW TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 16.22  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.890  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.60 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.30  
 EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 1.79

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.28 HALFSTREET FLOOD WIDTH(FEET) = 6.74  
 FLOW VELOCITY(FEET/SEC.) = 3.08 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.86  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 444.00 = 1603.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 444.00 TO NODE 445.00 IS CODE = 61

-----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 281.00 DOWNSTREAM ELEVATION(FEET) = 268.10  
 STREET LENGTH(FEET) = 462.90 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.03  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.29  
 HALFSTREET FLOOD WIDTH(FEET) = 7.24  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.16  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.91  
 STREET FLOW TRAVEL TIME(MIN.) = 2.44 Tc(MIN.) = 18.66  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.809

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.70 0.60 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.47  
 EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 2.09

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 7.34

FLOW VELOCITY(FEET/SEC.) = 3.20 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.92  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 445.00 = 2065.90 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 445.00 TO NODE 446.00 IS CODE = 61

-----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 268.10 DOWNSTREAM ELEVATION(FEET) = 257.00  
 STREET LENGTH(FEET) = 532.90 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.39  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.31  
 HALFSTREET FLOOD WIDTH(FEET) = 8.60  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.90  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.90  
 STREET FLOW TRAVEL TIME(MIN.) = 3.06 Tc(MIN.) = 21.72  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.729

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.60 0.100 -  
 USER-DEFINED - 0.60 0.60 0.100 -  
 USER-DEFINED - 0.30 0.60 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 0.60  
 EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 2.47

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 8.71  
 FLOW VELOCITY(FEET/SEC.) = 2.94 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.92  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 446.00 = 2598.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 446.00 TO NODE 431.10 IS CODE = 31

-----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 257.00 DOWNSTREAM(FEET) = 256.50  
 FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.4 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 3.64  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 2.47  
 PIPE TRAVEL TIME (MIN.) = 0.46 Tc (MIN.) = 22.17  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 22.17  
 RAINFALL INTENSITY (INCH/HR) = 0.72  
 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.10  
 EFFECTIVE STREAM AREA (ACRES) = 4.10  
 TOTAL STREAM AREA (ACRES) = 4.10  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 2.47

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1.32	9.77	1.241	0.60 (0.06)	0.10	1.2	429.00
2	2.47	22.17	0.720	0.60 (0.06)	0.10	4.1	410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3.27	9.77	1.241	0.60 (0.06)	0.10	3.0	429.00
2	3.21	22.17	0.720	0.60 (0.06)	0.10	5.3	410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 3.27 Tc (MIN.) = 9.77  
 EFFECTIVE AREA (ACRES) = 3.01 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 5.3  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 249.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 258.00 DOWNSTREAM (FEET) = 257.00  
 FLOW LENGTH (FEET) = 230.42 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.0 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 3.71  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 3.27

PIPE TRAVEL TIME (MIN.) = 1.03 Tc (MIN.) = 10.81  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<  
 =====

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3.27	10.81	1.167	0.60 (0.06)	0.10	3.0	429.00
2	3.21	23.21	0.698	0.60 (0.06)	0.10	5.3	410.00

LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	198.55	12.63	1.064	0.60 (0.22)	0.37	255.6	425.00
2	199.04	12.83	1.053	0.60 (0.22)	0.37	259.6	400.00
3	200.69	14.48	0.959	0.60 (0.22)	0.37	293.6	300.00
4	195.72	22.38	0.715	0.60 (0.23)	0.38	435.5	210.00
5	184.76	25.35	0.656	0.60 (0.22)	0.37	466.6	200.00
6	181.03	26.92	0.633	0.60 (0.22)	0.37	481.7	230.00
7	174.95	28.12	0.615	0.60 (0.22)	0.37	485.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	194.02	10.81	1.167	0.60 (0.22)	0.37	221.7	429.00
2	201.81	12.63	1.064	0.60 (0.22)	0.37	258.9	425.00
3	202.30	12.83	1.053	0.60 (0.22)	0.37	263.0	400.00
4	203.94	14.48	0.959	0.60 (0.22)	0.37	297.3	300.00
5	198.94	22.38	0.715	0.60 (0.22)	0.37	440.6	210.00
6	195.86	23.21	0.698	0.60 (0.22)	0.37	449.5	410.00
7	187.76	25.35	0.656	0.60 (0.22)	0.37	471.9	200.00
8	183.91	26.92	0.633	0.60 (0.22)	0.37	487.0	230.00
9	177.74	28.12	0.615	0.60 (0.22)	0.37	491.2	220.50

TOTAL AREA (ACRES) = 491.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 203.94 Tc (MIN.) = 14.483  
 EFFECTIVE AREA (ACRES) = 297.33 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA (ACRES) = 491.2  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 491.2 TC (MIN.) = 14.48  
 EFFECTIVE AREA (ACRES) = 297.33 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.369  
 PEAK FLOW RATE (CFS) = 203.94

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
---------------	---------	-----------	---------------------	-------------------	----	------------	----------------

1	194.02	10.81	1.167	0.60	( 0.22)	0.37	221.7	429.00
2	201.81	12.63	1.064	0.60	( 0.22)	0.37	258.9	425.00
3	202.30	12.83	1.053	0.60	( 0.22)	0.37	263.0	400.00
4	203.94	14.48	0.959	0.60	( 0.22)	0.37	297.3	300.00
5	198.94	22.38	0.715	0.60	( 0.22)	0.37	440.6	210.00
6	195.86	23.21	0.698	0.60	( 0.22)	0.37	449.5	410.00
7	187.76	25.35	0.656	0.60	( 0.22)	0.37	471.9	200.00
8	183.91	26.92	0.633	0.60	( 0.22)	0.37	487.0	230.00
9	177.74	28.12	0.615	0.60	( 0.22)	0.37	491.2	220.50

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=====  
END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
(c) Copyright 1983-2010 Advanced Engineering Software (aes)
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

FILE NAME: 0506101G.DAT
TIME/DATE OF STUDY: 12:42 04/15/2013

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 1.580
2) 6.00; 1.430
3) 7.00; 1.310
4) 8.00; 1.210
5) 9.00; 1.130
6) 10.00; 1.060
7) 11.00; 1.010
8) 12.00; 0.960
9) 13.00; 0.920
10) 14.00; 0.880
11) 15.00; 0.840
12) 20.00; 0.720
13) 25.00; 0.630
14) 30.00; 0.570
15) 40.00; 0.480
16) 50.00; 0.420
17) 60.00; 0.380
18) 90.00; 0.300
19) 120.00; 0.260
20) 180.00; 0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

Table with columns: NO., HALF WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-SIDE, PARK-/SIDE/WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), GEOMETRIES LIP (FT), MANNING HIKE (FT), FACTOR (n). Rows 1-4.

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10100.00 TO NODE 10101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00
ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 820.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.606
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.088
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"GRASS" - 0.10 0.60 1.000 98 9.61
NATURAL FAIR COVER
"OPEN BRUSH" - 0.30 0.60 1.000 98 9.61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.18
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 0.18

\*\*\*\*\*

FLOW PROCESS FROM NODE 10101.00 TO NODE 10102.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 790.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 152.00 CHANNEL SLOPE = 0.1974
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.18
FLOW VELOCITY(FEET/SEC.) = 2.68 FLOW DEPTH(FEET) = 0.15
TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 10.55
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10102.00 = 479.00 FEET.

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FLOW PROCESS FROM NODE 10102.00 TO NODE 10102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.55
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.032
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.50      0.60       1.000      -
USER-DEFINED  -        0.30      0.60       1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.80  SUBAREA RUNOFF (CFS) = 0.31
EFFECTIVE AREA (ACRES) = 1.20  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.2  PEAK FLOW RATE (CFS) = 0.47

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*****
FLOW PROCESS FROM NODE 10102.00 TO NODE 10103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 790.00  DOWNSTREAM(FEET) = 762.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00  CHANNEL SLOPE = 0.1400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.47
FLOW VELOCITY(FEET/SEC.) = 3.10  FLOW DEPTH(FEET) = 0.22
TRAVEL TIME(MIN.) = 1.08  Tc(MIN.) = 11.63
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10103.00 = 679.00 FEET.

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FLOW PROCESS FROM NODE 10103.00 TO NODE 10103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.63
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.979
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.40    0.60    1.000  -
USER-DEFINED        -        0.80    0.60    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.20  SUBAREA RUNOFF (CFS) = 0.41
EFFECTIVE AREA (ACRES) = 2.40  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 2.4  PEAK FLOW RATE (CFS) = 0.82

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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ELEVATION DATA: UPSTREAM(FEET) = 762.00  DOWNSTREAM(FEET) = 754.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 124.00  CHANNEL SLOPE = 0.0645
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.82
FLOW VELOCITY(FEET/SEC.) = 2.70  FLOW DEPTH(FEET) = 0.32
TRAVEL TIME(MIN.) = 0.76  Tc(MIN.) = 12.39
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10104.00 = 803.00 FEET.

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FLOW PROCESS FROM NODE 10104.00 TO NODE 10104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.39
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.944
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.70    0.60    1.000  -
USER-DEFINED        -        1.10    0.60    1.000  -
USER-DEFINED        -        0.10    0.60    1.000  -
USER-DEFINED        -        0.40    0.60    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 0.71
EFFECTIVE AREA (ACRES) = 4.70  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.7  PEAK FLOW RATE (CFS) = 1.46

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 754.00  DOWNSTREAM(FEET) = 740.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00  CHANNEL SLOPE = 0.0255
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.46
FLOW VELOCITY(FEET/SEC.) = 2.20  FLOW DEPTH(FEET) = 0.47
TRAVEL TIME(MIN.) = 4.17  Tc(MIN.) = 16.56
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10105.00 = 1353.00 FEET.

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 16.56
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.803
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        3.40    0.60    1.000  -
USER-DEFINED        -        0.60    0.60    1.000  -
USER-DEFINED        -        6.00    0.60    1.000  -
USER-DEFINED        -        0.60    0.60    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 10.60  SUBAREA RUNOFF (CFS) = 1.93
EFFECTIVE AREA (ACRES) = 15.30  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 15.3  PEAK FLOW RATE (CFS) = 2.79

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10106.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 740.00 DOWNSTREAM(FEET) = 623.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 929.00 CHANNEL SLOPE = 0.1259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.79
FLOW VELOCITY(FEET/SEC.) = 4.69 FLOW DEPTH(FEET) = 0.45
TRAVEL TIME(MIN.) = 3.30 Tc(MIN.) = 19.86
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10106.00 = 2282.00 FEET.

*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10106.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.86
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.723
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 10.40 0.60 1.000 -
USER-DEFINED - 0.40 0.60 1.000 -
USER-DEFINED - 4.50 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 1.72
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 3.42

*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 592.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 417.00 CHANNEL SLOPE = 0.0743
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.42
FLOW VELOCITY(FEET/SEC.) = 4.04 FLOW DEPTH(FEET) = 0.53
TRAVEL TIME(MIN.) = 1.72 Tc(MIN.) = 21.58
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10107.00 = 2699.00 FEET.

*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10107.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 21.58

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* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.691
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.60 1.000 -
USER-DEFINED - 0.60 0.60 1.000 -
USER-DEFINED - 5.10 0.60 1.000 -
USER-DEFINED - 1.10 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
USER-DEFINED - 2.30 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 0.78
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 3.42
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 592.00 DOWNSTREAM(FEET) = 590.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0333
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.42
FLOW VELOCITY(FEET/SEC.) = 3.01 FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 21.92
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10108.00 = 2759.00 FEET.

*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 21.92
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.686
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.60 1.000 -
USER-DEFINED - 1.10 0.60 1.000 -
USER-DEFINED - 7.00 0.60 1.000 -
USER-DEFINED - 0.40 0.60 1.000 -
USER-DEFINED - 7.50 0.60 1.000 -
USER-DEFINED - 1.80 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 1.40
EFFECTIVE AREA(ACRES) = 58.40 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.4 PEAK FLOW RATE(CFS) = 4.50

*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81

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=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 21.92  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.686  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.02  
EFFECTIVE AREA(ACRES) = 58.60 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 58.6 PEAK FLOW RATE(CFS) = 4.52

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10108.00 TO NODE 10109.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 526.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 973.00 CHANNEL SLOPE = 0.0658  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
FLOW VELOCITY(FEET/SEC.) = 4.11 FLOW DEPTH(FEET) = 0.61  
TRAVEL TIME(MIN.) = 3.95 Tc(MIN.) = 25.86  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10109.00 = 3732.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10109.00 TO NODE 10109.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 25.86  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.620  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 16.40 0.60 1.000 -  
USER-DEFINED - 0.60 0.60 1.000 -  
USER-DEFINED - 3.00 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 0.36  
EFFECTIVE AREA(ACRES) = 78.60 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 78.6 PEAK FLOW RATE(CFS) = 4.52  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10109.00 TO NODE 10110.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 526.00 DOWNSTREAM(FEET) = 455.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1045.00 CHANNEL SLOPE = 0.0679  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
FLOW VELOCITY(FEET/SEC.) = 4.19 FLOW DEPTH(FEET) = 0.60  
TRAVEL TIME(MIN.) = 4.16 Tc(MIN.) = 30.03  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10110.00 = 4777.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10110.00 TO NODE 10110.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 30.03  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.570  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.00 0.60 1.000 -  
USER-DEFINED - 0.50 0.60 1.000 -  
USER-DEFINED - 31.60 0.60 1.000 -  
USER-DEFINED - 1.60 0.60 1.000 -  
USER-DEFINED - 0.40 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 35.10 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 113.70 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 113.7 PEAK FLOW RATE(CFS) = 4.52  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10110.00 TO NODE 10111.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 675.00 CHANNEL SLOPE = 0.0667  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
FLOW VELOCITY(FEET/SEC.) = 4.19 FLOW DEPTH(FEET) = 0.60  
TRAVEL TIME(MIN.) = 2.69 Tc(MIN.) = 32.71  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10111.00 = 5452.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10111.00 TO NODE 10111.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 32.71  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.546

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.40	0.60	1.000	-
USER-DEFINED	-	6.00	0.60	1.000	-
USER-DEFINED	-	24.80	0.60	1.000	-
USER-DEFINED	-	0.90	0.60	1.000	-
USER-DEFINED	-	4.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 43.20 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 156.90 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 156.9 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10111.00 TO NODE 10112.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 405.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 143.00 CHANNEL SLOPE = 0.0350  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
 FLOW VELOCITY(FEET/SEC.) = 3.24 FLOW DEPTH(FEET) = 0.68  
 TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 33.45  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10112.00 = 5595.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10112.00 TO NODE 10112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 33.45  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.539  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	7.90	0.60	1.000	-
USER-DEFINED	-	25.90	0.60	1.000	-
USER-DEFINED	-	19.30	0.60	1.000	-
USER-DEFINED	-	2.10	0.60	1.000	-
USER-DEFINED	-	0.90	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 56.20 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 213.10 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 213.1 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10112.00 TO NODE 10113.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 363.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1642.00 CHANNEL SLOPE = 0.0256  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
 FLOW VELOCITY(FEET/SEC.) = 2.90 FLOW DEPTH(FEET) = 0.72  
 TRAVEL TIME(MIN.) = 9.42 Tc(MIN.) = 42.87  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10113.00 = 7237.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10113.00 TO NODE 10113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 42.87  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.463  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.60	1.000	-
USER-DEFINED	-	33.10	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 35.40 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 248.50 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 248.5 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10113.00 TO NODE 10114.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 363.00 DOWNSTREAM(FEET) = 340.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 918.00 CHANNEL SLOPE = 0.0251  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
 FLOW VELOCITY(FEET/SEC.) = 2.89 FLOW DEPTH(FEET) = 0.72



TRAVEL TIME(MIN.) = 5.30 Tc(MIN.) = 48.17  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10114.00 = 8155.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 48.17

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.431

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	10.10	0.60	1.000	-
USER-DEFINED	-	17.70	0.60	1.000	-
USER-DEFINED	-	52.90	0.60	1.000	-
USER-DEFINED	-	1.00	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 83.10 SUBAREA RUNOFF(CFS) = 0.00

EFFECTIVE AREA(ACRES) = 331.60 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 331.6 PEAK FLOW RATE(CFS) = 4.52

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 48.17

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.431

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 0.00

EFFECTIVE AREA(ACRES) = 333.10 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 333.1 PEAK FLOW RATE(CFS) = 4.52

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10115.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 301.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1467.00 CHANNEL SLOPE = 0.0266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
FLOW VELOCITY(FEET/SEC.) = 2.95 FLOW DEPTH(FEET) = 0.71  
TRAVEL TIME(MIN.) = 8.28 Tc(MIN.) = 56.45  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10115.00 = 9622.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10115.00 TO NODE 10115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 56.45

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.394

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.60	0.60	1.000	-
USER-DEFINED	-	24.30	0.60	1.000	-
USER-DEFINED	-	47.70	0.60	1.000	-
USER-DEFINED	-	9.80	0.60	1.000	-
USER-DEFINED	-	1.60	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 94.00 SUBAREA RUNOFF(CFS) = 0.00

EFFECTIVE AREA(ACRES) = 427.10 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 427.1 PEAK FLOW RATE(CFS) = 4.52

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10115.00 TO NODE 10116.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 272.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1696.00 CHANNEL SLOPE = 0.0171  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
FLOW VELOCITY(FEET/SEC.) = 2.51 FLOW DEPTH(FEET) = 0.78  
TRAVEL TIME(MIN.) = 11.28 Tc(MIN.) = 67.73  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10116.00 = 11318.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

MAINLINE Tc(MIN.) = 67.73  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.359  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.60 1.000 -  
 USER-DEFINED - 4.90 0.60 1.000 -  
 USER-DEFINED - 4.10 0.60 1.000 -  
 USER-DEFINED - 0.40 0.60 1.000 -  
 USER-DEFINED - 32.00 0.60 1.000 -  
 USER-DEFINED - 3.80 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 45.60 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 472.70 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 472.7 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81  
 -----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 67.73  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.359  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.00 0.60 1.000 -  
 USER-DEFINED - 7.70 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 9.70 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 482.40 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 482.4 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10116.00 TO NODE 10117.00 IS CODE = 51  
 -----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 272.00 DOWNSTREAM(FEET) = 252.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 878.00 CHANNEL SLOPE = 0.0228  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.52

FLOW VELOCITY(FEET/SEC.) = 2.79 FLOW DEPTH(FEET) = 0.74  
 TRAVEL TIME(MIN.) = 5.25 Tc(MIN.) = 72.99  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10117.00 = 12196.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81  
 -----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 72.99  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.345  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.60 0.850 -  
 USER-DEFINED - 0.60 0.60 1.000 -  
 USER-DEFINED - 0.90 0.60 1.000 -  
 USER-DEFINED - 0.90 0.60 1.000 -  
 USER-DEFINED - 8.20 0.60 1.000 -  
 USER-DEFINED - 1.10 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 0.03  
 EFFECTIVE AREA(ACRES) = 494.70 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 494.7 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81  
 -----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 72.99  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.345  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.60 0.850 -  
 USER-DEFINED - 14.60 0.60 1.000 -  
 USER-DEFINED - 6.10 0.60 1.000 -  
 USER-DEFINED - 0.20 0.60 1.000 -  
 USER-DEFINED - 3.50 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 25.00 SUBAREA RUNOFF(CFS) = 0.03  
 EFFECTIVE AREA(ACRES) = 519.70 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 519.7 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10117.00 TO NODE 10118.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 252.00 DOWNSTREAM(FEET) = 249.00
FLOW LENGTH(FEET) = 280.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.64
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.52
PIPE TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 73.81
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10118.00 = 12476.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10118.00 TO NODE 10119.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 249.00 DOWNSTREAM(FEET) = 240.00
FLOW LENGTH(FEET) = 892.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.52
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.52
PIPE TRAVEL TIME(MIN.) = 2.69 Tc(MIN.) = 76.51
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10119.00 = 13368.00 FEET.

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FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 76.51
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.336
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.60 0.100 -
USER-DEFINED - 1.00 0.60 0.600 -
USER-DEFINED - 0.80 0.60 0.850 -
USER-DEFINED - 0.90 0.60 1.000 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.706
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 0.32
EFFECTIVE AREA(ACRES) = 523.30 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 523.3 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 76.51
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.336
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.80 0.60 1.000 -
USER-DEFINED - 1.20 0.60 0.100 -
USER-DEFINED - 9.60 0.60 0.600 -
USER-DEFINED - 1.00 0.60 0.850 -
USER-DEFINED - 0.80 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.627
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 1.53
EFFECTIVE AREA(ACRES) = 536.90 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 536.9 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 76.51
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.336
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 537.00 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 537.0 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10119.00 TO NODE 10120.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 240.00 DOWNSTREAM(FEET) = 239.00
FLOW LENGTH(FEET) = 120.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.14
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.52
PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 76.89
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10120.00 = 13488.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 76.89
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.335
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.20 0.60 0.100 -
USER-DEFINED - 0.20 0.60 0.850 -
USER-DEFINED - 0.90 0.60 0.100 -
USER-DEFINED - 0.30 0.60 1.000 -
USER-DEFINED - 2.80 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.657
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 0.58
EFFECTIVE AREA(ACRES) = 542.60 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 542.6 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 76.89
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.335
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.50 0.60 0.100 -
USER-DEFINED - 0.20 0.60 0.600 -
USER-DEFINED - 0.10 0.60 0.850 -
USER-DEFINED - 2.90 0.60 1.000 -
USER-DEFINED - 0.40 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.717
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 0.44
EFFECTIVE AREA(ACRES) = 547.70 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 547.7 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 76.89
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.335
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 1.00 0.60 1.000 -
USER-DEFINED - 2.70 0.60 1.000 -
USER-DEFINED - 11.20 0.60 1.000 -
USER-DEFINED - 0.70 0.60 1.000 -
USER-DEFINED - 0.10 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 563.50 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 563.5 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 10120.00 TO NODE 10121.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 239.00 DOWNSTREAM(FEET) = 213.00
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.05
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.52
PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 77.12
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10121.00 = 13682.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10121.00 TO NODE 10122.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 213.00 DOWNSTREAM(FEET) = 176.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 995.00 CHANNEL SLOPE = 0.0372
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52
FLOW VELOCITY(FEET/SEC.) = 3.31 FLOW DEPTH(FEET) = 0.67
TRAVEL TIME(MIN.) = 5.01 Tc(MIN.) = 82.13
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10122.00 = 14677.00 FEET.

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FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 82.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.321
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.10      0.60      1.000      -
USER-DEFINED            -        1.40      0.60      1.000      -
USER-DEFINED            -        0.20      0.60      1.000      -
USER-DEFINED            -        0.40      0.60      1.000      -
USER-DEFINED            -        4.80      0.60      1.000      -
USER-DEFINED            -        0.40      0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 570.80 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 570.8 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 82.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.321
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        2.80      0.60      1.000      -
USER-DEFINED            -        3.30      0.60      1.000      -
USER-DEFINED            -        1.40      0.60      1.000      -
USER-DEFINED            -        3.00      0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 581.30 AREA-AVERAGED Fm(INCH/HR) = 0.59

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AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 581.3 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 82.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.321
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.30      0.60      1.000      -
USER-DEFINED            -        3.30      0.60      1.000      -
USER-DEFINED            -        0.10      0.60      1.000      -
USER-DEFINED            -        0.60      0.60      1.000      -
USER-DEFINED            -        3.50      0.60      1.000      -
USER-DEFINED            -        0.10      0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 589.20 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 589.2 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 82.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.321
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        1.80      0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 591.00 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 591.0 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF STUDY SUMMARY:

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TOTAL AREA (ACRES) = 591.0 TC (MIN.) = 82.13  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED Fm (INCH/HR) = 0.59  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.984  
PEAK FLOW RATE (CFS) = 4.52

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END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2007 Advanced Engineering Software (aes)  
Ver. 13.4 Release Date: 01/25/2007 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506102G.DAT  
TIME/DATE OF STUDY: 14:02 01/08/2009  
=====

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:  
=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.596
- 2) 10.00; 1.064
- 3) 15.00; 0.843
- 4) 20.00; 0.715
- 5) 25.00; 0.629
- 6) 30.00; 0.560
- 7) 40.00; 0.480
- 8) 50.00; 0.423
- 9) 60.00; 0.371
- 10) 90.00; 0.302
- 11) 120.00; 0.256
- 12) 180.00; 0.208
- 13) 360.00; 0.142
- 14) 1440.00; 0.060

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10200.00 TO NODE 10201.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 293.00  
ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 617.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.991

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.065

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						

"3-4 DWELLINGS/ACRE" - 0.73 0.60 0.600 0 9.99

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600

SUBAREA RUNOFF(CFS) = 0.46

TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 0.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10201.00 TO NODE 10202.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 617.00 DOWNSTREAM ELEVATION(FEET) = 613.00  
STREET LENGTH(FEET) = 323.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.70

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.23

HALFSTREET FLOOD WIDTH(FEET) = 3.83

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.08

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.49

STREET FLOW TRAVEL TIME(MIN.) = 2.59 Tc(MIN.) = 12.58

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.950

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED					

- 0.88 0.60 0.600 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 0.47  
EFFECTIVE AREA(ACRES) = 1.62 AREA-AVERAGED Fm(INCH/HR) = 0.36  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 0.86

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.25 HALFSTREET FLOOD WIDTH(FEET) = 4.71  
FLOW VELOCITY(FEET/SEC.) = 2.09 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.53  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10202.00 = 616.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10202.00 TO NODE 10203.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 613.00 DOWNSTREAM ELEVATION(FEET) = 594.00  
STREET LENGTH(FEET) = 613.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.23  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.24  
HALFSTREET FLOOD WIDTH(FEET) = 4.32  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.28  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.80  
STREET FLOW TRAVEL TIME(MIN.) = 3.12 Tc(MIN.) = 15.70  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.825

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.82 0.60 0.614 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.614  
SUBAREA AREA(ACRES) = 1.82 SUBAREA RUNOFF(CFS) = 0.75  
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.36  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 1.43

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 4.93  
FLOW VELOCITY(FEET/SEC.) = 3.30 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.85  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10203.00 = 1229.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10203.00 TO NODE 10204.00 IS CODE = 63

-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 594.00 DOWNSTREAM ELEVATION(FEET) = 578.00  
STREET LENGTH(FEET) = 433.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.63  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.26  
HALFSTREET FLOOD WIDTH(FEET) = 5.09  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.64  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.95  
STREET FLOW TRAVEL TIME(MIN.) = 1.98 Tc(MIN.) = 17.68  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.774

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.21 0.60 0.655 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.655  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 0.41  
EFFECTIVE AREA(ACRES) = 4.64 AREA-AVERAGED Fm(INCH/HR) = 0.37  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 1.68

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 5.20  
FLOW VELOCITY(FEET/SEC.) = 3.66 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.96  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10204.00 = 1662.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 578.00 DOWNSTREAM(FEET) = 575.00  
FLOW LENGTH(FEET) = 147.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.40  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 1.68  
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 18.14  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10205.00 = 1809.00 FEET.



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*****
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.14
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.763
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
    LAND USE         GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         3.61     0.60    0.917   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917
SUBAREA AREA(ACRES) = 3.61     SUBAREA RUNOFF(CFS) = 0.69
EFFECTIVE AREA(ACRES) = 8.25   AREA-AVERAGED Fm(INCH/HR) = 0.45
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.75
TOTAL AREA(ACRES) = 8.3       PEAK FLOW RATE(CFS) = 2.32

*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 563.00
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.01
ESTIMATED PIPE DIAMETER(INCH) = 18.00     NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.32
PIPE TRAVEL TIME(MIN.) = 1.57     Tc(MIN.) = 19.70
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10206.00 = 2374.00 FEET.

*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.70
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.723
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
    LAND USE         GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         4.75     0.60    0.669   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.669
SUBAREA AREA(ACRES) = 4.75     SUBAREA RUNOFF(CFS) = 1.37
EFFECTIVE AREA(ACRES) = 13.00  AREA-AVERAGED Fm(INCH/HR) = 0.43
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 13.0       PEAK FLOW RATE(CFS) = 3.40

*****
FLOW PROCESS FROM NODE 10206.00 TO NODE 10207.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 563.00 DOWNSTREAM(FEET) = 547.00
FLOW LENGTH(FEET) = 599.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.29
ESTIMATED PIPE DIAMETER(INCH) = 18.00     NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.40
PIPE TRAVEL TIME(MIN.) = 1.37     Tc(MIN.) = 21.07
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10207.00 = 2973.00 FEET.

*****
FLOW PROCESS FROM NODE 10206.10 TO NODE 10207.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 21.07
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.697
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
    LAND USE         GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         4.59     0.60    0.664   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.664
SUBAREA AREA(ACRES) = 4.59     SUBAREA RUNOFF(CFS) = 1.23
EFFECTIVE AREA(ACRES) = 17.58  AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 17.6       PEAK FLOW RATE(CFS) = 4.33

*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 516.00
FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.87
ESTIMATED PIPE DIAMETER(INCH) = 18.00     NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.33
PIPE TRAVEL TIME(MIN.) = 1.01     Tc(MIN.) = 22.08
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10208.00 = 3573.00 FEET.

*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.08
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.679
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
    LAND USE         GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         3.60     0.60    0.697   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.697
SUBAREA AREA(ACRES) = 3.60     SUBAREA RUNOFF(CFS) = 0.85

```

EFFECTIVE AREA(ACRES) = 21.18 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 21.2 PEAK FLOW RATE(CFS) = 4.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 516.00 DOWNSTREAM(FEET) = 480.00

FLOW LENGTH(FEET) = 604.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.77

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 4.90

PIPE TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 23.02

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10209.00 = 4177.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.02

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.663

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.21	0.60	0.645	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645

SUBAREA AREA(ACRES) = 8.21 SUBAREA RUNOFF(CFS) = 2.04

EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.41

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.69

TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 6.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 438.00

FLOW LENGTH(FEET) = 678.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.89

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 6.63

PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 23.97

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10210.00 = 4855.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 23.97

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.647

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.49	0.60	0.986	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986

SUBAREA AREA(ACRES) = 10.49 SUBAREA RUNOFF(CFS) = 0.52

EFFECTIVE AREA(ACRES) = 39.89 AREA-AVERAGED Fm(INCH/HR) = 0.46

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.77

TOTAL AREA(ACRES) = 39.9 PEAK FLOW RATE(CFS) = 6.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 280.00

FLOW LENGTH(FEET) = 2662.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.75

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 6.72

PIPE TRAVEL TIME(MIN.) = 3.78 Tc(MIN.) = 27.75

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10211.00 = 7517.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 27.75

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.591

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.00	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 0.00

EFFECTIVE AREA(ACRES) = 49.89 AREA-AVERAGED Fm(INCH/HR) = 0.49

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 49.9 PEAK FLOW RATE(CFS) = 6.72

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 280.00 DOWNSTREAM(FEET) = 176.00  
FLOW LENGTH(FEET) = 935.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.72  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 6.72  
PIPE TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 28.80  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10212.00 = 8452.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 28.80  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.576  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.37 0.60 0.926 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.926  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 18.37 SUBAREA RUNOFF(CFS) = 0.71  
EFFECTIVE AREA(ACRES) = 68.26 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 68.3 PEAK FLOW RATE(CFS) = 6.72  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10212.00 TO NODE 10242.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 176.00 DOWNSTREAM(FEET) = 169.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00 CHANNEL SLOPE = 0.0211  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.555  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.97 0.60 0.970 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.73  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.99  
AVERAGE FLOW DEPTH(FEET) = 0.87 TRAVEL TIME(MIN.) = 1.85  
Tc(MIN.) = 30.66  
SUBAREA AREA(ACRES) = 1.97 SUBAREA RUNOFF(CFS) = 0.03

EFFECTIVE AREA(ACRES) = 70.23 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 6.72  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.87 FLOW VELOCITY(FEET/SEC.) = 2.98  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10220.00 TO NODE 10221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 308.00 DOWNSTREAM(FEET) = 300.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.111  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.840  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"GRASS" - 1.03 0.60 1.000 0 15.11  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.22  
TOTAL AREA(ACRES) = 1.03 PEAK FLOW RATE(CFS) = 0.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10221.10 TO NODE 10222.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<

\*\*\*\*\*  
UPSTREAM ELEVATION(FEET) = 300.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.38  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.51  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.29  
STREET FLOW TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 16.22  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.812  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.64	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 0.31  
EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 0.51

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00  
FLOW VELOCITY(FEET/SEC.) = 6.51 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.29  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10222.00 = 764.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10221.20 TO NODE 10222.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 16.22  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.812  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.12	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.12 SUBAREA RUNOFF(CFS) = 0.59  
EFFECTIVE AREA(ACRES) = 5.78 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 1.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10222.10 TO NODE 10223.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

\*\*\*\*\*  
UPSTREAM ELEVATION(FEET) = 261.00 DOWNSTREAM ELEVATION(FEET) = 208.00  
STREET LENGTH(FEET) = 622.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.24  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.34  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.26  
STREET FLOW TRAVEL TIME(MIN.) = 1.64 Tc(MIN.) = 17.86  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.770

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.75	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 0.27  
EFFECTIVE AREA(ACRES) = 7.54 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.5 PEAK FLOW RATE(CFS) = 1.15

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00  
FLOW VELOCITY(FEET/SEC.) = 6.34 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.26  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10223.00 = 1386.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10222.20 TO NODE 10223.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 17.86  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.770  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.91	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.91 SUBAREA RUNOFF(CFS) = 1.21  
EFFECTIVE AREA(ACRES) = 15.45 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 2.36

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.10 TO NODE 10224.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

\*\*\*\*\*  
UPSTREAM ELEVATION(FEET) = 208.00 DOWNSTREAM ELEVATION(FEET) = 204.00  
STREET LENGTH(FEET) = 758.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00



DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 4.24 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 4.24 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 30.41 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 30.4 PEAK FLOW RATE(CFS) = 2.36  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

\*\*\*\*\*  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 31.55  
 RAINFALL INTENSITY(INCH/HR) = 0.55  
 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 30.41  
 TOTAL STREAM AREA(ACRES) = 30.41  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.36

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10230.00 TO NODE 10231.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 276.00  
 ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 390.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.944  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.496

SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 AGRICULTURAL POOR COVER  
 "FALLOW" - 0.95 0.60 1.000 0 5.94  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 0.77  
 TOTAL AREA(ACRES) = 0.95 PEAK FLOW RATE(CFS) = 0.77

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10231.10 TO NODE 10232.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

\*\*\*\*\*  
 ELEVATION DATA: UPSTREAM(FEET) = 390.00 DOWNSTREAM(FEET) = 301.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 394.00 CHANNEL SLOPE = 0.2259  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.382

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.68 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.36  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.13  
 AVERAGE FLOW DEPTH(FEET) = 0.27 TRAVEL TIME(MIN.) = 1.07  
 Tc(MIN.) = 7.01  
 SUBAREA AREA(ACRES) = 1.68 SUBAREA RUNOFF(CFS) = 1.18  
 EFFECTIVE AREA(ACRES) = 2.63 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 1.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.31 FLOW VELOCITY(FEET/SEC.) = 6.51  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10232.00 = 670.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10231.20 TO NODE 10232.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

\*\*\*\*\*  
 MAINLINE Tc(MIN.) = 7.01  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.382  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.38 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 6.38 SUBAREA RUNOFF(CFS) = 4.49  
 EFFECTIVE AREA(ACRES) = 9.01 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 9.0 PEAK FLOW RATE(CFS) = 6.34

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10232.00 TO NODE 10233.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 4 USED)<<<<

\*\*\*\*\*  
 UPSTREAM ELEVATION(FEET) = 301.00 DOWNSTREAM ELEVATION(FEET) = 277.00  
 STREET LENGTH(FEET) = 341.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.61

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.40

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.30  
HALFSTREET FLOOD WIDTH(FEET) = 7.05  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.38  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.61  
STREET FLOW TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 8.07

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.269

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.60	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 3.50		SUBAREA RUNOFF(CFS) = 2.11			
EFFECTIVE AREA(ACRES) = 12.52		AREA-AVERAGED Fm(INCH/HR) = 0.60			
AREA-AVERAGED Fp(INCH/HR) = 0.60		AREA-AVERAGED Ap = 1.00			
TOTAL AREA(ACRES) = 12.5		PEAK FLOW RATE(CFS) = 7.54			

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.10  
FLOW VELOCITY(FEET/SEC.) = 5.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.63  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10233.00 = 1011.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10233.10 TO NODE 10234.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 277.00 DOWNSTREAM ELEVATION(FEET) = 226.00  
STREET LENGTH(FEET) = 682.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.43

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.46  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.65  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.74  
STREET FLOW TRAVEL TIME(MIN.) = 2.01 Tc(MIN.) = 10.08

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.060

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.27	0.60	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 4.27		SUBAREA RUNOFF(CFS) = 1.77			
EFFECTIVE AREA(ACRES) = 16.78		AREA-AVERAGED Fm(INCH/HR) = 0.60			
AREA-AVERAGED Fp(INCH/HR) = 0.60		AREA-AVERAGED Ap = 1.00			
TOTAL AREA(ACRES) = 16.8		PEAK FLOW RATE(CFS) = 7.54			

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.00  
FLOW VELOCITY(FEET/SEC.) = 5.55 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.65  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10234.00 = 1693.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10233.20 TO NODE 10234.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 10.08  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.060

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.60	0.60	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 15.60		SUBAREA RUNOFF(CFS) = 6.46			
EFFECTIVE AREA(ACRES) = 32.38		AREA-AVERAGED Fm(INCH/HR) = 0.60			
AREA-AVERAGED Fp(INCH/HR) = 0.60		AREA-AVERAGED Ap = 1.00			
TOTAL AREA(ACRES) = 32.4		PEAK FLOW RATE(CFS) = 13.42			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10234.10 TO NODE 10235.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 3 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 226.00 DOWNSTREAM ELEVATION(FEET) = 205.00  
STREET LENGTH(FEET) = 759.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.13

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.40  
HALFSTREET FLOOD WIDTH(FEET) = 12.09

AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.28  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.71  
 STREET FLOW TRAVEL TIME (MIN.) = 2.96 Tc (MIN.) = 13.04  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.930  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.74	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 4.74 SUBAREA RUNOFF (CFS) = 1.41  
 EFFECTIVE AREA (ACRES) = 37.13 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 37.1 PEAK FLOW RATE (CFS) = 13.42  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.39 HALFSTREET FLOOD WIDTH (FEET) = 11.81  
 FLOW VELOCITY (FEET/SEC.) = 4.24 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.67  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10235.00 = 2452.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10234.20 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.04  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.930  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.02	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 8.02 SUBAREA RUNOFF (CFS) = 2.38  
 EFFECTIVE AREA (ACRES) = 45.15 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 45.1 PEAK FLOW RATE (CFS) = 13.42  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10234.30 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.04  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.930  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.62	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.62 SUBAREA RUNOFF (CFS) = 0.78  
 EFFECTIVE AREA (ACRES) = 47.76 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 14.18

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10235.00 TO NODE 10236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 205.00 DOWNSTREAM (FEET) = 201.00  
 FLOW LENGTH (FEET) = 489.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.2 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 6.74  
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 14.18  
 PIPE TRAVEL TIME (MIN.) = 1.21 Tc (MIN.) = 14.25  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10236.00 = 2941.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10235.10 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.25  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.876  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.89	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.89 SUBAREA RUNOFF (CFS) = 0.72  
 EFFECTIVE AREA (ACRES) = 50.65 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 50.7 PEAK FLOW RATE (CFS) = 14.18  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10235.20 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.25  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.876  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.84	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 4.84 SUBAREA RUNOFF (CFS) = 1.20  
 EFFECTIVE AREA (ACRES) = 55.49 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 14.18  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<



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=====
ELEVATION DATA: UPSTREAM(FEET) = 201.00 DOWNSTREAM(FEET) = 199.00
FLOW LENGTH(FEET) = 278.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.41
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 14.18
PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 14.97
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10237.00 = 3219.00 FEET.

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*****
FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.97
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.844
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp    Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        1.62    0.60    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.62 SUBAREA RUNOFF(CFS) = 0.36
EFFECTIVE AREA(ACRES) = 57.11 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 57.1 PEAK FLOW RATE(CFS) = 14.18
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 197.00
FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.86
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 14.18
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 15.95
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN.) = 15.95
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.819
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp    Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        1.38    0.60    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.38 SUBAREA RUNOFF(CFS) = 0.27

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EFFECTIVE AREA(ACRES) = 58.49 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 14.18
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====

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```

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 15.95
RAINFALL INTENSITY(INCH/HR) = 0.82
AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 58.49
TOTAL STREAM AREA(ACRES) = 58.49
PEAK FLOW RATE(CFS) AT CONFLUENCE = 14.18

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** CONFLUENCE DATA **

```

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2.36	31.55	0.548	0.60( 0.60)	1.00	30.4	10220.00
2	14.18	15.95	0.819	0.60( 0.60)	1.00	58.5	10230.00

```

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

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** PEAK FLOW RATE TABLE **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	15.96	15.95	0.819	0.60( 0.60)	1.00	73.9	10230.00
2	2.36	31.55	0.548	0.60( 0.60)	1.00	88.9	10220.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

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```

PEAK FLOW RATE(CFS) = 15.96 Tc(MIN.) = 15.95
EFFECTIVE AREA(ACRES) = 73.87 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 88.9
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10238.00 TO NODE 10239.00 IS CODE = 31
-----

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```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 197.00 DOWNSTREAM(FEET) = 193.00
FLOW LENGTH(FEET) = 753.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.90
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 15.96
PIPE TRAVEL TIME(MIN.) = 2.13 Tc(MIN.) = 18.08
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10239.00 = 4317.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10238.10 TO NODE 10239.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.08
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.744
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        2.22    0.60    0.916  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.72    SUBAREA RUNOFF(CFS) = 0.40
EFFECTIVE AREA(ACRES) = 76.59  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 91.6    PEAK FLOW RATE(CFS) = 15.96
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 10238.20 TO NODE 10239.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.08
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.744
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -       34.37    0.60    0.991  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991
SUBAREA AREA(ACRES) = 34.37    SUBAREA RUNOFF(CFS) = 5.25
EFFECTIVE AREA(ACRES) = 110.95  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 126.0    PEAK FLOW RATE(CFS) = 16.57

```

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*****
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 193.00  DOWNSTREAM(FEET) = 191.00
FLOW LENGTH(FEET) = 301.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.33
ESTIMATED PIPE DIAMETER(INCH) = 24.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 16.57
PIPE TRAVEL TIME(MIN.) = 0.79    Tc(MIN.) = 18.87
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10240.00 = 4618.00 FEET.
*****
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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```

MAINLINE Tc(MIN.) = 18.87
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.744
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        2.22    0.60    0.916  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.916
SUBAREA AREA(ACRES) = 2.22    SUBAREA RUNOFF(CFS) = 0.39
EFFECTIVE AREA(ACRES) = 113.18  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 128.2    PEAK FLOW RATE(CFS) = 16.57
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10240.00 TO NODE 10241.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 191.00  DOWNSTREAM(FEET) = 180.00
FLOW LENGTH(FEET) = 150.00  MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.05
ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 16.57
PIPE TRAVEL TIME(MIN.) = 0.16    Tc(MIN.) = 19.03
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10241.00 = 4768.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10241.00 TO NODE 10242.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 180.00  DOWNSTREAM(FEET) = 169.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 267.00  CHANNEL SLOPE = 0.0412
CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030    MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.721
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        2.16    0.60    0.958  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.72
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.97
AVERAGE FLOW DEPTH(FEET) = 0.97    TRAVEL TIME(MIN.) = 0.75
Tc(MIN.) = 19.77
SUBAREA AREA(ACRES) = 2.16    SUBAREA RUNOFF(CFS) = 0.28
EFFECTIVE AREA(ACRES) = 115.34  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 130.4    PEAK FLOW RATE(CFS) = 16.57
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.96 FLOW VELOCITY(FEET/SEC.) = 5.94  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 11

-----  
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\*\*\*\*  
\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	16.57	19.77	0.721	0.60( 0.60)	0.99	115.3	10230.00
2	2.36	37.69	0.498	0.60( 0.60)	1.00	130.4	10220.00

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\*\*\*\*  
\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	6.72	30.66	0.555	0.60( 0.51)	0.85	70.2	10200.00

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	23.29	19.77	0.721	0.60( 0.57)	0.95	160.6	10230.00
2	14.66	30.66	0.555	0.60( 0.56)	0.94	194.7	10200.00
3	8.40	37.69	0.498	0.60( 0.57)	0.94	200.6	10220.00

TOTAL AREA(ACRES) = 200.6

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 23.29 Tc(MIN.) = 19.772  
EFFECTIVE AREA(ACRES) = 160.63 AREA-AVERAGED Fm(INCH/HR) = 0.57  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 200.6  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 12

-----  
>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10256.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 169.00 DOWNSTREAM(FEET) = 163.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 315.00 CHANNEL SLOPE = 0.0190  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.700

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.10	0.60	0.995	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.72

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.89

AVERAGE FLOW DEPTH(FEET) = 1.27 TRAVEL TIME(MIN.) = 1.07

Tc(MIN.) = 20.85

SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 0.85

EFFECTIVE AREA(ACRES) = 169.74 AREA-AVERAGED Fm(INCH/HR) = 0.57

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96

TOTAL AREA(ACRES) = 209.7 PEAK FLOW RATE(CFS) = 23.29

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.26 FLOW VELOCITY(FEET/SEC.) = 4.86

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10243.00 TO NODE 10256.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 20.85

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.700

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.01	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 7.01 SUBAREA RUNOFF(CFS) = 0.63

EFFECTIVE AREA(ACRES) = 176.74 AREA-AVERAGED Fm(INCH/HR) = 0.57

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96

TOTAL AREA(ACRES) = 216.7 PEAK FLOW RATE(CFS) = 23.29

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 20.85

RAINFALL INTENSITY(INCH/HR) = 0.70

AREA-AVERAGED Fm(INCH/HR) = 0.57

AREA-AVERAGED Fp(INCH/HR) = 0.60

AREA-AVERAGED Ap = 0.96

EFFECTIVE STREAM AREA(ACRES) = 176.74

TOTAL STREAM AREA(ACRES) = 216.71

PEAK FLOW RATE(CFS) AT CONFLUENCE = 23.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10250.00 TO NODE 10251.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 284.00

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 243.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.802  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.797

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "WOODLAND,GRASS"	-	1.04	0.60	1.000	0	16.80

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.18  
TOTAL AREA(ACRES) = 1.04 PEAK FLOW RATE(CFS) = 0.18

\*\*\*\*\*

FLOW PROCESS FROM NODE 10251.00 TO NODE 10252.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 243.00 DOWNSTREAM ELEVATION(FEET) = 240.00  
STREET LENGTH(FEET) = 301.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.28  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.17  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.43  
STREET FLOW TRAVEL TIME(MIN.) = 2.31 Tc(MIN.) = 19.12  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.738

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.47	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 0.18  
EFFECTIVE AREA(ACRES) = 2.51 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 0.31

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00  
FLOW VELOCITY(FEET/SEC.) = 2.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.43  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10252.00 = 585.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10252.00 TO NODE 10253.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 240.00 DOWNSTREAM ELEVATION(FEET) = 234.00  
STREET LENGTH(FEET) = 544.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.44  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.28  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.45  
STREET FLOW TRAVEL TIME(MIN.) = 3.98 Tc(MIN.) = 23.09  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.662

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.60 SUBAREA RUNOFF(CFS) = 0.26  
EFFECTIVE AREA(ACRES) = 7.12 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 0.40

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00  
FLOW VELOCITY(FEET/SEC.) = 2.28 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.45  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10253.00 = 1129.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 234.00 DOWNSTREAM(FEET) = 219.00  
FLOW LENGTH(FEET) = 362.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 1.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.53  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 0.40

PIPE TRAVEL TIME(MIN.) = 1.33 Tc(MIN.) = 24.42  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10254.00 = 1491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 24.42  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.639  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.55 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 0.30  
EFFECTIVE AREA(ACRES) = 15.66 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.7 PEAK FLOW RATE(CFS) = 0.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10254.00 TO NODE 10255.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 219.00 DOWNSTREAM(FEET) = 182.00  
FLOW LENGTH(FEET) = 716.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 1.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.39  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 0.55  
PIPE TRAVEL TIME(MIN.) = 2.21 Tc(MIN.) = 26.64  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10255.00 = 2207.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10255.00 TO NODE 10256.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 182.00 DOWNSTREAM(FEET) = 163.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.0833  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.591  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 13.88 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.55  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.36

AVERAGE FLOW DEPTH(FEET) = 0.23 TRAVEL TIME(MIN.) = 1.13  
Tc(MIN.) = 27.77  
SUBAREA AREA(ACRES) = 13.88 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 29.54 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 29.5 PEAK FLOW RATE(CFS) = 0.55  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.23 FLOW VELOCITY(FEET/SEC.) = 3.36  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10256.00 = 2435.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 27.77  
RAINFALL INTENSITY(INCH/HR) = 0.59  
AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 29.54  
TOTAL STREAM AREA(ACRES) = 29.54  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 0.55

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	23.29	20.85	0.700	0.60( 0.57)	0.96	176.7	10230.00
1	14.66	31.87	0.545	0.60( 0.57)	0.95	210.8	10200.00
1	8.40	39.09	0.487	0.60( 0.57)	0.95	216.7	10220.00
2	0.55	27.77	0.591	0.60( 0.60)	1.00	29.5	10250.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	23.78	20.85	0.700	0.60( 0.58)	0.96	198.9	10230.00
2	18.42	27.77	0.591	0.60( 0.57)	0.96	227.7	10250.00
3	15.17	31.87	0.545	0.60( 0.57)	0.95	240.4	10200.00
4	8.86	39.09	0.487	0.60( 0.57)	0.95	246.3	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 23.78 Tc(MIN.) = 20.85  
EFFECTIVE AREA(ACRES) = 198.92 AREA-AVERAGED Fm(INCH/HR) = 0.58  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96  
TOTAL AREA(ACRES) = 246.3  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

-----  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 246.3 TC (MIN.) = 20.85  
 EFFECTIVE AREA (ACRES) = 198.92 AREA-AVERAGED Fm (INCH/HR) = 0.58  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.962  
 PEAK FLOW RATE (CFS) = 23.78

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	23.78	20.85	0.700	0.60 ( 0.58)	0.96	198.9	10230.00
2	18.42	27.77	0.591	0.60 ( 0.57)	0.96	227.7	10250.00
3	15.17	31.87	0.545	0.60 ( 0.57)	0.95	240.4	10200.00
4	8.86	39.09	0.487	0.60 ( 0.57)	0.95	246.3	10220.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

FILE NAME: 0506103G.DAT
TIME/DATE OF STUDY: 12:45 04/15/2013

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 1.580
2) 6.00; 1.430
3) 7.00; 1.310
4) 8.00; 1.210
5) 9.00; 1.130
6) 10.00; 1.060
7) 11.00; 1.010
8) 12.00; 0.960
9) 13.00; 0.920
10) 14.00; 0.880
11) 15.00; 0.840
12) 20.00; 0.720
13) 25.00; 0.630
14) 30.00; 0.570
15) 40.00; 0.480
16) 50.00; 0.420
17) 60.00; 0.380
18) 90.00; 0.300
19) 120.00; 0.260
20) 180.00; 0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

Table with 10 columns: NO., HALF WIDTH (FT), CROWN CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-/PARK-SIDE / SIDE/ WAY, CURB HEIGHT (FT), GUTTER GEOMETRIES WIDTH (FT), LIP (FT), HIKE (FT), MANNING FACTOR (n). Rows 1-4.

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10300.00 TO NODE 10301.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00
ELEVATION DATA: UPSTREAM(FEET) = 627.00 DOWNSTREAM(FEET) = 540.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.147
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.558
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.20 0.60 0.500 95 5.15
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 1.36
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 1.36

\*\*\*\*\*

FLOW PROCESS FROM NODE 10301.00 TO NODE 10302.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 510.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.2609
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.36
FLOW VELOCITY(FEET/SEC.) = 5.22 FLOW DEPTH(FEET) = 0.29
TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 5.51
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10302.00 = 443.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10302.00 TO NODE 10302.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 5.51
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.503
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.50 0.60 0.500 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 1.62  
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 2.92

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10302.00 TO NODE 10303.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 467.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.2575  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.92  
FLOW VELOCITY(FEET/SEC.) = 6.10 FLOW DEPTH(FEET) = 0.40  
TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 5.97  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10303.00 = 610.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10303.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.97  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.434  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 2.25  
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 5.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10304.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 467.00 DOWNSTREAM(FEET) = 446.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 5.00  
FLOW VELOCITY(FEET/SEC.) = 6.26 FLOW DEPTH(FEET) = 0.52  
TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 6.28  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10304.00 = 725.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10304.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.28  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.397  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.60 0.500 -  
USER-DEFINED - 0.40 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 2.26  
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.32  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 7.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10305.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 446.00 DOWNSTREAM(FEET) = 366.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 423.00 CHANNEL SLOPE = 0.1891  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.10  
FLOW VELOCITY(FEET/SEC.) = 6.92 FLOW DEPTH(FEET) = 0.58  
TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 7.30  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10305.00 = 1148.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10305.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 7.30  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.280  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.60 0.500 -  
USER-DEFINED - 1.30 0.60 1.000 -  
USER-DEFINED - 1.50 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.912  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 2.24  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.39  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.65  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 8.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10306.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 300.00



CHANNEL LENGTH THRU SUBAREA(FEET) = 574.00 CHANNEL SLOPE = 0.1150  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.58  
 FLOW VELOCITY(FEET/SEC.) = 5.98 FLOW DEPTH(FEET) = 0.69  
 TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 8.89  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10306.00 = 1722.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10306.00 TO NODE 10306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 8.89  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.138  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	2.80	0.60	1.000	-
USER-DEFINED	-	0.50	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
 SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 1.77  
 EFFECTIVE AREA(ACRES) = 14.30 AREA-AVERAGED Fm(INCH/HR) = 0.44  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 14.3 PEAK FLOW RATE(CFS) = 8.98

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10306.00 TO NODE 10307.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 293.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.0350  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.98  
 FLOW VELOCITY(FEET/SEC.) = 3.86 FLOW DEPTH(FEET) = 0.88  
 TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 9.76  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10307.00 = 1922.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10307.00 TO NODE 10307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 9.76  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.077  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.30  
 EFFECTIVE AREA(ACRES) = 15.00 AREA-AVERAGED Fm(INCH/HR) = 0.45  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.75  
 TOTAL AREA(ACRES) = 15.0 PEAK FLOW RATE(CFS) = 8.98  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10307.00 TO NODE 10308.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 293.00 DOWNSTREAM(FEET) = 276.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.0850  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.98  
 FLOW VELOCITY(FEET/SEC.) = 6.70 FLOW DEPTH(FEET) = 0.67  
 TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 10.25  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10308.00 = 2122.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10308.00 TO NODE 10308.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 10.25  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.047  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.60	1.000	-
USER-DEFINED	-	8.50	0.60	0.500	-
USER-DEFINED	-	3.80	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.696  
 SUBAREA AREA(ACRES) = 14.00 SUBAREA RUNOFF(CFS) = 7.93  
 EFFECTIVE AREA(ACRES) = 29.00 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA(ACRES) = 29.0 PEAK FLOW RATE(CFS) = 16.02

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10308.00 TO NODE 10309.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 250.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 600.00 CHANNEL SLOPE = 0.0433  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 16.02  
 FLOW VELOCITY(FEET/SEC.) = 6.03 FLOW DEPTH(FEET) = 0.94  
 TRAVEL TIME(MIN.) = 1.66 Tc(MIN.) = 11.91  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10309.00 = 2722.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.91

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.964

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.00	0.60	0.600	-
USER-DEFINED	-	1.80	0.60	0.850	-
USER-DEFINED	-	1.40	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	3.40	0.60	0.500	-
USER-DEFINED	-	2.10	0.60	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.662

SUBAREA AREA(ACRES) = 15.40 SUBAREA RUNOFF(CFS) = 7.86

EFFECTIVE AREA(ACRES) = 44.40 AREA-AVERAGED Fm(INCH/HR) = 0.42

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.70

TOTAL AREA(ACRES) = 44.4 PEAK FLOW RATE(CFS) = 21.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.91

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.964

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.60	0.850	-
USER-DEFINED	-	8.80	0.60	1.000	-
USER-DEFINED	-	3.50	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.967

SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 5.47

EFFECTIVE AREA(ACRES) = 60.20 AREA-AVERAGED Fm(INCH/HR) = 0.46

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.77

TOTAL AREA(ACRES) = 60.2 PEAK FLOW RATE(CFS) = 27.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 250.00 DOWNSTREAM(FEET) = 208.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 1021.00 CHANNEL SLOPE = 0.0411

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00

CHANNEL FLOW THRU SUBAREA(CFS) = 27.19

FLOW VELOCITY(FEET/SEC.) = 6.77 FLOW DEPTH(FEET) = 1.16

TRAVEL TIME(MIN.) = 2.51 Tc(MIN.) = 14.43

LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10310.00 = 3743.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.43

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.863

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	4.00	0.60	0.600	-
USER-DEFINED	-	1.80	0.60	0.850	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.668

SUBAREA AREA(ACRES) = 6.60 SUBAREA RUNOFF(CFS) = 2.75

EFFECTIVE AREA(ACRES) = 66.80 AREA-AVERAGED Fm(INCH/HR) = 0.46

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.76

TOTAL AREA(ACRES) = 66.8 PEAK FLOW RATE(CFS) = 27.19

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.43

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.863

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.500	-
USER-DEFINED	-	8.00	0.60	0.600	-
USER-DEFINED	-	7.10	0.60	0.850	-
USER-DEFINED	-	8.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA(ACRES) = 23.50 SUBAREA RUNOFF(CFS) = 7.92

EFFECTIVE AREA(ACRES) = 90.30 AREA-AVERAGED Fm(INCH/HR) = 0.46

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.77

TOTAL AREA(ACRES) = 90.3 PEAK FLOW RATE(CFS) = 32.36

\*\*\*\*\*

FLOW PROCESS FROM NODE 10310.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 208.00 DOWNSTREAM(FEET) = 189.00

FLOW LENGTH(FEET) = 1595.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 9.52

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 32.36

PIPE TRAVEL TIME(MIN.) = 2.79 Tc(MIN.) = 17.22

LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10335.00 = 5338.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 17.22
RAINFALL INTENSITY(INCH/HR) = 0.79
AREA-AVERAGED Fm(INCH/HR) = 0.46
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.77
EFFECTIVE STREAM AREA(ACRES) = 90.30
TOTAL STREAM AREA(ACRES) = 90.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 32.36

\*\*\*\*\*

FLOW PROCESS FROM NODE 10320.00 TO NODE 10321.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 671.00 DOWNSTREAM(FEET) = 622.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.795
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.461

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.00 0.60 0.500 95 5.79
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 1.04
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 1.04

\*\*\*\*\*

FLOW PROCESS FROM NODE 10321.00 TO NODE 10322.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 622.00 DOWNSTREAM(FEET) = 599.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 227.00 CHANNEL SLOPE = 0.1013
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.04
FLOW VELOCITY(FEET/SEC.) = 4.23 FLOW DEPTH(FEET) = 0.29
TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 6.69
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10322.00 = 557.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10322.00 TO NODE 10322.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.69
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.347
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.32
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 2.26

\*\*\*\*\*

FLOW PROCESS FROM NODE 10322.00 TO NODE 10323.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 599.00 DOWNSTREAM(FEET) = 539.00
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 2.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.39
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.26
PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 6.85
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10323.00 = 719.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10323.00 TO NODE 10323.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.85
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.327
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 0.46
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 2.68

\*\*\*\*\*

FLOW PROCESS FROM NODE 10323.00 TO NODE 10324.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 539.00 DOWNSTREAM(FEET) = 530.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 97.00 CHANNEL SLOPE = 0.0928
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.68  
FLOW VELOCITY(FEET/SEC.) = 4.18 FLOW DEPTH(FEET) = 0.46  
TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 7.24  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10324.00 = 816.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10324.00 TO NODE 10324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.24  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.286  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.80 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 1.60  
EFFECTIVE AREA(ACRES) = 4.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.7 PEAK FLOW RATE(CFS) = 4.17

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10324.00 TO NODE 10325.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 210.00 CHANNEL SLOPE = 0.1429  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.17  
FLOW VELOCITY(FEET/SEC.) = 5.42 FLOW DEPTH(FEET) = 0.51  
TRAVEL TIME(MIN.) = 0.65 Tc(MIN.) = 7.89  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10325.00 = 1026.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10325.00 TO NODE 10325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.89  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.221  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 1.41  
EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 5.31

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10326.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 460.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 345.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 5.31  
FLOW VELOCITY(FEET/SEC.) = 5.31 FLOW DEPTH(FEET) = 0.58  
TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 8.97  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10326.00 = 1371.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10326.00 TO NODE 10326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.97  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.132  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.90 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 1.42  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 6.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10326.00 TO NODE 10327.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 430.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 263.00 CHANNEL SLOPE = 0.1141  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 6.22  
FLOW VELOCITY(FEET/SEC.) = 5.51 FLOW DEPTH(FEET) = 0.61  
TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 9.76  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10327.00 = 1634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.76  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.077  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.60 0.500 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 2.87  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 8.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10328.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 375.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 437.00 CHANNEL SLOPE = 0.1259  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 8.67  
FLOW VELOCITY(FEET/SEC.) = 7.68 FLOW DEPTH(FEET) = 0.61  
TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 10.71  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10328.00 = 2071.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10328.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 10.71  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.024  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.60 0.500 -  
USER-DEFINED - 1.20 0.60 0.850 -  
USER-DEFINED - 0.90 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.772  
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 1.62  
EFFECTIVE AREA(ACRES) = 15.60 AREA-AVERAGED Fm(INCH/HR) = 0.33  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 15.6 PEAK FLOW RATE(CFS) = 9.70

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10329.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 375.00 DOWNSTREAM(FEET) = 372.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 224.00 CHANNEL SLOPE = 0.0134  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.70  
FLOW VELOCITY(FEET/SEC.) = 3.42 FLOW DEPTH(FEET) = 0.97  
TRAVEL TIME(MIN.) = 1.09 Tc(MIN.) = 11.80  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10329.00 = 2295.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10329.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 11.80  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.970  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.20 0.60 0.500 -  
USER-DEFINED - 1.40 0.60 0.850 -  
USER-DEFINED - 0.60 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.571  
SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 6.33  
EFFECTIVE AREA(ACRES) = 26.80 AREA-AVERAGED Fm(INCH/HR) = 0.34  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 26.8 PEAK FLOW RATE(CFS) = 15.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10329.00 TO NODE 10330.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 300.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 452.00 CHANNEL SLOPE = 0.1593  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 15.26  
FLOW VELOCITY(FEET/SEC.) = 9.76 FLOW DEPTH(FEET) = 0.72  
TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 12.57  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10330.00 = 2747.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10330.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 12.57  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.937  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.60 0.850 -  
USER-DEFINED - 4.20 0.60 0.500 -  
USER-DEFINED - 2.50 0.60 0.850 -  
USER-DEFINED - 0.60 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.673  
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 3.74  
EFFECTIVE AREA(ACRES) = 34.60 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 34.6 PEAK FLOW RATE(CFS) = 18.21

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10331.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 295.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 182.00 CHANNEL SLOPE = 0.0275
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 18.21
FLOW VELOCITY(FEET/SEC.) = 5.22 FLOW DEPTH(FEET) = 1.08
TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 13.16
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10331.00 = 2929.00 FEET.

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*****
FLOW PROCESS FROM NODE 10331.00 TO NODE 10331.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.16
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.914
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.70   0.60  0.850 -
USER-DEFINED        -        11.30   0.60  0.500 -
USER-DEFINED        -         0.20   0.60  0.600 -
USER-DEFINED        -         4.20   0.60  0.850 -
USER-DEFINED        -         1.60   0.60  1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.652
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 8.94
EFFECTIVE AREA(ACRES) = 53.60 AREA-AVERAGED Fm(INCH/HR) = 0.37
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 53.6 PEAK FLOW RATE(CFS) = 26.43

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*****
FLOW PROCESS FROM NODE 10331.00 TO NODE 10332.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 295.00 DOWNSTREAM(FEET) = 245.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.00 CHANNEL SLOPE = 0.0542
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 26.43
FLOW VELOCITY(FEET/SEC.) = 7.44 FLOW DEPTH(FEET) = 1.09
TRAVEL TIME(MIN.) = 2.07 Tc(MIN.) = 15.22
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10332.00 = 3851.00 FEET.

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*****
FLOW PROCESS FROM NODE 10332.00 TO NODE 10332.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.22
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.835
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS

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LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.60  0.850 -
USER-DEFINED        -         1.40   0.60  0.500 -
USER-DEFINED        -        15.40   0.60  0.850 -
USER-DEFINED        -         8.60   0.60  1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.881
SUBAREA AREA(ACRES) = 25.60 SUBAREA RUNOFF(CFS) = 7.05
EFFECTIVE AREA(ACRES) = 79.20 AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 79.2 PEAK FLOW RATE(CFS) = 29.67

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*****
FLOW PROCESS FROM NODE 10332.00 TO NODE 10333.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 199.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 564.00 CHANNEL SLOPE = 0.0816
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 29.67
FLOW VELOCITY(FEET/SEC.) = 8.87 FLOW DEPTH(FEET) = 1.06
TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 16.28
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10333.00 = 4415.00 FEET.

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*****
FLOW PROCESS FROM NODE 10333.00 TO NODE 10333.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.28
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.809
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.50   0.60  0.500 -
USER-DEFINED        -         0.50   0.60  0.850 -
USER-DEFINED        -         0.60   0.60  0.500 -
USER-DEFINED        -         5.70   0.60  0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.761
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 2.63
EFFECTIVE AREA(ACRES) = 87.50 AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 87.5 PEAK FLOW RATE(CFS) = 30.49

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*****
FLOW PROCESS FROM NODE 10333.00 TO NODE 10334.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 195.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 454.00 CHANNEL SLOPE = 0.0088
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 4.00

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CHANNEL FLOW THRU SUBAREA(CFS) = 30.49  
 FLOW VELOCITY(FEET/SEC.) = 3.90 FLOW DEPTH(FEET) = 1.61  
 TRAVEL TIME(MIN.) = 1.94 Tc(MIN.) = 18.22  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10334.00 = 4869.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10334.00 TO NODE 10334.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 18.22  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.763  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.10 0.60 0.800 -  
 USER-DEFINED - 2.60 0.60 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835  
 SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 0.87  
 EFFECTIVE AREA(ACRES) = 91.20 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.71  
 TOTAL AREA(ACRES) = 91.2 PEAK FLOW RATE(CFS) = 30.49  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10334.00 TO NODE 10335.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 195.00 DOWNSTREAM(FEET) = 189.00  
 FLOW LENGTH(FEET) = 1291.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 6.51  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 30.49  
 PIPE TRAVEL TIME(MIN.) = 3.31 Tc(MIN.) = 21.53  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 21.53  
 RAINFALL INTENSITY(INCH/HR) = 0.69  
 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.71  
 EFFECTIVE STREAM AREA(ACRES) = 91.20  
 TOTAL STREAM AREA(ACRES) = 91.20  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 30.49

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	32.36	17.22	0.787	0.60( 0.46)	0.77	90.3	10300.00
2	30.49	21.53	0.693	0.60( 0.43)	0.71	91.2	10320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	62.85	17.22	0.787	0.60( 0.45)	0.75	163.2	10300.00
2	53.38	21.53	0.693	0.60( 0.44)	0.74	181.5	10320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 62.85 Tc(MIN.) = 17.22  
 EFFECTIVE AREA(ACRES) = 163.24 AREA-AVERAGED Fm(INCH/HR) = 0.45  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.75  
 TOTAL AREA(ACRES) = 181.5  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10335.00 TO NODE 10336.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 189.00 DOWNSTREAM(FEET) = 188.00  
 FLOW LENGTH(FEET) = 103.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 26.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.37  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 62.85  
 PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 17.38  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10336.00 = 6263.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10336.00 TO NODE 10337.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 180.00  
 FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.22  
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 62.85  
 PIPE TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 17.59  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10337.00 = 6475.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10337.00 TO NODE 10338.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 161.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 872.00 CHANNEL SLOPE = 0.0218  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 62.85  
FLOW VELOCITY (FEET/SEC.) = 6.55 FLOW DEPTH (FEET) = 1.79  
TRAVEL TIME (MIN.) = 2.22 Tc (MIN.) = 19.81  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10338.00 = 7347.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 19.81  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.725  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.60 0.850 -  
USER-DEFINED - 0.80 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 1.000 -  
USER-DEFINED - 1.30 0.60 1.000 -  
USER-DEFINED - 0.90 0.60 0.850 -  
USER-DEFINED - 0.20 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.943  
SUBAREA AREA (ACRES) = 4.20 SUBAREA RUNOFF (CFS) = 0.60  
EFFECTIVE AREA (ACRES) = 167.44 AREA-AVERAGED Fm (INCH/HR) = 0.45  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 185.7 PEAK FLOW RATE (CFS) = 62.85  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 19.81  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.725  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.60 1.000 -  
USER-DEFINED - 4.60 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 0.56  
EFFECTIVE AREA (ACRES) = 172.44 AREA-AVERAGED Fm (INCH/HR) = 0.45  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 190.7 PEAK FLOW RATE (CFS) = 62.85  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10339.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
-----

ELEVATION DATA: UPSTREAM (FEET) = 161.00 DOWNSTREAM (FEET) = 159.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 328.00 CHANNEL SLOPE = 0.0061  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 62.85  
FLOW VELOCITY (FEET/SEC.) = 4.06 FLOW DEPTH (FEET) = 2.27  
TRAVEL TIME (MIN.) = 1.35 Tc (MIN.) = 21.15  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10339.00 = 7675.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 21.15  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.699  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.60 0.850 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 0.20 0.60 1.000 -  
USER-DEFINED - 0.40 0.60 0.500 -  
USER-DEFINED - 2.30 0.60 0.850 -  
USER-DEFINED - 0.40 0.60 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.767  
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 1.49  
EFFECTIVE AREA (ACRES) = 179.34 AREA-AVERAGED Fm (INCH/HR) = 0.45  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 62.85  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 21.15  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.699  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.60 0.500 -  
USER-DEFINED - 6.30 0.60 0.850 -  
USER-DEFINED - 0.20 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 2.20 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.876  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 1.44  
EFFECTIVE AREA (ACRES) = 188.54 AREA-AVERAGED Fm (INCH/HR) = 0.46  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 206.8 PEAK FLOW RATE (CFS) = 62.85  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10390.00 IS CODE = 51



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-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 159.00 DOWNSTREAM(FEET) = 155.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 782.00 CHANNEL SLOPE = 0.0051
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 62.85
FLOW VELOCITY(FEET/SEC.) = 3.80 FLOW DEPTH(FEET) = 2.35
TRAVEL TIME(MIN.) = 3.43 Tc(MIN.) = 24.58
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 24.58
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.638
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.30     0.60     0.800   -
USER-DEFINED        -         3.70     0.60     0.850   -
USER-DEFINED        -         0.10     0.60     1.000   -
USER-DEFINED        -         2.10     0.60     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.901
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 0.54
EFFECTIVE AREA(ACRES) = 194.74 AREA-AVERAGED Fm(INCH/HR) = 0.46
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 213.0 PEAK FLOW RATE(CFS) = 62.85
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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```

*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10
-----

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```

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====

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```

*****
FLOW PROCESS FROM NODE 10340.00 TO NODE 10341.00 IS CODE = 21
-----

```

```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

```

```

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 585.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.581
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.031
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS   Tc
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE"  -         0.10     0.60     0.800   95  10.58

```

```

PUBLIC PARK - 0.50 0.60 0.850 95 10.90
AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW" - 0.40 0.60 1.000 95 21.09
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA RUNOFF(CFS) = 0.44
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 0.44

```

```

*****
FLOW PROCESS FROM NODE 10341.00 TO NODE 10342.00 IS CODE = 63
-----

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```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====

```

```

UPSTREAM ELEVATION(FEET) = 585.00 DOWNSTREAM ELEVATION(FEET) = 570.00
STREET LENGTH(FEET) = 250.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

```

```

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

```

```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

```

```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.85
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.32
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.05
STREET FLOW TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 11.36
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.992

```

```

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70     0.60     0.800   -
USER-DEFINED        -         1.40     0.60     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 0.82
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.55
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 1.22

```

```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00
FLOW VELOCITY(FEET/SEC.) = 5.32 DEPTH*VELOCITY(FT*FT/SEC.) = 1.05
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10342.00 = 558.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
-----

```

```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

```

```

=====
UPSTREAM ELEVATION(FEET) = 570.00  DOWNSTREAM ELEVATION(FEET) = 560.00
STREET LENGTH(FEET) = 415.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

```

```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.65
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.22
HALFSTREET FLOOD WIDTH(FEET) = 2.89
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.02
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.65
STREET FLOW TRAVEL TIME(MIN.) = 2.29  Tc(MIN.) = 13.65
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.894
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -  1.20  0.60  0.800  -
USER-DEFINED  -  1.20  0.60  0.850  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.825
SUBAREA AREA(ACRES) = 2.40  SUBAREA RUNOFF(CFS) = 0.86
EFFECTIVE AREA(ACRES) = 5.50  AREA-AVERAGED Fm(INCH/HR) = 0.53
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 5.5  PEAK FLOW RATE(CFS) = 1.81

```

```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.23  HALFSTREET FLOOD WIDTH(FEET) = 3.45
FLOW VELOCITY(FEET/SEC.) = 2.93  DEPTH*VELOCITY(FT*FT/SEC.) = 0.67
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10343.00 = 973.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10343.00 TO NODE 10344.00 IS CODE = 63
-----

```

```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
-----

```

```

UPSTREAM ELEVATION(FEET) = 560.00  DOWNSTREAM ELEVATION(FEET) = 550.00
STREET LENGTH(FEET) = 616.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

```

```

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

```

```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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```

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

```

```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.18
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.26
HALFSTREET FLOOD WIDTH(FEET) = 5.12
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.41
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.63
STREET FLOW TRAVEL TIME(MIN.) = 4.26  Tc(MIN.) = 17.92
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.770
SUBAREA LOSS RATE DATA(AMC II):

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```

DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -  2.10  0.60  0.800  -
USER-DEFINED  -  0.80  0.60  0.850  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814
SUBAREA AREA(ACRES) = 2.90  SUBAREA RUNOFF(CFS) = 0.74
EFFECTIVE AREA(ACRES) = 8.40  AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.86
TOTAL AREA(ACRES) = 8.4  PEAK FLOW RATE(CFS) = 1.93

```

```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.25  HALFSTREET FLOOD WIDTH(FEET) = 4.67
FLOW VELOCITY(FEET/SEC.) = 2.37  DEPTH*VELOCITY(FT*FT/SEC.) = 0.60
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10344.00 = 1589.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10344.00 TO NODE 10345.00 IS CODE = 63
-----

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```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
-----

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```

UPSTREAM ELEVATION(FEET) = 550.00  DOWNSTREAM ELEVATION(FEET) = 510.00
STREET LENGTH(FEET) = 474.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

```

```

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

```

```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.28
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.31
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.25
STREET FLOW TRAVEL TIME(MIN.) = 1.25  Tc(MIN.) = 19.17
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.740
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN

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USER-DEFINED          -      2.80      0.60      0.800      -
USER-DEFINED          -      0.20      0.60      0.850      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803
SUBAREA AREA(ACRES) =      3.00      SUBAREA RUNOFF(CFS) =      0.70
EFFECTIVE AREA(ACRES) =      11.40      AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60      AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) =      11.4      PEAK FLOW RATE(CFS) =      2.40

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.20      HALFSTREET FLOOD WIDTH(FEET) = 2.00
FLOW VELOCITY(FEET/SEC.) = 6.31      DEPTH*VELOCITY(FT*FT/SEC.) = 1.25
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10345.00 = 2063.00 FEET.

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*****
FLOW PROCESS FROM NODE 10345.00 TO NODE 10346.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 510.00      DOWNSTREAM ELEVATION(FEET) = 484.00
STREET LENGTH(FEET) = 231.00      CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.54

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.67
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.28
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.44
STREET FLOW TRAVEL TIME(MIN.) = 0.53      Tc(MIN.) = 19.70
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.727
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN
USER-DEFINED      -      2.40      0.60      0.800      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 2.40      SUBAREA RUNOFF(CFS) = 0.53
EFFECTIVE AREA(ACRES) = 13.80      AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.60      AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 13.8      PEAK FLOW RATE(CFS) = 2.81

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.20      HALFSTREET FLOOD WIDTH(FEET) = 2.00
FLOW VELOCITY(FEET/SEC.) = 7.28      DEPTH*VELOCITY(FT*FT/SEC.) = 1.44
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10346.00 = 2294.00 FEET.

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*****
FLOW PROCESS FROM NODE 10346.00 TO NODE 10347.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 484.00      DOWNSTREAM ELEVATION(FEET) = 378.00
STREET LENGTH(FEET) = 995.00      CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.55

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.18
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.09
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.41
STREET FLOW TRAVEL TIME(MIN.) = 2.34      Tc(MIN.) = 22.04
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.683
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN
USER-DEFINED      -      4.10      0.60      0.800      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 4.10      SUBAREA RUNOFF(CFS) = 0.75
EFFECTIVE AREA(ACRES) = 17.90      AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.60      AREA-AVERAGED Ap = 0.83
TOTAL AREA(ACRES) = 17.9      PEAK FLOW RATE(CFS) = 3.01

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.20      HALFSTREET FLOOD WIDTH(FEET) = 2.00
FLOW VELOCITY(FEET/SEC.) = 7.09      DEPTH*VELOCITY(FT*FT/SEC.) = 1.41
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10347.00 = 3289.00 FEET.

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*****
FLOW PROCESS FROM NODE 10347.00 TO NODE 10348.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 378.00      DOWNSTREAM ELEVATION(FEET) = 303.00
STREET LENGTH(FEET) = 751.00      CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.56

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.62  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.23  
HALFSTREET FLOOD WIDTH(FEET) = 3.35  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.01  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.35  
STREET FLOW TRAVEL TIME(MIN.) = 2.08 Tc(MIN.) = 24.12  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.646

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.20 0.60 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 1.22  
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 3.63

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.23 HALFSTREET FLOOD WIDTH(FEET) = 3.40  
FLOW VELOCITY(FEET/SEC.) = 5.96 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.35  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10348.00 = 4040.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10348.00 TO NODE 10349.00 IS CODE = 63  
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 303.00 DOWNSTREAM ELEVATION(FEET) = 252.00  
STREET LENGTH(FEET) = 607.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.23  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.25  
HALFSTREET FLOOD WIDTH(FEET) = 4.46  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.44  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.35  
STREET FLOW TRAVEL TIME(MIN.) = 1.86 Tc(MIN.) = 25.98  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.618

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.30 0.60 0.800 -  
USER-DEFINED - 3.00 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.815  
SUBAREA AREA(ACRES) = 10.30 SUBAREA RUNOFF(CFS) = 1.20  
EFFECTIVE AREA(ACRES) = 36.40 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 36.4 PEAK FLOW RATE(CFS) = 4.18

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.25 HALFSTREET FLOOD WIDTH(FEET) = 4.46  
FLOW VELOCITY(FEET/SEC.) = 5.38 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.33  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10349.00 = 4647.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10349.00 TO NODE 10350.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 252.00 DOWNSTREAM ELEVATION(FEET) = 246.00  
STREET LENGTH(FEET) = 224.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.92  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.36  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.36  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.03  
STREET FLOW TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 27.09  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.605

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 12.60 0.60 0.800 -  
USER-DEFINED - 0.50 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.802  
SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 1.46  
EFFECTIVE AREA(ACRES) = 49.50 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 49.5 PEAK FLOW RATE(CFS) = 5.21

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 7.56  
FLOW VELOCITY(FEET/SEC.) = 3.42 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.06  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10350.00 = 4871.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10350.00 TO NODE 10351.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 237.00  
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.00  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 5.21  
PIPE TRAVEL TIME(MIN.) = 1.24 Tc(MIN.) = 28.32  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10351.00 = 5390.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10351.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 28.32  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.590  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.60 0.100 -  
USER-DEFINED - 5.60 0.60 0.800 -  
USER-DEFINED - 0.70 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.784  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 0.75  
EFFECTIVE AREA(ACRES) = 56.00 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 56.0 PEAK FLOW RATE(CFS) = 5.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10352.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 237.00 DOWNSTREAM(FEET) = 230.00  
FLOW LENGTH(FEET) = 675.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.89  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 5.65  
PIPE TRAVEL TIME(MIN.) = 1.91 Tc(MIN.) = 30.23

LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10352.00 = 6065.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 30.23  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.568  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.00 0.60 0.100 -  
USER-DEFINED - 0.40 0.60 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.300  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 0.50  
EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 5.94

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 30.23  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.568  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.60 0.100 -  
USER-DEFINED - 9.40 0.60 0.800 -  
USER-DEFINED - 1.10 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.755  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 1.41  
EFFECTIVE AREA(ACRES) = 68.70 AREA-AVERAGED Fm(INCH/HR) = 0.47  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.79  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 68.7 PEAK FLOW RATE(CFS) = 7.35

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10353.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 230.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.44  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 7.35  
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 30.52  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10353.00 = 6366.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10353.00 TO NODE 10353.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 30.52  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.565  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.100 -  
USER-DEFINED - 6.00 0.60 0.800 -  
USER-DEFINED - 1.30 0.60 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.799  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 0.76  
EFFECTIVE AREA(ACRES) = 76.10 AREA-AVERAGED Fm(INCH/HR) = 0.47  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.79  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 76.1 PEAK FLOW RATE(CFS) = 8.07

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10353.00 TO NODE 10354.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 172.00  
FLOW LENGTH(FEET) = 458.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.83  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 8.07  
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 31.50  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10354.00 = 6824.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10354.00 TO NODE 10390.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 172.00 DOWNSTREAM(FEET) = 155.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00 CHANNEL SLOPE = 0.0411  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 8.07

FLOW VELOCITY(FEET/SEC.) = 4.98 FLOW DEPTH(FEET) = 0.74  
TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 32.88  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 32.88  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.544  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.60 0.100 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 0.100 -  
USER-DEFINED - 0.90 0.60 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.520  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 0.47  
EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.47  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.78  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 8.24

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 32.88  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.544  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.60 1.000 -  
USER-DEFINED - 0.60 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 0.850 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 0.100 -  
USER-DEFINED - 2.10 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.964  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 0.07  
EFFECTIVE AREA(ACRES) = 81.90 AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.79  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 81.9 PEAK FLOW RATE(CFS) = 8.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 32.88  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.544  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.50 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 84.40 AREA-AVERAGED Fm(INCH/HR) = 0.48  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 84.4 PEAK FLOW RATE(CFS) = 8.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	8.30	32.88	0.544	0.60( 0.48)	0.80	84.4	10340.00

LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	62.85	24.58	0.638	0.60( 0.46)	0.77	194.7	10300.00
2	53.38	29.19	0.580	0.60( 0.46)	0.76	213.0	10320.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	71.16	24.58	0.638	0.60( 0.47)	0.78	257.8	10300.00
2	61.23	29.19	0.580	0.60( 0.46)	0.77	287.9	10320.00
3	58.40	32.88	0.544	0.60( 0.46)	0.77	297.4	10340.00

TOTAL AREA(ACRES) = 297.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 71.16 Tc(MIN.) = 24.578  
 EFFECTIVE AREA(ACRES) = 257.82 AREA-AVERAGED Fm(INCH/HR) = 0.47  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA(ACRES) = 297.4  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10360.00 TO NODE 10361.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 337.00 DOWNSTREAM(FEET) = 292.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.697  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.025  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 NATURAL FAIR COVER  
 "WOODLAND,GRASS" - 0.30 0.60 1.000 95 10.70  
 NATURAL FAIR COVER  
 "GRASS" - 0.50 0.60 1.000 95 10.70  
 NATURAL FAIR COVER  
 "WOODLAND,GRASS" - 0.10 0.60 1.000 95 10.70  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 0.34  
 TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 0.34

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10361.00 TO NODE 10362.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 292.00 DOWNSTREAM(FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 199.00 CHANNEL SLOPE = 0.0101  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.34  
FLOW VELOCITY(FEET/SEC.) = 1.34 FLOW DEPTH(FEET) = 0.29  
TRAVEL TIME(MIN.) = 2.48 Tc(MIN.) = 13.17  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10362.00 = 529.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10362.00 TO NODE 10362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 13.17  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.913  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.90	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 0.32  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 0.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10362.00 TO NODE 10363.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 290.00 DOWNSTREAM(FEET) = 288.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.57  
FLOW VELOCITY(FEET/SEC.) = 1.72 FLOW DEPTH(FEET) = 0.33  
TRAVEL TIME(MIN.) = 1.42 Tc(MIN.) = 14.60  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10363.00 = 676.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10363.00 TO NODE 10363.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 14.60  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.856  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	0.80	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 0.57  
EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 1.04

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10363.00 TO NODE 10364.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 288.00 DOWNSTREAM(FEET) = 286.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.04

FLOW VELOCITY(FEET/SEC.) = 1.99 FLOW DEPTH(FEET) = 0.42  
TRAVEL TIME(MIN.) = 1.23 Tc(MIN.) = 15.83  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10364.00 = 823.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10364.00 TO NODE 10364.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 15.83  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.820  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	1.40	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 0.39  
EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 1.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10364.00 TO NODE 10365.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 286.00 DOWNSTREAM(FEET) = 284.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.29  
FLOW VELOCITY(FEET/SEC.) = 1.71 FLOW DEPTH(FEET) = 0.50  
TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 18.24  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10365.00 = 1071.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10365.00 TO NODE 10365.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 18.24  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.762  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	1.000	-
USER-DEFINED	-	1.80	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	0.50	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 0.54



EFFECTIVE AREA (ACRES) = 9.80 AREA-AVERAGED Fm (INCH/HR) = 0.59  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 9.8 PEAK FLOW RATE (CFS) = 1.50

\*\*\*\*\*

FLOW PROCESS FROM NODE 10365.00 TO NODE 10366.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 284.00 DOWNSTREAM (FEET) = 282.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 248.00 CHANNEL SLOPE = 0.0081  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 1.50  
FLOW VELOCITY (FEET/SEC.) = 1.77 FLOW DEPTH (FEET) = 0.53  
TRAVEL TIME (MIN.) = 2.34 Tc (MIN.) = 20.57  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10366.00 = 1319.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10366.00 TO NODE 10366.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 20.57  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.710  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.850 -  
USER-DEFINED - 3.20 0.60 1.000 -  
USER-DEFINED - 2.30 0.60 1.000 -  
USER-DEFINED - 0.20 0.60 0.850 -  
USER-DEFINED - 2.70 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.995  
SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 0.86  
EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.59  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 1.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 10366.00 TO NODE 10367.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 279.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 292.00 CHANNEL SLOPE = 0.0103  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 1.90  
FLOW VELOCITY (FEET/SEC.) = 2.06 FLOW DEPTH (FEET) = 0.55  
TRAVEL TIME (MIN.) = 2.36 Tc (MIN.) = 22.93  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10367.00 = 1611.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10367.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 22.93  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.667  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.60 0.850 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 1.10 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 0.850 -  
USER-DEFINED - 0.10 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.972  
SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 0.12  
EFFECTIVE AREA (ACRES) = 19.90 AREA-AVERAGED Fm (INCH/HR) = 0.59  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 19.9 PEAK FLOW RATE (CFS) = 1.90  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10368.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 279.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 378.00 CHANNEL SLOPE = 0.0079  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 1.90  
FLOW VELOCITY (FEET/SEC.) = 1.86 FLOW DEPTH (FEET) = 0.58  
TRAVEL TIME (MIN.) = 3.38 Tc (MIN.) = 26.31  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10368.00 = 1989.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10368.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 26.31  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.614  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.60 0.850 -  
USER-DEFINED - 0.90 0.60 1.000 -  
USER-DEFINED - 0.90 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.973  
SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 0.06  
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.59  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 1.90  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10369.00 IS CODE = 51

-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 247.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 229.00 CHANNEL SLOPE = 0.1266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.90  
FLOW VELOCITY(FEET/SEC.) = 5.28 FLOW DEPTH(FEET) = 0.35  
TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 27.04  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10369.00 = 2218.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10369.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 27.04  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.606  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	9.70	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	1.40	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.996  
SUBAREA AREA(ACRES) = 11.60 SUBAREA RUNOFF(CFS) = 0.08  
EFFECTIVE AREA(ACRES) = 33.70 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 33.7 PEAK FLOW RATE(CFS) = 1.90  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10370.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 247.00 DOWNSTREAM(FEET) = 226.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 179.00 CHANNEL SLOPE = 0.1173  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.90  
FLOW VELOCITY(FEET/SEC.) = 5.05 FLOW DEPTH(FEET) = 0.35  
TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 27.63  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10370.00 = 2397.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10370.00 TO NODE 10370.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 27.63  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.598

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	3.60	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	5.60	0.60	1.000	-
USER-DEFINED	-	1.50	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.997  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 0.02  
EFFECTIVE AREA(ACRES) = 44.80 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 44.8 PEAK FLOW RATE(CFS) = 1.90  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10370.00 TO NODE 10371.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 226.00 DOWNSTREAM(FEET) = 188.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 434.00 CHANNEL SLOPE = 0.0876  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.90  
FLOW VELOCITY(FEET/SEC.) = 4.60 FLOW DEPTH(FEET) = 0.37  
TRAVEL TIME(MIN.) = 1.57 Tc(MIN.) = 29.20  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10371.00 = 2831.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10371.00 TO NODE 10371.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 29.20  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.580  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	1.20	0.60	0.850	-
USER-DEFINED	-	1.60	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	7.20	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.958  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 10.70 SUBAREA RUNOFF(CFS) = 0.23  
EFFECTIVE AREA(ACRES) = 55.50 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 1.90  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10371.00 TO NODE 10389.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 157.00  
 FLOW LENGTH(FEET) = 1918.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.16  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 1.90  
 PIPE TRAVEL TIME(MIN.) = 6.20 Tc(MIN.) = 35.40  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 35.40  
 RAINFALL INTENSITY(INCH/HR) = 0.52  
 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.99  
 EFFECTIVE STREAM AREA(ACRES) = 55.50  
 TOTAL STREAM AREA(ACRES) = 55.50  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.90

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10380.00 TO NODE 10381.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 241.00  
 ELEVATION DATA: UPSTREAM(FEET) = 275.00 DOWNSTREAM(FEET) = 273.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.110  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.299

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.60	0.100	95	7.11
PUBLIC PARK	-	1.10	0.60	0.850	95	11.30

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.735  
 SUBAREA RUNOFF(CFS) = 1.00  
 TOTAL AREA(ACRES) = 1.30 PEAK FLOW RATE(CFS) = 1.00

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10381.00 TO NODE 10382.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 273.00 DOWNSTREAM ELEVATION(FEET) = 271.00  
 STREET LENGTH(FEET) = 238.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.52

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.26  
 HALFSTREET FLOOD WIDTH(FEET) = 5.03  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.72  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.44  
 STREET FLOW TRAVEL TIME(MIN.) = 2.31 Tc(MIN.) = 9.42  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.100

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	1.40	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.718  
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 1.03  
 EFFECTIVE AREA(ACRES) = 3.00 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 1.80

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 5.66  
 FLOW VELOCITY(FEET/SEC.) = 1.76 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.48  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10382.00 = 479.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10382.00 TO NODE 10383.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 271.00 DOWNSTREAM ELEVATION(FEET) = 268.00  
 STREET LENGTH(FEET) = 357.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020  
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.69  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.30  
HALFSTREET FLOOD WIDTH(FEET) = 7.28  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.87  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.57  
STREET FLOW TRAVEL TIME(MIN.) = 3.18 Tc(MIN.) = 12.60  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.936

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.500	-
USER-DEFINED	-	1.30	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.452  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 1.80  
EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 3.15

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 7.91  
FLOW VELOCITY(FEET/SEC.) = 1.93 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.61  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10383.00 = 836.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10383.00 TO NODE 10384.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 268.00 DOWNSTREAM ELEVATION(FEET) = 264.00  
STREET LENGTH(FEET) = 473.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.07  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 8.97

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.05  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.69  
STREET FLOW TRAVEL TIME(MIN.) = 3.85 Tc(MIN.) = 16.45  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.805

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	3.00	0.60	0.500	-
USER-DEFINED	-	0.60	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 1.84  
EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.34  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.57  
TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 4.29

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 9.22  
FLOW VELOCITY(FEET/SEC.) = 2.06 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.71  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10384.00 = 1309.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10384.00 TO NODE 10385.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 264.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
STREET LENGTH(FEET) = 463.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.22  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 10.74  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.94  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.72  
STREET FLOW TRAVEL TIME(MIN.) = 3.97 Tc(MIN.) = 20.42  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.712

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	0.600	-
USER-DEFINED	-	0.30	0.60	0.600	-
USER-DEFINED	-	0.60	0.60	0.850	-

USER-DEFINED - 0.30 0.60 0.500 -  
 USER-DEFINED - 4.00 0.60 0.600 -  
 USER-DEFINED - 0.80 0.60 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.650  
 SUBAREA AREA (ACRES) = 6.40 SUBAREA RUNOFF (CFS) = 1.86  
 EFFECTIVE AREA (ACRES) = 16.70 AREA-AVERAGED Fm (INCH/HR) = 0.36  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA (ACRES) = 16.7 PEAK FLOW RATE (CFS) = 5.28

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 10.82  
 FLOW VELOCITY (FEET/SEC.) = 1.94 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.73  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10385.00 = 1772.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10385.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 20.42  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.712  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.500	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.07  
 EFFECTIVE AREA (ACRES) = 16.90 AREA-AVERAGED Fm (INCH/HR) = 0.36  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA (ACRES) = 16.9 PEAK FLOW RATE (CFS) = 5.36

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10386.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 261.00 DOWNSTREAM (FEET) = 200.00  
 FLOW LENGTH (FEET) = 712.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.2 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.59  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 5.36  
 PIPE TRAVEL TIME (MIN.) = 0.94 Tc (MIN.) = 21.36  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10386.00 = 2484.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 21.36  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.695  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.500	-

LAND USE	GROUP	ACRES	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.561  
 SUBAREA AREA (ACRES) = 1.40 SUBAREA RUNOFF (CFS) = 0.45  
 EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.36  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 5.55

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 21.36  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.695  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.600	-
USER-DEFINED	-	1.70	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.544  
 SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 1.36  
 EFFECTIVE AREA (ACRES) = 22.40 AREA-AVERAGED Fm (INCH/HR) = 0.35  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA (ACRES) = 22.4 PEAK FLOW RATE (CFS) = 6.92

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 21.36  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.695  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.600	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	0.70	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.850	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223  
 SUBAREA AREA (ACRES) = 3.50 SUBAREA RUNOFF (CFS) = 1.77  
 EFFECTIVE AREA (ACRES) = 25.90 AREA-AVERAGED Fm (INCH/HR) = 0.32  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.54

TOTAL AREA (ACRES) = 25.9 PEAK FLOW RATE (CFS) = 8.69

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 21.36

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.695

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	1.70	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.228

SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 1.01

EFFECTIVE AREA (ACRES) = 27.90 AREA-AVERAGED Fm (INCH/HR) = 0.31

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.52

TOTAL AREA (ACRES) = 27.9 PEAK FLOW RATE (CFS) = 9.69

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 21.36

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.695

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.50	0.60	0.850	-
USER-DEFINED	-	2.10	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.225

SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 1.51

EFFECTIVE AREA (ACRES) = 30.90 AREA-AVERAGED Fm (INCH/HR) = 0.29

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.49

TOTAL AREA (ACRES) = 30.9 PEAK FLOW RATE (CFS) = 11.20

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 21.36

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.695

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.60	0.100	-
USER-DEFINED	-	1.50	0.60	0.600	-
USER-DEFINED	-	1.70	0.60	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.204

SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 3.71

EFFECTIVE AREA (ACRES) = 38.10 AREA-AVERAGED Fm (INCH/HR) = 0.26

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43

TOTAL AREA (ACRES) = 38.1 PEAK FLOW RATE (CFS) = 14.92

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10387.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 200.00 DOWNSTREAM (FEET) = 163.00

FLOW LENGTH (FEET) = 1145.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.5 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 11.34

ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 14.92

PIPE TRAVEL TIME (MIN.) = 1.68 Tc (MIN.) = 23.05

LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10387.00 = 3629.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 23.05

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.665

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	0.100	-
USER-DEFINED	-	23.80	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.80	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	0.100	-
USER-DEFINED	-	6.90	0.60	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.830

SUBAREA AREA (ACRES) = 32.90 SUBAREA RUNOFF (CFS) = 4.95

EFFECTIVE AREA (ACRES) = 71.00 AREA-AVERAGED Fm (INCH/HR) = 0.37

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.62

TOTAL AREA (ACRES) = 71.0 PEAK FLOW RATE (CFS) = 18.83

\*\*\*\*\*

FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 23.05

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.665

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	1.20	0.60	0.100	-
USER-DEFINED	-	1.70	0.60	0.850	-

USER-DEFINED - 0.30 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.641  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 0.96  
EFFECTIVE AREA(ACRES) = 74.80 AREA-AVERAGED Fm(INCH/HR) = 0.37  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 74.8 PEAK FLOW RATE(CFS) = 19.79

\*\*\*\*\*

FLOW PROCESS FROM NODE 10387.00 TO NODE 10388.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 163.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.42  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 19.79  
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 23.25  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10388.00 = 3779.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.25  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.662

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.80	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	0.400	-
USER-DEFINED	-	0.60	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 2.90  
EFFECTIVE AREA(ACRES) = 80.90 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 80.9 PEAK FLOW RATE(CFS) = 22.45

\*\*\*\*\*

FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.25  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.662

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-

USER-DEFINED - 10.70 0.60 0.400 -  
USER-DEFINED - 2.30 0.60 0.850 -  
USER-DEFINED - 0.50 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 1.000 -  
USER-DEFINED - 0.70 0.60 0.400 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.502  
SUBAREA AREA(ACRES) = 14.60 SUBAREA RUNOFF(CFS) = 4.74  
EFFECTIVE AREA(ACRES) = 95.50 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 95.5 PEAK FLOW RATE(CFS) = 27.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.25  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.662

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.10  
EFFECTIVE AREA(ACRES) = 96.20 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 96.2 PEAK FLOW RATE(CFS) = 27.28

\*\*\*\*\*

FLOW PROCESS FROM NODE 10388.00 TO NODE 10389.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 158.00 DOWNSTREAM(FEET) = 157.00  
FLOW LENGTH(FEET) = 51.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.84  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 27.28  
PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 23.33  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10389.00 = 3830.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 23.33  
RAINFALL INTENSITY(INCH/HR) = 0.66  
AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.58

EFFECTIVE STREAM AREA(ACRES) = 96.20  
TOTAL STREAM AREA(ACRES) = 96.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 27.28

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1.90	35.40	0.521	0.60( 0.59)	0.99	55.5	10360.00
2	27.28	23.33	0.660	0.60( 0.35)	0.58	96.2	10380.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	28.86	23.33	0.660	0.60( 0.41)	0.69	132.8	10380.00
2	21.06	35.40	0.521	0.60( 0.44)	0.73	151.7	10360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 28.86 Tc(MIN.) = 23.33  
EFFECTIVE AREA(ACRES) = 132.77 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 151.7  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10390.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 157.00 DOWNSTREAM(FEET) = 155.00  
FLOW LENGTH(FEET) = 312.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.21  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 28.86  
PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 24.05  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc(MIN.) = 24.05  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.647

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	3.10	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	5.70	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.997  
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 0.42  
EFFECTIVE AREA(ACRES) = 142.27 AREA-AVERAGED Fm(INCH/HR) = 0.43  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.71  
TOTAL AREA(ACRES) = 161.2 PEAK FLOW RATE(CFS) = 28.86  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc(MIN.) = 24.05

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.647

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.20	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 0.09

EFFECTIVE AREA(ACRES) = 144.47 AREA-AVERAGED Fm(INCH/HR) = 0.43

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.71

TOTAL AREA(ACRES) = 163.4 PEAK FLOW RATE(CFS) = 28.86

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
-----

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	28.86	24.05	0.647	0.60( 0.43)	0.71	144.5	10380.00
2	21.06	36.17	0.514	0.60( 0.45)	0.75	163.4	10360.00

LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	71.16	24.58	0.638	0.60( 0.47)	0.78	257.8	10300.00
2	61.23	29.19	0.580	0.60( 0.46)	0.77	287.9	10320.00
3	58.40	32.88	0.544	0.60( 0.46)	0.77	297.4	10340.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	100.02	24.05	0.647	0.60( 0.45)	0.75	396.7	10380.00
2	99.68	24.58	0.638	0.60( 0.45)	0.75	403.1	10300.00
3	86.78	29.19	0.580	0.60( 0.45)	0.76	440.4	10320.00
4	81.58	32.88	0.544	0.60( 0.46)	0.76	455.7	10340.00
5	76.28	36.17	0.514	0.60( 0.46)	0.76	460.8	10360.00

TOTAL AREA(ACRES) = 460.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:



PEAK FLOW RATE(CFS) = 100.02 Tc(MIN.) = 24.048  
 EFFECTIVE AREA(ACRES) = 396.74 AREA-AVERAGED Fm(INCH/HR) = 0.45  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.75  
 TOTAL AREA(ACRES) = 460.8  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

=====  
 END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 460.8 TC(MIN.) = 24.05  
 EFFECTIVE AREA(ACRES) = 396.74 AREA-AVERAGED Fm(INCH/HR)= 0.45  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.754  
 PEAK FLOW RATE(CFS) = 100.02

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	100.02	24.05	0.647	0.60( 0.45)	0.75	396.7	10380.00
2	99.68	24.58	0.638	0.60( 0.45)	0.75	403.1	10300.00
3	86.78	29.19	0.580	0.60( 0.45)	0.76	440.4	10320.00
4	81.58	32.88	0.544	0.60( 0.46)	0.76	455.7	10340.00
5	76.28	36.17	0.514	0.60( 0.46)	0.76	460.8	10360.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506104G.DAT  
TIME/DATE OF STUDY: 12:47 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 1.580
- 2) 6.00; 1.430
- 3) 7.00; 1.310
- 4) 8.00; 1.210
- 5) 9.00; 1.130
- 6) 10.00; 1.060
- 7) 11.00; 1.010
- 8) 12.00; 0.960
- 9) 13.00; 0.920
- 10) 14.00; 0.880
- 11) 15.00; 0.840
- 12) 20.00; 0.720
- 13) 25.00; 0.630
- 14) 30.00; 0.570
- 15) 40.00; 0.480
- 16) 50.00; 0.420
- 17) 60.00; 0.380
- 18) 90.00; 0.300
- 19) 120.00; 0.260
- 20) 180.00; 0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10400.00 TO NODE 10401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00  
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.434  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.378  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
PUBLIC PARK	-	0.50	0.60	0.850	95	6.43

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.850  
 SUBAREA RUNOFF(CFS) = 0.39  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 10401.00 TO NODE 10402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.3419  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 0.39  
 FLOW VELOCITY(FEET/SEC.) = 4.09 FLOW DEPTH(FEET) = 0.18  
 TRAVEL TIME(MIN.) = 0.48  $T_c$ (MIN.) = 6.91  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10402.00 = 424.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 6.91  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.321  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.940  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 0.34  
EFFECTIVE AREA(ACRES) = 1.00 AREA-AVERAGED Fm(INCH/HR) = 0.54  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 0.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10402.00 TO NODE 10403.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.2439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.71  
FLOW VELOCITY(FEET/SEC.) = 4.31 FLOW DEPTH(FEET) = 0.23  
TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 7.39  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10403.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10403.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 7.39  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.271  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.60 0.850 -  
USER-DEFINED - 0.40 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 0.58  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.54  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.91  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 1.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10404.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 420.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 266.00 CHANNEL SLOPE = 0.1880  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.25  
FLOW VELOCITY(FEET/SEC.) = 4.38 FLOW DEPTH(FEET) = 0.31  
TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 8.40  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10404.00 = 813.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10404.00 IS CODE = 81  
-----

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc(MIN.) = 8.40  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.178  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.60 0.850 -  
USER-DEFINED - 0.20 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.863  
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 1.37  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.53  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 2.45

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10405.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 370.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 289.00 CHANNEL SLOPE = 0.1730  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.45  
FLOW VELOCITY(FEET/SEC.) = 5.12 FLOW DEPTH(FEET) = 0.40  
TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 9.34  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10405.00 = 1102.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10405.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 9.34  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.106  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.60 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 2.15  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.52  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 4.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10406.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 367.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 23.00 CHANNEL SLOPE = 0.1304  
-----

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.33  
FLOW VELOCITY (FEET/SEC.) = 5.30 FLOW DEPTH (FEET) = 0.52  
TRAVEL TIME (MIN.) = 0.07 Tc (MIN.) = 9.41  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10406.00 = 1125.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.41  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.101  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 1.12  
EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.52  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 5.41

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 367.00 DOWNSTREAM (FEET) = 344.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 214.00 CHANNEL SLOPE = 0.1075  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 5.41  
FLOW VELOCITY (FEET/SEC.) = 5.17 FLOW DEPTH (FEET) = 0.59  
TRAVEL TIME (MIN.) = 0.69 Tc (MIN.) = 10.10  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10407.00 = 1339.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.10  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.055  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 0.98  
EFFECTIVE AREA (ACRES) = 12.30 AREA-AVERAGED Fm (INCH/HR) = 0.52  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 5.96

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 344.00 DOWNSTREAM (FEET) = 327.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 919.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 5.96  
FLOW VELOCITY (FEET/SEC.) = 3.44 FLOW DEPTH (FEET) = 0.76  
TRAVEL TIME (MIN.) = 4.45 Tc (MIN.) = 14.55  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10408.00 = 2258.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10408.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 14.55  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.858  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.800 -  
USER-DEFINED - 7.90 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.849  
SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 2.51  
EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.51  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 6.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 327.00 DOWNSTREAM (FEET) = 314.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 807.00 CHANNEL SLOPE = 0.0161  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 6.29  
FLOW VELOCITY (FEET/SEC.) = 3.29 FLOW DEPTH (FEET) = 0.80  
TRAVEL TIME (MIN.) = 4.09 Tc (MIN.) = 18.64  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10409.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10409.00 TO NODE 10409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 18.64  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.753  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

```

LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        6.90     0.60      0.800      -
USER-DEFINED  -        5.70     0.60      0.850      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.823
SUBAREA AREA (ACRES) = 12.60  SUBAREA RUNOFF (CFS) = 2.94
EFFECTIVE AREA (ACRES) = 32.90  AREA-AVERAGED Fm (INCH/HR) = 0.51
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.84
TOTAL AREA (ACRES) = 32.9  PEAK FLOW RATE (CFS) = 7.30

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*****
FLOW PROCESS FROM NODE 10409.00 TO NODE 10410.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 314.00  DOWNSTREAM(FEET) = 266.00
FLOW LENGTH(FEET) = 213.00  MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.41
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.30
PIPE TRAVEL TIME(MIN.) = 0.18  Tc(MIN.) = 18.83
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10410.00 = 3278.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 10410.00 TO NODE 10411.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 266.00  DOWNSTREAM(FEET) = 170.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1470.00  CHANNEL SLOPE = 0.0653
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.30
FLOW VELOCITY(FEET/SEC.) = 5.74  FLOW DEPTH(FEET) = 0.65
TRAVEL TIME(MIN.) = 4.27  Tc(MIN.) = 23.10
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10411.00 = 4748.00 FEET.

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*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10411.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 23.10
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.664
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -  0.60  0.60  0.100  -
USER-DEFINED  -  0.10  0.60  0.850  -
USER-DEFINED  -  0.40  0.60  0.100  -
USER-DEFINED  -  6.60  0.60  0.800  -
USER-DEFINED  -  0.80  0.60  0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.723

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SUBAREA AREA(ACRES) = 8.50  SUBAREA RUNOFF(CFS) = 1.76
EFFECTIVE AREA(ACRES) = 41.40  AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.82
TOTAL AREA(ACRES) = 41.4  PEAK FLOW RATE(CFS) = 7.30
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10412.00 IS CODE = 31
-----

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```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 170.00  DOWNSTREAM(FEET) = 161.00
FLOW LENGTH(FEET) = 1129.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.62
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.30
PIPE TRAVEL TIME(MIN.) = 3.35  Tc(MIN.) = 26.45
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10412.00 = 5877.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10412.00 TO NODE 10413.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 161.00  DOWNSTREAM(FEET) = 141.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 360.00  CHANNEL SLOPE = 0.0556
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.30
FLOW VELOCITY(FEET/SEC.) = 5.45  FLOW DEPTH(FEET) = 0.67
TRAVEL TIME(MIN.) = 1.10  Tc(MIN.) = 27.55
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10413.00 = 6237.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10413.00 TO NODE 10413.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

```

MAINLINE Tc(MIN.) = 27.55
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.599
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -  1.20  0.60  0.100  -
USER-DEFINED  -  0.40  0.60  0.850  -
USER-DEFINED  -  0.30  0.60  0.100  -
USER-DEFINED  -  0.10  0.60  0.850  -
USER-DEFINED  -  0.90  0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.509
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 2.90  SUBAREA RUNOFF(CFS) = 0.77
EFFECTIVE AREA(ACRES) = 44.30  AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.80

```

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED  $F_p$ ;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 44.3 PEAK FLOW RATE (CFS) = 7.30  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 44.3 TC (MIN.) = 27.55  
EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.48  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.60 AREA-AVERAGED  $A_p$  = 0.798  
PEAK FLOW RATE (CFS) = 7.30

=====

=====

END OF RATIONAL METHOD ANALYSIS



```

LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.10     0.60      1.000     -
USER-DEFINED  -        0.80     0.60      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 0.29
EFFECTIVE AREA (ACRES) = 1.40  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.4    PEAK FLOW RATE (CFS) = 0.45

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```

*****
FLOW PROCESS FROM NODE 10502.00 TO NODE 10503.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1025.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 193.00  CHANNEL SLOPE = 0.1295
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.45
FLOW VELOCITY(FEET/SEC.) = 2.99  FLOW DEPTH(FEET) = 0.22
TRAVEL TIME(MIN.) = 1.07  Tc(MIN.) = 13.13
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10503.00 = 700.00 FEET.

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10503.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.915
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.50   0.60  1.000  -
USER-DEFINED      -        1.80   0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 0.65
EFFECTIVE AREA (ACRES) = 3.70  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 3.7    PEAK FLOW RATE (CFS) = 1.05

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```

*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10504.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 1025.00  DOWNSTREAM(FEET) = 1020.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00  CHANNEL SLOPE = 0.0151
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.05
FLOW VELOCITY(FEET/SEC.) = 2.03  FLOW DEPTH(FEET) = 0.41
TRAVEL TIME(MIN.) = 2.72  Tc(MIN.) = 15.85
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10504.00 = 1032.00 FEET.

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10504.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.85
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.820
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.10   0.60  1.000  -
USER-DEFINED      -        0.80   0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 0.18
EFFECTIVE AREA (ACRES) = 4.60  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.6    PEAK FLOW RATE (CFS) = 1.05
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10505.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 1020.00  DOWNSTREAM(FEET) = 975.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 397.00  CHANNEL SLOPE = 0.1134
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.05
FLOW VELOCITY(FEET/SEC.) = 4.30  FLOW DEPTH(FEET) = 0.29
TRAVEL TIME(MIN.) = 1.54  Tc(MIN.) = 17.39
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10505.00 = 1429.00 FEET.

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10505.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 17.39
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.783
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.20   0.60  1.000  -
USER-DEFINED      -        1.20   0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.40  SUBAREA RUNOFF (CFS) = 0.23
EFFECTIVE AREA (ACRES) = 6.00  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.0    PEAK FLOW RATE (CFS) = 1.05
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10506.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 905.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 334.00 CHANNEL SLOPE = 0.2096
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.05
FLOW VELOCITY(FEET/SEC.) = 5.39 FLOW DEPTH(FEET) = 0.25
TRAVEL TIME(MIN.) = 1.03 Tc(MIN.) = 18.42
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10506.00 = 1763.00 FEET.

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10506.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.42
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.758
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.10 0.60 1.000 -
USER-DEFINED - 3.70 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 1.39
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 2.25

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10507.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 790.00 CHANNEL SLOPE = 0.0380
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.25
FLOW VELOCITY(FEET/SEC.) = 2.83 FLOW DEPTH(FEET) = 0.51
TRAVEL TIME(MIN.) = 4.65 Tc(MIN.) = 23.07
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10507.00 = 2553.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10507.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 23.07
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.665
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.70 0.60 1.000 -

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```

USER-DEFINED - 6.30 0.60 1.000 -
USER-DEFINED - 0.30 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 0.54
EFFECTIVE AREA(ACRES) = 25.10 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 2.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10508.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 755.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.25
FLOW VELOCITY(FEET/SEC.) = 4.16 FLOW DEPTH(FEET) = 0.42
TRAVEL TIME(MIN.) = 4.49 Tc(MIN.) = 27.56
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10508.00 = 3673.00 FEET.

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10508.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 27.56
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.599
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.80 0.60 1.000 -
USER-DEFINED - 11.10 0.60 1.000 -
USER-DEFINED - 3.10 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 40.10 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 2.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10509.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 755.00 DOWNSTREAM(FEET) = 533.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1578.00 CHANNEL SLOPE = 0.1407

```

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.25  
FLOW VELOCITY (FEET/SEC.) = 4.65 FLOW DEPTH (FEET) = 0.40  
TRAVEL TIME (MIN.) = 5.66 Tc (MIN.) = 33.22  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10509.00 = 5251.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10509.00 TO NODE 10509.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 33.22

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.541

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.80	0.60	1.000	-
USER-DEFINED	-	11.40	0.60	1.000	-
USER-DEFINED	-	1.10	0.60	1.000	-
USER-DEFINED	-	8.30	0.60	1.000	-
USER-DEFINED	-	38.10	0.60	1.000	-
USER-DEFINED	-	8.70	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA (ACRES) = 77.40 SUBAREA RUNOFF (CFS) = 0.00

EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 2.25

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10509.00 TO NODE 10510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 415.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1236.00 CHANNEL SLOPE = 0.0955  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.25  
FLOW VELOCITY (FEET/SEC.) = 4.01 FLOW DEPTH (FEET) = 0.43  
TRAVEL TIME (MIN.) = 5.13 Tc (MIN.) = 38.35  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10510.00 = 6487.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10510.00 TO NODE 10510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 38.35

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.495

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	30.10	0.60	1.000	-
USER-DEFINED	-	15.30	0.60	1.000	-
USER-DEFINED	-	2.00	0.60	1.000	-
USER-DEFINED	-	11.30	0.60	1.000	-
USER-DEFINED	-	5.10	0.60	1.000	-
USER-DEFINED	-	1.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA (ACRES) = 64.90 SUBAREA RUNOFF (CFS) = 0.00

EFFECTIVE AREA (ACRES) = 182.40 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 182.4 PEAK FLOW RATE (CFS) = 2.25

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10510.00 TO NODE 10511.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 302.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1161.00 CHANNEL SLOPE = 0.0973  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.25  
FLOW VELOCITY (FEET/SEC.) = 4.01 FLOW DEPTH (FEET) = 0.43  
TRAVEL TIME (MIN.) = 4.82 Tc (MIN.) = 43.18  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10511.00 = 7648.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10511.00 TO NODE 10511.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 43.18

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.461

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.50	0.60	1.000	-
USER-DEFINED	-	10.80	0.60	1.000	-
USER-DEFINED	-	1.10	0.60	1.000	-
USER-DEFINED	-	22.10	0.60	1.000	-
USER-DEFINED	-	4.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA (ACRES) = 54.80 SUBAREA RUNOFF (CFS) = 0.00

EFFECTIVE AREA (ACRES) = 237.20 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 237.2 PEAK FLOW RATE (CFS) = 2.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10511.00 TO NODE 10512.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	302.00	DOWNSTREAM (FEET) =	190.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	1644.00	CHANNEL SLOPE =	0.0681
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	4.00
CHANNEL FLOW THRU SUBAREA (CFS) =	2.25		
FLOW VELOCITY (FEET/SEC.) =	3.53	FLOW DEPTH (FEET) =	0.46
TRAVEL TIME (MIN.) =	7.76	Tc (MIN.) =	50.94
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10512.00 =	9292.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10512.00 TO NODE 10512.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc (MIN.) =	50.94				
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.416				
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.50	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	1.70	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	14.20	0.60	1.000	-
USER-DEFINED	-	2.80	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA (ACRES) = 19.50 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 256.70 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 256.7 PEAK FLOW RATE (CFS) = 2.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10512.00 TO NODE 10513.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	190.00	DOWNSTREAM (FEET) =	183.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	86.00	CHANNEL SLOPE =	0.0814
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	4.00
CHANNEL FLOW THRU SUBAREA (CFS) =	2.25		

FLOW VELOCITY (FEET/SEC.) = 3.78 FLOW DEPTH (FEET) = 0.45  
TRAVEL TIME (MIN.) = 0.38 Tc (MIN.) = 51.32  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10513.00 = 9378.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) =	51.32				
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.415				
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	1.30	0.60	1.000	-
USER-DEFINED	-	29.90	0.60	1.000	-
USER-DEFINED	-	11.90	0.60	1.000	-
USER-DEFINED	-	1.70	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA (ACRES) = 45.50 SUBAREA RUNOFF (CFS) = 0.24  
EFFECTIVE AREA (ACRES) = 302.20 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 302.2 PEAK FLOW RATE (CFS) = 2.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) =	51.32				
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.415				
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	9.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA (ACRES) = 9.30 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 311.50 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 311.5 PEAK FLOW RATE (CFS) = 2.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10513.00 TO NODE 10514.00 IS CODE = 31  
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 171.00
FLOW LENGTH(FEET) = 1209.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.54
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.25
PIPE TRAVEL TIME(MIN.) = 4.43 Tc(MIN.) = 55.75
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10514.00 = 10587.00 FEET.

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FLOW PROCESS FROM NODE 10514.00 TO NODE 10514.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 55.75
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.397
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.60 0.100 -
USER-DEFINED - 0.40 0.60 1.000 -
USER-DEFINED - 1.70 0.60 0.100 -
USER-DEFINED - 31.30 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 33.60 SUBAREA RUNOFF(CFS) = 0.61
EFFECTIVE AREA(ACRES) = 345.10 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 345.1 PEAK FLOW RATE(CFS) = 2.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10514.00 TO NODE 10515.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 171.00 DOWNSTREAM(FEET) = 165.00
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.66
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.25
PIPE TRAVEL TIME(MIN.) = 2.02 Tc(MIN.) = 57.78
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10515.00 = 11152.00 FEET.

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*****
FLOW PROCESS FROM NODE 10515.00 TO NODE 10515.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 57.78
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.389
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.60 0.850 -
USER-DEFINED - 1.30 0.60 0.100 -
USER-DEFINED - 0.90 0.60 0.850 -
USER-DEFINED - 15.30 0.60 0.100 -
USER-DEFINED - 1.10 0.60 0.850 -
USER-DEFINED - 0.10 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.202
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 5.36
EFFECTIVE AREA(ACRES) = 364.30 AREA-AVERAGED Fm(INCH/HR) = 0.57
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 364.3 PEAK FLOW RATE(CFS) = 6.18

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*****
FLOW PROCESS FROM NODE 10515.00 TO NODE 10525.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00
FLOW LENGTH(FEET) = 709.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.91
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 6.18
PIPE TRAVEL TIME(MIN.) = 2.00 Tc(MIN.) = 59.78
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

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*****
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 59.78
RAINFALL INTENSITY(INCH/HR) = 0.38
AREA-AVERAGED Fm(INCH/HR) = 0.57
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.95
EFFECTIVE STREAM AREA(ACRES) = 364.30
TOTAL STREAM AREA(ACRES) = 364.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.18

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*****
FLOW PROCESS FROM NODE 10520.00 TO NODE 10521.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 289.00  
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 180.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.311  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.279

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.30	0.60	0.100	95	7.31
PUBLIC PARK	-	1.20	0.60	0.850	95	11.62

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.700

SUBAREA RUNOFF(CFS) = 1.16

TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 1.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10521.00 TO NODE 10522.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 180.00 DOWNSTREAM ELEVATION(FEET) = 176.00  
STREET LENGTH(FEET) = 408.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.95  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.27  
HALFSTREET FLOOD WIDTH(FEET) = 5.66  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.92  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.52  
STREET FLOW TRAVEL TIME(MIN.) = 3.55 Tc(MIN.) = 10.86  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.017

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	0.100	-
USER-DEFINED	-	0.60	0.60	0.850	-
USER-DEFINED	-	0.60	0.60	0.100	-
USER-DEFINED	-	0.80	0.60	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520

SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 1.59

EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.35

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 2.39

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 6.47

FLOW VELOCITY(FEET/SEC.) = 1.97 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.57

LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10522.00 = 697.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10522.00 TO NODE 10523.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 176.00 DOWNSTREAM ELEVATION(FEET) = 173.00  
STREET LENGTH(FEET) = 333.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.42

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.34

HALFSTREET FLOOD WIDTH(FEET) = 9.22

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.13

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.73

STREET FLOW TRAVEL TIME(MIN.) = 2.61 Tc(MIN.) = 13.47

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.901

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	0.100	-
USER-DEFINED	-	4.70	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.600	-
USER-DEFINED	-	0.10	0.60	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.109

SUBAREA AREA(ACRES) = 5.40 SUBAREA RUNOFF(CFS) = 4.06

EFFECTIVE AREA(ACRES) = 9.40 AREA-AVERAGED Fm(INCH/HR) = 0.19

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31

TOTAL AREA(ACRES) = 9.4 PEAK FLOW RATE(CFS) = 6.04

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.66

FLOW VELOCITY(FEET/SEC.) = 2.28 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.85

LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10523.00 = 1030.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10523.00 TO NODE 10523.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 13.47  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.901  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	1.90	0.60	0.850	-
USER-DEFINED	-	0.80	0.60	0.100	-
USER-DEFINED	-	4.80	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	4.90	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785  
 SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 4.92  
 EFFECTIVE AREA(ACRES) = 22.10 AREA-AVERAGED Fm(INCH/HR) = 0.35  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA(ACRES) = 22.1 PEAK FLOW RATE(CFS) = 10.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10524.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 173.00 DOWNSTREAM(FEET) = 165.00  
 FLOW LENGTH(FEET) = 736.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.05  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 10.96  
 PIPE TRAVEL TIME(MIN.) = 1.74 Tc(MIN.) = 15.21  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10524.00 = 1766.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10524.00 TO NODE 10524.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 15.21  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.835  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.90	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.308  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 1.05  
 EFFECTIVE AREA(ACRES) = 23.90 AREA-AVERAGED Fm(INCH/HR) = 0.34  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.56  
 TOTAL AREA(ACRES) = 23.9 PEAK FLOW RATE(CFS) = 10.96  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10524.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
 FLOW LENGTH(FEET) = 623.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.14  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 10.96  
 PIPE TRAVEL TIME(MIN.) = 1.45 Tc(MIN.) = 16.66  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10525.00 = 2389.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 16.66  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.800  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	6.80	0.60	0.850	-
USER-DEFINED	-	0.90	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
 SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 2.36  
 EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.39  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.64  
 TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 12.30

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 16.66  
 RAINFALL INTENSITY(INCH/HR) = 0.80  
 AREA-AVERAGED Fm(INCH/HR) = 0.39  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.64  
 EFFECTIVE STREAM AREA(ACRES) = 33.00  
 TOTAL STREAM AREA(ACRES) = 33.00  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.30

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	6.18	59.78	0.381	0.60( 0.57)	0.95	364.3	10500.00
2	12.30	16.66	0.800	0.60( 0.39)	0.64	33.0	10520.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	18.48	16.66	0.800	0.60( 0.53)	0.88	134.6	10520.00
2	10.21	59.78	0.381	0.60( 0.56)	0.93	397.3	10500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 18.48 Tc(MIN.) = 16.66  
EFFECTIVE AREA(ACRES) = 134.56 AREA-AVERAGED Fm(INCH/HR) = 0.53  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 397.3  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10526.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 158.00 DOWNSTREAM(FEET) = 148.00  
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 28.99  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 18.48  
PIPE TRAVEL TIME(MIN.) = 0.02 Tc(MIN.) = 16.68  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10526.00 = 11891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10526.00 TO NODE 10527.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 148.00 DOWNSTREAM(FEET) = 135.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 296.00 CHANNEL SLOPE = 0.0439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 18.48  
FLOW VELOCITY(FEET/SEC.) = 6.30 FLOW DEPTH(FEET) = 0.99  
TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 17.46  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10527.00 = 12187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.46  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.781  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 0.30 0.60 1.000 -  
USER-DEFINED - 0.80 0.60 1.000 -  
USER-DEFINED - 0.20 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 0.23  
EFFECTIVE AREA(ACRES) = 135.96 AREA-AVERAGED Fm(INCH/HR) = 0.53  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 398.7 PEAK FLOW RATE(CFS) = 31.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.46  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.781  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.100 -  
USER-DEFINED - 1.10 0.60 1.000 -  
USER-DEFINED - 0.40 0.60 1.000 -  
USER-DEFINED - 1.10 0.60 1.000 -  
USER-DEFINED - 2.20 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.982  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 0.85  
EFFECTIVE AREA(ACRES) = 140.86 AREA-AVERAGED Fm(INCH/HR) = 0.53  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 403.6 PEAK FLOW RATE(CFS) = 32.00

=====

END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 403.6 TC(MIN.) = 17.46  
EFFECTIVE AREA(ACRES) = 140.86 AREA-AVERAGED Fm(INCH/HR) = 0.53  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.881  
PEAK FLOW RATE(CFS) = 32.00

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	32.00	17.46	0.781	0.60( 0.53)	0.88	140.9	10520.00
2	10.21	60.70	0.378	0.60( 0.56)	0.93	403.6	10500.00

=====

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

FILE NAME: 0506106G.DAT
TIME/DATE OF STUDY: 12:52 04/15/2013

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
\*USER-DEFINED TABLED RAINFALL USED\*
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20
1) 5.00; 1.580
2) 6.00; 1.430
3) 7.00; 1.310
4) 8.00; 1.210
5) 9.00; 1.130
6) 10.00; 1.060
7) 11.00; 1.010
8) 12.00; 0.960
9) 13.00; 0.920
10) 14.00; 0.880
11) 15.00; 0.840
12) 20.00; 0.720
13) 25.00; 0.630
14) 30.00; 0.570
15) 40.00; 0.480
16) 50.00; 0.420
17) 60.00; 0.380
18) 90.00; 0.300
19) 120.00; 0.260
20) 180.00; 0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

Table with columns: NO., HALF WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN- / OUT- / SIDE / SIDE / WAY, CURB HEIGHT (FT), GUTTER GEOMETRIES (FT), MANNING FACTOR (n). Rows 1-4.

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10600.00 TO NODE 10601.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 311.00
ELEVATION DATA: UPSTREAM(FEET) = 166.00 DOWNSTREAM(FEET) = 164.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.602
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.030
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 0.50 0.60 0.500 95 10.60
PUBLIC PARK - 0.60 0.60 0.850 95 13.16
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.691
SUBAREA RUNOFF(CFS) = 0.61
TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 0.61

\*\*\*\*\*

FLOW PROCESS FROM NODE 10601.00 TO NODE 10602.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 164.00 DOWNSTREAM ELEVATION(FEET) = 162.00
STREET LENGTH(FEET) = 220.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.20
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.24
HALFSTREET FLOOD WIDTH(FEET) = 3.84
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.78

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.42  
 STREET FLOW TRAVEL TIME (MIN.) = 2.06 Tc (MIN.) = 12.66  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.933  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	1.80	0.60	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.517  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 1.18  
 EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.35  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 1.69

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.26 HALFSTREET FLOOD WIDTH (FEET) = 5.28  
 FLOW VELOCITY (FEET/SEC.) = 1.81 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.48  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10602.00 = 531.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10602.00 TO NODE 10603.00 IS CODE = 63  
 -----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<<  
 =====

UPSTREAM ELEVATION (FEET) = 162.00 DOWNSTREAM ELEVATION (FEET) = 159.00  
 STREET LENGTH (FEET) = 328.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.59  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.30  
 HALFSTREET FLOOD WIDTH (FEET) = 6.91  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.94  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.58  
 STREET FLOW TRAVEL TIME (MIN.) = 2.81 Tc (MIN.) = 15.48  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.829

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.60	0.500	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	2.40	0.60	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527  
 SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 1.80

EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.33  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 3.19

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.31 HALFSTREET FLOOD WIDTH (FEET) = 7.78  
 FLOW VELOCITY (FEET/SEC.) = 2.01 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.63  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10603.00 = 859.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10603.00 TO NODE 10604.00 IS CODE = 63  
 -----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<<  
 =====

UPSTREAM ELEVATION (FEET) = 159.00 DOWNSTREAM ELEVATION (FEET) = 155.00  
 STREET LENGTH (FEET) = 465.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.66  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.35  
 HALFSTREET FLOOD WIDTH (FEET) = 9.53  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.12  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.74  
 STREET FLOW TRAVEL TIME (MIN.) = 3.66 Tc (MIN.) = 19.13  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.741

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.60	0.500	-
USER-DEFINED	-	0.40	0.60	0.850	-
USER-DEFINED	-	3.00	0.60	0.500	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.513  
 SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 2.92  
 EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.32  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 5.55

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 10.35  
 FLOW VELOCITY (FEET/SEC.) = 2.20 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.80  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10604.00 = 1324.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10604.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.741
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.60    0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.10    SUBAREA RUNOFF(CFS) = 0.02
EFFECTIVE AREA(ACRES) = 14.70  AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 14.7    PEAK FLOW RATE(CFS) = 5.57

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10605.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 155.00  DOWNSTREAM(FEET) = 140.00
FLOW LENGTH(FEET) = 214.00  MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.84
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.57
PIPE TRAVEL TIME(MIN.) = 0.30  Tc(MIN.) = 19.43
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10605.00 = 1538.00 FEET.

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10605.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.43
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.734
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20    0.60    0.100  -
USER-DEFINED        -         1.70    0.60    0.100  -
USER-DEFINED        -        10.20    0.60    0.800  -
USER-DEFINED        -         2.90    0.60    0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.682
SUBAREA AREA(ACRES) = 16.00  SUBAREA RUNOFF(CFS) = 4.67
EFFECTIVE AREA(ACRES) = 30.70  AREA-AVERAGED Fm(INCH/HR) = 0.37
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 30.7    PEAK FLOW RATE(CFS) = 10.15

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10606.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 140.00  DOWNSTREAM(FEET) = 133.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00  CHANNEL SLOPE = 0.0400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.15
FLOW VELOCITY(FEET/SEC.) = 5.21  FLOW DEPTH(FEET) = 0.81
TRAVEL TIME(MIN.) = 0.56  Tc(MIN.) = 19.99
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10606.00 = 1713.00 FEET.

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.99
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.720
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.60    0.500  -
USER-DEFINED        -         0.30    0.60    0.850  -
USER-DEFINED        -         0.10    0.60    1.000  -
USER-DEFINED        -         1.10    0.60    1.000  -
USER-DEFINED        -         0.10    0.60    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 1.80    SUBAREA RUNOFF(CFS) = 0.27
EFFECTIVE AREA(ACRES) = 32.50  AREA-AVERAGED Fm(INCH/HR) = 0.38
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 32.5    PEAK FLOW RATE(CFS) = 10.15
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.99
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.720
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.60    0.850  -
USER-DEFINED        -         1.20    0.60    1.000  -
USER-DEFINED        -         0.10    0.60    1.000  -
USER-DEFINED        -         1.80    0.60    1.000  -
USER-DEFINED        -         0.10    0.60    0.850  -
USER-DEFINED        -         0.20    0.60    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 0.45
EFFECTIVE AREA(ACRES) = 36.30  AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.66
TOTAL AREA(ACRES) = 36.3    PEAK FLOW RATE(CFS) = 10.50

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\*\*\*\*\*

FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.99

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.720

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.06

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.40

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.67

TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 10.57

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 36.9 TC(MIN.) = 19.99

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR)= 0.40

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.670

PEAK FLOW RATE(CFS) = 10.57

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 2 Yr \*  
\* From Node: 40300 To Node: 40313 \*  
\*\*\*\*\*

FILE NAME: 0610403T.DAT  
TIME/DATE OF STUDY: 08:37 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.873
- 2) 10.00; 1.249
- 3) 15.00; 0.951
- 4) 20.00; 0.777
- 5) 25.00; 0.669
- 6) 30.00; 0.593
- 7) 40.00; 0.511
- 8) 50.00; 0.454
- 9) 60.00; 0.414
- 10) 90.00; 0.351
- 11) 120.00; 0.307
- 12) 180.00; 0.257
- 13) 360.00; 0.190
- 14) 1440.00; 0.084

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40300.00 TO NODE 40301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 316.00  
ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 720.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.541  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.306  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.39	0.60	1.000	0	9.54

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.25  
TOTAL AREA(ACRES) = 0.39 PEAK FLOW RATE(CFS) = 0.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40301.00 TO NODE 40302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 191.00 CHANNEL SLOPE = 0.2356  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.226  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.88	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.50  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.82  
AVERAGE FLOW DEPTH(FEET) = 0.21 TRAVEL TIME(MIN.) = 0.83  
Tc(MIN.) = 10.37  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 0.50  
EFFECTIVE AREA(ACRES) = 1.28 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.3 PEAK FLOW RATE(CFS) = 0.72

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.24 FLOW VELOCITY(FEET/SEC.) = 4.19  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40302.00 = 507.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40302.00 TO NODE 40303.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	675.00	DOWNSTREAM(FEET) =	625.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	179.00	CHANNEL SLOPE =	0.2793
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.189		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.84	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.94

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.78

AVERAGE FLOW DEPTH(FEET) = 0.26 TRAVEL TIME(MIN.) = 0.62

Tc(MIN.) = 11.00

SUBAREA AREA(ACRES) = 0.84 SUBAREA RUNOFF(CFS) = 0.44

EFFECTIVE AREA(ACRES) = 2.12 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.1 PEAK FLOW RATE(CFS) = 1.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.27 FLOW VELOCITY(FEET/SEC.) = 5.06

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40303.00 = 686.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40303.00 TO NODE 40304.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	625.00	DOWNSTREAM(FEET) =	557.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	161.00	CHANNEL SLOPE =	0.4224
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.165		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.94	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.87

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.57

AVERAGE FLOW DEPTH(FEET) = 0.31 TRAVEL TIME(MIN.) = 0.41

Tc(MIN.) = 11.41

SUBAREA AREA(ACRES) = 2.94 SUBAREA RUNOFF(CFS) = 1.50

EFFECTIVE AREA(ACRES) = 5.06 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.1 PEAK FLOW RATE(CFS) = 2.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 FLOW VELOCITY(FEET/SEC.) = 7.15

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40304.00 = 847.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40304.00 TO NODE 40305.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	557.00	DOWNSTREAM(FEET) =	548.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	42.00	CHANNEL SLOPE =	0.2143
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.158		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.68	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.99

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.79

AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 0.12

Tc(MIN.) = 11.53

SUBAREA AREA(ACRES) = 1.68 SUBAREA RUNOFF(CFS) = 0.84

EFFECTIVE AREA(ACRES) = 6.73 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 3.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.43 FLOW VELOCITY(FEET/SEC.) = 6.04

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40305.00 = 889.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40305.00 TO NODE 40306.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	548.00	DOWNSTREAM(FEET) =	515.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	217.00	CHANNEL SLOPE =	0.1521
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.119		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.67	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.47

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.64

AVERAGE FLOW DEPTH(FEET) = 0.51 TRAVEL TIME(MIN.) = 0.64

Tc(MIN.) = 12.17

SUBAREA AREA(ACRES) = 4.67 SUBAREA RUNOFF(CFS) = 2.19

EFFECTIVE AREA(ACRES) = 11.41 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.4 PEAK FLOW RATE (CFS) = 5.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.55 FLOW VELOCITY (FEET/SEC.) = 5.95  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40306.00 = 1106.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40306.00 TO NODE 40307.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 502.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 180.00 CHANNEL SLOPE = 0.0722  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.082

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.44	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.16  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.81  
AVERAGE FLOW DEPTH (FEET) = 0.70 TRAVEL TIME (MIN.) = 0.62  
Tc (MIN.) = 12.79

SUBAREA AREA (ACRES) = 8.44 SUBAREA RUNOFF (CFS) = 3.66  
EFFECTIVE AREA (ACRES) = 19.84 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 19.8 PEAK FLOW RATE (CFS) = 8.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.75 FLOW VELOCITY (FEET/SEC.) = 5.07  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40307.00 = 1286.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40307.00 TO NODE 40308.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 502.00 DOWNSTREAM (FEET) = 469.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 553.00 CHANNEL SLOPE = 0.0597  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.970

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.07	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.30  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.91  
AVERAGE FLOW DEPTH (FEET) = 0.84 TRAVEL TIME (MIN.) = 1.88  
Tc (MIN.) = 14.67

SUBAREA AREA (ACRES) = 10.07 SUBAREA RUNOFF (CFS) = 3.36  
EFFECTIVE AREA (ACRES) = 29.92 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 29.9 PEAK FLOW RATE (CFS) = 9.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.83 FLOW VELOCITY (FEET/SEC.) = 4.86  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40308.00 = 1839.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40308.00 TO NODE 40309.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 469.00 DOWNSTREAM (FEET) = 433.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 631.00 CHANNEL SLOPE = 0.0571  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.888

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.09	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.15  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.95  
AVERAGE FLOW DEPTH (FEET) = 0.87 TRAVEL TIME (MIN.) = 2.13  
Tc (MIN.) = 16.80

SUBAREA AREA (ACRES) = 9.09 SUBAREA RUNOFF (CFS) = 2.36  
EFFECTIVE AREA (ACRES) = 39.01 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 39.0 PEAK FLOW RATE (CFS) = 10.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.84 FLOW VELOCITY (FEET/SEC.) = 4.82  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40309.00 = 2470.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40309.00 TO NODE 40310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 433.00 DOWNSTREAM (FEET) = 406.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 595.00 CHANNEL SLOPE = 0.0454  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.812

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.61	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.52

AVERAGE FLOW DEPTH(FEET) = 0.91 TRAVEL TIME(MIN.) = 2.20  
Tc(MIN.) = 18.99  
SUBAREA AREA(ACRES) = 11.61 SUBAREA RUNOFF(CFS) = 2.22  
EFFECTIVE AREA(ACRES) = 50.62 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 50.6 PEAK FLOW RATE(CFS) = 10.12  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.87 FLOW VELOCITY(FEET/SEC.) = 4.41  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40310.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40310.00 TO NODE 40311.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 406.00 DOWNSTREAM(FEET) = 353.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1122.00 CHANNEL SLOPE = 0.0472  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.728

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.32	0.60	0.897	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.44  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.68  
AVERAGE FLOW DEPTH(FEET) = 0.82 TRAVEL TIME(MIN.) = 3.29  
Tc(MIN.) = 22.28

SUBAREA AREA(ACRES) = 15.32 SUBAREA RUNOFF(CFS) = 2.62  
EFFECTIVE AREA(ACRES) = 65.94 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 65.9 PEAK FLOW RATE(CFS) = 10.12  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.78 FLOW VELOCITY(FEET/SEC.) = 5.53  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40311.00 = 4187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40311.00 TO NODE 40312.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 843.00 CHANNEL SLOPE = 0.0451  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.674

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	26.00	0.60	0.886	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.886  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.80  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.65  
AVERAGE FLOW DEPTH(FEET) = 0.83 TRAVEL TIME(MIN.) = 2.49  
Tc(MIN.) = 24.77

SUBAREA AREA(ACRES) = 26.00 SUBAREA RUNOFF(CFS) = 3.33  
EFFECTIVE AREA(ACRES) = 91.94 AREA-AVERAGED Fm(INCH/HR) = 0.57  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 91.9 PEAK FLOW RATE(CFS) = 10.12  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.79 FLOW VELOCITY(FEET/SEC.) = 5.42  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40312.00 = 5030.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40312.00 TO NODE 40313.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 310.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 226.00 CHANNEL SLOPE = 0.0221  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.659

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.53	0.60	0.896	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.896  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.26  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.19  
AVERAGE FLOW DEPTH(FEET) = 0.90 TRAVEL TIME(MIN.) = 0.90  
Tc(MIN.) = 25.67

SUBAREA AREA(ACRES) = 2.53 SUBAREA RUNOFF(CFS) = 0.28  
EFFECTIVE AREA(ACRES) = 94.47 AREA-AVERAGED Fm(INCH/HR) = 0.57  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 94.5 PEAK FLOW RATE(CFS) = 10.12  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.90 FLOW VELOCITY(FEET/SEC.) = 4.19  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40313.00 = 5256.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40313.00 TO NODE 40313.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 25.67  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.659

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	80.58	0.60	0.984	-



SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$  (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.984  
SUBAREA AREA (ACRES) = 80.58 SUBAREA RUNOFF (CFS) = 4.97  
EFFECTIVE AREA (ACRES) = 175.05 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.58  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.60 AREA-AVERAGED  $A_p$  = 0.97  
TOTAL AREA (ACRES) = 175.0 PEAK FLOW RATE (CFS) = 12.58

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 175.0 TC (MIN.) = 25.67  
EFFECTIVE AREA (ACRES) = 175.05 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.58  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.60 AREA-AVERAGED  $A_p$  = 0.965  
PEAK FLOW RATE (CFS) = 12.58

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 2 Yr \*  
\* From Node: 40400 To Node: 40453 \*  
\*\*\*\*\*

FILE NAME: 0610404T.DAT  
TIME/DATE OF STUDY: 08:38 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.873
- 2) 10.00; 1.249
- 3) 15.00; 0.951
- 4) 20.00; 0.777
- 5) 25.00; 0.669
- 6) 30.00; 0.593
- 7) 40.00; 0.511
- 8) 50.00; 0.454
- 9) 60.00; 0.414
- 10) 90.00; 0.351
- 11) 120.00; 0.307
- 12) 180.00; 0.257
- 13) 360.00; 0.190
- 14) 1440.00; 0.084

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40400.00 TO NODE 40401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 928.00 DOWNSTREAM(FEET) = 750.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.081  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.488  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.75	0.60	1.000	0	8.08

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.60  
TOTAL AREA(ACRES) = 0.75 PEAK FLOW RATE(CFS) = 0.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40401.00 TO NODE 40402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 710.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 107.00 CHANNEL SLOPE = 0.3738  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.447  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.17	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.05  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.40  
AVERAGE FLOW DEPTH(FEET) = 0.25 TRAVEL TIME(MIN.) = 0.33  
Tc(MIN.) = 8.41  
SUBAREA AREA(ACRES) = 1.17 SUBAREA RUNOFF(CFS) = 0.90  
EFFECTIVE AREA(ACRES) = 1.93 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 1.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.29 FLOW VELOCITY(FEET/SEC.) = 6.02  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40402.00 = 434.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40402.00 TO NODE 40403.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 710.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.2756  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.400

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.05	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.85

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.62

AVERAGE FLOW DEPTH(FEET) = 0.33 TRAVEL TIME(MIN.) = 0.38

Tc(MIN.) = 8.79

SUBAREA AREA(ACRES) = 1.05 SUBAREA RUNOFF(CFS) = 0.75

EFFECTIVE AREA(ACRES) = 2.97 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 2.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 FLOW VELOCITY(FEET/SEC.) = 5.89

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40403.00 = 561.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40403.00 TO NODE 40404.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 113.00 CHANNEL SLOPE = 0.2212  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.359

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.95	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.81

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.81

AVERAGE FLOW DEPTH(FEET) = 0.40 TRAVEL TIME(MIN.) = 0.32

Tc(MIN.) = 9.11

SUBAREA AREA(ACRES) = 1.95 SUBAREA RUNOFF(CFS) = 1.33

EFFECTIVE AREA(ACRES) = 4.92 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 3.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.43 FLOW VELOCITY(FEET/SEC.) = 6.06

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40404.00 = 674.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40404.00 TO NODE 40405.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 650.00 DOWNSTREAM(FEET) = 610.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 219.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.282

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.15	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.03

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.88

AVERAGE FLOW DEPTH(FEET) = 0.48 TRAVEL TIME(MIN.) = 0.62

Tc(MIN.) = 9.73

SUBAREA AREA(ACRES) = 2.15 SUBAREA RUNOFF(CFS) = 1.32

EFFECTIVE AREA(ACRES) = 7.07 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 4.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.49 FLOW VELOCITY(FEET/SEC.) = 6.00

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40405.00 = 893.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40405.00 TO NODE 40406.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 605.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 43.00 CHANNEL SLOPE = 0.1163  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.265

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.21

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.36

AVERAGE FLOW DEPTH(FEET) = 0.57 TRAVEL TIME(MIN.) = 0.13

Tc(MIN.) = 9.87

SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 1.74

EFFECTIVE AREA(ACRES) = 9.97 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 10.0 PEAK FLOW RATE (CFS) = 5.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.60 FLOW VELOCITY (FEET/SEC.) = 5.53  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40406.00 = 936.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40406.00 TO NODE 40407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 605.00 DOWNSTREAM (FEET) = 602.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 52.00 CHANNEL SLOPE = 0.0577  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.245

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.51	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.28  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.47  
AVERAGE FLOW DEPTH (FEET) = 0.74 TRAVEL TIME (MIN.) = 0.19  
Tc (MIN.) = 10.06

SUBAREA AREA (ACRES) = 4.51 SUBAREA RUNOFF (CFS) = 2.62  
EFFECTIVE AREA (ACRES) = 14.48 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 14.5 PEAK FLOW RATE (CFS) = 8.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.78 FLOW VELOCITY (FEET/SEC.) = 4.59  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40407.00 = 988.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40407.00 TO NODE 40408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 602.00 DOWNSTREAM (FEET) = 559.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 533.00 CHANNEL SLOPE = 0.0807  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.147

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.99	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.88  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.40  
AVERAGE FLOW DEPTH (FEET) = 0.78 TRAVEL TIME (MIN.) = 1.64  
Tc (MIN.) = 11.71

SUBAREA AREA (ACRES) = 5.99 SUBAREA RUNOFF (CFS) = 2.95  
EFFECTIVE AREA (ACRES) = 20.47 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.5 PEAK FLOW RATE (CFS) = 10.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.78 FLOW VELOCITY (FEET/SEC.) = 5.48  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40408.00 = 1521.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40408.00 TO NODE 40409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 559.00 DOWNSTREAM (FEET) = 509.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 702.00 CHANNEL SLOPE = 0.0712  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.016

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.05	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.22  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.34  
AVERAGE FLOW DEPTH (FEET) = 0.84 TRAVEL TIME (MIN.) = 2.19  
Tc (MIN.) = 13.90

SUBAREA AREA (ACRES) = 6.05 SUBAREA RUNOFF (CFS) = 2.27  
EFFECTIVE AREA (ACRES) = 26.51 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.5 PEAK FLOW RATE (CFS) = 10.08  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.80 FLOW VELOCITY (FEET/SEC.) = 5.20  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40409.00 = 2223.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40409.00 TO NODE 40447.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 509.00 DOWNSTREAM (FEET) = 482.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 440.00 CHANNEL SLOPE = 0.0614  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.939

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.09	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.00

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.06  
 AVERAGE FLOW DEPTH (FEET) = 0.85 TRAVEL TIME (MIN.) = 1.45  
 Tc (MIN.) = 15.35  
 SUBAREA AREA (ACRES) = 6.09 SUBAREA RUNOFF (CFS) = 1.85  
 EFFECTIVE AREA (ACRES) = 32.60 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 32.6 PEAK FLOW RATE (CFS) = 10.08  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.83 FLOW VELOCITY (FEET/SEC.) = 4.91  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 15.35  
 RAINFALL INTENSITY (INCH/HR) = 0.94  
 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 32.60  
 TOTAL STREAM AREA (ACRES) = 32.60  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 10.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40410.00 TO NODE 40411.00 IS CODE = 21

-----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 329.00  
 ELEVATION DATA: UPSTREAM (FEET) = 878.00 DOWNSTREAM (FEET) = 726.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.371  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.452  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	-	0.69	0.60	1.000	0	8.37

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 0.53  
 TOTAL AREA (ACRES) = 0.69 PEAK FLOW RATE (CFS) = 0.53

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40411.00 TO NODE 40412.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 726.00 DOWNSTREAM (FEET) = 687.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 101.00 CHANNEL SLOPE = 0.3861  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.413

SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.91	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 0.86  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.33  
 AVERAGE FLOW DEPTH (FEET) = 0.23 TRAVEL TIME (MIN.) = 0.32  
 Tc (MIN.) = 8.69  
 SUBAREA AREA (ACRES) = 0.91 SUBAREA RUNOFF (CFS) = 0.67  
 EFFECTIVE AREA (ACRES) = 1.60 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.6 PEAK FLOW RATE (CFS) = 1.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.26 FLOW VELOCITY (FEET/SEC.) = 5.66  
 LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40412.00 = 430.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40412.00 TO NODE 40413.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 687.00 DOWNSTREAM (FEET) = 658.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 153.00 CHANNEL SLOPE = 0.1895  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.345  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.96	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.49  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.69  
 AVERAGE FLOW DEPTH (FEET) = 0.33 TRAVEL TIME (MIN.) = 0.54  
 Tc (MIN.) = 9.23  
 SUBAREA AREA (ACRES) = 0.96 SUBAREA RUNOFF (CFS) = 0.64  
 EFFECTIVE AREA (ACRES) = 2.55 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.6 PEAK FLOW RATE (CFS) = 1.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.35 FLOW VELOCITY (FEET/SEC.) = 4.76  
 LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40413.00 = 583.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40413.00 TO NODE 40414.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====

=====
ELEVATION DATA: UPSTREAM(FEET) = 658.00 DOWNSTREAM(FEET) = 615.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 247.00 CHANNEL SLOPE = 0.1741
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.246
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.51 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.44
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.10
AVERAGE FLOW DEPTH (FEET) = 0.40 TRAVEL TIME (MIN.) = 0.81
Tc (MIN.) = 10.04
SUBAREA AREA (ACRES) = 2.51 SUBAREA RUNOFF (CFS) = 1.46
EFFECTIVE AREA (ACRES) = 5.06 AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 5.1 PEAK FLOW RATE (CFS) = 2.95

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.43 FLOW VELOCITY (FEET/SEC.) = 5.31
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40414.00 = 830.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 40414.00 TO NODE 40415.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 615.00 DOWNSTREAM(FEET) = 567.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 414.00 CHANNEL SLOPE = 0.1159
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.164
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.38 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.06
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.97
AVERAGE FLOW DEPTH (FEET) = 0.52 TRAVEL TIME (MIN.) = 1.39
Tc (MIN.) = 11.43
SUBAREA AREA (ACRES) = 4.38 SUBAREA RUNOFF (CFS) = 2.22
EFFECTIVE AREA (ACRES) = 9.44 AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 9.4 PEAK FLOW RATE (CFS) = 4.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.55 FLOW VELOCITY (FEET/SEC.) = 5.20
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40415.00 = 1244.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 40415.00 TO NODE 40416.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 567.00 DOWNSTREAM(FEET) = 538.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 301.00 CHANNEL SLOPE = 0.0963
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.107
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.77 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.56
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.25
AVERAGE FLOW DEPTH (FEET) = 0.65 TRAVEL TIME (MIN.) = 0.96
Tc (MIN.) = 12.38
SUBAREA AREA (ACRES) = 7.77 SUBAREA RUNOFF (CFS) = 3.54
EFFECTIVE AREA (ACRES) = 17.21 AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 17.2 PEAK FLOW RATE (CFS) = 7.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.69 FLOW VELOCITY (FEET/SEC.) = 5.47
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40416.00 = 1545.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 40416.00 TO NODE 40417.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====
ELEVATION DATA: UPSTREAM(FEET) = 538.00 DOWNSTREAM(FEET) = 529.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 116.00 CHANNEL SLOPE = 0.0776
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.086
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 16.20 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.39
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.55
AVERAGE FLOW DEPTH (FEET) = 0.83 TRAVEL TIME (MIN.) = 0.35
Tc (MIN.) = 12.73
SUBAREA AREA (ACRES) = 16.20 SUBAREA RUNOFF (CFS) = 7.09
EFFECTIVE AREA (ACRES) = 33.41 AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 33.4 PEAK FLOW RATE (CFS) = 14.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.91 FLOW VELOCITY (FEET/SEC.) = 5.87
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40417.00 = 1661.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40417.00 TO NODE 40447.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 529.00 DOWNSTREAM(FEET) = 482.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 891.00 CHANNEL SLOPE = 0.0527
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.932

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 14.55 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.80

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.31

AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 2.80

Tc(MIN.) = 15.53

SUBAREA AREA(ACRES) = 14.55 SUBAREA RUNOFF(CFS) = 4.35

EFFECTIVE AREA(ACRES) = 47.96 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 48.0 PEAK FLOW RATE(CFS) = 14.61

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.97 FLOW VELOCITY(FEET/SEC.) = 5.14

LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40447.00 = 2552.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 15.53
RAINFALL INTENSITY(INCH/HR) = 0.93
AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 47.96
TOTAL STREAM AREA(ACRES) = 47.96
PEAK FLOW RATE(CFS) AT CONFLUENCE = 14.61

\*\* CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 10.08 15.35 0.939 0.60( 0.60) 1.00 32.6 40400.00
2 14.61 15.53 0.932 0.60( 0.60) 1.00 48.0 40410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER

NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 24.69 15.35 0.939 0.60( 0.60) 1.00 80.0 40400.00
2 24.50 15.53 0.932 0.60( 0.60) 1.00 80.6 40410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 24.69 Tc(MIN.) = 15.35
EFFECTIVE AREA(ACRES) = 79.99 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 80.6
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<

\*\*\*\*\*
FLOW PROCESS FROM NODE 40420.00 TO NODE 40421.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00
ELEVATION DATA: UPSTREAM(FEET) = 925.00 DOWNSTREAM(FEET) = 815.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.799
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.399

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" - 0.31 0.60 1.000 0 8.80

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF(CFS) = 0.22

TOTAL AREA(ACRES) = 0.31 PEAK FLOW RATE(CFS) = 0.22

\*\*\*\*\*
FLOW PROCESS FROM NODE 40421.00 TO NODE 40422.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 815.00 DOWNSTREAM(FEET) = 743.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.5854
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.346

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 0.30 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.32

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.89

AVERAGE FLOW DEPTH (FEET) = 0.15 TRAVEL TIME (MIN.) = 0.42  
Tc (MIN.) = 9.22  
SUBAREA AREA (ACRES) = 0.30 SUBAREA RUNOFF (CFS) = 0.20  
EFFECTIVE AREA (ACRES) = 0.60 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 0.6 PEAK FLOW RATE (CFS) = 0.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.16 FLOW VELOCITY (FEET/SEC.) = 5.09  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40422.00 = 444.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40422.00 TO NODE 40423.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 743.00 DOWNSTREAM (FEET) = 665.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 142.00 CHANNEL SLOPE = 0.5493  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.295  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 0.66  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.72  
AVERAGE FLOW DEPTH (FEET) = 0.20 TRAVEL TIME (MIN.) = 0.41  
Tc (MIN.) = 9.63  
SUBAREA AREA (ACRES) = 0.80 SUBAREA RUNOFF (CFS) = 0.50  
EFFECTIVE AREA (ACRES) = 1.40 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 1.4 PEAK FLOW RATE (CFS) = 0.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.22 FLOW VELOCITY (FEET/SEC.) = 6.14  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40423.00 = 586.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40423.00 TO NODE 40424.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 665.00 DOWNSTREAM (FEET) = 630.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 99.00 CHANNEL SLOPE = 0.3535  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.256  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.32 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 0.97  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.31  
AVERAGE FLOW DEPTH (FEET) = 0.25 TRAVEL TIME (MIN.) = 0.31  
Tc (MIN.) = 9.94  
SUBAREA AREA (ACRES) = 0.32 SUBAREA RUNOFF (CFS) = 0.19  
EFFECTIVE AREA (ACRES) = 1.72 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 1.7 PEAK FLOW RATE (CFS) = 1.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.25 FLOW VELOCITY (FEET/SEC.) = 5.48  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40424.00 = 685.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40424.00 TO NODE 40425.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 630.00 DOWNSTREAM (FEET) = 615.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 35.00 CHANNEL SLOPE = 0.4286  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.247  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.87 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.56  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.40  
AVERAGE FLOW DEPTH (FEET) = 0.29 TRAVEL TIME (MIN.) = 0.09  
Tc (MIN.) = 10.03  
SUBAREA AREA (ACRES) = 1.87 SUBAREA RUNOFF (CFS) = 1.09  
EFFECTIVE AREA (ACRES) = 3.59 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 3.6 PEAK FLOW RATE (CFS) = 2.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.32 FLOW VELOCITY (FEET/SEC.) = 6.91  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40425.00 = 720.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40425.00 TO NODE 40426.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 615.00 DOWNSTREAM (FEET) = 574.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 260.00 CHANNEL SLOPE = 0.1577  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.193  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.19 0.60 1.000 -



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.41  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.84  
AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 0.89  
Tc(MIN.) = 10.93  
SUBAREA AREA(ACRES) = 1.19 SUBAREA RUNOFF(CFS) = 0.64  
EFFECTIVE AREA(ACRES) = 4.78 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 2.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.41 FLOW VELOCITY(FEET/SEC.) = 4.95  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40426.00 = 980.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40426.00 TO NODE 40427.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 574.00 DOWNSTREAM(FEET) = 533.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 322.00 CHANNEL SLOPE = 0.1273  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.127

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.82 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.98  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.81  
AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 1.12  
Tc(MIN.) = 12.04  
SUBAREA AREA(ACRES) = 1.82 SUBAREA RUNOFF(CFS) = 0.86  
EFFECTIVE AREA(ACRES) = 6.60 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 6.6 PEAK FLOW RATE(CFS) = 3.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.46 FLOW VELOCITY(FEET/SEC.) = 4.88  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40427.00 = 1302.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40427.00 TO NODE 40428.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 533.00 DOWNSTREAM(FEET) = 521.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 160.00 CHANNEL SLOPE = 0.0750  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.091

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 6.79 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.63  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.40  
AVERAGE FLOW DEPTH(FEET) = 0.59 TRAVEL TIME(MIN.) = 0.61  
Tc(MIN.) = 12.65  
SUBAREA AREA(ACRES) = 6.79 SUBAREA RUNOFF(CFS) = 3.00  
EFFECTIVE AREA(ACRES) = 13.39 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 13.4 PEAK FLOW RATE(CFS) = 5.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.65 FLOW VELOCITY(FEET/SEC.) = 4.65  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40428.00 = 1462.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40428.00 TO NODE 40429.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 521.00 DOWNSTREAM(FEET) = 508.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 221.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.040

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.74 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.66  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.37  
AVERAGE FLOW DEPTH(FEET) = 0.71 TRAVEL TIME(MIN.) = 0.84  
Tc(MIN.) = 13.49  
SUBAREA AREA(ACRES) = 3.74 SUBAREA RUNOFF(CFS) = 1.48  
EFFECTIVE AREA(ACRES) = 17.13 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 17.1 PEAK FLOW RATE(CFS) = 6.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.72 FLOW VELOCITY(FEET/SEC.) = 4.37  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40429.00 = 1683.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40429.00 TO NODE 40446.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 508.00 DOWNSTREAM(FEET) = 489.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 306.00 CHANNEL SLOPE = 0.0621  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.973

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.99	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.96  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.55  
AVERAGE FLOW DEPTH(FEET) = 0.71 TRAVEL TIME(MIN.) = 1.12  
Tc(MIN.) = 14.62  
SUBAREA AREA(ACRES) = 0.99 SUBAREA RUNOFF(CFS) = 0.33  
EFFECTIVE AREA(ACRES) = 18.12 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 18.1 PEAK FLOW RATE(CFS) = 6.79  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.71 FLOW VELOCITY(FEET/SEC.) = 4.46  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40446.00 = 1989.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40446.00 TO NODE 40446.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40430.00 TO NODE 40431.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 302.00  
ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 875.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.870  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.514  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.40	0.60	1.000	0	7.87

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.33  
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 0.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40431.00 TO NODE 40432.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 800.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 160.00 CHANNEL SLOPE = 0.4688  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.450

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.65	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.58  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.16  
AVERAGE FLOW DEPTH(FEET) = 0.19 TRAVEL TIME(MIN.) = 0.52  
Tc(MIN.) = 8.39  
SUBAREA AREA(ACRES) = 0.65 SUBAREA RUNOFF(CFS) = 0.50  
EFFECTIVE AREA(ACRES) = 1.05 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 0.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.22 FLOW VELOCITY(FEET/SEC.) = 5.63  
LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40432.00 = 462.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40432.00 TO NODE 40433.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 800.00 DOWNSTREAM(FEET) = 712.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 150.00 CHANNEL SLOPE = 0.5867  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.404  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.08	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.20  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.85  
AVERAGE FLOW DEPTH(FEET) = 0.24 TRAVEL TIME(MIN.) = 0.37  
Tc(MIN.) = 8.75  
SUBAREA AREA(ACRES) = 1.08 SUBAREA RUNOFF(CFS) = 0.78  
EFFECTIVE AREA(ACRES) = 2.13 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.1 PEAK FLOW RATE(CFS) = 1.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.27 FLOW VELOCITY(FEET/SEC.) = 7.07  
LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40433.00 = 612.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40433.00 TO NODE 40434.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 712.00 DOWNSTREAM(FEET) = 657.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 120.00 CHANNEL SLOPE = 0.4583

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.369  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.98	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.23  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.12  
 AVERAGE FLOW DEPTH (FEET) = 0.32 TRAVEL TIME (MIN.) = 0.28  
 Tc (MIN.) = 9.03  
 SUBAREA AREA (ACRES) = 1.98 SUBAREA RUNOFF (CFS) = 1.37  
 EFFECTIVE AREA (ACRES) = 4.11 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 4.1 PEAK FLOW RATE (CFS) = 2.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.35 FLOW VELOCITY (FEET/SEC.) = 7.59  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40434.00 = 732.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40434.00 TO NODE 40435.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 657.00 DOWNSTREAM (FEET) = 620.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 161.00 CHANNEL SLOPE = 0.2298  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.316  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.34	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.60  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.27  
 AVERAGE FLOW DEPTH (FEET) = 0.44 TRAVEL TIME (MIN.) = 0.43  
 Tc (MIN.) = 9.46  
 SUBAREA AREA (ACRES) = 2.34 SUBAREA RUNOFF (CFS) = 1.51  
 EFFECTIVE AREA (ACRES) = 6.46 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 6.5 PEAK FLOW RATE (CFS) = 4.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.46 FLOW VELOCITY (FEET/SEC.) = 6.48  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40435.00 = 893.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40435.00 TO NODE 40445.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 620.00 DOWNSTREAM (FEET) = 579.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 358.00 CHANNEL SLOPE = 0.1145  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.211  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.75	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.64  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.08  
 AVERAGE FLOW DEPTH (FEET) = 0.55 TRAVEL TIME (MIN.) = 1.18  
 Tc (MIN.) = 10.64  
 SUBAREA AREA (ACRES) = 1.75 SUBAREA RUNOFF (CFS) = 0.96  
 EFFECTIVE AREA (ACRES) = 8.21 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 8.2 PEAK FLOW RATE (CFS) = 4.51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.54 FLOW VELOCITY (FEET/SEC.) = 5.07  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40445.00 = 1251.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40445.00 TO NODE 40445.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 10.64  
 RAINFALL INTENSITY (INCH/HR) = 1.21  
 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 8.21  
 TOTAL STREAM AREA (ACRES) = 8.21  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 4.51

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40440.00 TO NODE 40441.00 IS CODE = 21

-----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 319.00  
 ELEVATION DATA: UPSTREAM (FEET) = 1020.00 DOWNSTREAM (FEET) = 898.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.586  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.425  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	-	0.75	0.60	1.000	0	8.59

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.56  
TOTAL AREA (ACRES) = 0.75 PEAK FLOW RATE (CFS) = 0.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40441.00 TO NODE 40442.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 898.00 DOWNSTREAM(FEET) = 760.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 253.00 CHANNEL SLOPE = 0.5455  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.338

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.89 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.85  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.07  
AVERAGE FLOW DEPTH(FEET) = 0.22 TRAVEL TIME(MIN.) = 0.70  
Tc(MIN.) = 9.28  
SUBAREA AREA(ACRES) = 0.89 SUBAREA RUNOFF(CFS) = 0.59  
EFFECTIVE AREA(ACRES) = 1.64 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 1.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.24 FLOW VELOCITY(FEET/SEC.) = 6.33  
LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40442.00 = 572.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40442.00 TO NODE 40443.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 760.00 DOWNSTREAM(FEET) = 653.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 188.00 CHANNEL SLOPE = 0.5691  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.283

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.80 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.64  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.12  
AVERAGE FLOW DEPTH(FEET) = 0.28 TRAVEL TIME(MIN.) = 0.44  
Tc(MIN.) = 9.72  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 1.11  
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 2.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.30 FLOW VELOCITY(FEET/SEC.) = 7.72  
LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40443.00 = 760.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40443.00 TO NODE 40444.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 653.00 DOWNSTREAM(FEET) = 605.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 198.00 CHANNEL SLOPE = 0.2424  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.233

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.16 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.02  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.07  
AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 0.54  
Tc(MIN.) = 10.27  
SUBAREA AREA(ACRES) = 3.16 SUBAREA RUNOFF(CFS) = 1.80  
EFFECTIVE AREA(ACRES) = 6.60 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 6.6 PEAK FLOW RATE(CFS) = 3.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.44 FLOW VELOCITY(FEET/SEC.) = 6.48  
LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40444.00 = 958.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40444.00 TO NODE 40445.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 605.00 DOWNSTREAM(FEET) = 579.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 243.00 CHANNEL SLOPE = 0.1070  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.183

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.67 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.20  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.86  
AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 0.83  
Tc(MIN.) = 11.10  
SUBAREA AREA(ACRES) = 1.67 SUBAREA RUNOFF(CFS) = 0.88

EFFECTIVE AREA(ACRES) = 8.27 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 4.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.54 FLOW VELOCITY(FEET/SEC.) = 4.88  
LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40445.00 = 1201.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40445.00 TO NODE 40445.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 11.10  
RAINFALL INTENSITY(INCH/HR) = 1.18  
AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 8.27  
TOTAL STREAM AREA(ACRES) = 8.27  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.34

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	4.51	10.64	1.211	0.60( 0.60)	1.00	8.2	40430.00
2	4.34	11.10	1.183	0.60( 0.60)	1.00	8.3	40440.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	8.86	10.64	1.211	0.60( 0.60)	1.00	16.1	40430.00
2	8.65	11.10	1.183	0.60( 0.60)	1.00	16.5	40440.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 8.86 Tc(MIN.) = 10.64  
EFFECTIVE AREA(ACRES) = 16.14 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 16.5  
LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40445.00 = 1251.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40445.00 TO NODE 40446.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 579.00 DOWNSTREAM(FEET) = 489.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.00 CHANNEL SLOPE = 0.1415  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.116

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.79 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.74  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.68  
AVERAGE FLOW DEPTH(FEET) = 0.70 TRAVEL TIME(MIN.) = 1.59  
Tc(MIN.) = 12.22  
SUBAREA AREA(ACRES) = 3.79 SUBAREA RUNOFF(CFS) = 1.76  
EFFECTIVE AREA(ACRES) = 19.92 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.3 PEAK FLOW RATE(CFS) = 9.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.68 FLOW VELOCITY(FEET/SEC.) = 6.60  
LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40446.00 = 1887.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40446.00 TO NODE 40446.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.26	12.22	1.116	0.60( 0.60)	1.00	19.9	40430.00
2	8.91	12.69	1.088	0.60( 0.60)	1.00	20.3	40440.00

LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40446.00 = 1887.00 FEET.

\*\* MEMORY BANK # 2 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	6.79	14.62	0.973	0.60( 0.60)	1.00	18.1	40420.00

LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40446.00 = 1989.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	16.05	12.22	1.116	0.60( 0.60)	1.00	35.1	40430.00
2	15.70	12.69	1.088	0.60( 0.60)	1.00	36.0	40440.00
3	13.61	14.62	0.973	0.60( 0.60)	1.00	38.4	40420.00

TOTAL AREA(ACRES) = 38.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 16.05 Tc(MIN.) = 12.223  
EFFECTIVE AREA(ACRES) = 35.08 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 38.4  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40446.00 = 1989.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40446.00 TO NODE 40446.00 IS CODE = 12  
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>>>>CLEAR MEMORY BANK # 2 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 40446.00 TO NODE 40447.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 489.00 DOWNSTREAM(FEET) = 482.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.0419

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.082

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.18

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.82

AVERAGE FLOW DEPTH(FEET) = 1.06 TRAVEL TIME(MIN.) = 0.58

Tc(MIN.) = 12.80

SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 0.26

EFFECTIVE AREA(ACRES) = 35.67 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 39.0 PEAK FLOW RATE(CFS) = 16.05

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.06 FLOW VELOCITY(FEET/SEC.) = 4.80

LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40447.00 = 2156.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	16.05	12.80	1.082	0.60( 0.60)	1.00	35.7	40430.00
2	15.70	13.28	1.053	0.60( 0.60)	1.00	36.6	40440.00
3	13.61	15.22	0.943	0.60( 0.60)	1.00	39.0	40420.00

LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40447.00 = 2156.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	24.69	15.35	0.939	0.60( 0.60)	1.00	80.0	40400.00
2	24.50	15.53	0.932	0.60( 0.60)	1.00	80.6	40410.00

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	40.74	12.80	1.082	0.60( 0.60)	1.00	102.4	40430.00
2	40.39	13.28	1.053	0.60( 0.60)	1.00	105.8	40440.00

3	38.30	15.22	0.943	0.60( 0.60)	1.00	118.3	40420.00
4	38.12	15.35	0.939	0.60( 0.60)	1.00	119.0	40400.00
5	37.68	15.53	0.932	0.60( 0.60)	1.00	119.5	40410.00

TOTAL AREA(ACRES) = 119.5

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 40.74 Tc(MIN.) = 12.800

EFFECTIVE AREA(ACRES) = 102.39 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 119.5

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 40447.00 TO NODE 40448.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 482.00 DOWNSTREAM(FEET) = 447.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 926.00 CHANNEL SLOPE = 0.0378

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.937

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	24.32	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 44.43

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.96

AVERAGE FLOW DEPTH(FEET) = 1.58 TRAVEL TIME(MIN.) = 2.59

Tc(MIN.) = 15.39

SUBAREA AREA(ACRES) = 24.32 SUBAREA RUNOFF(CFS) = 7.38

EFFECTIVE AREA(ACRES) = 126.71 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 143.9 PEAK FLOW RATE(CFS) = 40.74

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.53 FLOW VELOCITY(FEET/SEC.) = 5.81

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40448.00 = 3589.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40448.00 TO NODE 40449.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 447.00 DOWNSTREAM(FEET) = 433.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 443.00 CHANNEL SLOPE = 0.0316

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.893  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 108.49 0.60 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 55.10  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.88  
 AVERAGE FLOW DEPTH (FEET) = 1.77 TRAVEL TIME (MIN.) = 1.26  
 Tc (MIN.) = 16.64  
 SUBAREA AREA (ACRES) = 108.49 SUBAREA RUNOFF (CFS) = 28.67  
 EFFECTIVE AREA (ACRES) = 235.20 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 252.3 PEAK FLOW RATE (CFS) = 62.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.85 FLOW VELOCITY (FEET/SEC.) = 6.06  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40449.00 = 4032.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40449.00 TO NODE 40450.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 433.00 DOWNSTREAM (FEET) = 398.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1065.00 CHANNEL SLOPE = 0.0329  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.795  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 36.85 0.60 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 65.39  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.22  
 AVERAGE FLOW DEPTH (FEET) = 1.87 TRAVEL TIME (MIN.) = 2.85  
 Tc (MIN.) = 19.50  
 SUBAREA AREA (ACRES) = 36.85 SUBAREA RUNOFF (CFS) = 6.46  
 EFFECTIVE AREA (ACRES) = 272.04 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 289.2 PEAK FLOW RATE (CFS) = 62.15  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.84 FLOW VELOCITY (FEET/SEC.) = 6.15  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40450.00 = 5097.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40450.00 TO NODE 40451.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 398.00 DOWNSTREAM (FEET) = 386.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 401.00 CHANNEL SLOPE = 0.0299  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.764  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 71.80 0.60 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 67.47  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.05  
 AVERAGE FLOW DEPTH (FEET) = 1.93 TRAVEL TIME (MIN.) = 1.10  
 Tc (MIN.) = 20.60  
 SUBAREA AREA (ACRES) = 71.80 SUBAREA RUNOFF (CFS) = 10.61  
 EFFECTIVE AREA (ACRES) = 343.85 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 361.0 PEAK FLOW RATE (CFS) = 62.15  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.87 FLOW VELOCITY (FEET/SEC.) = 5.95  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40451.00 = 5498.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40451.00 TO NODE 40452.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 386.00 DOWNSTREAM (FEET) = 358.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 957.00 CHANNEL SLOPE = 0.0293  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.717  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 12.07 0.60 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 62.79  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.32  
 AVERAGE FLOW DEPTH (FEET) = 1.69 TRAVEL TIME (MIN.) = 2.18  
 Tc (MIN.) = 22.78  
 SUBAREA AREA (ACRES) = 12.07 SUBAREA RUNOFF (CFS) = 1.27  
 EFFECTIVE AREA (ACRES) = 355.92 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 373.1 PEAK FLOW RATE (CFS) = 62.15  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.68 FLOW VELOCITY (FEET/SEC.) = 7.31  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40452.00 = 6455.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40452.00 TO NODE 40453.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<  
 =====

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40452.00 TO NODE 40453.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 358.00 DOWNSTREAM(FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 973.00 CHANNEL SLOPE = 0.0576  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.680  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 9.14 0.60 0.970 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 62.56  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.38  
 AVERAGE FLOW DEPTH(FEET) = 1.49 TRAVEL TIME(MIN.) = 1.73  
 Tc(MIN.) = 24.51  
 SUBAREA AREA(ACRES) = 9.14 SUBAREA RUNOFF(CFS) = 0.80  
 EFFECTIVE AREA(ACRES) = 365.05 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 382.2 PEAK FLOW RATE(CFS) = 62.15  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.48 FLOW VELOCITY(FEET/SEC.) = 9.40  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40453.00 = 7428.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40453.00 TO NODE 40453.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc(MIN.) = 24.51  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.680  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 28.26 0.60 0.882 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.882  
 SUBAREA AREA(ACRES) = 28.26 SUBAREA RUNOFF(CFS) = 3.83  
 EFFECTIVE AREA(ACRES) = 393.32 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 410.5 PEAK FLOW RATE(CFS) = 62.15  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 410.5 TC(MIN.) = 24.51  
 EFFECTIVE AREA(ACRES) = 393.32 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.991  
 PEAK FLOW RATE(CFS) = 62.15

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	62.15	24.51	0.680	0.60 (0.59)	0.99	393.3	40430.00

2	59.42	25.09	0.668	0.60 (0.59)	0.99	396.7	40440.00
3	46.67	27.60	0.629	0.60 (0.59)	0.99	409.2	40420.00
4	45.68	27.81	0.626	0.60 (0.59)	0.99	409.9	40400.00
5	44.28	28.05	0.623	0.60 (0.59)	0.99	410.5	40410.00

=====

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 2 Yr \*  
\* From Node: 40500 To Node: 40519 \*  
\*\*\*\*\*

FILE NAME: 0610405T.DAT  
TIME/DATE OF STUDY: 08:38 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.873
- 2) 10.00; 1.249
- 3) 15.00; 0.951
- 4) 20.00; 0.777
- 5) 25.00; 0.669
- 6) 30.00; 0.593
- 7) 40.00; 0.511
- 8) 50.00; 0.454
- 9) 60.00; 0.414
- 10) 90.00; 0.351
- 11) 120.00; 0.307
- 12) 180.00; 0.257
- 13) 360.00; 0.190
- 14) 1440.00; 0.084

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40500.00 TO NODE 40501.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 961.00 DOWNSTREAM(FEET) = 845.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.819  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.396  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.63	0.60	1.000	0	8.82

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.45  
TOTAL AREA(ACRES) = 0.63 PEAK FLOW RATE(CFS) = 0.45

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40501.00 TO NODE 40502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 845.00 DOWNSTREAM(FEET) = 788.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 141.00 CHANNEL SLOPE = 0.4043  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.341  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.11	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.36  
AVERAGE FLOW DEPTH(FEET) = 0.23 TRAVEL TIME(MIN.) = 0.44  
Tc(MIN.) = 9.26  
SUBAREA AREA(ACRES) = 1.11 SUBAREA RUNOFF(CFS) = 0.74  
EFFECTIVE AREA(ACRES) = 1.74 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 1.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.26 FLOW VELOCITY(FEET/SEC.) = 5.88  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40502.00 = 469.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40502.00 TO NODE 40503.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	788.00	DOWNSTREAM(FEET) =	719.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	187.00	CHANNEL SLOPE =	0.3690
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.278		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.44	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.60

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.14

AVERAGE FLOW DEPTH(FEET) = 0.29 TRAVEL TIME(MIN.) = 0.51

Tc(MIN.) = 9.77

SUBAREA AREA(ACRES) = 1.44 SUBAREA RUNOFF(CFS) = 0.88

EFFECTIVE AREA(ACRES) = 3.18 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 1.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 6.41

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40503.00 = 656.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40503.00 TO NODE 40504.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	719.00	DOWNSTREAM(FEET) =	545.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	302.00	CHANNEL SLOPE =	0.5762
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.227		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.36	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.89

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.31

AVERAGE FLOW DEPTH(FEET) = 0.34 TRAVEL TIME(MIN.) = 0.61

Tc(MIN.) = 10.37

SUBAREA AREA(ACRES) = 3.36 SUBAREA RUNOFF(CFS) = 1.90

EFFECTIVE AREA(ACRES) = 6.54 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 6.5 PEAK FLOW RATE(CFS) = 3.69

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 FLOW VELOCITY(FEET/SEC.) = 8.93

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40504.00 = 958.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40504.00 TO NODE 40505.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	545.00	DOWNSTREAM(FEET) =	470.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	328.00	CHANNEL SLOPE =	0.2287
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.181		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.58	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.20

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.16

AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 0.76

Tc(MIN.) = 11.13

SUBAREA AREA(ACRES) = 9.58 SUBAREA RUNOFF(CFS) = 5.01

EFFECTIVE AREA(ACRES) = 16.12 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 8.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.61 FLOW VELOCITY(FEET/SEC.) = 7.66

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40505.00 = 1286.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40505.00 TO NODE 40506.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	470.00	DOWNSTREAM(FEET) =	410.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	507.00	CHANNEL SLOPE =	0.1183
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.103		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.98	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.92

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.43

AVERAGE FLOW DEPTH(FEET) = 0.75 TRAVEL TIME(MIN.) = 1.31

Tc(MIN.) = 12.45

SUBAREA AREA(ACRES) = 10.98 SUBAREA RUNOFF(CFS) = 4.97

EFFECTIVE AREA(ACRES) = 27.10 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 27.1 PEAK FLOW RATE (CFS) = 12.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.79 FLOW VELOCITY (FEET/SEC.) = 6.57  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40506.00 = 1793.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40506.00 TO NODE 40507.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	410.00	DOWNSTREAM (FEET) =	355.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	698.00	CHANNEL SLOPE =	0.0788
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.983		

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.53	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 13.05  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.79  
AVERAGE FLOW DEPTH (FEET) = 0.87 TRAVEL TIME (MIN.) = 2.01  
Tc (MIN.) = 14.46

SUBAREA AREA (ACRES) = 4.53 SUBAREA RUNOFF (CFS) = 1.56  
EFFECTIVE AREA (ACRES) = 31.63 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 31.6 PEAK FLOW RATE (CFS) = 12.27  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.85 FLOW VELOCITY (FEET/SEC.) = 5.66  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40507.00 = 2491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40507.00 TO NODE 40518.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	355.00	DOWNSTREAM (FEET) =	341.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	604.00	CHANNEL SLOPE =	0.0232
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH (FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.893		

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.02	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 13.46  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.59  
AVERAGE FLOW DEPTH (FEET) = 0.99 TRAVEL TIME (MIN.) = 2.19

Tc (MIN.) = 16.65  
SUBAREA AREA (ACRES) = 9.02 SUBAREA RUNOFF (CFS) = 2.38  
EFFECTIVE AREA (ACRES) = 40.66 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 40.7 PEAK FLOW RATE (CFS) = 12.27  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.96 FLOW VELOCITY (FEET/SEC.) = 4.45  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40518.00 = 3095.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40518.00 TO NODE 40518.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 16.65  
RAINFALL INTENSITY (INCH/HR) = 0.89  
AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA (ACRES) = 40.66  
TOTAL STREAM AREA (ACRES) = 40.66  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 12.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40510.00 TO NODE 40511.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 329.00  
ELEVATION DATA: UPSTREAM (FEET) = 851.00 DOWNSTREAM (FEET) = 735.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.835  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.394

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	-	0.48	0.60	1.000	0	8.84

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF (CFS) = 0.34  
TOTAL AREA (ACRES) = 0.48 PEAK FLOW RATE (CFS) = 0.34

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40511.00 TO NODE 40512.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	735.00	DOWNSTREAM (FEET) =	650.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	116.00	CHANNEL SLOPE =	0.7328
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.355  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.73 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.59  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.15  
 AVERAGE FLOW DEPTH(FEET) = 0.18 TRAVEL TIME(MIN.) = 0.31  
 Tc(MIN.) = 9.15  
 SUBAREA AREA(ACRES) = 0.73 SUBAREA RUNOFF(CFS) = 0.49  
 EFFECTIVE AREA(ACRES) = 1.20 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 0.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.20 FLOW VELOCITY(FEET/SEC.) = 6.72  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40512.00 = 445.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40512.00 TO NODE 40513.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 650.00 DOWNSTREAM(FEET) = 581.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 152.00 CHANNEL SLOPE = 0.4539  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.305  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.36 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.25  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.32  
 AVERAGE FLOW DEPTH(FEET) = 0.26 TRAVEL TIME(MIN.) = 0.40  
 Tc(MIN.) = 9.55  
 SUBAREA AREA(ACRES) = 1.36 SUBAREA RUNOFF(CFS) = 0.86  
 EFFECTIVE AREA(ACRES) = 2.56 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 1.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.29 FLOW VELOCITY(FEET/SEC.) = 6.57  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40513.00 = 597.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40513.00 TO NODE 40514.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 581.00 DOWNSTREAM(FEET) = 500.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00 CHANNEL SLOPE = 0.4629  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.255  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.32 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.31  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.27  
 AVERAGE FLOW DEPTH(FEET) = 0.33 TRAVEL TIME(MIN.) = 0.40  
 Tc(MIN.) = 9.95  
 SUBAREA AREA(ACRES) = 2.32 SUBAREA RUNOFF(CFS) = 1.37  
 EFFECTIVE AREA(ACRES) = 4.88 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 2.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.35 FLOW VELOCITY(FEET/SEC.) = 7.65  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40514.00 = 772.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40514.00 TO NODE 40515.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 440.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 206.00 CHANNEL SLOPE = 0.2913  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.221  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.15 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.48  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.73  
 AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 0.51  
 Tc(MIN.) = 10.46  
 SUBAREA AREA(ACRES) = 2.15 SUBAREA RUNOFF(CFS) = 1.20  
 EFFECTIVE AREA(ACRES) = 7.03 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 7.0 PEAK FLOW RATE(CFS) = 3.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.43 FLOW VELOCITY(FEET/SEC.) = 7.02  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40515.00 = 978.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40515.00 TO NODE 40516.00 IS CODE = 51

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 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 390.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 269.00 CHANNEL SLOPE = 0.1859
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.179
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 5.24 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.30
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.30
AVERAGE FLOW DEPTH(FEET) = 0.53 TRAVEL TIME(MIN.) = 0.71
Tc(MIN.) = 11.17
SUBAREA AREA(ACRES) = 5.24 SUBAREA RUNOFF(CFS) = 2.73
EFFECTIVE AREA(ACRES) = 12.27 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 6.39

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.57 FLOW VELOCITY(FEET/SEC.) = 6.62
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40516.00 = 1247.00 FEET.

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FLOW PROCESS FROM NODE 40516.00 TO NODE 40517.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 390.00 DOWNSTREAM(FEET) = 355.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 384.00 CHANNEL SLOPE = 0.0911
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.106
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.01 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.31
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.24
AVERAGE FLOW DEPTH(FEET) = 0.68 TRAVEL TIME(MIN.) = 1.22
Tc(MIN.) = 12.39
SUBAREA AREA(ACRES) = 4.01 SUBAREA RUNOFF(CFS) = 1.83
EFFECTIVE AREA(ACRES) = 16.28 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 16.3 PEAK FLOW RATE(CFS) = 7.42

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.68 FLOW VELOCITY(FEET/SEC.) = 5.29
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40517.00 = 1631.00 FEET.

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*****
FLOW PROCESS FROM NODE 40517.00 TO NODE 40518.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 355.00 DOWNSTREAM(FEET) = 341.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 512.00 CHANNEL SLOPE = 0.0273
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.990
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 8.89 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.98
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.38
AVERAGE FLOW DEPTH(FEET) = 0.83 TRAVEL TIME(MIN.) = 1.95
Tc(MIN.) = 14.34
SUBAREA AREA(ACRES) = 8.89 SUBAREA RUNOFF(CFS) = 3.12
EFFECTIVE AREA(ACRES) = 25.17 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 25.2 PEAK FLOW RATE(CFS) = 8.83

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.82 FLOW VELOCITY(FEET/SEC.) = 4.37
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40518.00 = 2143.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 40518.00 TO NODE 40518.00 IS CODE = 1

```

```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

```

```

=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 14.34
RAINFALL INTENSITY(INCH/HR) = 0.99
AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 25.17
TOTAL STREAM AREA(ACRES) = 25.17
PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.83

```

```

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 12.27 16.65 0.893 0.60( 0.60) 1.00 40.7 40500.00
2 8.83 14.34 0.990 0.60( 0.60) 1.00 25.2 40510.00

```

```

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

```

```

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 21.10 14.34 0.990 0.60( 0.60) 1.00 60.2 40510.00
2 18.91 16.65 0.893 0.60( 0.60) 1.00 65.8 40500.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 21.10 Tc(MIN.) = 14.34  
 EFFECTIVE AREA(ACRES) = 60.19 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 65.8  
 LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40518.00 = 3095.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40518.00 TO NODE 40519.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 341.00 DOWNSTREAM(FEET) = 295.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 996.00 CHANNEL SLOPE = 0.0462  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.887  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.05	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.88  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.64  
 AVERAGE FLOW DEPTH(FEET) = 1.05 TRAVEL TIME(MIN.) = 2.50  
 Tc(MIN.) = 16.84  
 SUBAREA AREA(ACRES) = 6.05 SUBAREA RUNOFF(CFS) = 1.56  
 EFFECTIVE AREA(ACRES) = 66.24 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 71.9 PEAK FLOW RATE(CFS) = 21.10  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.03 FLOW VELOCITY(FEET/SEC.) = 6.59  
 LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40519.00 = 4091.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40519.00 TO NODE 40519.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.84  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.887  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.50	0.60	0.982	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 2.54  
 EFFECTIVE AREA(ACRES) = 75.74 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 81.4 PEAK FLOW RATE(CFS) = 21.10  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 81.4 TC(MIN.) = 16.84  
 EFFECTIVE AREA(ACRES) = 75.74 AREA-AVERAGED Fm(INCH/HR)= 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.998  
 PEAK FLOW RATE(CFS) = 21.10

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	21.10	16.84	0.887	0.60( 0.60)	1.00	75.7	40510.00
2	18.91	19.22	0.804	0.60( 0.60)	1.00	81.4	40500.00

=====

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 2 Yr \*  
\* From Node: 40600 To Node: 40615 \*  
\*\*\*\*\*

FILE NAME: 0610406T.DAT  
TIME/DATE OF STUDY: 08:38 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.873
- 2) 10.00; 1.249
- 3) 15.00; 0.951
- 4) 20.00; 0.777
- 5) 25.00; 0.669
- 6) 30.00; 0.593
- 7) 40.00; 0.511
- 8) 50.00; 0.454
- 9) 60.00; 0.414
- 10) 90.00; 0.351
- 11) 120.00; 0.307
- 12) 180.00; 0.257
- 13) 360.00; 0.190
- 14) 1440.00; 0.084

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40600.00 TO NODE 40601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 279.00  
ELEVATION DATA: UPSTREAM(FEET) = 1054.00 DOWNSTREAM(FEET) = 1000.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.326  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.333  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.54	0.60	1.000	0	9.33

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.36  
TOTAL AREA(ACRES) = 0.54 PEAK FLOW RATE(CFS) = 0.36

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40601.00 TO NODE 40602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 985.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 199.00 CHANNEL SLOPE = 0.0754  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.213  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.76	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.60  
AVERAGE FLOW DEPTH(FEET) = 0.27 TRAVEL TIME(MIN.) = 1.28  
Tc(MIN.) = 10.60  
SUBAREA AREA(ACRES) = 0.76 SUBAREA RUNOFF(CFS) = 0.42  
EFFECTIVE AREA(ACRES) = 1.30 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.3 PEAK FLOW RATE(CFS) = 0.72

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.29 FLOW VELOCITY(FEET/SEC.) = 2.76  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40602.00 = 478.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40602.00 TO NODE 40603.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	985.00	DOWNSTREAM(FEET) =	958.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	282.00	CHANNEL SLOPE =	0.0957
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.126		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.11	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.98

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.24

AVERAGE FLOW DEPTH(FEET) = 0.32 TRAVEL TIME(MIN.) = 1.45

Tc(MIN.) = 12.05

SUBAREA AREA(ACRES) = 1.11 SUBAREA RUNOFF(CFS) = 0.53

EFFECTIVE AREA(ACRES) = 2.41 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 1.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.34 FLOW VELOCITY(FEET/SEC.) = 3.33

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40603.00 = 760.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40603.00 TO NODE 40604.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	958.00	DOWNSTREAM(FEET) =	940.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	219.00	CHANNEL SLOPE =	0.0822
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.059		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.36	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.22

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.24

AVERAGE FLOW DEPTH(FEET) = 0.35 TRAVEL TIME(MIN.) = 1.13

Tc(MIN.) = 13.18

SUBAREA AREA(ACRES) = 0.36 SUBAREA RUNOFF(CFS) = 0.15

EFFECTIVE AREA(ACRES) = 2.77 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.8 PEAK FLOW RATE(CFS) = 1.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 FLOW VELOCITY(FEET/SEC.) = 3.19

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40604.00 = 979.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40604.00 TO NODE 40605.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	940.00	DOWNSTREAM(FEET) =	800.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	547.00	CHANNEL SLOPE =	0.2559
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.958		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.00	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.63

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.38

AVERAGE FLOW DEPTH(FEET) = 0.32 TRAVEL TIME(MIN.) = 1.69

Tc(MIN.) = 14.87

SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 0.97

EFFECTIVE AREA(ACRES) = 5.77 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 1.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.33 FLOW VELOCITY(FEET/SEC.) = 5.60

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40605.00 = 1526.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40605.00 TO NODE 40606.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	800.00	DOWNSTREAM(FEET) =	680.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	277.00	CHANNEL SLOPE =	0.4332
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.932		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.22	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.19

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.99

AVERAGE FLOW DEPTH(FEET) = 0.32 TRAVEL TIME(MIN.) = 0.66

Tc(MIN.) = 15.53

SUBAREA AREA(ACRES) = 2.22 SUBAREA RUNOFF(CFS) = 0.66

EFFECTIVE AREA(ACRES) = 7.99 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.0 PEAK FLOW RATE (CFS) = 2.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.33 FLOW VELOCITY (FEET/SEC.) = 7.19  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40606.00 = 1803.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40606.00 TO NODE 40607.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 680.00 DOWNSTREAM (FEET) = 670.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 59.00 CHANNEL SLOPE = 0.1695  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.926

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.34	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.76  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.67  
AVERAGE FLOW DEPTH (FEET) = 0.47 TRAVEL TIME (MIN.) = 0.17  
Tc (MIN.) = 15.70

SUBAREA AREA (ACRES) = 9.34 SUBAREA RUNOFF (CFS) = 2.74  
EFFECTIVE AREA (ACRES) = 17.33 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.3 PEAK FLOW RATE (CFS) = 5.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.53 FLOW VELOCITY (FEET/SEC.) = 6.05  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40607.00 = 1862.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40607.00 TO NODE 40608.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 670.00 DOWNSTREAM (FEET) = 585.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 246.00 CHANNEL SLOPE = 0.3455  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.909

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.64	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.73  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.17  
AVERAGE FLOW DEPTH (FEET) = 0.48 TRAVEL TIME (MIN.) = 0.50  
Tc (MIN.) = 16.21

SUBAREA AREA (ACRES) = 4.64 SUBAREA RUNOFF (CFS) = 1.29  
EFFECTIVE AREA (ACRES) = 21.96 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 6.10

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.49 FLOW VELOCITY (FEET/SEC.) = 8.37  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40608.00 = 2108.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40608.00 TO NODE 40609.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 585.00 DOWNSTREAM (FEET) = 494.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 482.00 CHANNEL SLOPE = 0.1888  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.868

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.61	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.15  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.84  
AVERAGE FLOW DEPTH (FEET) = 0.59 TRAVEL TIME (MIN.) = 1.18  
Tc (MIN.) = 17.38

SUBAREA AREA (ACRES) = 8.61 SUBAREA RUNOFF (CFS) = 2.08  
EFFECTIVE AREA (ACRES) = 30.57 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 30.6 PEAK FLOW RATE (CFS) = 7.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.59 FLOW VELOCITY (FEET/SEC.) = 7.01  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40609.00 = 2590.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40609.00 TO NODE 40610.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 494.00 DOWNSTREAM (FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 236.00 CHANNEL SLOPE = 0.1017  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.845

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	18.33	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.40  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.88

AVERAGE FLOW DEPTH(FEET) = 0.73 TRAVEL TIME(MIN.) = 0.67  
Tc(MIN.) = 18.05  
SUBAREA AREA(ACRES) = 18.33 SUBAREA RUNOFF(CFS) = 4.04  
EFFECTIVE AREA(ACRES) = 48.90 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 48.9 PEAK FLOW RATE(CFS) = 10.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.77 FLOW VELOCITY(FEET/SEC.) = 6.10  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40610.00 = 2826.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40610.00 TO NODE 40611.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 425.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 560.00 CHANNEL SLOPE = 0.0804  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.787

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.11	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.63

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.65

AVERAGE FLOW DEPTH(FEET) = 0.83 TRAVEL TIME(MIN.) = 1.65

Tc(MIN.) = 19.70

SUBAREA AREA(ACRES) = 10.11 SUBAREA RUNOFF(CFS) = 1.71

EFFECTIVE AREA(ACRES) = 59.01 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 59.0 PEAK FLOW RATE(CFS) = 10.78

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.81 FLOW VELOCITY(FEET/SEC.) = 5.53

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40611.00 = 3386.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40611.00 TO NODE 40612.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 373.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 906.00 CHANNEL SLOPE = 0.0574  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.718

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	20.87	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.90  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.01  
AVERAGE FLOW DEPTH(FEET) = 0.89 TRAVEL TIME(MIN.) = 3.01  
Tc(MIN.) = 22.72  
SUBAREA AREA(ACRES) = 20.87 SUBAREA RUNOFF(CFS) = 2.23  
EFFECTIVE AREA(ACRES) = 79.89 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 79.9 PEAK FLOW RATE(CFS) = 10.78  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.86 FLOW VELOCITY(FEET/SEC.) = 4.89  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40612.00 = 4292.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40612.00 TO NODE 40613.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 373.00 DOWNSTREAM(FEET) = 326.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1220.00 CHANNEL SLOPE = 0.0385  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.645

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	13.07	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.05

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.27

AVERAGE FLOW DEPTH(FEET) = 0.84 TRAVEL TIME(MIN.) = 3.86

Tc(MIN.) = 26.58

SUBAREA AREA(ACRES) = 13.07 SUBAREA RUNOFF(CFS) = 0.53

EFFECTIVE AREA(ACRES) = 92.95 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 93.0 PEAK FLOW RATE(CFS) = 10.78

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.83 FLOW VELOCITY(FEET/SEC.) = 5.23

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40613.00 = 5512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40613.00 TO NODE 40614.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 326.00 DOWNSTREAM(FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 209.00 CHANNEL SLOPE = 0.1722  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.639

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	14.71	0.60	0.999	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.05  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.27  
 AVERAGE FLOW DEPTH(FEET) = 0.63 TRAVEL TIME(MIN.) = 0.38  
 Tc(MIN.) = 26.95  
 SUBAREA AREA(ACRES) = 14.71 SUBAREA RUNOFF(CFS) = 0.53  
 EFFECTIVE AREA(ACRES) = 107.67 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 107.7 PEAK FLOW RATE(CFS) = 10.78  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.63 FLOW VELOCITY(FEET/SEC.) = 9.10  
 LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40614.00 = 5721.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40614.00 TO NODE 40615.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 290.00 DOWNSTREAM(FEET) = 286.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0104  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.609  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	23.56	0.60	0.971	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.971  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.07  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.22  
 AVERAGE FLOW DEPTH(FEET) = 1.07 TRAVEL TIME(MIN.) = 2.00  
 Tc(MIN.) = 28.95  
 SUBAREA AREA(ACRES) = 23.56 SUBAREA RUNOFF(CFS) = 0.56  
 EFFECTIVE AREA(ACRES) = 131.23 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 131.2 PEAK FLOW RATE(CFS) = 10.78  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.06 FLOW VELOCITY(FEET/SEC.) = 3.18  
 LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40615.00 = 6107.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40615.00 TO NODE 40615.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 28.95  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.609  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.74	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 3.74 SUBAREA RUNOFF(CFS) = 0.03  
 EFFECTIVE AREA(ACRES) = 134.97 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 135.0 PEAK FLOW RATE(CFS) = 10.78  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 135.0 TC(MIN.) = 28.95  
 EFFECTIVE AREA(ACRES) = 134.97 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.995  
 PEAK FLOW RATE(CFS) = 10.78

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 2 Yr \*  
\* From Node: 50100 To Node: 50167 \*  
\*\*\*\*\*

FILE NAME: 0610501T.DAT  
TIME/DATE OF STUDY: 08:39 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.864
- 2) 10.00; 1.243
- 3) 15.00; 0.947
- 4) 20.00; 0.775
- 5) 25.00; 0.668
- 6) 30.00; 0.592
- 7) 40.00; 0.510
- 8) 50.00; 0.453
- 9) 60.00; 0.412
- 10) 90.00; 0.349
- 11) 120.00; 0.305
- 12) 180.00; 0.256
- 13) 360.00; 0.189
- 14) 1440.00; 0.083

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50100.00 TO NODE 50101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00  
ELEVATION DATA: UPSTREAM(FEET) = 1072.00 DOWNSTREAM(FEET) = 1063.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.598  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.971  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.60	1.000	0	14.60

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.20  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50101.00 TO NODE 50102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1063.00 DOWNSTREAM(FEET) = 975.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 273.00 CHANNEL SLOPE = 0.3223  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.918  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.29	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.63  
AVERAGE FLOW DEPTH(FEET) = 0.15 TRAVEL TIME(MIN.) = 1.25  
Tc(MIN.) = 15.85  
SUBAREA AREA(ACRES) = 0.29 SUBAREA RUNOFF(CFS) = 0.08  
EFFECTIVE AREA(ACRES) = 0.90 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 0.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.16 FLOW VELOCITY(FEET/SEC.) = 3.55  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50102.00 = 597.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50102.00 TO NODE 50103.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 948.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 111.00 CHANNEL SLOPE = 0.2432  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.898

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.22	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.29

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.28

AVERAGE FLOW DEPTH(FEET) = 0.17 TRAVEL TIME(MIN.) = 0.56

Tc(MIN.) = 16.41

SUBAREA AREA(ACRES) = 0.22 SUBAREA RUNOFF(CFS) = 0.06

EFFECTIVE AREA(ACRES) = 1.12 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 0.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.17 FLOW VELOCITY(FEET/SEC.) = 3.44

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50103.00 = 708.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50103.00 TO NODE 50104.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 948.00 DOWNSTREAM(FEET) = 914.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 136.00 CHANNEL SLOPE = 0.2500  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.877

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.37

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.61

AVERAGE FLOW DEPTH(FEET) = 0.19 TRAVEL TIME(MIN.) = 0.63

Tc(MIN.) = 17.04

SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 0.15

EFFECTIVE AREA(ACRES) = 1.71 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 0.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.19 FLOW VELOCITY(FEET/SEC.) = 3.80

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50104.00 = 844.00 FEET.

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FLOW PROCESS FROM NODE 50104.00 TO NODE 50105.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 914.00 DOWNSTREAM(FEET) = 895.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 52.00 CHANNEL SLOPE = 0.3654  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.871

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.73	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.64

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.78

AVERAGE FLOW DEPTH(FEET) = 0.21 TRAVEL TIME(MIN.) = 0.18

Tc(MIN.) = 17.22

SUBAREA AREA(ACRES) = 1.73 SUBAREA RUNOFF(CFS) = 0.42

EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 0.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.23 FLOW VELOCITY(FEET/SEC.) = 5.20

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50105.00 = 896.00 FEET.

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FLOW PROCESS FROM NODE 50105.00 TO NODE 50106.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 835.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00 CHANNEL SLOPE = 0.2143  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.836

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.24

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.60

AVERAGE FLOW DEPTH(FEET) = 0.30 TRAVEL TIME(MIN.) = 1.02

Tc(MIN.) = 18.24

SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 0.81

EFFECTIVE AREA(ACRES) = 7.24 AREA-AVERAGED Fm(INCH/HR) = 0.60



AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 7.2 PEAK FLOW RATE (CFS) = 1.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.32 FLOW VELOCITY (FEET/SEC.) = 4.91  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50106.00 = 1176.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50106.00 TO NODE 50107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 835.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 413.00 CHANNEL SLOPE = 0.2179  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.791

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.53	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.93  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.31  
AVERAGE FLOW DEPTH (FEET) = 0.35 TRAVEL TIME (MIN.) = 1.30  
Tc (MIN.) = 19.54

SUBAREA AREA (ACRES) = 4.53 SUBAREA RUNOFF (CFS) = 0.78  
EFFECTIVE AREA (ACRES) = 11.77 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.8 PEAK FLOW RATE (CFS) = 2.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.36 FLOW VELOCITY (FEET/SEC.) = 5.34  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50107.00 = 1589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50107.00 TO NODE 50108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 302.00 CHANNEL SLOPE = 0.2318  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.766

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.76	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.46  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.72  
AVERAGE FLOW DEPTH (FEET) = 0.38 TRAVEL TIME (MIN.) = 0.88  
Tc (MIN.) = 20.42

SUBAREA AREA (ACRES) = 5.76 SUBAREA RUNOFF (CFS) = 0.86  
EFFECTIVE AREA (ACRES) = 17.54 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.5 PEAK FLOW RATE (CFS) = 2.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.39 FLOW VELOCITY (FEET/SEC.) = 5.87  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50108.00 = 1891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50108.00 TO NODE 50109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 655.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 81.00 CHANNEL SLOPE = 0.2469  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.762

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.77	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.78  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.51  
AVERAGE FLOW DEPTH (FEET) = 0.44 TRAVEL TIME (MIN.) = 0.21  
Tc (MIN.) = 20.62

SUBAREA AREA (ACRES) = 15.77 SUBAREA RUNOFF (CFS) = 2.30  
EFFECTIVE AREA (ACRES) = 33.31 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 33.3 PEAK FLOW RATE (CFS) = 4.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.48 FLOW VELOCITY (FEET/SEC.) = 6.92  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50109.00 = 1972.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 655.00 DOWNSTREAM (FEET) = 590.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 379.00 CHANNEL SLOPE = 0.1715  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.740

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.53	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.58  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.23

AVERAGE FLOW DEPTH(FEET) = 0.55 TRAVEL TIME(MIN.) = 1.01  
Tc(MIN.) = 21.64  
SUBAREA AREA(ACRES) = 11.53 SUBAREA RUNOFF(CFS) = 1.45  
EFFECTIVE AREA(ACRES) = 44.84 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 44.8 PEAK FLOW RATE(CFS) = 5.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.55 FLOW VELOCITY(FEET/SEC.) = 6.31  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50110.00 = 2351.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50110.00 TO NODE 50111.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 570.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 340.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.713

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	27.15	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.03

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.43

AVERAGE FLOW DEPTH(FEET) = 0.73 TRAVEL TIME(MIN.) = 1.28

Tc(MIN.) = 22.92

SUBAREA AREA(ACRES) = 27.15 SUBAREA RUNOFF(CFS) = 2.75

EFFECTIVE AREA(ACRES) = 71.99 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 72.0 PEAK FLOW RATE(CFS) = 7.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.74 FLOW VELOCITY(FEET/SEC.) = 4.48

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50111.00 = 2691.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50111.00 TO NODE 50112.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 567.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 403.00 CHANNEL SLOPE = 0.0074  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.652

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	66.68	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.94  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.17  
AVERAGE FLOW DEPTH(FEET) = 1.17 TRAVEL TIME(MIN.) = 3.10  
Tc(MIN.) = 26.02  
SUBAREA AREA(ACRES) = 66.68 SUBAREA RUNOFF(CFS) = 3.15  
EFFECTIVE AREA(ACRES) = 138.68 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 138.7 PEAK FLOW RATE(CFS) = 7.30  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.09 FLOW VELOCITY(FEET/SEC.) = 2.06

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50112.00 = 3094.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50112.00 TO NODE 50140.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 26.02

RAINFALL INTENSITY(INCH/HR) = 0.65

AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60

AREA-AVERAGED Ap = 1.00

EFFECTIVE STREAM AREA(ACRES) = 138.68

TOTAL STREAM AREA(ACRES) = 138.68

PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50120.00 TO NODE 50121.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00

ELEVATION DATA: UPSTREAM(FEET) = 1068.00 DOWNSTREAM(FEET) = 968.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.018

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.365

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	-	0.29	0.60	1.000	0	9.02

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF(CFS) = 0.20

TOTAL AREA(ACRES) = 0.29 PEAK FLOW RATE(CFS) = 0.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50121.00 TO NODE 50122.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 968.00 DOWNSTREAM(FEET) = 916.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 242.00 CHANNEL SLOPE = 0.2149  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.231  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.55	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.35  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.41  
 AVERAGE FLOW DEPTH(FEET) = 0.19 TRAVEL TIME(MIN.) = 1.18  
 Tc(MIN.) = 10.20  
 SUBAREA AREA(ACRES) = 0.55 SUBAREA RUNOFF(CFS) = 0.31  
 EFFECTIVE AREA(ACRES) = 0.83 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 0.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.21 FLOW VELOCITY(FEET/SEC.) = 3.62  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50122.00 = 566.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50122.00 TO NODE 50123.00 IS CODE = 51

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 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM(FEET) = 916.00 DOWNSTREAM(FEET) = 906.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 111.00 CHANNEL SLOPE = 0.0901  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.192  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.68	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.66  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.83  
 AVERAGE FLOW DEPTH(FEET) = 0.28 TRAVEL TIME(MIN.) = 0.65  
 Tc(MIN.) = 10.85  
 SUBAREA AREA(ACRES) = 0.68 SUBAREA RUNOFF(CFS) = 0.36  
 EFFECTIVE AREA(ACRES) = 1.51 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 1.5 PEAK FLOW RATE(CFS) = 0.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.30 FLOW VELOCITY(FEET/SEC.) = 2.98  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50123.00 = 677.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50123.00 TO NODE 50124.00 IS CODE = 51

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 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM(FEET) = 906.00 DOWNSTREAM(FEET) = 903.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0500  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.169  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.96  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.52  
 AVERAGE FLOW DEPTH(FEET) = 0.36 TRAVEL TIME(MIN.) = 0.40  
 Tc(MIN.) = 11.25  
 SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 0.30  
 EFFECTIVE AREA(ACRES) = 2.10 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 2.1 PEAK FLOW RATE(CFS) = 1.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.37 FLOW VELOCITY(FEET/SEC.) = 2.61  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50124.00 = 737.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50124.00 TO NODE 50125.00 IS CODE = 51

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 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM(FEET) = 903.00 DOWNSTREAM(FEET) = 901.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 29.00 CHANNEL SLOPE = 0.0690  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.160  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.44	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.44  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.12  
 AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 0.15  
 Tc(MIN.) = 11.41  
 SUBAREA AREA(ACRES) = 1.44 SUBAREA RUNOFF(CFS) = 0.73  
 EFFECTIVE AREA(ACRES) = 3.54 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 3.5 PEAK FLOW RATE(CFS) = 1.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.42 FLOW VELOCITY(FEET/SEC.) = 3.33  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50125.00 = 766.00 FEET.

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 FLOW PROCESS FROM NODE 50125.00 TO NODE 50126.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 901.00 DOWNSTREAM(FEET) = 889.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 130.00 CHANNEL SLOPE = 0.0923
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.128
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.69 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.42
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.04
AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.54
Tc(MIN.) = 11.94
SUBAREA AREA(ACRES) = 2.69 SUBAREA RUNOFF(CFS) = 1.28
EFFECTIVE AREA(ACRES) = 6.23 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.2 PEAK FLOW RATE(CFS) = 2.96

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.48 FLOW VELOCITY(FEET/SEC.) = 4.23
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50126.00 = 896.00 FEET.

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FLOW PROCESS FROM NODE 50126.00 TO NODE 50127.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 889.00 DOWNSTREAM(FEET) = 855.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 231.00 CHANNEL SLOPE = 0.1472
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.085
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.18 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.44
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.23
AVERAGE FLOW DEPTH(FEET) = 0.47 TRAVEL TIME(MIN.) = 0.74
Tc(MIN.) = 12.68
SUBAREA AREA(ACRES) = 2.18 SUBAREA RUNOFF(CFS) = 0.95
EFFECTIVE AREA(ACRES) = 8.41 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 3.67

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.48 FLOW VELOCITY(FEET/SEC.) = 5.36
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50127.00 = 1127.00 FEET.

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FLOW PROCESS FROM NODE 50127.00 TO NODE 50128.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 855.00 DOWNSTREAM(FEET) = 793.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 211.00 CHANNEL SLOPE = 0.2938
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.056
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 5.70 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.84
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.36
AVERAGE FLOW DEPTH(FEET) = 0.47 TRAVEL TIME(MIN.) = 0.48
Tc(MIN.) = 13.16
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 2.34
EFFECTIVE AREA(ACRES) = 14.11 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.1 PEAK FLOW RATE(CFS) = 5.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.50 FLOW VELOCITY(FEET/SEC.) = 7.71
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50128.00 = 1338.00 FEET.

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FLOW PROCESS FROM NODE 50128.00 TO NODE 50129.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 793.00 DOWNSTREAM(FEET) = 708.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 353.00 CHANNEL SLOPE = 0.2408
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.011
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 9.99 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.64
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.65
AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 0.77
Tc(MIN.) = 13.92
SUBAREA AREA(ACRES) = 9.99 SUBAREA RUNOFF(CFS) = 3.70
EFFECTIVE AREA(ACRES) = 24.10 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 8.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.61 FLOW VELOCITY(FEET/SEC.) = 8.05

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LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50129.00 = 1691.00 FEET.

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FLOW PROCESS FROM NODE 50129.00 TO NODE 50130.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 708.00 DOWNSTREAM(FEET) = 571.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 735.00 CHANNEL SLOPE = 0.1864
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.929
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 13.71 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.95
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.63
AVERAGE FLOW DEPTH(FEET) = 0.69 TRAVEL TIME(MIN.) = 1.60
Tc(MIN.) = 15.53
SUBAREA AREA(ACRES) = 13.71 SUBAREA RUNOFF(CFS) = 4.06
EFFECTIVE AREA(ACRES) = 37.82 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 11.20

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.70 FLOW VELOCITY(FEET/SEC.) = 7.68
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50130.00 = 2426.00 FEET.

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FLOW PROCESS FROM NODE 50130.00 TO NODE 50131.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 571.00 DOWNSTREAM(FEET) = 566.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 709.00 CHANNEL SLOPE = 0.0071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.762
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.71 0.60 0.986 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.82
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.33
AVERAGE FLOW DEPTH(FEET) = 1.36 TRAVEL TIME(MIN.) = 5.08
Tc(MIN.) = 20.61
SUBAREA AREA(ACRES) = 20.71 SUBAREA RUNOFF(CFS) = 3.18
EFFECTIVE AREA(ACRES) = 58.52 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 11.20
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.29 FLOW VELOCITY(FEET/SEC.) = 2.26
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50131.00 = 3135.00 FEET.

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FLOW PROCESS FROM NODE 50132.00 TO NODE 50131.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.61
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.762
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 154.02 0.60 0.949 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 154.02 SUBAREA RUNOFF(CFS) = 26.73
EFFECTIVE AREA(ACRES) = 212.54 AREA-AVERAGED Fm(INCH/HR) = 0.58
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 212.5 PEAK FLOW RATE(CFS) = 35.44

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FLOW PROCESS FROM NODE 50131.00 TO NODE 50140.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 20.61
RAINFALL INTENSITY(INCH/HR) = 0.76
AREA-AVERAGED Fm(INCH/HR) = 0.58
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 212.54
TOTAL STREAM AREA(ACRES) = 212.54
PEAK FLOW RATE(CFS) AT CONFLUENCE = 35.44

\*\* CONFLUENCE DATA \*\*
Table with 7 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*
Table with 7 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 42.74 Tc(MIN.) = 20.61
EFFECTIVE AREA(ACRES) = 322.40 AREA-AVERAGED Fm(INCH/HR) = 0.58

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.97  
TOTAL AREA (ACRES) = 351.2  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50140.00 = 3135.00 FEET.

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FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 566.00 DOWNSTREAM(FEET) = 416.00  
FLOW LENGTH(FEET) = 376.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 38.29  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 42.74  
PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 20.77  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50141.00 = 3511.00 FEET.

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FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.77  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.759  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 48.73 0.60 0.922 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.922  
SUBAREA AREA(ACRES) = 48.73 SUBAREA RUNOFF(CFS) = 9.01  
EFFECTIVE AREA(ACRES) = 371.13 AREA-AVERAGED Fm(INCH/HR) = 0.58  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 400.0 PEAK FLOW RATE(CFS) = 59.48

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FLOW PROCESS FROM NODE 50141.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 416.00 DOWNSTREAM(FEET) = 404.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 972.00 CHANNEL SLOPE = 0.0123  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.676  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.56 0.60 0.610 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.610  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 60.53  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.23  
AVERAGE FLOW DEPTH(FEET) = 2.18 TRAVEL TIME(MIN.) = 3.83  
Tc(MIN.) = 24.60

SUBAREA AREA(ACRES) = 7.56 SUBAREA RUNOFF(CFS) = 2.11  
EFFECTIVE AREA(ACRES) = 378.69 AREA-AVERAGED Fm(INCH/HR) = 0.58  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96  
TOTAL AREA(ACRES) = 407.5 PEAK FLOW RATE(CFS) = 59.48  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.17 FLOW VELOCITY(FEET/SEC.) = 4.21  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50162.00 = 4483.00 FEET.

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FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 24.60  
RAINFALL INTENSITY(INCH/HR) = 0.68  
AREA-AVERAGED Fm(INCH/HR) = 0.58  
AREA-AVERAGED Fp(INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.96  
EFFECTIVE STREAM AREA(ACRES) = 378.69  
TOTAL STREAM AREA(ACRES) = 407.52  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 59.48

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FLOW PROCESS FROM NODE 50150.00 TO NODE 50151.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00  
ELEVATION DATA: UPSTREAM(FEET) = 1076.00 DOWNSTREAM(FEET) = 988.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.235  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.338  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.46	0.60	1.000	0	9.23
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60						
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000						
SUBAREA RUNOFF(CFS) = 0.30						
TOTAL AREA(ACRES) = 0.46 PEAK FLOW RATE(CFS) = 0.30						

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FLOW PROCESS FROM NODE 50151.00 TO NODE 50152.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 988.00 DOWNSTREAM(FEET) = 938.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 220.00 CHANNEL SLOPE = 0.2273  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.231  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.60	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 0.47  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.80  
 AVERAGE FLOW DEPTH (FEET) = 0.20 TRAVEL TIME (MIN.) = 0.97  
 Tc (MIN.) = 10.20  
 SUBAREA AREA (ACRES) = 0.59 SUBAREA RUNOFF (CFS) = 0.33  
 EFFECTIVE AREA (ACRES) = 1.04 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.0 PEAK FLOW RATE (CFS) = 0.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.22 FLOW VELOCITY (FEET/SEC.) = 3.94  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50152.00 = 543.00 FEET.

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 FLOW PROCESS FROM NODE 50152.00 TO NODE 50153.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 938.00 DOWNSTREAM (FEET) = 904.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 218.00 CHANNEL SLOPE = 0.1560  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.174  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.13	0.60	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 0.89  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.79  
 AVERAGE FLOW DEPTH (FEET) = 0.28 TRAVEL TIME (MIN.) = 0.96  
 Tc (MIN.) = 11.16  
 SUBAREA AREA (ACRES) = 1.13 SUBAREA RUNOFF (CFS) = 0.59  
 EFFECTIVE AREA (ACRES) = 2.18 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.2 PEAK FLOW RATE (CFS) = 1.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.30 FLOW VELOCITY (FEET/SEC.) = 4.10  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50153.00 = 761.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50153.00 TO NODE 50154.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 904.00 DOWNSTREAM (FEET) = 881.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 212.00 CHANNEL SLOPE = 0.1085

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.122  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.00	0.60	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.83  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.97  
 AVERAGE FLOW DEPTH (FEET) = 0.39 TRAVEL TIME (MIN.) = 0.89  
 Tc (MIN.) = 12.05  
 SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 1.41  
 EFFECTIVE AREA (ACRES) = 5.18 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.2 PEAK FLOW RATE (CFS) = 2.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.44 FLOW VELOCITY (FEET/SEC.) = 4.23  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50154.00 = 973.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50154.00 TO NODE 50155.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 881.00 DOWNSTREAM (FEET) = 877.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 158.00 CHANNEL SLOPE = 0.0253  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.063  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.60	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.23  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.66  
 AVERAGE FLOW DEPTH (FEET) = 0.64 TRAVEL TIME (MIN.) = 0.99  
 Tc (MIN.) = 13.04  
 SUBAREA AREA (ACRES) = 3.81 SUBAREA RUNOFF (CFS) = 1.59  
 EFFECTIVE AREA (ACRES) = 8.99 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.0 PEAK FLOW RATE (CFS) = 3.75

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.67 FLOW VELOCITY (FEET/SEC.) = 2.75  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50155.00 = 1131.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50155.00 TO NODE 50156.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 877.00 DOWNSTREAM(FEET) = 875.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 195.00 CHANNEL SLOPE = 0.0103  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.969  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.32	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.30  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.05  
 AVERAGE FLOW DEPTH(FEET) = 0.84 TRAVEL TIME(MIN.) = 1.59  
 Tc(MIN.) = 14.63  
 SUBAREA AREA(ACRES) = 3.32 SUBAREA RUNOFF(CFS) = 1.10  
 EFFECTIVE AREA(ACRES) = 12.31 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 4.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.82 FLOW VELOCITY(FEET/SEC.) = 2.02  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50156.00 = 1326.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50156.00 TO NODE 50157.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 850.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 424.00 CHANNEL SLOPE = 0.0590  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.899  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.78	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.60  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.98  
 AVERAGE FLOW DEPTH(FEET) = 0.62 TRAVEL TIME(MIN.) = 1.78  
 Tc(MIN.) = 16.40  
 SUBAREA AREA(ACRES) = 3.78 SUBAREA RUNOFF(CFS) = 1.02  
 EFFECTIVE AREA(ACRES) = 16.09 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 4.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.61 FLOW VELOCITY(FEET/SEC.) = 3.94  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50157.00 = 1750.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50157.00 TO NODE 50158.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 835.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0949  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.881  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.22	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.75  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.06  
 AVERAGE FLOW DEPTH(FEET) = 0.62 TRAVEL TIME(MIN.) = 0.52  
 Tc(MIN.) = 16.92  
 SUBAREA AREA(ACRES) = 11.22 SUBAREA RUNOFF(CFS) = 2.84  
 EFFECTIVE AREA(ACRES) = 27.31 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 27.3 PEAK FLOW RATE(CFS) = 6.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.66 FLOW VELOCITY(FEET/SEC.) = 5.27  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50158.00 = 1908.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50158.00 TO NODE 50159.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 835.00 DOWNSTREAM(FEET) = 680.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 721.00 CHANNEL SLOPE = 0.2150  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.827  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	20.87	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.05  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.64  
 AVERAGE FLOW DEPTH(FEET) = 0.63 TRAVEL TIME(MIN.) = 1.57  
 Tc(MIN.) = 18.50  
 SUBAREA AREA(ACRES) = 20.87 SUBAREA RUNOFF(CFS) = 4.26  
 EFFECTIVE AREA(ACRES) = 48.18 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 48.2 PEAK FLOW RATE(CFS) = 9.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.65 FLOW VELOCITY(FEET/SEC.) = 7.87  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50159.00 = 2629.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50159.00 TO NODE 50160.00 IS CODE = 51



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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 680.00 DOWNSTREAM(FEET) = 558.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 874.00 CHANNEL SLOPE = 0.1396
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.763
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 32.02 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.21
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.04
AVERAGE FLOW DEPTH(FEET) = 0.76 TRAVEL TIME(MIN.) = 2.07
Tc(MIN.) = 20.57
SUBAREA AREA(ACRES) = 32.02 SUBAREA RUNOFF(CFS) = 4.70
EFFECTIVE AREA(ACRES) = 80.20 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 11.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.75 FLOW VELOCITY(FEET/SEC.) = 6.97
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50160.00 = 3503.00 FEET.

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FLOW PROCESS FROM NODE 50160.00 TO NODE 50161.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 558.00 DOWNSTREAM(FEET) = 463.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1013.00 CHANNEL SLOPE = 0.0938
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.703
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 13.52 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.41
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.05
AVERAGE FLOW DEPTH(FEET) = 0.83 TRAVEL TIME(MIN.) = 2.79
Tc(MIN.) = 23.36
SUBAREA AREA(ACRES) = 13.52 SUBAREA RUNOFF(CFS) = 1.26
EFFECTIVE AREA(ACRES) = 93.72 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 93.7 PEAK FLOW RATE(CFS) = 11.78
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.81 FLOW VELOCITY(FEET/SEC.) = 6.05
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50161.00 = 4516.00 FEET.

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FLOW PROCESS FROM NODE 50161.00 TO NODE 50162.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 404.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1126.00 CHANNEL SLOPE = 0.0524
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.634
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 19.35 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.08
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.86
AVERAGE FLOW DEPTH(FEET) = 0.91 TRAVEL TIME(MIN.) = 3.86
Tc(MIN.) = 27.22
SUBAREA AREA(ACRES) = 19.35 SUBAREA RUNOFF(CFS) = 0.60
EFFECTIVE AREA(ACRES) = 113.07 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.1 PEAK FLOW RATE(CFS) = 11.78
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.90 FLOW VELOCITY(FEET/SEC.) = 4.81
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

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*****
FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 27.22
RAINFALL INTENSITY(INCH/HR) = 0.63
AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 113.07
TOTAL STREAM AREA(ACRES) = 113.07
PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.78

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** CONFLUENCE DATA **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	59.48	24.60	0.676	0.60( 0.58)	0.96	378.7	50120.00
1	24.30	30.98	0.584	0.60( 0.58)	0.96	407.5	50100.00
2	11.78	27.22	0.634	0.60( 0.60)	1.00	113.1	50150.00

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RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

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\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	71.25	24.60	0.676	0.60 ( 0.58)	0.97	480.9	50120.00
2	56.82	27.22	0.634	0.60 ( 0.58)	0.97	503.6	50150.00
3	24.29	30.98	0.584	0.60 ( 0.58)	0.97	520.6	50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 71.25 Tc(MIN.) = 24.60  
EFFECTIVE AREA(ACRES) = 480.89 AREA-AVERAGED Fm(INCH/HR) = 0.58  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 520.6  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

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FLOW PROCESS FROM NODE 50162.00 TO NODE 50163.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 378.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1158.00 CHANNEL SLOPE = 0.0225  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.621

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	151.93	0.60	0.990	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 73.21  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.56  
AVERAGE FLOW DEPTH(FEET) = 2.10 TRAVEL TIME(MIN.) = 3.47  
Tc(MIN.) = 28.08  
SUBAREA AREA(ACRES) = 151.93 SUBAREA RUNOFF(CFS) = 3.72  
EFFECTIVE AREA(ACRES) = 632.82 AREA-AVERAGED Fm(INCH/HR) = 0.58  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 672.5 PEAK FLOW RATE(CFS) = 71.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.08 FLOW VELOCITY(FEET/SEC.) = 5.50  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50163.00 = 6800.00 FEET.

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FLOW PROCESS FROM NODE 50163.00 TO NODE 50164.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 378.00 DOWNSTREAM(FEET) = 356.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 886.00 CHANNEL SLOPE = 0.0248  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.587

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	177.01	0.60	0.989	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.989  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 71.77  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.74  
AVERAGE FLOW DEPTH(FEET) = 2.04 TRAVEL TIME(MIN.) = 2.57  
Tc(MIN.) = 30.65

SUBAREA AREA(ACRES) = 177.01 SUBAREA RUNOFF(CFS) = 1.03  
EFFECTIVE AREA(ACRES) = 809.83 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 849.5 PEAK FLOW RATE(CFS) = 71.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.04 FLOW VELOCITY(FEET/SEC.) = 5.71  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50164.00 = 7686.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50164.00 TO NODE 50165.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 356.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1762.00 CHANNEL SLOPE = 0.0233  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.544

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	155.27	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 71.25  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.58  
AVERAGE FLOW DEPTH(FEET) = 2.06 TRAVEL TIME(MIN.) = 5.26  
Tc(MIN.) = 35.91

SUBAREA AREA(ACRES) = 155.27 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 965.10 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 1004.8 PEAK FLOW RATE(CFS) = 71.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.06 FLOW VELOCITY(FEET/SEC.) = 5.58  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50165.00 = 9448.00 FEET.

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FLOW PROCESS FROM NODE 50165.00 TO NODE 50166.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 284.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 893.00 CHANNEL SLOPE = 0.0347
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.525
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE          GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      50.24    0.60    0.997    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 71.29
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.50
AVERAGE FLOW DEPTH(FEET) = 1.91 TRAVEL TIME(MIN.) = 2.29
Tc(MIN.) = 38.20
SUBAREA AREA(ACRES) = 50.24 SUBAREA RUNOFF(CFS) = 0.07
EFFECTIVE AREA(ACRES) = 1015.34 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 1055.0 PEAK FLOW RATE(CFS) = 71.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.91 FLOW VELOCITY(FEET/SEC.) = 6.50
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50166.00 = 10341.00 FEET.

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FLOW PROCESS FROM NODE 50166.00 TO NODE 50167.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 240.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00 CHANNEL SLOPE = 0.0437
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.507
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE          GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      8.36    0.60    0.892    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.892
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 71.46
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.08
AVERAGE FLOW DEPTH(FEET) = 1.83 TRAVEL TIME(MIN.) = 2.37
Tc(MIN.) = 40.57

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SUBAREA AREA(ACRES) = 8.36 SUBAREA RUNOFF(CFS) = 0.41
EFFECTIVE AREA(ACRES) = 1023.70 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 1063.4 PEAK FLOW RATE(CFS) = 71.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.83 FLOW VELOCITY(FEET/SEC.) = 7.06
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50167.00 = 11349.00 FEET.

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=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 1063.4 TC(MIN.) = 40.57
EFFECTIVE AREA(ACRES) = 1023.70 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.981
PEAK FLOW RATE(CFS) = 71.25

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\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	71.25	40.57	0.507	0.60( 0.59)	0.98	1023.7	50120.00
2	56.82	44.15	0.487	0.60( 0.59)	0.98	1046.4	50150.00
3	24.29	51.88	0.446	0.60( 0.59)	0.98	1063.4	50100.00

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END OF RATIONAL METHOD ANALYSIS

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\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 2 Yr \*  
\* From Node: 50500 To Node: 50513 \*  
\*\*\*\*\*

FILE NAME: 0610505T.DAT  
TIME/DATE OF STUDY: 08:40 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.820
- 2) 10.00; 1.213
- 3) 15.00; 0.930
- 4) 20.00; 0.765
- 5) 25.00; 0.661
- 6) 30.00; 0.587
- 7) 40.00; 0.505
- 8) 50.00; 0.448
- 9) 60.00; 0.406
- 10) 90.00; 0.341
- 11) 120.00; 0.297
- 12) 180.00; 0.248
- 13) 360.00; 0.181
- 14) 1440.00; 0.079

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50500.00 TO NODE 50501.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 1122.00 DOWNSTREAM(FEET) = 980.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.501  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.395  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.67	0.60	1.000	0	8.50

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.48  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 0.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50501.00 TO NODE 50502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 832.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 500.00 CHANNEL SLOPE = 0.2960  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.195  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.83	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.70  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.59  
AVERAGE FLOW DEPTH(FEET) = 0.23 TRAVEL TIME(MIN.) = 1.82  
Tc(MIN.) = 10.32  
SUBAREA AREA(ACRES) = 0.83 SUBAREA RUNOFF(CFS) = 0.45  
EFFECTIVE AREA(ACRES) = 1.50 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.5 PEAK FLOW RATE(CFS) = 0.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.24 FLOW VELOCITY(FEET/SEC.) = 4.69  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50502.00 = 830.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50502.00 TO NODE 50503.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 832.00 DOWNSTREAM(FEET) = 779.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 255.00 CHANNEL SLOPE = 0.2078  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.148  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.76	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.73  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.04  
AVERAGE FLOW DEPTH(FEET) = 0.34 TRAVEL TIME(MIN.) = 0.84  
Tc(MIN.) = 11.16  
SUBAREA AREA(ACRES) = 3.76 SUBAREA RUNOFF(CFS) = 1.85  
EFFECTIVE AREA(ACRES) = 5.26 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.3 PEAK FLOW RATE(CFS) = 2.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.39 FLOW VELOCITY(FEET/SEC.) = 5.57  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50503.00 = 1085.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50503.00 TO NODE 50504.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 779.00 DOWNSTREAM(FEET) = 765.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 382.00 CHANNEL SLOPE = 0.0366  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.031  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.56	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.48  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.09  
AVERAGE FLOW DEPTH(FEET) = 0.61 TRAVEL TIME(MIN.) = 2.06  
Tc(MIN.) = 13.22  
SUBAREA AREA(ACRES) = 4.56 SUBAREA RUNOFF(CFS) = 1.77  
EFFECTIVE AREA(ACRES) = 9.82 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 3.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.63 FLOW VELOCITY(FEET/SEC.) = 3.19  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50504.00 = 1467.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50504.00 TO NODE 50505.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 355.00 CHANNEL SLOPE = 0.0423  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.935  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.79	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.38  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.50  
AVERAGE FLOW DEPTH(FEET) = 0.65 TRAVEL TIME(MIN.) = 1.69  
Tc(MIN.) = 14.91  
SUBAREA AREA(ACRES) = 3.79 SUBAREA RUNOFF(CFS) = 1.14  
EFFECTIVE AREA(ACRES) = 13.61 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 13.6 PEAK FLOW RATE(CFS) = 4.10

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.63 FLOW VELOCITY(FEET/SEC.) = 3.44  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50505.00 = 1822.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50505.00 TO NODE 50506.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 712.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 261.00 CHANNEL SLOPE = 0.1456  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.908  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.43	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.99  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.73  
AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 0.76  
Tc(MIN.) = 15.67  
SUBAREA AREA(ACRES) = 6.43 SUBAREA RUNOFF(CFS) = 1.78  
EFFECTIVE AREA(ACRES) = 20.03 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.0 PEAK FLOW RATE (CFS) = 5.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.56 FLOW VELOCITY (FEET/SEC.) = 5.87  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50506.00 = 2083.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50506.00 TO NODE 50507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 464.00 CHANNEL SLOPE = 0.2414  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.872

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.57	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.87  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.19  
AVERAGE FLOW DEPTH (FEET) = 0.52 TRAVEL TIME (MIN.) = 1.08  
Tc (MIN.) = 16.75  
SUBAREA AREA (ACRES) = 2.57 SUBAREA RUNOFF (CFS) = 0.63  
EFFECTIVE AREA (ACRES) = 22.60 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.6 PEAK FLOW RATE (CFS) = 5.55  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.51 FLOW VELOCITY (FEET/SEC.) = 7.16  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50507.00 = 2547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50507.00 TO NODE 50508.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 535.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 310.00 CHANNEL SLOPE = 0.2097  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.848

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.09	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.23  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.96  
AVERAGE FLOW DEPTH (FEET) = 0.55 TRAVEL TIME (MIN.) = 0.74

Tc (MIN.) = 17.49  
SUBAREA AREA (ACRES) = 6.09 SUBAREA RUNOFF (CFS) = 1.36  
EFFECTIVE AREA (ACRES) = 28.69 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 28.7 PEAK FLOW RATE (CFS) = 6.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.55 FLOW VELOCITY (FEET/SEC.) = 6.95  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50508.00 = 2857.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50508.00 TO NODE 50509.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 405.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.2658  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.814

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.02	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.37  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.84  
AVERAGE FLOW DEPTH (FEET) = 0.56 TRAVEL TIME (MIN.) = 1.04  
Tc (MIN.) = 18.53  
SUBAREA AREA (ACRES) = 10.02 SUBAREA RUNOFF (CFS) = 1.93  
EFFECTIVE AREA (ACRES) = 38.72 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.7 PEAK FLOW RATE (CFS) = 7.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.56 FLOW VELOCITY (FEET/SEC.) = 7.92  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50509.00 = 3346.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50509.00 TO NODE 50510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 285.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 706.00 CHANNEL SLOPE = 0.1700  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.760

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.60	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.92

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.81  
AVERAGE FLOW DEPTH (FEET) = 0.62 TRAVEL TIME (MIN.) = 1.73  
Tc (MIN.) = 20.26  
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 0.95  
EFFECTIVE AREA (ACRES) = 45.32 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 7.45  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.61 FLOW VELOCITY (FEET/SEC.) = 6.73  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50510.00 = 4052.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50510.00 TO NODE 50511.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	285.00	DOWNSTREAM (FEET) =	238.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	1169.00	CHANNEL SLOPE =	0.0402
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH (FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.679		

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	22.45	0.60	0.991	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.991  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.32  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.00  
AVERAGE FLOW DEPTH (FEET) = 0.74 TRAVEL TIME (MIN.) = 3.90  
Tc (MIN.) = 24.16  
SUBAREA AREA (ACRES) = 22.45 SUBAREA RUNOFF (CFS) = 1.71  
EFFECTIVE AREA (ACRES) = 67.77 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 67.8 PEAK FLOW RATE (CFS) = 7.45  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.71 FLOW VELOCITY (FEET/SEC.) = 4.87  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50511.00 = 5221.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50511.00 TO NODE 50512.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	238.00	DOWNSTREAM (FEET) =	233.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	489.00	CHANNEL SLOPE =	0.0102
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH (FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.633		

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	22.45	0.60	0.991	-

USER-DEFINED - 39.83 0.60 0.990 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.990  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.18  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.97  
AVERAGE FLOW DEPTH (FEET) = 0.96 TRAVEL TIME (MIN.) = 2.75  
Tc (MIN.) = 26.90  
SUBAREA AREA (ACRES) = 39.83 SUBAREA RUNOFF (CFS) = 1.40  
EFFECTIVE AREA (ACRES) = 107.59 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 107.6 PEAK FLOW RATE (CFS) = 7.45  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.93 FLOW VELOCITY (FEET/SEC.) = 2.90  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50512.00 = 5710.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50512.00 TO NODE 50513.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	233.00	DOWNSTREAM (FEET) =	209.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	537.00	CHANNEL SLOPE =	0.0447
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH (FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.606		

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	7.40	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.47  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.01  
AVERAGE FLOW DEPTH (FEET) = 0.70 TRAVEL TIME (MIN.) = 1.78  
Tc (MIN.) = 28.69  
SUBAREA AREA (ACRES) = 7.40 SUBAREA RUNOFF (CFS) = 0.04  
EFFECTIVE AREA (ACRES) = 114.99 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 115.0 PEAK FLOW RATE (CFS) = 7.45  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.70 FLOW VELOCITY (FEET/SEC.) = 5.00  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50513.00 = 6247.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50513.00 TO NODE 50513.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 28.69  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.606  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	7.40	0.60	1.000	-



USER-DEFINED - 38.19 0.60 0.961 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$  (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.961  
SUBAREA AREA (ACRES) = 38.19 SUBAREA RUNOFF (CFS) = 1.02  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.59  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.60 AREA-AVERAGED  $A_p$  = 0.99  
TOTAL AREA (ACRES) = 153.2 PEAK FLOW RATE (CFS) = 7.45  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 153.2 TC (MIN.) = 28.69  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.59  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.60 AREA-AVERAGED  $A_p$  = 0.986  
PEAK FLOW RATE (CFS) = 7.45

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 2 Yr \*  
\* From Node: 50600 To Node: 50610 \*  
\*\*\*\*\*

FILE NAME: 0610506T.DAT  
TIME/DATE OF STUDY: 08:40 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.820
- 2) 10.00; 1.213
- 3) 15.00; 0.930
- 4) 20.00; 0.765
- 5) 25.00; 0.661
- 6) 30.00; 0.587
- 7) 40.00; 0.505
- 8) 50.00; 0.448
- 9) 60.00; 0.406
- 10) 90.00; 0.341
- 11) 120.00; 0.297
- 12) 180.00; 0.248
- 13) 360.00; 0.181
- 14) 1440.00; 0.079

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50600.00 TO NODE 50601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00  
ELEVATION DATA: UPSTREAM(FEET) = 780.00 DOWNSTREAM(FEET) = 730.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.166  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.204  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	1.44	0.60	1.000	0	10.17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.78  
TOTAL AREA(ACRES) = 1.44 PEAK FLOW RATE(CFS) = 0.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50601.00 TO NODE 50602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.1541  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.119  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.27	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.08  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.98  
AVERAGE FLOW DEPTH(FEET) = 0.30 TRAVEL TIME(MIN.) = 1.49  
Tc(MIN.) = 11.66  
SUBAREA AREA(ACRES) = 1.27 SUBAREA RUNOFF(CFS) = 0.59  
EFFECTIVE AREA(ACRES) = 2.71 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 1.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 4.18  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50602.00 = 671.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50602.00 TO NODE 50603.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 258.00 CHANNEL SLOPE = 0.2907  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.074

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.31	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.55

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.43

AVERAGE FLOW DEPTH(FEET) = 0.31 TRAVEL TIME(MIN.) = 0.79

Tc(MIN.) = 12.45

SUBAREA AREA(ACRES) = 1.31 SUBAREA RUNOFF(CFS) = 0.56

EFFECTIVE AREA(ACRES) = 4.02 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 1.72

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 5.67

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50603.00 = 929.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50603.00 TO NODE 50604.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 585.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.1293  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.049

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.58	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.04

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.38

AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 0.44

Tc(MIN.) = 12.89

SUBAREA AREA(ACRES) = 1.58 SUBAREA RUNOFF(CFS) = 0.64

EFFECTIVE AREA(ACRES) = 5.60 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.6 PEAK FLOW RATE(CFS) = 2.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 FLOW VELOCITY(FEET/SEC.) = 4.51

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50604.00 = 1045.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50604.00 TO NODE 50605.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 584.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 16.00 CHANNEL SLOPE = 0.0625  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.045

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.98	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.26

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.75

AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 0.07

Tc(MIN.) = 12.97

SUBAREA AREA(ACRES) = 4.98 SUBAREA RUNOFF(CFS) = 2.00

EFFECTIVE AREA(ACRES) = 10.58 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 10.6 PEAK FLOW RATE(CFS) = 4.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 FLOW VELOCITY(FEET/SEC.) = 4.03

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50605.00 = 1061.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50605.00 TO NODE 50606.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 584.00 DOWNSTREAM(FEET) = 579.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 122.00 CHANNEL SLOPE = 0.0410  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.013

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.18	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.21

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.57

AVERAGE FLOW DEPTH(FEET) = 0.70 TRAVEL TIME(MIN.) = 0.57

Tc(MIN.) = 13.53

SUBAREA AREA(ACRES) = 5.18 SUBAREA RUNOFF(CFS) = 1.93

EFFECTIVE AREA(ACRES) = 15.76 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 15.8 PEAK FLOW RATE (CFS) = 5.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.73 FLOW VELOCITY (FEET/SEC.) = 3.69  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50606.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50606.00 TO NODE 50607.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 579.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 637.00 CHANNEL SLOPE = 0.0801  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.907

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.34	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.88  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.93  
AVERAGE FLOW DEPTH (FEET) = 0.68 TRAVEL TIME (MIN.) = 2.15  
Tc (MIN.) = 15.69

SUBAREA AREA (ACRES) = 7.34 SUBAREA RUNOFF (CFS) = 2.03  
EFFECTIVE AREA (ACRES) = 23.11 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 23.1 PEAK FLOW RATE (CFS) = 6.40

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.66 FLOW VELOCITY (FEET/SEC.) = 4.88  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50607.00 = 1820.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50607.00 TO NODE 50608.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 422.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 529.00 CHANNEL SLOPE = 0.2004  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.866

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.99	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.75  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.95  
AVERAGE FLOW DEPTH (FEET) = 0.57 TRAVEL TIME (MIN.) = 1.27  
Tc (MIN.) = 16.96

SUBAREA AREA (ACRES) = 2.99 SUBAREA RUNOFF (CFS) = 0.72  
EFFECTIVE AREA (ACRES) = 26.10 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.1 PEAK FLOW RATE (CFS) = 6.40  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.56 FLOW VELOCITY (FEET/SEC.) = 6.80  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50608.00 = 2349.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50608.00 TO NODE 50609.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 422.00 DOWNSTREAM (FEET) = 297.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 708.00 CHANNEL SLOPE = 0.1766  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.808

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.94	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.52  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.79  
AVERAGE FLOW DEPTH (FEET) = 0.61 TRAVEL TIME (MIN.) = 1.74  
Tc (MIN.) = 18.69

SUBAREA AREA (ACRES) = 11.94 SUBAREA RUNOFF (CFS) = 2.24  
EFFECTIVE AREA (ACRES) = 38.04 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.0 PEAK FLOW RATE (CFS) = 7.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.60 FLOW VELOCITY (FEET/SEC.) = 6.65  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50609.00 = 3057.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50609.00 TO NODE 50610.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 297.00 DOWNSTREAM (FEET) = 207.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1321.00 CHANNEL SLOPE = 0.0681  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.715

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.38	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.68

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.90  
AVERAGE FLOW DEPTH (FEET) = 0.66 TRAVEL TIME (MIN.) = 3.73  
Tc (MIN.) = 22.42  
SUBAREA AREA (ACRES) = 10.38 SUBAREA RUNOFF (CFS) = 1.07  
EFFECTIVE AREA (ACRES) = 48.42 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 7.14  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.64 FLOW VELOCITY (FEET/SEC.) = 5.85  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50610.00 = 4378.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 22.42  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.715  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.17	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.17 SUBAREA RUNOFF (CFS) = 0.12  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 49.6 PEAK FLOW RATE (CFS) = 7.14  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 49.6 TC (MIN.) = 22.42  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.000  
PEAK FLOW RATE (CFS) = 7.14

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 2 Yr \*  
\* From Node: 50700 To Node: 50716 \*  
\*\*\*\*\*

FILE NAME: 0610507T.DAT  
TIME/DATE OF STUDY: 08:40 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.820
- 2) 10.00; 1.213
- 3) 15.00; 0.930
- 4) 20.00; 0.765
- 5) 25.00; 0.661
- 6) 30.00; 0.587
- 7) 40.00; 0.505
- 8) 50.00; 0.448
- 9) 60.00; 0.406
- 10) 90.00; 0.341
- 11) 120.00; 0.297
- 12) 180.00; 0.248
- 13) 360.00; 0.181
- 14) 1440.00; 0.079

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50700.00 TO NODE 50701.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00  
ELEVATION DATA: UPSTREAM(FEET) = 1121.00 DOWNSTREAM(FEET) = 870.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.572  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.508  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.18	0.60	1.000	0	7.57

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.15  
TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 0.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50701.00 TO NODE 50702.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 827.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.3386  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.442  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.42	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.31  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.89  
AVERAGE FLOW DEPTH(FEET) = 0.16 TRAVEL TIME(MIN.) = 0.54  
Tc(MIN.) = 8.12  
SUBAREA AREA(ACRES) = 0.42 SUBAREA RUNOFF(CFS) = 0.32  
EFFECTIVE AREA(ACRES) = 0.61 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 0.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.19 FLOW VELOCITY(FEET/SEC.) = 4.34  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50702.00 = 456.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50702.00 TO NODE 50703.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 827.00 DOWNSTREAM(FEET) = 815.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 94.00 CHANNEL SLOPE = 0.1277  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.382

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.34	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.58

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.16

AVERAGE FLOW DEPTH(FEET) = 0.25 TRAVEL TIME(MIN.) = 0.50

Tc(MIN.) = 8.61

SUBAREA AREA(ACRES) = 0.34 SUBAREA RUNOFF(CFS) = 0.24

EFFECTIVE AREA(ACRES) = 0.94 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 0.67

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.26 FLOW VELOCITY(FEET/SEC.) = 3.22

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50703.00 = 550.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50703.00 TO NODE 50704.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 815.00 DOWNSTREAM(FEET) = 800.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 169.00 CHANNEL SLOPE = 0.0888  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.279

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.72	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.19

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.32

AVERAGE FLOW DEPTH(FEET) = 0.35 TRAVEL TIME(MIN.) = 0.85

Tc(MIN.) = 9.46

SUBAREA AREA(ACRES) = 1.72 SUBAREA RUNOFF(CFS) = 1.05

EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 1.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 FLOW VELOCITY(FEET/SEC.) = 3.64

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50704.00 = 719.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50704.00 TO NODE 50705.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 800.00 DOWNSTREAM(FEET) = 785.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 128.00 CHANNEL SLOPE = 0.1172  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.219

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.12	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.22

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.30

AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 0.50

Tc(MIN.) = 9.96

SUBAREA AREA(ACRES) = 2.12 SUBAREA RUNOFF(CFS) = 1.18

EFFECTIVE AREA(ACRES) = 4.79 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 2.67

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 4.48

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50705.00 = 847.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50705.00 TO NODE 50706.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 775.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.173

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.64	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.61

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.73

AVERAGE FLOW DEPTH(FEET) = 0.57 TRAVEL TIME(MIN.) = 0.76

Tc(MIN.) = 10.72

SUBAREA AREA(ACRES) = 3.64 SUBAREA RUNOFF(CFS) = 1.88

EFFECTIVE AREA(ACRES) = 8.42 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.4 PEAK FLOW RATE (CFS) = 4.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.61 FLOW VELOCITY (FEET/SEC.) = 3.92  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50706.00 = 1017.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50706.00 TO NODE 50707.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 775.00 DOWNSTREAM (FEET) = 772.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 162.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.116

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.65	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.42  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.69  
AVERAGE FLOW DEPTH (FEET) = 0.82 TRAVEL TIME (MIN.) = 1.00  
Tc (MIN.) = 11.72

SUBAREA AREA (ACRES) = 4.65 SUBAREA RUNOFF (CFS) = 2.16  
EFFECTIVE AREA (ACRES) = 13.07 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 13.1 PEAK FLOW RATE (CFS) = 6.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.86 FLOW VELOCITY (FEET/SEC.) = 2.75  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50707.00 = 1179.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50707.00 TO NODE 50708.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 772.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 357.00 CHANNEL SLOPE = 0.0756  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.046

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.55	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.79  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.84  
AVERAGE FLOW DEPTH (FEET) = 0.68 TRAVEL TIME (MIN.) = 1.23  
Tc (MIN.) = 12.95

SUBAREA AREA (ACRES) = 3.55 SUBAREA RUNOFF (CFS) = 1.43  
EFFECTIVE AREA (ACRES) = 16.62 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 16.6 PEAK FLOW RATE (CFS) = 6.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.68 FLOW VELOCITY (FEET/SEC.) = 4.79  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50708.00 = 1536.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50708.00 TO NODE 50709.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 733.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 444.00 CHANNEL SLOPE = 0.0270  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.926

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.58	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.50  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.39  
AVERAGE FLOW DEPTH (FEET) = 0.86 TRAVEL TIME (MIN.) = 2.19  
Tc (MIN.) = 15.13

SUBAREA AREA (ACRES) = 5.58 SUBAREA RUNOFF (CFS) = 1.64  
EFFECTIVE AREA (ACRES) = 22.20 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.2 PEAK FLOW RATE (CFS) = 6.68  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.83 FLOW VELOCITY (FEET/SEC.) = 3.26  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50709.00 = 1980.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50709.00 TO NODE 50710.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 733.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 467.00 CHANNEL SLOPE = 0.1242  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.882

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.17	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.21



TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.90  
AVERAGE FLOW DEPTH (FEET) = 0.64 TRAVEL TIME (MIN.) = 1.32  
Tc (MIN.) = 16.45  
SUBAREA AREA (ACRES) = 4.17 SUBAREA RUNOFF (CFS) = 1.06  
EFFECTIVE AREA (ACRES) = 26.38 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.4 PEAK FLOW RATE (CFS) = 6.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.62 FLOW VELOCITY (FEET/SEC.) = 5.80  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50710.00 = 2447.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50710.00 TO NODE 50711.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 619.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 516.00 CHANNEL SLOPE = 0.1085  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.834  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	21.41	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.97  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.89  
AVERAGE FLOW DEPTH (FEET) = 0.71 TRAVEL TIME (MIN.) = 1.46  
Tc (MIN.) = 17.91  
SUBAREA AREA (ACRES) = 21.41 SUBAREA RUNOFF (CFS) = 4.51  
EFFECTIVE AREA (ACRES) = 47.78 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 10.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.74 FLOW VELOCITY (FEET/SEC.) = 6.08  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50711.00 = 2963.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50711.00 TO NODE 50712.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 619.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 650.00 CHANNEL SLOPE = 0.0292  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.761  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.43	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.61  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.71  
AVERAGE FLOW DEPTH (FEET) = 0.87 TRAVEL TIME (MIN.) = 2.30  
Tc (MIN.) = 20.21  
SUBAREA AREA (ACRES) = 7.43 SUBAREA RUNOFF (CFS) = 1.08  
EFFECTIVE AREA (ACRES) = 55.21 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.2 PEAK FLOW RATE (CFS) = 10.07  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.85 FLOW VELOCITY (FEET/SEC.) = 4.63  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50712.00 = 3613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50713.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 794.00 CHANNEL SLOPE = 0.0907  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.724  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	36.47	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.12  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.44  
AVERAGE FLOW DEPTH (FEET) = 0.74 TRAVEL TIME (MIN.) = 1.78  
Tc (MIN.) = 21.99  
SUBAREA AREA (ACRES) = 36.47 SUBAREA RUNOFF (CFS) = 4.07  
EFFECTIVE AREA (ACRES) = 91.68 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 10.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.69 FLOW VELOCITY (FEET/SEC.) = 7.13  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50713.00 = 4407.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50713.00 TO NODE 50714.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 423.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1215.00 CHANNEL SLOPE = 0.0864  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.664  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.43	0.60	1.000	-

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.52 0.60 0.998 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.998  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.78  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.08  
AVERAGE FLOW DEPTH(FEET) = 0.71 TRAVEL TIME(MIN.) = 2.86  
Tc(MIN.) = 24.85  
SUBAREA AREA(ACRES) = 18.52 SUBAREA RUNOFF(CFS) = 1.10  
EFFECTIVE AREA(ACRES) = 110.21 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 110.2 PEAK FLOW RATE(CFS) = 10.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.70 FLOW VELOCITY(FEET/SEC.) = 6.98  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50714.00 = 5622.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50714.00 TO NODE 50715.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 319.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 768.00 CHANNEL SLOPE = 0.1354  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.640

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 5.31 0.60 0.993 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.34  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.27  
AVERAGE FLOW DEPTH(FEET) = 0.65 TRAVEL TIME(MIN.) = 1.55  
Tc(MIN.) = 26.40  
SUBAREA AREA(ACRES) = 5.31 SUBAREA RUNOFF(CFS) = 0.21  
EFFECTIVE AREA(ACRES) = 115.52 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 115.5 PEAK FLOW RATE(CFS) = 10.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.64 FLOW VELOCITY(FEET/SEC.) = 8.23  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50715.00 = 6390.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50715.00 TO NODE 50716.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 319.00 DOWNSTREAM(FEET) = 182.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1513.00 CHANNEL SLOPE = 0.0905  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.588  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 79.09 0.60 0.979 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.67  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.16  
AVERAGE FLOW DEPTH(FEET) = 0.70 TRAVEL TIME(MIN.) = 3.52  
Tc(MIN.) = 29.92  
SUBAREA AREA(ACRES) = 79.09 SUBAREA RUNOFF(CFS) = 0.88  
EFFECTIVE AREA(ACRES) = 194.61 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 194.6 PEAK FLOW RATE(CFS) = 10.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.69 FLOW VELOCITY(FEET/SEC.) = 7.13  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50716.00 = 7903.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50716.00 TO NODE 50716.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 29.92  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.588  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 42.18 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 42.18 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 236.8 PEAK FLOW RATE(CFS) = 10.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 236.8 TC(MIN.) = 29.92  
EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.993  
PEAK FLOW RATE(CFS) = 10.23

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 2 Yr \*  
\* From Node: 50800 To Node: 50811 \*  
\*\*\*\*\*

FILE NAME: 0610508T.DAT  
TIME/DATE OF STUDY: 08:40 01/21/2013

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.820
- 2) 10.00; 1.213
- 3) 15.00; 0.930
- 4) 20.00; 0.765
- 5) 25.00; 0.661
- 6) 30.00; 0.587
- 7) 40.00; 0.505
- 8) 50.00; 0.448
- 9) 60.00; 0.406
- 10) 90.00; 0.341
- 11) 120.00; 0.297
- 12) 180.00; 0.248
- 13) 360.00; 0.181
- 14) 1440.00; 0.079

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50800.00 TO NODE 50801.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00  
ELEVATION DATA: UPSTREAM(FEET) = 795.00 DOWNSTREAM(FEET) = 745.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.302  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.196  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.60	0.60	1.000	0	10.30

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.32  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50801.00 TO NODE 50802.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 725.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 245.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.124  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.35	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.11  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.20  
AVERAGE FLOW DEPTH(FEET) = 0.34 TRAVEL TIME(MIN.) = 1.28  
Tc(MIN.) = 11.58  
SUBAREA AREA(ACRES) = 3.35 SUBAREA RUNOFF(CFS) = 1.58  
EFFECTIVE AREA(ACRES) = 3.94 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 3.9 PEAK FLOW RATE(CFS) = 1.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 FLOW VELOCITY(FEET/SEC.) = 3.60  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50802.00 = 566.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50802.00 TO NODE 50803.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	725.00	DOWNSTREAM(FEET) =	700.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	325.00	CHANNEL SLOPE =	0.0769
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.039		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.52	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.16  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.64  
AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 1.49  
Tc(MIN.) = 13.07  
SUBAREA AREA(ACRES) = 1.52 SUBAREA RUNOFF(CFS) = 0.60  
EFFECTIVE AREA(ACRES) = 5.47 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 2.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 3.64  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50803.00 = 891.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50803.00 TO NODE 50804.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	700.00	DOWNSTREAM(FEET) =	652.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	594.00	CHANNEL SLOPE =	0.0808
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.913		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.12	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.03  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.03  
AVERAGE FLOW DEPTH(FEET) = 0.50 TRAVEL TIME(MIN.) = 2.46  
Tc(MIN.) = 15.53  
SUBAREA AREA(ACRES) = 6.12 SUBAREA RUNOFF(CFS) = 1.72  
EFFECTIVE AREA(ACRES) = 11.59 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 11.6 PEAK FLOW RATE(CFS) = 3.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.51 FLOW VELOCITY(FEET/SEC.) = 4.12  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50804.00 = 1485.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50804.00 TO NODE 50805.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	652.00	DOWNSTREAM(FEET) =	542.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	499.00	CHANNEL SLOPE =	0.2204
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.869		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.17	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.89  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.27  
AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 1.33  
Tc(MIN.) = 16.85  
SUBAREA AREA(ACRES) = 5.17 SUBAREA RUNOFF(CFS) = 1.25  
EFFECTIVE AREA(ACRES) = 16.76 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 4.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.46 FLOW VELOCITY(FEET/SEC.) = 6.33  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50805.00 = 1984.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50805.00 TO NODE 50806.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	542.00	DOWNSTREAM(FEET) =	450.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	650.00	CHANNEL SLOPE =	0.1415
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.804		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.22	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.54  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.52  
AVERAGE FLOW DEPTH(FEET) = 0.52 TRAVEL TIME(MIN.) = 1.96  
Tc(MIN.) = 18.81  
SUBAREA AREA(ACRES) = 5.22 SUBAREA RUNOFF(CFS) = 0.96  
EFFECTIVE AREA(ACRES) = 21.99 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 4.06  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.50 FLOW VELOCITY (FEET/SEC.) = 5.40  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50806.00 = 2634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50806.00 TO NODE 50807.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 450.00 DOWNSTREAM (FEET) = 400.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 639.00 CHANNEL SLOPE = 0.0782  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.742  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.83	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.07  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.58  
AVERAGE FLOW DEPTH (FEET) = 0.61 TRAVEL TIME (MIN.) = 2.32  
Tc (MIN.) = 21.14  
SUBAREA AREA (ACRES) = 15.83 SUBAREA RUNOFF (CFS) = 2.02  
EFFECTIVE AREA (ACRES) = 37.82 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 37.8 PEAK FLOW RATE (CFS) = 4.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.60 FLOW VELOCITY (FEET/SEC.) = 4.50  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50807.00 = 3273.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50807.00 TO NODE 50808.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 400.00 DOWNSTREAM (FEET) = 350.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 448.00 CHANNEL SLOPE = 0.1116  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.712  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.46	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.20  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.24  
AVERAGE FLOW DEPTH (FEET) = 0.58 TRAVEL TIME (MIN.) = 1.42

Tc (MIN.) = 22.56  
SUBAREA AREA (ACRES) = 7.46 SUBAREA RUNOFF (CFS) = 0.75  
EFFECTIVE AREA (ACRES) = 45.28 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 4.82  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.56 FLOW VELOCITY (FEET/SEC.) = 5.13  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50808.00 = 3721.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50808.00 TO NODE 50809.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 350.00 DOWNSTREAM (FEET) = 283.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 438.00 CHANNEL SLOPE = 0.1530  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.686  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.20	0.60	0.972	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.972  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.16  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.92  
AVERAGE FLOW DEPTH (FEET) = 0.54 TRAVEL TIME (MIN.) = 1.23  
Tc (MIN.) = 23.80

SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 0.67  
EFFECTIVE AREA (ACRES) = 52.48 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 52.5 PEAK FLOW RATE (CFS) = 4.82  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.53 FLOW VELOCITY (FEET/SEC.) = 5.74  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50809.00 = 4159.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50809.00 TO NODE 50810.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 283.00 DOWNSTREAM (FEET) = 243.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 665.00 CHANNEL SLOPE = 0.0602  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.649  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	63.52	0.60	0.983	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.983  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.56  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.40  
 AVERAGE FLOW DEPTH(FEET) = 0.64 TRAVEL TIME(MIN.) = 2.05  
 Tc(MIN.) = 25.85  
 SUBAREA AREA(ACRES) = 63.52 SUBAREA RUNOFF(CFS) = 3.38  
 EFFECTIVE AREA(ACRES) = 116.00 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 116.0 PEAK FLOW RATE(CFS) = 5.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.61 FLOW VELOCITY(FEET/SEC.) = 5.26  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50810.00 = 4824.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50810.00 TO NODE 50811.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM(FEET) = 243.00 DOWNSTREAM(FEET) = 173.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1122.00 CHANNEL SLOPE = 0.0624  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.585

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	11.57	0.60	0.980	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.85  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.29  
 AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 4.36  
 Tc(MIN.) = 30.21  
 SUBAREA AREA(ACRES) = 11.57 SUBAREA RUNOFF(CFS) = 0.12  
 EFFECTIVE AREA(ACRES) = 127.57 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 127.6 PEAK FLOW RATE(CFS) = 5.79  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.67 FLOW VELOCITY(FEET/SEC.) = 4.32  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50811.00 = 5946.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
 MAINLINE Tc(MIN.) = 30.21  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.585  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
-------------------	----------	------	----	----	-----

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	3.70	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 131.27 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 131.3 PEAK FLOW RATE(CFS) = 5.79  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 131.3 TC(MIN.) = 30.21  
 EFFECTIVE AREA(ACRES) = 131.27 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.988  
 PEAK FLOW RATE(CFS) = 5.79  
 =====

END OF RATIONAL METHOD ANALYSIS





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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 2 \*  
\* HYDROLOGIC ANALYSIS - 2-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E502XX02.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	1.580
2)	6.000;	1.430
3)	7.000;	1.310
4)	8.000;	1.210
5)	9.000;	1.130
6)	10.000;	1.060
7)	11.000;	1.010
8)	12.000;	0.960
9)	13.000;	0.920
10)	14.000;	0.880
11)	15.000;	0.840
12)	20.000;	0.720
13)	25.000;	0.630
14)	30.000;	0.570
15)	40.000;	0.480
16)	50.000;	0.420
17)	60.000;	0.380
18)	90.000;	0.300
19)	120.000;	0.260
20)	180.000;	0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50200.00 TO NODE 50201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 497.00 DOWNSTREAM(FEET) = 365.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.563  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.165  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.60	1.000	95	8.56
NATURAL FAIR COVER "OPEN BRUSH"	-	0.60	0.60	1.000	95	8.56
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.20	0.60	1.000	95	8.56

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.71  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 0.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50201.00 TO NODE 50202.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 365.00 DOWNSTREAM(FEET) = 335.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 259.00 CHANNEL SLOPE = 0.1158  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.71  
FLOW VELOCITY(FEET/SEC.) = 3.21 FLOW DEPTH(FEET) = 0.27  
TRAVEL TIME(MIN.) = 1.34  $T_c$ (MIN.) = 9.91  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50202.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50202.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.91  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.067  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.60 1.000 -  
USER-DEFINED - 0.70 0.60 1.000 -  
USER-DEFINED - 0.20 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 1.13  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 1.72

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50203.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 335.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.1020  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.72  
FLOW VELOCITY(FEET/SEC.) = 3.85 FLOW DEPTH(FEET) = 0.39  
TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 10.76  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50203.00 = 781.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50203.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.76  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.022  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.60 1.000 -  
USER-DEFINED - 0.20 0.60 1.000 -  
USER-DEFINED - 2.80 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 1.60  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 3.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50204.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 304.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0696  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.16  
FLOW VELOCITY(FEET/SEC.) = 3.86 FLOW DEPTH(FEET) = 0.52  
TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 11.44  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50204.00 = 939.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50204.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 11.44  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.988  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.60 0.100 -  
USER-DEFINED - 0.80 0.60 1.000 -  
USER-DEFINED - 2.80 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 1.84  
EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.57  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 4.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50205.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 304.00 DOWNSTREAM(FEET) = 234.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 487.00 CHANNEL SLOPE = 0.1437  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.74  
FLOW VELOCITY(FEET/SEC.) = 6.98 FLOW DEPTH(FEET) = 0.48  
TRAVEL TIME(MIN.) = 1.16 Tc(MIN.) = 12.60  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50205.00 = 1426.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 12.60  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.936  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.60 0.100 -

USER-DEFINED - 0.40 0.60 1.000 -  
 USER-DEFINED - 0.60 0.60 1.000 -  
 USER-DEFINED - 0.10 0.60 0.850 -  
 USER-DEFINED - 1.90 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 1.31  
 EFFECTIVE AREA(ACRES) = 16.10 AREA-AVERAGED Fm(INCH/HR) = 0.56  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 5.46

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN) = 12.60  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.936  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.60	0.100	-
USER-DEFINED	-	1.10	0.60	1.000	-
USER-DEFINED	-	4.90	0.60	1.000	-
USER-DEFINED	-	1.50	0.60	0.850	-
USER-DEFINED	-	3.70	0.60	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.882  
 SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 4.61  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.55  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.91  
 TOTAL AREA(ACRES) = 28.7 PEAK FLOW RATE(CFS) = 10.08

=====  
 END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 28.7 TC(MIN.) = 12.60  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.55  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.910  
 PEAK FLOW RATE(CFS) = 10.08  
 =====

=====  
 END OF RATIONAL METHOD ANALYSIS  
 =====

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 3 \*  
\* HYDROLOGIC ANALYSIS - 2-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E503XX02.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	1.580
2)	6.000;	1.430
3)	7.000;	1.310
4)	8.000;	1.210
5)	9.000;	1.130
6)	10.000;	1.060
7)	11.000;	1.010
8)	12.000;	0.960
9)	13.000;	0.920
10)	14.000;	0.880
11)	15.000;	0.840
12)	20.000;	0.720
13)	25.000;	0.630
14)	30.000;	0.570
15)	40.000;	0.480
16)	50.000;	0.420
17)	60.000;	0.380
18)	90.000;	0.300
19)	120.000;	0.260
20)	180.000;	0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	(FT)	(FT)	SIDE / SIDE/ WAY	(FT)	(FT)	(FT)	(FT)	(n)

HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50300.00 TO NODE 50301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00  
ELEVATION DATA: UPSTREAM(FEET) = 1110.00 DOWNSTREAM(FEET) = 1035.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.517  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.094  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.60	0.60	1.000	95	9.52
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.60	1.000	95	9.52

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.40  
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 0.40

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50301.00 TO NODE 50302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 960.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 225.00 CHANNEL SLOPE = 0.3333  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.40  
FLOW VELOCITY(FEET/SEC.) = 4.11 FLOW DEPTH(FEET) = 0.18  
TRAVEL TIME(MIN.) = 0.91  $T_c$ (MIN.) = 10.43  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50302.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50302.00 TO NODE 50302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN) = 10.43
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.038
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.60    1.000   -
USER-DEFINED        -         1.00    0.60    1.000   -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.10    SUBAREA RUNOFF(CFS) = 0.43
EFFECTIVE AREA(ACRES) = 2.00    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.0        PEAK FLOW RATE(CFS) = 0.79

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*****
FLOW PROCESS FROM NODE 50302.00 TO NODE 50303.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 84.00 CHANNEL SLOPE = 0.1190
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.79
FLOW VELOCITY(FEET/SEC.) = 3.37 FLOW DEPTH(FEET) = 0.28
TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 10.85
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50303.00 = 631.00 FEET.

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*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50303.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.85
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.018
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.60    1.000   -
USER-DEFINED        -         0.30    0.60    1.000   -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.70    SUBAREA RUNOFF(CFS) = 0.26
EFFECTIVE AREA(ACRES) = 2.70    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.7        PEAK FLOW RATE(CFS) = 1.02

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*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50304.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

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=====
ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 940.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 72.00 CHANNEL SLOPE = 0.1389
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

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MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.02
FLOW VELOCITY(FEET/SEC.) = 3.75 FLOW DEPTH(FEET) = 0.30
TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 11.17
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50304.00 = 703.00 FEET.

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*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50304.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.17
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.002
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.30    0.60    1.000   -
USER-DEFINED        -         0.90    0.60    1.000   -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.20    SUBAREA RUNOFF(CFS) = 0.80
EFFECTIVE AREA(ACRES) = 4.90    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.9        PEAK FLOW RATE(CFS) = 1.77

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*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50305.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 940.00 DOWNSTREAM(FEET) = 890.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.2941
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.77
FLOW VELOCITY(FEET/SEC.) = 5.65 FLOW DEPTH(FEET) = 0.32
TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 11.67
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50305.00 = 873.00 FEET.

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*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.67
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.977
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00    0.60    1.000   -
USER-DEFINED        -         0.80    0.60    1.000   -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.80    SUBAREA RUNOFF(CFS) = 0.95
EFFECTIVE AREA(ACRES) = 7.70    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 7.7        PEAK FLOW RATE(CFS) = 2.61

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*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50306.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 890.00 DOWNSTREAM(FEET) = 785.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 439.00 CHANNEL SLOPE = 0.2392
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.61
FLOW VELOCITY(FEET/SEC.) = 5.83 FLOW DEPTH(FEET) = 0.39
TRAVEL TIME(MIN.) = 1.25 Tc(MIN.) = 12.92
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50306.00 = 1312.00 FEET.

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*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.92
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.923
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         3.80   0.60  1.000  -
USER-DEFINED       -         3.30   0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 2.07
EFFECTIVE AREA(ACRES) = 14.80 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.8 PEAK FLOW RATE(CFS) = 4.31

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*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50307.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 737.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 213.00 CHANNEL SLOPE = 0.2254
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.31
FLOW VELOCITY(FEET/SEC.) = 6.49 FLOW DEPTH(FEET) = 0.47
TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 13.47
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50307.00 = 1525.00 FEET.

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*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 13.47
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.901
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         2.00   0.60  1.000  -
USER-DEFINED       -         0.90   0.60  1.000  -
USER-DEFINED       -         0.20   0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 0.84
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 4.86

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*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50308.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 737.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 527.00 CHANNEL SLOPE = 0.2600
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.86
FLOW VELOCITY(FEET/SEC.) = 7.09 FLOW DEPTH(FEET) = 0.48
TRAVEL TIME(MIN.) = 1.24 Tc(MIN.) = 14.71
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50308.00 = 2052.00 FEET.

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*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.71
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.852
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         5.70   0.60  1.000  -
USER-DEFINED       -         1.00   0.60  1.000  -
USER-DEFINED       -         3.30   0.60  1.000  -
USER-DEFINED       -         0.40   0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 2.36
EFFECTIVE AREA(ACRES) = 28.30 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 28.3 PEAK FLOW RATE(CFS) = 6.42

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*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50309.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 555.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 561.00 CHANNEL SLOPE = 0.0802
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00

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CHANNEL FLOW THRU SUBAREA(CFS) = 6.42  
FLOW VELOCITY(FEET/SEC.) = 4.90 FLOW DEPTH(FEET) = 0.66  
TRAVEL TIME(MIN.) = 1.91 Tc(MIN.) = 16.62  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 2613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 16.62  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.801  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.60	1.000	-
USER-DEFINED	-	0.80	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 0.56  
EFFECTIVE AREA(ACRES) = 31.40 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.4 PEAK FLOW RATE(CFS) = 6.42  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50310.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 555.00 DOWNSTREAM(FEET) = 509.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 401.00 CHANNEL SLOPE = 0.1147  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 6.42  
FLOW VELOCITY(FEET/SEC.) = 5.55 FLOW DEPTH(FEET) = 0.62  
TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 17.82  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50310.00 = 3014.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 17.82  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.772  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	1.60	0.60	1.000	-
USER-DEFINED	-	7.60	0.60	1.000	-
USER-DEFINED	-	6.60	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	1.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 2.68  
EFFECTIVE AREA(ACRES) = 48.70 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 48.7 PEAK FLOW RATE(CFS) = 7.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50311.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 509.00 DOWNSTREAM(FEET) = 395.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 685.00 CHANNEL SLOPE = 0.1664  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.56  
FLOW VELOCITY(FEET/SEC.) = 6.66 FLOW DEPTH(FEET) = 0.62  
TRAVEL TIME(MIN.) = 1.71 Tc(MIN.) = 19.54  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50311.00 = 3699.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50311.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.54  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.731  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.50	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	2.90	0.60	1.000	-
USER-DEFINED	-	1.50	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 1.11  
EFFECTIVE AREA(ACRES) = 58.10 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 58.1 PEAK FLOW RATE(CFS) = 7.56  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50312.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 383.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 216.00 CHANNEL SLOPE = 0.0556  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.56  
FLOW VELOCITY(FEET/SEC.) = 4.45 FLOW DEPTH(FEET) = 0.75  
TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 20.35  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50312.00 = 3915.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 20.35  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.714  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.60	1.000	-
USER-DEFINED	-	1.50	0.60	1.000	-
USER-DEFINED	-	18.40	0.60	1.000	-
USER-DEFINED	-	11.60	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	1.80	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 37.70 SUBAREA RUNOFF(CFS) = 3.87  
EFFECTIVE AREA(ACRES) = 95.80 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 95.8 PEAK FLOW RATE(CFS) = 9.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 20.35  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.714  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.30	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 0.35  
EFFECTIVE AREA(ACRES) = 99.20 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 99.2 PEAK FLOW RATE(CFS) = 10.17

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50312.00 TO NODE 50313.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 383.00 DOWNSTREAM(FEET) = 350.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 762.00 CHANNEL SLOPE = 0.0433  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.17  
FLOW VELOCITY(FEET/SEC.) = 4.36 FLOW DEPTH(FEET) = 0.88  
TRAVEL TIME(MIN.) = 2.92 Tc(MIN.) = 23.26  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50313.00 = 4677.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 23.26  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.661  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	3.30	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 0.35  
EFFECTIVE AREA(ACRES) = 105.50 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 105.5 PEAK FLOW RATE(CFS) = 10.17  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 23.26  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.661  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.30	0.60	1.000	-
USER-DEFINED	-	1.60	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 10.90 SUBAREA RUNOFF(CFS) = 0.60  
EFFECTIVE AREA(ACRES) = 116.40 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 116.4 PEAK FLOW RATE(CFS) = 10.17  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50313.00 TO NODE 50314.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 318.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 957.00 CHANNEL SLOPE = 0.0334  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.17  
FLOW VELOCITY(FEET/SEC.) = 3.94 FLOW DEPTH(FEET) = 0.93  
TRAVEL TIME(MIN.) = 4.05 Tc(MIN.) = 27.31  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50314.00 = 5634.00 FEET.



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*****
FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 27.31
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.602
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.30     0.60     1.000    -
USER-DEFINED        -         0.20     0.60     1.000    -
USER-DEFINED        -         3.70     0.60     1.000    -
USER-DEFINED        -         3.40     0.60     1.000    -
USER-DEFINED        -         2.00     0.60     1.000    -
USER-DEFINED        -        10.20     0.60     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 21.80     SUBAREA RUNOFF(CFS) = 0.05
EFFECTIVE AREA(ACRES) = 138.20  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 138.2     PEAK FLOW RATE(CFS) = 10.17
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 27.31
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.602
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        10.80     0.60     1.000    -
USER-DEFINED        -        15.20     0.60     1.000    -
USER-DEFINED        -         5.90     0.60     1.000    -
USER-DEFINED        -         1.30     0.60     1.000    -
USER-DEFINED        -         0.20     0.60     1.000    -
USER-DEFINED        -         1.30     0.60     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 34.70     SUBAREA RUNOFF(CFS) = 0.08
EFFECTIVE AREA(ACRES) = 172.90  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 172.9     PEAK FLOW RATE(CFS) = 10.17
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 27.31
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.602
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS

```

```

LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.80     0.60     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.80     SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 173.70  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 173.7     PEAK FLOW RATE(CFS) = 10.17
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 50314.00 TO NODE 50315.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 318.00  DOWNSTREAM(FEET) = 313.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00  CHANNEL SLOPE = 0.0179
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 5.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.17
FLOW VELOCITY(FEET/SEC.) = 3.12  FLOW DEPTH(FEET) = 1.04
TRAVEL TIME(MIN.) = 1.50  Tc(MIN.) = 28.81
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50315.00 = 5914.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50315.00 TO NODE 50315.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 28.81
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.584
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70     0.60     1.000    -
USER-DEFINED        -         0.60     0.60     1.000    -
USER-DEFINED        -         0.50     0.60     1.000    -
USER-DEFINED        -         2.40     0.60     1.000    -
USER-DEFINED        -         2.00     0.60     1.000    -
USER-DEFINED        -         0.50     0.60     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 6.70     SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 180.40  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 180.4     PEAK FLOW RATE(CFS) = 10.17
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 50315.00 TO NODE 50316.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 313.00 DOWNSTREAM(FEET) = 285.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 642.00 CHANNEL SLOPE = 0.0436
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.17
FLOW VELOCITY(FEET/SEC.) = 4.36 FLOW DEPTH(FEET) = 0.88
TRAVEL TIME(MIN.) = 2.46 Tc(MIN.) = 31.26
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50316.00 = 6556.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----

```

```

MAINLINE Tc(MIN) = 31.26

```

```

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.559

```

```

SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	3.50	0.60	1.000	-
USER-DEFINED	-	1.00	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	2.20	0.60	1.000	-

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

```

```

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

```

```

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

```

```

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

```

```

SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 0.00

```

```

EFFECTIVE AREA(ACRES) = 187.70 AREA-AVERAGED Fm(INCH/HR) = 0.60

```

```

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

```

```

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

```

```

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

```

```

TOTAL AREA(ACRES) = 187.7 PEAK FLOW RATE(CFS) = 10.17

```

```

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----

```

```

MAINLINE Tc(MIN) = 31.26

```

```

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.559

```

```

SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.60	1.000	-
USER-DEFINED	-	1.10	0.60	1.000	-

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

```

```

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

```

```

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

```

```

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

```

```

SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 0.00

```

```

EFFECTIVE AREA(ACRES) = 189.90 AREA-AVERAGED Fm(INCH/HR) = 0.60

```

```

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

```

```

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

```

```

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

```

```

TOTAL AREA(ACRES) = 189.9 PEAK FLOW RATE(CFS) = 10.17

```

```

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 50316.00 TO NODE 50317.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

```

```

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 282.00

```

```

CHANNEL LENGTH THRU SUBAREA(FEET) = 448.00 CHANNEL SLOPE = 0.0067

```

```

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

```

```

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00

```

```

CHANNEL FLOW THRU SUBAREA(CFS) = 10.17

```

```

FLOW VELOCITY(FEET/SEC.) = 2.15 FLOW DEPTH(FEET) = 1.26

```

```

TRAVEL TIME(MIN.) = 3.47 Tc(MIN.) = 34.74

```

```

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50317.00 = 7004.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----

```

```

MAINLINE Tc(MIN) = 34.74

```

```

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.527

```

```

SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.60	1.000	-
USER-DEFINED	-	2.90	0.60	1.000	-
USER-DEFINED	-	2.60	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	10.20	0.60	1.000	-
USER-DEFINED	-	42.80	0.60	1.000	-

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

```

```

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997

```

```

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

```

```

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

```

```

SUBAREA AREA(ACRES) = 59.70 SUBAREA RUNOFF(CFS) = 0.09

```

```

EFFECTIVE AREA(ACRES) = 249.60 AREA-AVERAGED Fm(INCH/HR) = 0.60

```

```

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

```

```

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

```

```

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

```

```

TOTAL AREA(ACRES) = 249.6 PEAK FLOW RATE(CFS) = 10.17

```

```

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----

```

```

MAINLINE Tc(MIN) = 34.74

```

```

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.527

```

```

SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.60	1.000	-

```

USER-DEFINED      -      17.50    0.60    1.000    -
USER-DEFINED      -      22.00    0.60    1.000    -
USER-DEFINED      -       0.90    0.60    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 65.80    SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 315.40    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 1.00
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 315.4    PEAK FLOW RATE(CFS) = 10.17
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 50317.00 TO NODE 50318.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 233.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 600.00 CHANNEL SLOPE = 0.0817
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.17
FLOW VELOCITY(FEET/SEC.) = 5.53 FLOW DEPTH(FEET) = 0.78
TRAVEL TIME(MIN.) = 1.81 Tc(MIN.) = 36.54
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50318.00 = 7604.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 36.54
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.511
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -          0.10    0.60    0.100    -
USER-DEFINED        -          0.20    0.60    1.000    -
USER-DEFINED        -          1.10    0.60    0.100    -
USER-DEFINED        -          1.50    0.60    1.000    -
USER-DEFINED        -          1.60    0.60    1.000    -
USER-DEFINED        -          2.20    0.60    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.839
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 6.70    SUBAREA RUNOFF(CFS) = 0.50
EFFECTIVE AREA(ACRES) = 322.10    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 1.00
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 322.1    PEAK FLOW RATE(CFS) = 10.17
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

```

MAINLINE Tc(MIN) = 36.54
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.511
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -          0.40    0.60    0.100    -
USER-DEFINED        -          0.90    0.60    0.850    -
USER-DEFINED        -          0.40    0.60    1.000    -
USER-DEFINED        -          5.00    0.60    1.000    -
USER-DEFINED        -          0.90    0.60    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.935
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 7.60    SUBAREA RUNOFF(CFS) = 0.23
EFFECTIVE AREA(ACRES) = 329.70    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 0.99
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 329.7    PEAK FLOW RATE(CFS) = 10.17
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 50318.00 TO NODE 50319.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

```

```

ELEVATION DATA: UPSTREAM(FEET) = 233.00 DOWNSTREAM(FEET) = 228.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 201.00 CHANNEL SLOPE = 0.0249
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.17
FLOW VELOCITY(FEET/SEC.) = 4.38 FLOW DEPTH(FEET) = 0.88
TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 37.31
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50319.00 = 7805.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

```

MAINLINE Tc(MIN) = 37.31
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.504
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -          1.30    0.60    0.100    -
USER-DEFINED        -          0.30    0.60    1.000    -
USER-DEFINED        -          0.40    0.60    1.000    -
USER-DEFINED        -          0.90    0.60    1.000    -
USER-DEFINED        -          2.30    0.60    1.000    -
USER-DEFINED        -          1.10    0.60    1.000    -

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 0.53  
 EFFECTIVE AREA(ACRES) = 336.00 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 336.0 PEAK FLOW RATE(CFS) = 10.17  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 37.31  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.504  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.60	1.000	-
USER-DEFINED	-	1.60	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	1.40	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.994  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 0.02  
 EFFECTIVE AREA(ACRES) = 343.80 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 343.8 PEAK FLOW RATE(CFS) = 10.17  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50319.00 TO NODE 50320.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 228.00 DOWNSTREAM(FEET) = 214.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 809.00 CHANNEL SLOPE = 0.0173  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 10.17  
 FLOW VELOCITY(FEET/SEC.) = 3.81 FLOW DEPTH(FEET) = 0.94  
 TRAVEL TIME(MIN.) = 3.54 Tc(MIN.) = 40.85  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50320.00 = 8614.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 40.85  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.475  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.50	0.60	1.000	-
USER-DEFINED	-	4.80	0.60	0.850	-
USER-DEFINED	-	5.80	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.929  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 0.35  
 EFFECTIVE AREA(ACRES) = 355.20 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 355.2 PEAK FLOW RATE(CFS) = 10.17  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 40.85  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.475  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.90	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.854  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 0.70  
 EFFECTIVE AREA(ACRES) = 366.40 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 366.4 PEAK FLOW RATE(CFS) = 10.17  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 366.4 TC(MIN.) = 40.85  
 EFFECTIVE AREA(ACRES) = 366.40 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.985  
 PEAK FLOW RATE(CFS) = 10.17

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 4 \*  
\* HYDROLOGIC ANALYSIS - 2-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E504XX02.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	1.580
2)	6.000;	1.430
3)	7.000;	1.310
4)	8.000;	1.210
5)	9.000;	1.130
6)	10.000;	1.060
7)	11.000;	1.010
8)	12.000;	0.960
9)	13.000;	0.920
10)	14.000;	0.880
11)	15.000;	0.840
12)	20.000;	0.720
13)	25.000;	0.630
14)	30.000;	0.570
15)	40.000;	0.480
16)	50.000;	0.420
17)	60.000;	0.380
18)	90.000;	0.300
19)	120.000;	0.260
20)	180.000;	0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.482  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.50	0.60	1.000	95	10.48

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.20  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.20  
FLOW VELOCITY(FEET/SEC.) = 2.99 FLOW DEPTH(FEET) = 0.15  
TRAVEL TIME(MIN.) = 1.46  $T_c$ (MIN.) = 11.94  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.94

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.963  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.13  
 EFFECTIVE AREA (ACRES) = 0.90 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 0.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 239.00 CHANNEL SLOPE = 0.4184  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 0.29  
 FLOW VELOCITY (FEET/SEC.) = 4.06 FLOW DEPTH (FEET) = 0.16  
 TRAVEL TIME (MIN.) = 0.98 Tc (MIN.) = 12.92  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50403.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.92  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.923  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.60 1.000 -  
 USER-DEFINED - 0.20 0.60 1.000 -  
 USER-DEFINED - 0.10 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.12  
 EFFECTIVE AREA (ACRES) = 1.30 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.3 PEAK FLOW RATE (CFS) = 0.38

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00 CHANNEL SLOPE = 0.7042  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 0.38

FLOW VELOCITY (FEET/SEC.) = 5.22 FLOW DEPTH (FEET) = 0.16  
 TRAVEL TIME (MIN.) = 0.23 Tc (MIN.) = 13.15  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50404.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 13.15  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.914  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.60 1.000 -  
 USER-DEFINED - 0.80 0.60 1.000 -  
 USER-DEFINED - 0.30 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 0.34  
 EFFECTIVE AREA (ACRES) = 2.50 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.5 PEAK FLOW RATE (CFS) = 0.71

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 145.00 CHANNEL SLOPE = 0.3448  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 0.71  
 FLOW VELOCITY (FEET/SEC.) = 4.94 FLOW DEPTH (FEET) = 0.22  
 TRAVEL TIME (MIN.) = 0.49 Tc (MIN.) = 13.64  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50405.00 TO NODE 50405.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 13.64  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.894  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.60 1.000 -  
 USER-DEFINED - 0.80 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 0.29  
 EFFECTIVE AREA (ACRES) = 3.60 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.6 PEAK FLOW RATE (CFS) = 0.95

```

*****
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.95
FLOW VELOCITY(FEET/SEC.) = 5.14 FLOW DEPTH(FEET) = 0.25
TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 14.15
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50406.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.15
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.874
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
USER-DEFINED - 0.80 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 0.30
EFFECTIVE AREA(ACRES) = 4.80 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 1.18

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.2193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.18
FLOW VELOCITY(FEET/SEC.) = 4.60 FLOW DEPTH(FEET) = 0.29
TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 14.98
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50407.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.98
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.841
SUBAREA LOSS RATE DATA(AMC II):

```

```

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.60 1.000 -
USER-DEFINED - 1.20 0.60 1.000 -
USER-DEFINED - 1.70 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 1.39
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 2.43

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 325.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 490.00 CHANNEL SLOPE = 0.1531
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.43
FLOW VELOCITY(FEET/SEC.) = 4.88 FLOW DEPTH(FEET) = 0.41
TRAVEL TIME(MIN.) = 1.67 Tc(MIN.) = 16.65
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 16.65
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.800
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 0.60 0.60 1.000 -
USER-DEFINED - 1.30 0.60 1.000 -
USER-DEFINED - 0.50 0.60 1.000 -
USER-DEFINED - 1.20 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 0.69
EFFECTIVE AREA(ACRES) = 15.00 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.0 PEAK FLOW RATE(CFS) = 2.71

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 16.65
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.800
SUBAREA LOSS RATE DATA(AMC II):

```



DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 0.16  
EFFECTIVE AREA(ACRES) = 15.90 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.9 PEAK FLOW RATE(CFS) = 2.87

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.87  
FLOW VELOCITY(FEET/SEC.) = 3.73 FLOW DEPTH(FEET) = 0.51  
TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 16.97  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 16.97  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.793  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	1.60	0.60	1.000	-
USER-DEFINED	-	6.40	0.60	1.000	-
USER-DEFINED	-	6.30	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 14.80 SUBAREA RUNOFF(CFS) = 2.57  
EFFECTIVE AREA(ACRES) = 30.70 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.7 PEAK FLOW RATE(CFS) = 5.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 16.97  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.793  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.10  
EFFECTIVE AREA(ACRES) = 31.30 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.3 PEAK FLOW RATE(CFS) = 5.43

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 5.43  
FLOW VELOCITY(FEET/SEC.) = 4.67 FLOW DEPTH(FEET) = 0.62  
TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 17.34  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 17.34  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.784  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	2.50	0.60	1.000	-
USER-DEFINED	-	1.20	0.60	1.000	-
USER-DEFINED	-	1.80	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 1.06  
EFFECTIVE AREA(ACRES) = 37.70 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 37.7 PEAK FLOW RATE(CFS) = 6.24

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 17.34  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.784  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.10  
 EFFECTIVE AREA(ACRES) = 38.30 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 38.3 PEAK FLOW RATE(CFS) = 6.34

\*\*\*\*\*

FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 312.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 566.00 CHANNEL SLOPE = 0.0530  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 6.34  
 FLOW VELOCITY(FEET/SEC.) = 4.14 FLOW DEPTH(FEET) = 0.71  
 TRAVEL TIME(MIN.) = 2.28 Tc(MIN.) = 19.62  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 19.62  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.729  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.60 0.100 -  
 USER-DEFINED - 0.20 0.60 1.000 -  
 USER-DEFINED - 1.60 0.60 1.000 -  
 USER-DEFINED - 0.90 0.60 1.000 -  
 USER-DEFINED - 1.50 0.60 0.100 -  
 USER-DEFINED - 0.40 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658  
 SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 1.51  
 EFFECTIVE AREA(ACRES) = 43.30 AREA-AVERAGED Fm(INCH/HR) = 0.58  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 43.3 PEAK FLOW RATE(CFS) = 6.34  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 19.62  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.729  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 0.80 0.60 1.000 -  
 USER-DEFINED - 5.80 0.60 1.000 -  
 USER-DEFINED - 0.50 0.60 1.000 -  
 USER-DEFINED - 3.40 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 1.22  
 EFFECTIVE AREA(ACRES) = 53.80 AREA-AVERAGED Fm(INCH/HR) = 0.58  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 53.8 PEAK FLOW RATE(CFS) = 7.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 216.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 954.00 CHANNEL SLOPE = 0.0692  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 7.19  
 FLOW VELOCITY(FEET/SEC.) = 5.89 FLOW DEPTH(FEET) = 0.64  
 TRAVEL TIME(MIN.) = 2.70 Tc(MIN.) = 22.32  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 22.32  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.678  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.60 0.100 -  
 USER-DEFINED - 0.60 0.60 1.000 -  
 USER-DEFINED - 1.00 0.60 1.000 -  
 USER-DEFINED - 1.10 0.60 1.000 -  
 USER-DEFINED - 0.40 0.60 1.000 -  
 USER-DEFINED - 0.20 0.60 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875  
 SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 0.50  
 EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.58  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 7.19  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 22.32  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.678  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	1.30	0.60	1.000	-
USER-DEFINED	-	9.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 SUBAREA AREA (ACRES) = 10.60      SUBAREA RUNOFF (CFS) = 0.76  
 EFFECTIVE AREA (ACRES) = 68.00      AREA-AVERAGED Fm (INCH/HR) = 0.58  
 AREA-AVERAGED Fp (INCH/HR) = 0.60      AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 68.0      PEAK FLOW RATE (CFS) = 7.19  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 22.32  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.678  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	1.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.934  
 SUBAREA AREA (ACRES) = 2.50      SUBAREA RUNOFF (CFS) = 0.27  
 EFFECTIVE AREA (ACRES) = 70.50      AREA-AVERAGED Fm (INCH/HR) = 0.58  
 AREA-AVERAGED Fp (INCH/HR) = 0.60      AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 70.5      PEAK FLOW RATE (CFS) = 7.19  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:  
 TOTAL AREA (ACRES) = 70.5      TC (MIN.) = 22.32  
 EFFECTIVE AREA (ACRES) = 70.50      AREA-AVERAGED Fm (INCH/HR) = 0.58  
 AREA-AVERAGED Fp (INCH/HR) = 0.60      AREA-AVERAGED Ap = 0.967  
 PEAK FLOW RATE (CFS) = 7.19

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 2 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 2-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P201XX02.DAT  
TIME/DATE OF STUDY: 10:20 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	1.580
2)	6.000;	1.430
3)	7.000;	1.310
4)	8.000;	1.210
5)	9.000;	1.130
6)	10.000;	1.060
7)	11.000;	1.010
8)	12.000;	0.960
9)	13.000;	0.920
10)	14.000;	0.880
11)	15.000;	0.840
12)	20.000;	0.720
13)	25.000;	0.630
14)	30.000;	0.570
15)	40.000;	0.480
16)	50.000;	0.420
17)	60.000;	0.380
18)	90.000;	0.300
19)	120.000;	0.260
20)	180.000;	0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20100.00 TO NODE 20101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 830.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.230  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.114  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.60	1.000	95	9.23
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.60	1.000	95	9.23

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.28  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20101.00 TO NODE 20102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 276.00 CHANNEL SLOPE = 0.2899  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.28  
FLOW VELOCITY(FEET/SEC.) = 3.48 FLOW DEPTH(FEET) = 0.16  
TRAVEL TIME(MIN.) = 1.32  $T_c$ (MIN.) = 10.55  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20102.00 = 595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20102.00 TO NODE 20102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN) = 10.55
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.032
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.80    0.60    1.000    -
USER-DEFINED        -         0.20    0.60    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.00    SUBAREA RUNOFF(CFS) = 0.39
EFFECTIVE AREA(ACRES) = 1.60    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6        PEAK FLOW RATE(CFS) = 0.62

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*****
FLOW PROCESS FROM NODE 20102.00 TO NODE 20103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.1863
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.62
FLOW VELOCITY(FEET/SEC.) = 3.80 FLOW DEPTH(FEET) = 0.23
TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 11.26
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20103.00 = 756.00 FEET.

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.26
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.997
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50    0.60    1.000    -
USER-DEFINED        -         0.10    0.60    1.000    -
USER-DEFINED        -         0.30    0.60    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90    SUBAREA RUNOFF(CFS) = 0.32
EFFECTIVE AREA(ACRES) = 2.50    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.5        PEAK FLOW RATE(CFS) = 0.89

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 690.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 64.00 CHANNEL SLOPE = 0.4688

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CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.89
FLOW VELOCITY(FEET/SEC.) = 5.83 FLOW DEPTH(FEET) = 0.23
TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 11.44
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20104.00 = 820.00 FEET.

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.44
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.988
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.60    1.000    -
USER-DEFINED        -         3.30    0.60    1.000    -
USER-DEFINED        -         0.10    0.60    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 1.33
EFFECTIVE AREA(ACRES) = 6.30    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.3        PEAK FLOW RATE(CFS) = 2.20

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 690.00 DOWNSTREAM(FEET) = 670.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 159.00 CHANNEL SLOPE = 0.1258
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.20
FLOW VELOCITY(FEET/SEC.) = 4.42 FLOW DEPTH(FEET) = 0.41
TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 12.04
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20105.00 = 979.00 FEET.

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*****
FLOW PROCESS FROM NODE 20105.00 TO NODE 20105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 12.04
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.958
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.60    1.000    -
USER-DEFINED        -         1.50    0.60    1.000    -
USER-DEFINED        -         2.20    0.60    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90    SUBAREA RUNOFF(CFS) = 1.26

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EFFECTIVE AREA (ACRES) = 10.20 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 10.2 PEAK FLOW RATE (CFS) = 3.29

\*\*\*\*\*

FLOW PROCESS FROM NODE 20105.00 TO NODE 20106.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 670.00 DOWNSTREAM (FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 192.00 CHANNEL SLOPE = 0.1042  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 3.29  
FLOW VELOCITY (FEET/SEC.) = 4.55 FLOW DEPTH (FEET) = 0.49  
TRAVEL TIME (MIN.) = 0.70 Tc (MIN.) = 12.74  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20106.00 = 1171.00 FEET.

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FLOW PROCESS FROM NODE 20106.00 TO NODE 20106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 12.74

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.930

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.60	1.000	-
USER-DEFINED	-	2.10	0.60	1.000	-
USER-DEFINED	-	0.90	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 3.80 SUBAREA RUNOFF (CFS) = 1.13

EFFECTIVE AREA (ACRES) = 14.00 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 14.0 PEAK FLOW RATE (CFS) = 4.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 650.00 DOWNSTREAM (FEET) = 640.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 156.00 CHANNEL SLOPE = 0.0641  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.16  
FLOW VELOCITY (FEET/SEC.) = 3.98 FLOW DEPTH (FEET) = 0.59  
TRAVEL TIME (MIN.) = 0.65 Tc (MIN.) = 13.40  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20107.00 = 1327.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

\*\*\*\*\*

MAINLINE Tc (MIN) = 13.40

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.904

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	1.20	0.60	1.000	-
USER-DEFINED	-	2.30	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 1.10

EFFECTIVE AREA (ACRES) = 18.00 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 18.0 PEAK FLOW RATE (CFS) = 4.93

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 640.00 DOWNSTREAM (FEET) = 609.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 512.00 CHANNEL SLOPE = 0.0605  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.93  
FLOW VELOCITY (FEET/SEC.) = 4.14 FLOW DEPTH (FEET) = 0.63  
TRAVEL TIME (MIN.) = 2.06 Tc (MIN.) = 15.46  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20108.00 = 1839.00 FEET.

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 15.46

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.829

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.200	-
USER-DEFINED	-	1.50	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.80	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970

SUBAREA AREA (ACRES) = 2.70 SUBAREA RUNOFF (CFS) = 0.60

EFFECTIVE AREA (ACRES) = 20.70 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 20.7 PEAK FLOW RATE (CFS) = 4.93

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

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>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 600.00
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.86
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.93
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 15.79
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20109.00 = 2033.00 FEET.

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FLOW PROCESS FROM NODE 20109.00 TO NODE 20109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 15.79
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.821
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70   0.60  0.200  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.44
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.58
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 4.93
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 20109.00 TO NODE 20110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 594.00
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.79
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.93
PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 16.67
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20110.00 = 2393.00 FEET.

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*****
FLOW PROCESS FROM NODE 20110.00 TO NODE 20110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 16.67
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.800
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.30   0.60  0.100  -

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USER-DEFINED        -         3.50   0.60  0.200  -
USER-DEFINED        -         2.70   0.60  1.000  -
USER-DEFINED        -         0.20   0.60  1.000  -
USER-DEFINED        -         1.20   0.60  1.000  -
USER-DEFINED        -         0.30   0.60  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.626
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 3.13
EFFECTIVE AREA(ACRES) = 29.60 AREA-AVERAGED Fm(INCH/HR) = 0.52
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 29.6 PEAK FLOW RATE(CFS) = 7.33

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*****
FLOW PROCESS FROM NODE 20110.00 TO NODE 20111.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 594.00 DOWNSTREAM(FEET) = 590.00
FLOW LENGTH(FEET) = 246.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.45
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.33
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 17.22
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20111.00 = 2639.00 FEET.

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*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 17.22
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.787
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70   0.60  0.100  -
USER-DEFINED        -         2.10   0.60  0.200  -
USER-DEFINED        -         2.10   0.60  1.000  -
USER-DEFINED        -         0.60   0.60  1.000  -
USER-DEFINED        -         4.70   0.60  1.000  -
USER-DEFINED        -         0.90   0.60  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.792
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 3.11
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 10.09

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*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20112.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 580.00

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FLOW LENGTH(FEET) = 628.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.91  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 10.09  
PIPE TRAVEL TIME(MIN.) = 1.32 Tc(MIN.) = 18.54  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20112.00 = 3267.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 18.54  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.755  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.60	0.100	-
USER-DEFINED	-	0.90	0.60	0.200	-
USER-DEFINED	-	4.40	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	7.50	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.797  
SUBAREA AREA(ACRES) = 15.20 SUBAREA RUNOFF(CFS) = 3.79  
EFFECTIVE AREA(ACRES) = 55.90 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 55.9 PEAK FLOW RATE(CFS) = 12.72

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 18.54  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.755  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	0.80	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 0.40  
EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 13.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20112.00 TO NODE 20113.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 580.00 DOWNSTREAM(FEET) = 570.00  
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.90  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 13.12  
PIPE TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 19.52  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20113.00 = 3786.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 19.52  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.732  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.60	0.100	-
USER-DEFINED	-	4.30	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	1.80	0.60	1.000	-
USER-DEFINED	-	4.60	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.877  
SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 2.33  
EFFECTIVE AREA(ACRES) = 70.90 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 14.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 19.52  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.732  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	0.100	-
USER-DEFINED	-	0.90	0.60	0.850	-
USER-DEFINED	-	1.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.787  
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 0.84  
EFFECTIVE AREA(ACRES) = 74.50 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 74.5 PEAK FLOW RATE(CFS) = 15.07

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20113.00 TO NODE 20114.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<



ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00  
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.84  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 15.07  
PIPE TRAVEL TIME(MIN.) = 1.48 Tc(MIN.) = 20.99  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20114.00 = 4393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 20.99  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.702  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.60 0.100 -  
USER-DEFINED - 4.00 0.60 0.850 -  
USER-DEFINED - 0.20 0.60 1.000 -  
USER-DEFINED - 1.40 0.60 1.000 -  
USER-DEFINED - 0.50 0.60 0.100 -  
USER-DEFINED - 0.90 0.60 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.747  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 1.80  
EFFECTIVE AREA(ACRES) = 82.40 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 82.4 PEAK FLOW RATE(CFS) = 15.07  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 20.99  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.702  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.60 1.000 -  
USER-DEFINED - 8.20 0.60 1.000 -  
USER-DEFINED - 3.20 0.60 1.000 -  
USER-DEFINED - 0.70 0.60 0.100 -  
USER-DEFINED - 3.70 0.60 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.932  
SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 2.25  
EFFECTIVE AREA(ACRES) = 99.90 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 99.9 PEAK FLOW RATE(CFS) = 17.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20115.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 560.00  
FLOW LENGTH(FEET) = 461.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.84  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 17.14  
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 21.97  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20115.00 = 4854.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 21.97  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.684  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.60 0.60 0.850 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 1.40 0.60 0.100 -  
USER-DEFINED - 6.20 0.60 0.850 -  
USER-DEFINED - 2.20 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798  
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 2.37  
EFFECTIVE AREA(ACRES) = 112.70 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 112.7 PEAK FLOW RATE(CFS) = 17.92

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 21.97  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.684  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.05  
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 17.98

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20116.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 560.00 DOWNSTREAM(FEET) = 528.00
FLOW LENGTH(FEET) = 219.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.25
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 17.98
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 22.15
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20116.00 = 5073.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 20116.00 TO NODE 20117.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 489.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 174.00 CHANNEL SLOPE = 0.2241
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 17.98
FLOW VELOCITY(FEET/SEC.) = 11.50 FLOW DEPTH(FEET) = 0.72
TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 22.40
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20117.00 = 5247.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.40
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.677
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.60 0.850 -
USER-DEFINED - 0.40 0.60 1.000 -
USER-DEFINED - 0.10 0.60 0.850 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 0.40 0.60 1.000 -
USER-DEFINED - 0.10 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.910
SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 0.29
EFFECTIVE AREA(ACRES) = 115.90 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 115.9 PEAK FLOW RATE(CFS) = 17.98
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.40
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.677

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.70 0.60 0.200 -
USER-DEFINED - 3.30 0.60 0.850 -
USER-DEFINED - 0.90 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
USER-DEFINED - 6.50 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.855
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 1.89
EFFECTIVE AREA(ACRES) = 128.70 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 128.7 PEAK FLOW RATE(CFS) = 19.38

\*\*\*\*\*
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.40
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.677
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.10 0.60 1.000 -
USER-DEFINED - 0.70 0.60 0.850 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 2.80 0.60 1.000 -
USER-DEFINED - 0.40 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 0.41
EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 133.8 PEAK FLOW RATE(CFS) = 19.79

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 133.8 TC(MIN.) = 22.40
EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.854
PEAK FLOW RATE(CFS) = 19.79

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S31 \*  
\* Rational Method Hydrology Analysis - 2-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S31.DAT  
TIME/DATE OF STUDY: 09:24 04/03/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.596
- 2) 10.00; 1.064
- 3) 15.00; 0.843
- 4) 20.00; 0.715
- 5) 25.00; 0.629
- 6) 30.00; 0.560
- 7) 40.00; 0.480
- 8) 50.00; 0.423
- 9) 60.00; 0.371
- 10) 90.00; 0.302
- 11) 120.00; 0.256
- 12) 180.00; 0.208
- 13) 360.00; 0.142
- 14) 1440.00; 0.060

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13100.00 TO NODE 13101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.58  
ELEVATION DATA: UPSTREAM(FEET) = 1069.66 DOWNSTREAM(FEET) = 969.92

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.312  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.244  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.94	0.60	1.000	0	8.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.54  
TOTAL AREA(ACRES) = 0.94 PEAK FLOW RATE(CFS) = 0.54

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13101.00 TO NODE 13102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 969.92 DOWNSTREAM(FEET) = 807.20  
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.89 CHANNEL SLOPE = 0.2444  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.019  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.67	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.03  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.07  
AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 2.73  
Tc(MIN.) = 11.04  
SUBAREA AREA(ACRES) = 7.67 SUBAREA RUNOFF(CFS) = 2.89  
EFFECTIVE AREA(ACRES) = 8.61 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 3.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.49 FLOW VELOCITY(FEET/SEC.) = 4.59  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13102.00 = 948.47 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13102.00 TO NODE 13103.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 807.20 DOWNSTREAM(FEET) = 769.94
CHANNEL LENGTH THRU SUBAREA(FEET) = 691.01 CHANNEL SLOPE = 0.0539
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.850

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.65 0.60 0.999 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.65

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.01

AVERAGE FLOW DEPTH(FEET) = 0.79 TRAVEL TIME(MIN.) = 3.82

Tc(MIN.) = 14.86

SUBAREA AREA(ACRES) = 20.65 SUBAREA RUNOFF(CFS) = 4.66

EFFECTIVE AREA(ACRES) = 29.26 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 29.3 PEAK FLOW RATE(CFS) = 6.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.84 FLOW VELOCITY(FEET/SEC.) = 3.10

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13103.00 = 1639.48 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 769.94 DOWNSTREAM(FEET) = 693.88
FLOW LENGTH(FEET) = 1563.10 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 5.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.12

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 6.59

PIPE TRAVEL TIME(MIN.) = 2.57 Tc(MIN.) = 17.43

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13104.00 = 3202.58 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.43

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.781

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 28.00 0.60 0.750 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750

SUBAREA AREA(ACRES) = 28.00 SUBAREA RUNOFF(CFS) = 8.34
EFFECTIVE AREA(ACRES) = 57.26 AREA-AVERAGED Fm(INCH/HR) = 0.53
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 57.3 PEAK FLOW RATE(CFS) = 13.13

\*\*\*\*\*
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 693.88 DOWNSTREAM(FEET) = 645.69
FLOW LENGTH(FEET) = 1068.98 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 7.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 12.07

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 13.13

PIPE TRAVEL TIME(MIN.) = 1.48 Tc(MIN.) = 18.91

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13105.00 = 4271.56 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.91

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.743

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 35.28 0.60 0.867 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867

SUBAREA AREA(ACRES) = 35.28 SUBAREA RUNOFF(CFS) = 7.08

EFFECTIVE AREA(ACRES) = 92.54 AREA-AVERAGED Fm(INCH/HR) = 0.52

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.87

TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 18.25

\*\*\*\*\*
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 645.69 DOWNSTREAM(FEET) = 608.48
FLOW LENGTH(FEET) = 1127.55 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 9.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.89

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 18.25

PIPE TRAVEL TIME(MIN.) = 1.58 Tc(MIN.) = 20.49

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 20.49
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.707
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      37.68  0.60    0.889  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.889
SUBAREA AREA(ACRES) = 37.68      SUBAREA RUNOFF(CFS) = 5.88
EFFECTIVE AREA(ACRES) = 130.22   AREA-AVERAGED Fm(INCH/HR) = 0.53
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 130.2      PEAK FLOW RATE(CFS) = 21.10

```

```

*****
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 10
-----

```

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<

```

*****
FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 15.1
-----

```

>>>>DEFINE MEMORY BANK # 2<<<<

```

=====
PEAK FLOWRATE TABLE FILE NAME: S30.DNA
MEMORY BANK # 2 DEFINED AS FOLLOWS:
STREAM   Q      Tc      Fp(Fm)   Ap    Ae    HEADWATER
NUMBER  (CFS)  (MIN.) (INCH/HR) (ACRES)  NODE
1      141.43  53.48  0.60( 0.48) 0.81  1996.2  13000.00
2      137.37  56.64  0.60( 0.48) 0.81  2016.1  13010.00
TOTAL AREA(ACRES) = 2016.1

```

```

*****
FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 14.0
-----

```

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<

```

=====
MAIN-STREAM MEMORY DEFINED AS FOLLOWS:
STREAM   Q      Tc      Fp(Fm)   Ap    Ae    HEADWATER
NUMBER  (CFS)  (MIN.) (INCH/HR) (ACRES)  NODE
1      141.43  53.48  0.60( 0.48) 0.81  1996.2  13000.00
2      137.37  56.64  0.60( 0.48) 0.81  2016.1  13010.00
TOTAL AREA(ACRES) = 2016.1

```

```

*****
FLOW PROCESS FROM NODE 13026.00 TO NODE 13106.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 662.66 DOWNSTREAM(FEET) = 608.48
CHANNEL LENGTH THRU SUBAREA(FEET) = 3098.88 CHANNEL SLOPE = 0.0175
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.370

```

SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      75.28  0.60    0.755  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 144.50
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.43
AVERAGE FLOW DEPTH(FEET) = 2.55 TRAVEL TIME(MIN.) = 6.95
Tc(MIN.) = 60.43
SUBAREA AREA(ACRES) = 75.28      SUBAREA RUNOFF(CFS) = 6.14
EFFECTIVE AREA(ACRES) = 2071.44 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 2091.4      PEAK FLOW RATE(CFS) = 141.43
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.53 FLOW VELOCITY(FEET/SEC.) = 7.38
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

```

```

*****
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 11
-----

```

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

```

=====
** MAIN STREAM CONFLUENCE DATA **
STREAM   Q      Tc      Intensity  Fp(Fm)   Ap    Ae    HEADWATER
NUMBER  (CFS)  (MIN.) (INCH/HR) (INCH/HR) (ACRES)  NODE
1      141.43  60.43  0.370  0.60( 0.48) 0.80  2071.4  13000.00
2      137.37  63.65  0.363  0.60( 0.48) 0.80  2091.4  13010.00
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

```

```

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM   Q      Tc      Intensity  Fp(Fm)   Ap    Ae    HEADWATER
NUMBER  (CFS)  (MIN.) (INCH/HR) (INCH/HR) (ACRES)  NODE
1      21.10  20.49  0.707  0.60( 0.53) 0.88  130.2  13100.00
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

```

```

** PEAK FLOW RATE TABLE **
STREAM   Q      Tc      Intensity  Fp(Fm)   Ap    Ae    HEADWATER
NUMBER  (CFS)  (MIN.) (INCH/HR) (INCH/HR) (ACRES)  NODE
1      162.53  20.49  0.707  0.60( 0.49) 0.82  832.5  13100.00
2      146.72  60.43  0.370  0.60( 0.48) 0.81  2201.7  13000.00
3      142.56  63.65  0.363  0.60( 0.48) 0.81  2221.6  13010.00
TOTAL AREA(ACRES) = 2221.6

```

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 162.53 Tc(MIN.) = 20.488
EFFECTIVE AREA(ACRES) = 832.54 AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 2221.6
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

```

```

*****
FLOW PROCESS FROM NODE 13106.00 TO NODE 13107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 608.48 DOWNSTREAM(FEET) = 584.29
CHANNEL LENGTH THRU SUBAREA(FEET) = 1650.20 CHANNEL SLOPE = 0.0147
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.642
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 190.45 0.60 0.755 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 178.77
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.33
AVERAGE FLOW DEPTH(FEET) = 2.85 TRAVEL TIME(MIN.) = 3.75
Tc(MIN.) = 24.24
SUBAREA AREA(ACRES) = 190.45 SUBAREA RUNOFF(CFS) = 32.44
EFFECTIVE AREA(ACRES) = 1022.99 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 2412.1 PEAK FLOW RATE(CFS) = 162.53
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.75 FLOW VELOCITY(FEET/SEC.) = 7.16
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13107.00 = 20924.84 FEET.

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*****
FLOW PROCESS FROM NODE 13107.00 TO NODE 13108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 584.29 DOWNSTREAM(FEET) = 563.78
CHANNEL LENGTH THRU SUBAREA(FEET) = 1061.67 CHANNEL SLOPE = 0.0193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.609
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 314.12 0.60 0.939 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.939
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 169.11
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.03
AVERAGE FLOW DEPTH(FEET) = 2.65 TRAVEL TIME(MIN.) = 2.20
Tc(MIN.) = 26.44
SUBAREA AREA(ACRES) = 314.12 SUBAREA RUNOFF(CFS) = 12.97
EFFECTIVE AREA(ACRES) = 1337.11 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 2726.2 PEAK FLOW RATE(CFS) = 162.53
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.61 FLOW VELOCITY(FEET/SEC.) = 7.94
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13108.00 = 21986.51 FEET.

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*****
FLOW PROCESS FROM NODE 13108.00 TO NODE 13109.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 563.78 DOWNSTREAM(FEET) = 541.61
CHANNEL LENGTH THRU SUBAREA(FEET) = 1657.28 CHANNEL SLOPE = 0.0134
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.557
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 203.63 0.60 0.785 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 173.50
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.04
AVERAGE FLOW DEPTH(FEET) = 2.87 TRAVEL TIME(MIN.) = 3.92
Tc(MIN.) = 30.37
SUBAREA AREA(ACRES) = 203.63 SUBAREA RUNOFF(CFS) = 21.95
EFFECTIVE AREA(ACRES) = 1540.74 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.83
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 2929.8 PEAK FLOW RATE(CFS) = 162.53
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.80 FLOW VELOCITY(FEET/SEC.) = 6.92
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13109.00 = 23643.79 FEET.

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** PEAK FLOW RATE TABLE **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	162.53	30.37	0.557	0.60( 0.50)	0.83	1540.7	13100.00
2	166.03	70.56	0.347	0.60( 0.49)	0.82	2909.9	13000.00
3	163.84	73.82	0.339	0.60( 0.49)	0.82	2929.8	13010.00

```

NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 166.03 Tc(MIN.) = 70.56
AREA-AVERAGED Fm(INCH/HR) = 0.49 AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA(ACRES) = 2909.86

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*****
FLOW PROCESS FROM NODE 13109.00 TO NODE 13110.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 541.61 DOWNSTREAM(FEET) = 509.94
CHANNEL LENGTH THRU SUBAREA(FEET) = 2016.96 CHANNEL SLOPE = 0.0157

```

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.336  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 283.06 0.60 0.791 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.791  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 174.98  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.50  
 AVERAGE FLOW DEPTH (FEET) = 2.79 TRAVEL TIME (MIN.) = 4.48  
 Tc (MIN.) = 75.04  
 SUBAREA AREA (ACRES) = 283.06 SUBAREA RUNOFF (CFS) = 17.90  
 EFFECTIVE AREA (ACRES) = 3192.92 AREA-AVERAGED Fm (INCH/HR) = 0.49  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA (ACRES) = 3212.9 PEAK FLOW RATE (CFS) = 178.96

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.81 FLOW VELOCITY (FEET/SEC.) = 7.54  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13110.00 = 25660.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	162.53	34.86	0.521	0.60 (0.49)	0.82	1823.8	13100.00
2	178.96	75.04	0.336	0.60 (0.49)	0.81	3192.9	13000.00
3	176.28	78.34	0.329	0.60 (0.49)	0.81	3212.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 178.96 Tc (MIN.) = 75.04  
 AREA-AVERAGED Fm (INCH/HR) = 0.49 AREA-AVERAGED Fp (INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA (ACRES) = 3192.92

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13110.00 TO NODE 13111.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 509.94 DOWNSTREAM (FEET) = 461.07  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 3058.95 CHANNEL SLOPE = 0.0160  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.321

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	248.05	0.60	0.783	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 186.73

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.66

AVERAGE FLOW DEPTH (FEET) = 2.85 TRAVEL TIME (MIN.) = 6.66  
 Tc (MIN.) = 81.70  
 SUBAREA AREA (ACRES) = 248.05 SUBAREA RUNOFF (CFS) = 15.54  
 EFFECTIVE AREA (ACRES) = 3440.97 AREA-AVERAGED Fm (INCH/HR) = 0.49  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA (ACRES) = 3460.9 PEAK FLOW RATE (CFS) = 186.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.85 FLOW VELOCITY (FEET/SEC.) = 7.65  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13111.00 = 28719.70 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	162.53	41.62	0.471	0.60 (0.49)	0.82	2071.8	13100.00
2	186.30	81.70	0.321	0.60 (0.49)	0.81	3441.0	13000.00
3	183.15	85.02	0.313	0.60 (0.49)	0.81	3460.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 186.30 Tc (MIN.) = 81.70  
 AREA-AVERAGED Fm (INCH/HR) = 0.49 AREA-AVERAGED Fp (INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA (ACRES) = 3440.97

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13111.00 TO NODE 13112.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 461.07 DOWNSTREAM (FEET) = 452.77  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1781.78 CHANNEL SLOPE = 0.0047  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.307

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	179.91	0.60	0.694	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.694

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 193.89

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.87

AVERAGE FLOW DEPTH (FEET) = 3.64 TRAVEL TIME (MIN.) = 6.10

Tc (MIN.) = 87.80

SUBAREA AREA (ACRES) = 179.91 SUBAREA RUNOFF (CFS) = 15.19

EFFECTIVE AREA (ACRES) = 3620.88 AREA-AVERAGED Fm (INCH/HR) = 0.48

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 3640.9 PEAK FLOW RATE (CFS) = 193.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 3.64 FLOW VELOCITY (FEET/SEC.) = 4.87

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13112.00 = 30501.48 FEET.



\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	168.83	47.89	0.435	0.60 ( 0.48)	0.81	2251.8	13100.00
2	193.29	87.80	0.307	0.60 ( 0.48)	0.81	3620.9	13000.00
3	190.24	91.15	0.300	0.60 ( 0.48)	0.81	3640.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 193.29 Tc(MIN.) = 87.80  
 AREA-AVERAGED Fm(INCH/HR) = 0.48 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3620.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13112.00 TO NODE 13222.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 452.77 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1625.01 CHANNEL SLOPE = 0.0155  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.300

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	155.96	0.60	0.836	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.836

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 196.74

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.67

AVERAGE FLOW DEPTH(FEET) = 2.92 TRAVEL TIME(MIN.) = 3.53

Tc(MIN.) = 91.33

SUBAREA AREA(ACRES) = 155.96 SUBAREA RUNOFF(CFS) = 6.90

EFFECTIVE AREA(ACRES) = 3776.84 AREA-AVERAGED Fm(INCH/HR) = 0.48

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 3796.8 PEAK FLOW RATE(CFS) = 195.69

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.92 FLOW VELOCITY(FEET/SEC.) = 7.66

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13222.00 = 32126.49 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	170.57	51.53	0.415	0.60 ( 0.49)	0.81	2407.7	13100.00
2	195.69	91.33	0.300	0.60 ( 0.48)	0.81	3776.8	13000.00
3	193.58	94.68	0.294	0.60 ( 0.48)	0.81	3796.8	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 195.69 Tc(MIN.) = 91.33  
 AREA-AVERAGED Fm(INCH/HR) = 0.48 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3776.84

=====  
 END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 3796.8 TC(MIN.) = 91.33

EFFECTIVE AREA(ACRES) = 3776.84 AREA-AVERAGED Fm(INCH/HR)= 0.48  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.808  
 PEAK FLOW RATE(CFS) = 195.69

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	170.57	51.53	0.415	0.60 ( 0.49)	0.81	2407.7	13100.00
2	195.69	91.33	0.300	0.60 ( 0.48)	0.81	3776.8	13000.00
3	193.58	94.68	0.294	0.60 ( 0.48)	0.81	3796.8	13010.00

=====  
 END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S32 \*  
\* Rational Method Hydrology Analysis - 2-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S32.DAT  
TIME/DATE OF STUDY: 16:24 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.596
- 2) 10.00; 1.064
- 3) 15.00; 0.843
- 4) 20.00; 0.715
- 5) 25.00; 0.629
- 6) 30.00; 0.560
- 7) 40.00; 0.480
- 8) 50.00; 0.423
- 9) 60.00; 0.371
- 10) 90.00; 0.302
- 11) 120.00; 0.256
- 12) 180.00; 0.208
- 13) 360.00; 0.142
- 14) 1440.00; 0.060

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13200.00 TO NODE 13201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 298.57  
ELEVATION DATA: UPSTREAM(FEET) = 1069.04 DOWNSTREAM(FEET) = 1005.76

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.127  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.67	0.60	1.000	0	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.32  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 0.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13201.00 TO NODE 13202.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.76 DOWNSTREAM(FEET) = 896.98  
CHANNEL LENGTH THRU SUBAREA(FEET) = 747.55 CHANNEL SLOPE = 0.1455  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.911  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.42	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.41  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.06  
AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 4.07  
Tc(MIN.) = 13.48  
SUBAREA AREA(ACRES) = 7.42 SUBAREA RUNOFF(CFS) = 2.08  
EFFECTIVE AREA(ACRES) = 8.09 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.1 PEAK FLOW RATE(CFS) = 2.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.47 FLOW VELOCITY(FEET/SEC.) = 3.44  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13202.00 = 1046.12 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 896.98 DOWNSTREAM(FEET) = 840.27
FLOW LENGTH(FEET) = 1789.59 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 3.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.32
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.26
PIPE TRAVEL TIME(MIN.) = 4.72 Tc(MIN.) = 18.20
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13203.00 = 2835.71 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 18.20
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.761
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 38.89 0.60 0.731 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.731
SUBAREA AREA(ACRES) = 38.89 SUBAREA RUNOFF(CFS) = 11.30
EFFECTIVE AREA(ACRES) = 46.98 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.78
TOTAL AREA(ACRES) = 47.0 PEAK FLOW RATE(CFS) = 12.48

\*\*\*\*\*
FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 840.27 DOWNSTREAM(FEET) = 782.97
FLOW LENGTH(FEET) = 992.54 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 7.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.98
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 12.48
PIPE TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 19.47
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13204.00 = 3828.25 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 19.47
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.729
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 163.73 0.60 0.858 -

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 83.09 0.60 0.645 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645
SUBAREA AREA(ACRES) = 83.09 SUBAREA RUNOFF(CFS) = 25.55
EFFECTIVE AREA(ACRES) = 130.07 AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 130.1 PEAK FLOW RATE(CFS) = 36.65

\*\*\*\*\*
FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 782.97 DOWNSTREAM(FEET) = 692.52
FLOW LENGTH(FEET) = 2046.57 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 12.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.07
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 36.65
PIPE TRAVEL TIME(MIN.) = 2.12 Tc(MIN.) = 21.59
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13205.00 = 5874.82 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 21.59
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.688
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 88.51 0.60 0.679 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.679
SUBAREA AREA(ACRES) = 88.51 SUBAREA RUNOFF(CFS) = 22.33
EFFECTIVE AREA(ACRES) = 218.58 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 218.6 PEAK FLOW RATE(CFS) = 54.18

\*\*\*\*\*
FLOW PROCESS FROM NODE 13205.00 TO NODE 13206.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 692.52 DOWNSTREAM(FEET) = 605.24
CHANNEL LENGTH THRU SUBAREA(FEET) = 2704.69 CHANNEL SLOPE = 0.0323
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.573
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 163.73 0.60 0.858 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.858  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 60.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.06  
AVERAGE FLOW DEPTH(FEET) = 1.82 TRAVEL TIME(MIN.) = 7.44  
Tc(MIN.) = 29.03  
SUBAREA AREA(ACRES) = 163.73 SUBAREA RUNOFF(CFS) = 12.00  
EFFECTIVE AREA(ACRES) = 382.31 AREA-AVERAGED Fm(INCH/HR) = 0.46  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.76  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 382.3 PEAK FLOW RATE(CFS) = 54.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.75 FLOW VELOCITY(FEET/SEC.) = 5.90  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13206.00 = 8579.51 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13206.00 TO NODE 13207.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 605.24 DOWNSTREAM(FEET) = 555.41  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2479.15 CHANNEL SLOPE = 0.0201  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.502  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.60	0.888	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.888  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 57.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.03  
AVERAGE FLOW DEPTH(FEET) = 1.96 TRAVEL TIME(MIN.) = 8.22  
Tc(MIN.) = 37.25  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 7.26  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 54.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.91 FLOW VELOCITY(FEET/SEC.) = 4.94  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13207.00 = 11058.66 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 555.41 DOWNSTREAM(FEET) = 505.65  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1734.55 CHANNEL SLOPE = 0.0287  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.467  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.60	0.858	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.858  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 57.87  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.74  
AVERAGE FLOW DEPTH(FEET) = 1.83 TRAVEL TIME(MIN.) = 5.04  
Tc(MIN.) = 42.29  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 7.38  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 54.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.79 FLOW VELOCITY(FEET/SEC.) = 5.64  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 42.29  
RAINFALL INTENSITY(INCH/HR) = 0.47  
AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.81  
EFFECTIVE STREAM AREA(ACRES) = 649.28  
TOTAL STREAM AREA(ACRES) = 649.28  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 54.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13210.00 TO NODE 13211.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.51  
ELEVATION DATA: UPSTREAM(FEET) = 949.80 DOWNSTREAM(FEET) = 828.64

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.525  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.221  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	1.96	0.60	1.000	0	8.53

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 1.10  
 TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 1.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13211.00 TO NODE 13212.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 828.64 DOWNSTREAM(FEET) = 767.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 652.49 CHANNEL SLOPE = 0.0930  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.980  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.95	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.20  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.20  
 AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 3.39  
 Tc(MIN.) = 11.92  
 SUBAREA AREA(ACRES) = 11.95 SUBAREA RUNOFF(CFS) = 4.08  
 EFFECTIVE AREA(ACRES) = 13.91 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 4.75

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.67 FLOW VELOCITY(FEET/SEC.) = 3.55  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13212.00 = 967.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13212.00 TO NODE 13213.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 767.94 DOWNSTREAM(FEET) = 706.43  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 967.91 CHANNEL SLOPE = 0.0635  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.801  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	27.07	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.29  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.41  
 AVERAGE FLOW DEPTH(FEET) = 0.84 TRAVEL TIME(MIN.) = 4.73  
 Tc(MIN.) = 16.65  
 SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 4.90  
 EFFECTIVE AREA(ACRES) = 40.98 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 41.0 PEAK FLOW RATE(CFS) = 7.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.85 FLOW VELOCITY(FEET/SEC.) = 3.41  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13213.00 = 1934.91 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13213.00 TO NODE 13214.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 706.43 DOWNSTREAM(FEET) = 659.31  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 948.11 CHANNEL SLOPE = 0.0497  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.687  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	18.09	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.16  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.17  
 AVERAGE FLOW DEPTH(FEET) = 0.93 TRAVEL TIME(MIN.) = 4.98  
 Tc(MIN.) = 21.63  
 SUBAREA AREA(ACRES) = 18.09 SUBAREA RUNOFF(CFS) = 1.42  
 EFFECTIVE AREA(ACRES) = 59.07 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 7.42  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.89 FLOW VELOCITY(FEET/SEC.) = 3.13  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13214.00 = 2883.02 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13214.00 TO NODE 13215.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 659.31 DOWNSTREAM(FEET) = 628.91  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 970.24 CHANNEL SLOPE = 0.0313  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.590  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	27.07	0.60	1.000	-

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        71.42    0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.42
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.62
AVERAGE FLOW DEPTH(FEET) = 0.97 TRAVEL TIME(MIN.) = 6.17
Tc(MIN.) = 27.80
SUBAREA AREA(ACRES) = 71.42 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 130.49 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 130.5 PEAK FLOW RATE(CFS) = 7.42
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.97 FLOW VELOCITY(FEET/SEC.) = 2.62
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13215.00 = 3853.26 FEET.

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FLOW PROCESS FROM NODE 13215.00 TO NODE 13216.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 628.91 DOWNSTREAM(FEET) = 598.39
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.63 CHANNEL SLOPE = 0.0331
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.532
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 36.33 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.42
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.66
AVERAGE FLOW DEPTH(FEET) = 0.96 TRAVEL TIME(MIN.) = 5.78
Tc(MIN.) = 33.58
SUBAREA AREA(ACRES) = 36.33 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 166.82 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 166.8 PEAK FLOW RATE(CFS) = 7.42
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.96 FLOW VELOCITY(FEET/SEC.) = 2.66
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13216.00 = 4775.89 FEET.

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FLOW PROCESS FROM NODE 13216.00 TO NODE 13217.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 598.39 DOWNSTREAM(FEET) = 568.48
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.40 CHANNEL SLOPE = 0.0470
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.504
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 42.51 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.42
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.03
AVERAGE FLOW DEPTH(FEET) = 0.90 TRAVEL TIME(MIN.) = 3.50
Tc(MIN.) = 37.07
SUBAREA AREA(ACRES) = 42.51 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 209.33 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 209.3 PEAK FLOW RATE(CFS) = 7.42
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.90 FLOW VELOCITY(FEET/SEC.) = 3.03
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13217.00 = 5412.29 FEET.

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FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 568.48 DOWNSTREAM(FEET) = 505.65
CHANNEL LENGTH THRU SUBAREA(FEET) = 1896.50 CHANNEL SLOPE = 0.0331
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.431
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 73.24 0.60 0.951 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.951
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.12
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.74
AVERAGE FLOW DEPTH(FEET) = 0.99 TRAVEL TIME(MIN.) = 11.55
Tc(MIN.) = 48.63
SUBAREA AREA(ACRES) = 73.24 SUBAREA RUNOFF(CFS) = 1.39

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EFFECTIVE AREA(ACRES) = 282.57 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 282.6 PEAK FLOW RATE(CFS) = 7.42  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.96 FLOW VELOCITY(FEET/SEC.) = 2.66  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13220.00 = 7308.79 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

-----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 48.63  
 RAINFALL INTENSITY(INCH/HR) = 0.43  
 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.99  
 EFFECTIVE STREAM AREA(ACRES) = 282.57  
 TOTAL STREAM AREA(ACRES) = 282.57  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.42

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	54.18	42.29	0.467	0.60( 0.48)	0.81	649.3	13200.00
2	7.42	48.63	0.431	0.60( 0.59)	0.99	282.6	13210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	61.19	42.29	0.467	0.60( 0.51)	0.86	895.0	13200.00
2	57.36	48.63	0.431	0.60( 0.52)	0.86	931.8	13210.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 61.19 Tc(MIN.) = 42.29  
 EFFECTIVE AREA(ACRES) = 895.05 AREA-AVERAGED Fm(INCH/HR) = 0.51  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA(ACRES) = 931.8  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13220.00 TO NODE 13221.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM(FEET) = 505.65 DOWNSTREAM(FEET) = 478.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1949.14 CHANNEL SLOPE = 0.0137

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.434

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	108.50	0.60	0.637	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.637

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 68.87  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.63  
 AVERAGE FLOW DEPTH(FEET) = 2.02 TRAVEL TIME(MIN.) = 5.77  
 Tc(MIN.) = 48.06

SUBAREA AREA(ACRES) = 108.50 SUBAREA RUNOFF(CFS) = 15.38  
 EFFECTIVE AREA(ACRES) = 1003.55 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.83  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 1040.3 PEAK FLOW RATE(CFS) = 65.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.98 FLOW VELOCITY(FEET/SEC.) = 5.56  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13221.00 = 14742.35 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	65.48	48.06	0.434	0.60( 0.50)	0.83	1003.5	13200.00
2	60.46	54.50	0.399	0.60( 0.50)	0.84	1040.3	13210.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 65.48 Tc(MIN.) = 48.06  
 AREA-AVERAGED Fm(INCH/HR) = 0.50 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.83 EFFECTIVE AREA(ACRES) = 1003.55

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13221.00 TO NODE 13222.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM(FEET) = 478.94 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2078.70 CHANNEL SLOPE = 0.0247  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.407

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	87.26	0.60	0.699	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.699

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 70.30  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.07  
 AVERAGE FLOW DEPTH(FEET) = 1.82 TRAVEL TIME(MIN.) = 4.90



Tc(MIN.) = 52.96  
 SUBAREA AREA(ACRES) = 87.26 SUBAREA RUNOFF(CFS) = 9.63  
 EFFECTIVE AREA(ACRES) = 1090.81 AREA-AVERAGED Fm(INCH/HR) = 0.49  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.82  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 1127.6 PEAK FLOW RATE(CFS) = 71.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.83 FLOW VELOCITY(FEET/SEC.) = 7.09  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13222.00 = 16821.05 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	71.12	52.96	0.407	0.60 ( 0.49)	0.82	1090.8	13200.00
2	65.38	59.51	0.374	0.60 ( 0.50)	0.83	1127.6	13210.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 71.12 Tc(MIN.) = 52.96  
 AREA-AVERAGED Fm(INCH/HR) = 0.49 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA(ACRES) = 1090.81

=====  
 END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1127.6 TC(MIN.) = 52.96  
 EFFECTIVE AREA(ACRES) = 1090.81 AREA-AVERAGED Fm(INCH/HR)= 0.49  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.822  
 PEAK FLOW RATE(CFS) = 71.12

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	71.12	52.96	0.407	0.60 ( 0.49)	0.82	1090.8	13200.00
2	65.38	59.51	0.374	0.60 ( 0.50)	0.83	1127.6	13210.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S35 \*  
\* Rational Method Hydrology Analysis - 2-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S35.DAT  
TIME/DATE OF STUDY: 16:24 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.596
- 2) 10.00; 1.064
- 3) 15.00; 0.843
- 4) 20.00; 0.715
- 5) 25.00; 0.629
- 6) 30.00; 0.560
- 7) 40.00; 0.480
- 8) 50.00; 0.423
- 9) 60.00; 0.371
- 10) 90.00; 0.302
- 11) 120.00; 0.256
- 12) 180.00; 0.208
- 13) 360.00; 0.142
- 14) 1440.00; 0.060

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	MANNING LIP (FT)	HIKE FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.00 TO NODE 13500.50 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 548.43  
ELEVATION DATA: UPSTREAM(FEET) = 1183.47 DOWNSTREAM(FEET) = 1065.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.978  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	5.11	0.60	1.000	0	11.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.74  
TOTAL AREA(ACRES) = 5.11 PEAK FLOW RATE(CFS) = 1.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.50 TO NODE 13501.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1033.15  
CHANNEL LENGTH THRU SUBAREA(FEET) = 431.71 CHANNEL SLOPE = 0.0738  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.866  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.87	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.84  
AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 2.53  
Tc(MIN.) = 14.49  
SUBAREA AREA(ACRES) = 8.87 SUBAREA RUNOFF(CFS) = 2.12  
EFFECTIVE AREA(ACRES) = 13.98 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 3.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 2.95  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13501.00 = 980.14 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13501.00 TO NODE 13502.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1033.15 DOWNSTREAM(FEET) = 990.26
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.63 CHANNEL SLOPE = 0.0452
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.705

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 16.82 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.19

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.59

AVERAGE FLOW DEPTH(FEET) = 0.74 TRAVEL TIME(MIN.) = 6.12

Tc(MIN.) = 20.61

SUBAREA AREA(ACRES) = 16.82 SUBAREA RUNOFF(CFS) = 1.59

EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 3.35

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.67 FLOW VELOCITY(FEET/SEC.) = 2.45

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13502.00 = 1928.77 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13502.00 TO NODE 13503.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.26 DOWNSTREAM(FEET) = 956.06
CHANNEL LENGTH THRU SUBAREA(FEET) = 940.98 CHANNEL SLOPE = 0.0363
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.595

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 46.02 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.49

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.29

AVERAGE FLOW DEPTH(FEET) = 0.71 TRAVEL TIME(MIN.) = 6.84

Tc(MIN.) = 27.45

SUBAREA AREA(ACRES) = 46.02 SUBAREA RUNOFF(CFS) = 0.00

EFFECTIVE AREA(ACRES) = 76.82 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 76.8 PEAK FLOW RATE(CFS) = 3.35

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.70 FLOW VELOCITY(FEET/SEC.) = 2.28

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13503.00 = 2869.75 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13503.00 TO NODE 13504.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 956.06 DOWNSTREAM(FEET) = 889.48
CHANNEL LENGTH THRU SUBAREA(FEET) = 2131.31 CHANNEL SLOPE = 0.0312
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.457

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 58.46 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.35

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.14

AVERAGE FLOW DEPTH(FEET) = 0.72 TRAVEL TIME(MIN.) = 16.59

Tc(MIN.) = 44.04

SUBAREA AREA(ACRES) = 58.46 SUBAREA RUNOFF(CFS) = 0.00

EFFECTIVE AREA(ACRES) = 135.28 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 135.3 PEAK FLOW RATE(CFS) = 3.35

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.72 FLOW VELOCITY(FEET/SEC.) = 2.14

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13504.00 = 5001.06 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13504.00 TO NODE 13505.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 889.48 DOWNSTREAM(FEET) = 848.10
CHANNEL LENGTH THRU SUBAREA(FEET) = 1661.97 CHANNEL SLOPE = 0.0249
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.381

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 49.30 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.35  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.97  
 AVERAGE FLOW DEPTH(FEET) = 0.75 TRAVEL TIME(MIN.) = 14.05  
 Tc(MIN.) = 58.09  
 SUBAREA AREA(ACRES) = 49.30 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 184.58 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 184.6 PEAK FLOW RATE(CFS) = 3.35  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.75 FLOW VELOCITY(FEET/SEC.) = 1.97  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.00 = 6663.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13505.00 TO NODE 13505.50 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 848.10 DOWNSTREAM(FEET) = 811.10  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1234.61 CHANNEL SLOPE = 0.0300  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.355  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.35	0.60	0.811	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.811  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.53  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.28  
 AVERAGE FLOW DEPTH(FEET) = 0.81 TRAVEL TIME(MIN.) = 9.02  
 Tc(MIN.) = 67.11  
 SUBAREA AREA(ACRES) = 39.35 SUBAREA RUNOFF(CFS) = 2.37  
 EFFECTIVE AREA(ACRES) = 223.93 AREA-AVERAGED Fm(INCH/HR) = 0.58  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.97  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 223.9 PEAK FLOW RATE(CFS) = 3.35  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.73 FLOW VELOCITY(FEET/SEC.) = 2.11  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.50 = 7897.64 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13505.50 TO NODE 13506.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 811.10 DOWNSTREAM(FEET) = 781.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1415.98 CHANNEL SLOPE = 0.0213  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.329  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	54.33	0.60	0.738	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.738  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.44  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.10  
 AVERAGE FLOW DEPTH(FEET) = 0.93 TRAVEL TIME(MIN.) = 11.22  
 Tc(MIN.) = 78.33

SUBAREA AREA(ACRES) = 54.33 SUBAREA RUNOFF(CFS) = 4.21  
 EFFECTIVE AREA(ACRES) = 278.26 AREA-AVERAGED Fm(INCH/HR) = 0.55  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.92  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 278.3 PEAK FLOW RATE(CFS) = 6.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.99 FLOW VELOCITY(FEET/SEC.) = 2.18  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.00 = 9313.62 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13506.50 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 781.00 DOWNSTREAM(FEET) = 743.17  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1542.62 CHANNEL SLOPE = 0.0245  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.304  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	61.33	0.60	0.783	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.23  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.45  
 AVERAGE FLOW DEPTH(FEET) = 1.06 TRAVEL TIME(MIN.) = 10.49  
 Tc(MIN.) = 88.81

SUBAREA AREA(ACRES) = 61.33 SUBAREA RUNOFF(CFS) = 3.65  
 EFFECTIVE AREA(ACRES) = 339.59 AREA-AVERAGED Fm(INCH/HR) = 0.54  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.90  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 339.6 PEAK FLOW RATE (CFS) = 9.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.12 FLOW VELOCITY (FEET/SEC.) = 2.55  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.50 = 10856.24 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13506.50 TO NODE 13520.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 743.17 DOWNSTREAM (FEET) = 717.04  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1370.93 CHANNEL SLOPE = 0.0191  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.289  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.86	0.60	0.848	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.848  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.37  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.36  
AVERAGE FLOW DEPTH (FEET) = 1.21 TRAVEL TIME (MIN.) = 9.68  
Tc (MIN.) = 98.50  
SUBAREA AREA (ACRES) = 39.86 SUBAREA RUNOFF (CFS) = 1.57  
EFFECTIVE AREA (ACRES) = 379.45 AREA-AVERAGED Fm (INCH/HR) = 0.53  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.89  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 379.5 PEAK FLOW RATE (CFS) = 10.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.22 FLOW VELOCITY (FEET/SEC.) = 2.37  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13506.00 TO NODE 13520.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 98.50  
RAINFALL INTENSITY (INCH/HR) = 0.29  
AREA-AVERAGED Fm (INCH/HR) = 0.53  
AREA-AVERAGED Fp (INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.89  
EFFECTIVE STREAM AREA (ACRES) = 379.45  
TOTAL STREAM AREA (ACRES) = 379.45  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 10.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13510.00 TO NODE 13511.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 903.68  
ELEVATION DATA: UPSTREAM (FEET) = 1216.90 DOWNSTREAM (FEET) = 1022.78

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.615  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.860  
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	6.66	0.60	1.000	0	14.62

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF (CFS) = 1.56  
TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 1.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13511.00 TO NODE 13512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1022.78 DOWNSTREAM (FEET) = 954.27  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1027.63 CHANNEL SLOPE = 0.0667  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.699  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.83  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.71  
AVERAGE FLOW DEPTH (FEET) = 0.59 TRAVEL TIME (MIN.) = 6.32  
Tc (MIN.) = 20.94  
SUBAREA AREA (ACRES) = 25.40 SUBAREA RUNOFF (CFS) = 2.26  
EFFECTIVE AREA (ACRES) = 32.06 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 2.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.59 FLOW VELOCITY (FEET/SEC.) = 2.73  
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13512.00 = 1931.31 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13512.00 TO NODE 13513.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 954.27 DOWNSTREAM (FEET) = 872.45  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1926.42 CHANNEL SLOPE = 0.0425

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.521  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	90.23	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.30  
AVERAGE FLOW DEPTH (FEET) = 0.64 TRAVEL TIME (MIN.) = 13.96  
Tc (MIN.) = 34.90  
SUBAREA AREA (ACRES) = 90.23 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 122.29 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 122.3 PEAK FLOW RATE (CFS) = 2.86  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.64 FLOW VELOCITY (FEET/SEC.) = 2.30  
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13513.00 = 3857.73 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13513.00 TO NODE 13514.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 872.45 DOWNSTREAM (FEET) = 813.12  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1895.66 CHANNEL SLOPE = 0.0313  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.421  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	135.65	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.05  
AVERAGE FLOW DEPTH (FEET) = 0.68 TRAVEL TIME (MIN.) = 15.42  
Tc (MIN.) = 50.32  
SUBAREA AREA (ACRES) = 135.65 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 257.94 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 257.9 PEAK FLOW RATE (CFS) = 2.86  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.68 FLOW VELOCITY (FEET/SEC.) = 2.05  
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13514.00 = 5753.39 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13514.00 TO NODE 13515.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 813.12 DOWNSTREAM (FEET) = 773.74  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1926.15 CHANNEL SLOPE = 0.0204  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.351  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	109.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 1.75  
AVERAGE FLOW DEPTH (FEET) = 0.74 TRAVEL TIME (MIN.) = 18.31  
Tc (MIN.) = 68.63  
SUBAREA AREA (ACRES) = 109.30 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 367.24 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 367.2 PEAK FLOW RATE (CFS) = 2.86  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.74 FLOW VELOCITY (FEET/SEC.) = 1.75  
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13515.00 = 7679.54 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 773.74 DOWNSTREAM (FEET) = 717.04  
CHANNEL LENGTH THRU SUBAREA (FEET) = 2279.49 CHANNEL SLOPE = 0.0249  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.304  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	231.44	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.86  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.88  
 AVERAGE FLOW DEPTH(FEET) = 0.71 TRAVEL TIME(MIN.) = 20.24  
 Tc(MIN.) = 88.87  
 SUBAREA AREA(ACRES) = 231.44 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 598.68 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 598.7 PEAK FLOW RATE(CFS) = 2.86  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.71 FLOW VELOCITY(FEET/SEC.) = 1.88  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13520.00 = 9959.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

-----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 88.87  
 RAINFALL INTENSITY(INCH/HR) = 0.30  
 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 598.68  
 TOTAL STREAM AREA(ACRES) = 598.68  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.86

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	10.66	98.50	0.289	0.60( 0.53)	0.89	379.5	13500.00
2	2.86	88.87	0.304	0.60( 0.60)	1.00	598.7	13510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	13.00	88.87	0.304	0.60( 0.58)	0.96	941.0	13510.00
2	13.37	98.50	0.289	0.60( 0.57)	0.96	978.1	13500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 13.37 Tc(MIN.) = 98.50  
 EFFECTIVE AREA(ACRES) = 978.13 AREA-AVERAGED Fm(INCH/HR) = 0.57  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 978.1  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.00 TO NODE 13520.50 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM(FEET) = 717.04 DOWNSTREAM(FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2019.22 CHANNEL SLOPE = 0.0084  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.268

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 193.31 0.60 0.965 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.19  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.55  
 AVERAGE FLOW DEPTH(FEET) = 1.36 TRAVEL TIME(MIN.) = 13.18  
 Tc(MIN.) = 111.68

SUBAREA AREA(ACRES) = 193.31 SUBAREA RUNOFF(CFS) = 1.63  
 EFFECTIVE AREA(ACRES) = 1171.44 AREA-AVERAGED Fm(INCH/HR) = 0.58  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 1171.4 PEAK FLOW RATE(CFS) = 13.37  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.33 FLOW VELOCITY(FEET/SEC.) = 2.51  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.50 = 14246.39 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	13.00	102.10	0.283	0.60( 0.58)	0.96	1134.3	13510.00
2	13.37	111.68	0.268	0.60( 0.58)	0.96	1171.4	13500.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 13.37 Tc(MIN.) = 111.68  
 AREA-AVERAGED Fm(INCH/HR) = 0.58 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 1171.44

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.50 TO NODE 13521.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 661.95  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1622.36 CHANNEL SLOPE = 0.0235  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.257

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 129.79 0.60 0.897 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.92  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.78  
 AVERAGE FLOW DEPTH(FEET) = 1.15 TRAVEL TIME(MIN.) = 7.16  
 Tc(MIN.) = 118.83  
 SUBAREA AREA(ACRES) = 129.79 SUBAREA RUNOFF(CFS) = 3.10  
 EFFECTIVE AREA(ACRES) = 1301.23 AREA-AVERAGED Fm(INCH/HR) = 0.57  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 1301.2 PEAK FLOW RATE(CFS) = 14.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.12 FLOW VELOCITY(FEET/SEC.) = 3.74  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13521.00 = 15868.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	13.99	109.30	0.272	0.60( 0.57)	0.95	1264.1	13510.00
2	14.17	118.83	0.257	0.60( 0.57)	0.95	1301.2	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 14.17 Tc(MIN.) = 118.83  
 AREA-AVERAGED Fm(INCH/HR) = 0.57 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.95 EFFECTIVE AREA(ACRES) = 1301.23

\*\*\*\*\*

FLOW PROCESS FROM NODE 13521.00 TO NODE 13522.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 661.95 DOWNSTREAM(FEET) = 632.19  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2746.01 CHANNEL SLOPE = 0.0108  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.244  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	278.60	0.60	0.905	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.08  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.93  
 AVERAGE FLOW DEPTH(FEET) = 1.39 TRAVEL TIME(MIN.) = 15.61  
 Tc(MIN.) = 134.44  
 SUBAREA AREA(ACRES) = 278.60 SUBAREA RUNOFF(CFS) = 5.81  
 EFFECTIVE AREA(ACRES) = 1579.83 AREA-AVERAGED Fm(INCH/HR) = 0.57  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.94  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 1579.8 PEAK FLOW RATE(CFS) = 19.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.45 FLOW VELOCITY(FEET/SEC.) = 3.03  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13522.00 = 18614.76 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	18.94	124.94	0.252	0.60( 0.57)	0.95	1542.7	13510.00
2	19.25	134.44	0.244	0.60( 0.57)	0.94	1579.8	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 19.25 Tc(MIN.) = 134.44  
 AREA-AVERAGED Fm(INCH/HR) = 0.57 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.94 EFFECTIVE AREA(ACRES) = 1579.83

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1579.8 TC(MIN.) = 134.44  
 EFFECTIVE AREA(ACRES) = 1579.83 AREA-AVERAGED Fm(INCH/HR) = 0.57  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.945  
 PEAK FLOW RATE(CFS) = 19.25

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	18.94	124.94	0.252	0.60( 0.57)	0.95	1542.7	13510.00
2	19.25	134.44	0.244	0.60( 0.57)	0.94	1579.8	13500.00

=====

END OF RATIONAL METHOD ANALYSIS





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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 5-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P05EVAA.DAT  
TIME/DATE OF STUDY: 14:42 11/14/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.604
- 2) 10.00; 1.741
- 3) 15.00; 1.296
- 4) 20.00; 1.108
- 5) 25.00; 0.968
- 6) 30.00; 0.871
- 7) 40.00; 0.743
- 8) 50.00; 0.660
- 9) 60.00; 0.598
- 10) 90.00; 0.495
- 11) 120.00; 0.435
- 12) 180.00; 0.364
- 13) 360.00; 0.267
- 14) 1200.00; 0.116

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 571.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.305  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.206  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	-	0.80	0.50	0.200	0	7.31

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 1.52  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 1.52

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.206  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.50	0.200	-
USER-DEFINED	-	1.00	0.50	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.170  
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 6.30  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.09  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 7.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.206  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.50	0.200	-
USER-DEFINED	-	1.00	0.50	0.100	-

USER-DEFINED - 2.60 0.50 0.200 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA (ACRES) = 2.60 SUBAREA RUNOFF (CFS) = 4.93  
 EFFECTIVE AREA (ACRES) = 6.70 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.19  
 TOTAL AREA (ACRES) = 6.7 PEAK FLOW RATE (CFS) = 12.74

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 571.00 DOWNSTREAM ELEVATION (FEET) = 530.50  
 STREET LENGTH (FEET) = 1215.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.28  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.39  
 HALFSTREET FLOOD WIDTH (FEET) = 12.93  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.53  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.78  
 STREET FLOW TRAVEL TIME (MIN.) = 4.47 Tc (MIN.) = 11.78

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.583

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.50	0.200	-
USER-DEFINED	-	0.10	0.50	0.200	-
USER-DEFINED	-	2.40	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.135  
 SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 5.05  
 EFFECTIVE AREA (ACRES) = 10.40 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA (ACRES) = 10.4 PEAK FLOW RATE (CFS) = 14.03

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.39 HALFSTREET FLOOD WIDTH (FEET) = 12.46  
 FLOW VELOCITY (FEET/SEC.) = 4.44 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.71  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1542.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 11.78  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.583  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.40	0.50	0.200	-
USER-DEFINED	-	18.20	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.119  
 SUBAREA AREA (ACRES) = 22.60 SUBAREA RUNOFF (CFS) = 30.98  
 EFFECTIVE AREA (ACRES) = 33.00 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.13  
 TOTAL AREA (ACRES) = 33.0 PEAK FLOW RATE (CFS) = 45.01

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 11.78  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.583  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.20	0.50	0.200	-
USER-DEFINED	-	0.10	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198  
 SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 8.41  
 EFFECTIVE AREA (ACRES) = 39.30 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA (ACRES) = 39.3 PEAK FLOW RATE (CFS) = 53.43

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 530.50 DOWNSTREAM (FEET) = 522.00  
 FLOW LENGTH (FEET) = 837.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.2 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.10  
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 53.43  
 PIPE TRAVEL TIME (MIN.) = 1.38 Tc (MIN.) = 13.16  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2379.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 13.16  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.460  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED - 15.30 0.50 0.100 -  
 USER-DEFINED - 0.70 0.50 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.133  
 SUBAREA AREA (ACRES) = 16.00 SUBAREA RUNOFF (CFS) = 20.07  
 EFFECTIVE AREA (ACRES) = 55.30 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA (ACRES) = 55.3 PEAK FLOW RATE (CFS) = 69.15

\*\*\*\*\*

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 522.00 DOWNSTREAM (FEET) = 473.00  
 FLOW LENGTH (FEET) = 568.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 24.12  
 ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 69.15  
 PIPE TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 13.55  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2947.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.55  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.425

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.50	0.850	-
USER-DEFINED	-	0.30	0.50	0.500	-
USER-DEFINED	-	0.50	0.50	0.100	-
USER-DEFINED	-	13.00	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.820  
 SUBAREA AREA (ACRES) = 15.90 SUBAREA RUNOFF (CFS) = 14.53  
 EFFECTIVE AREA (ACRES) = 71.20 AREA-AVERAGED Fm (INCH/HR) = 0.15  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA (ACRES) = 71.2 PEAK FLOW RATE (CFS) = 81.94

\*\*\*\*\*

FLOW PROCESS FROM NODE 104.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 473.00 DOWNSTREAM (FEET) = 435.00  
 FLOW LENGTH (FEET) = 588.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.8 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 22.52  
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 81.94  
 PIPE TRAVEL TIME (MIN.) = 0.44 Tc (MIN.) = 13.98

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 100.00 TO NODE 121.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 577.00 DOWNSTREAM (FEET) = 574.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.438  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.011  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	-	0.60	0.50	0.200	0	8.44

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF (CFS) = 1.03  
 TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 1.03

\*\*\*\*\*

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 574.00 DOWNSTREAM ELEVATION (FEET) = 557.00  
 STREET LENGTH (FEET) = 221.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.47  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.34  
 HALFSTREET FLOOD WIDTH (FEET) = 9.72  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.01  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.02  
 STREET FLOW TRAVEL TIME (MIN.) = 0.61 Tc (MIN.) = 9.05  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.905  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.200	-
USER-DEFINED	-	7.90	0.50	0.200	-
USER-DEFINED	-	4.10	0.50	0.400	-
USER-DEFINED	-	2.20	0.50	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.257  
SUBAREA AREA (ACRES) = 14.30 SUBAREA RUNOFF (CFS) = 22.86  
EFFECTIVE AREA (ACRES) = 14.90 AREA-AVERAGED Fm (INCH/HR) = 0.13  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.26  
TOTAL AREA (ACRES) = 14.9 PEAK FLOW RATE (CFS) = 23.83

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.40 HALFSTREET FLOOD WIDTH (FEET) = 13.09  
FLOW VELOCITY (FEET/SEC.) = 6.92 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.74  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 551.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 557.00 DOWNSTREAM ELEVATION (FEET) = 527.00  
STREET LENGTH (FEET) = 317.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 30.59

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.41  
HALFSTREET FLOOD WIDTH (FEET) = 13.87  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 8.00  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.28

STREET FLOW TRAVEL TIME (MIN.) = 0.66 Tc (MIN.) = 9.71

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.791

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.320	-
USER-DEFINED	-	4.50	0.50	0.400	-
USER-DEFINED	-	0.70	0.50	0.200	-
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	3.50	0.50	0.350	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.352

SUBAREA AREA (ACRES) = 9.30 SUBAREA RUNOFF (CFS) = 13.52

EFFECTIVE AREA (ACRES) = 24.20 AREA-AVERAGED Fm (INCH/HR) = 0.15

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.29

TOTAL AREA (ACRES) = 24.2 PEAK FLOW RATE (CFS) = 35.82

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.43 HALFSTREET FLOOD WIDTH (FEET) = 14.88

FLOW VELOCITY (FEET/SEC.) = 8.25 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.53

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 123.00 = 868.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 527.00 DOWNSTREAM ELEVATION (FEET) = 496.00  
STREET LENGTH (FEET) = 315.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 43.62

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.45

HALFSTREET FLOOD WIDTH (FEET) = 15.98

AVERAGE FLOW VELOCITY (FEET/SEC.) = 8.82

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.95

STREET FLOW TRAVEL TIME (MIN.) = 0.60 Tc (MIN.) = 10.31

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.714

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.50	0.400	-
USER-DEFINED	-	1.40	0.50	0.350	-
USER-DEFINED	-	4.00	0.50	0.400	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	2.70	0.50	0.350	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387

SUBAREA AREA (ACRES) = 11.40 SUBAREA RUNOFF (CFS) = 15.60

EFFECTIVE AREA (ACRES) = 35.60 AREA-AVERAGED Fm (INCH/HR) = 0.16

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.32

TOTAL AREA (ACRES) = 35.6 PEAK FLOW RATE (CFS) = 49.74

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.46 HALFSTREET FLOOD WIDTH (FEET) = 16.91

FLOW VELOCITY (FEET/SEC.) = 9.05 DEPTH\*VELOCITY (FT\*FT/SEC.) = 4.20

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 124.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 10.31
RAINFALL INTENSITY(INCH/HR) = 1.71
AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA(ACRES) = 35.60
TOTAL STREAM AREA(ACRES) = 35.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 49.74

\*\*\*\*\*
FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 317.00
ELEVATION DATA: UPSTREAM(FEET) = 699.00 DOWNSTREAM(FEET) = 610.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.111
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.894
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"OPEN BRUSH" - 1.50 0.50 1.000 0 9.11
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.88
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 1.88

\*\*\*\*\*
FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 575.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 206.00 CHANNEL SLOPE = 0.1699
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.787
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.80 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.50
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.50
AVERAGE FLOW DEPTH(FEET) = 0.46 TRAVEL TIME(MIN.) = 0.62
Tc(MIN.) = 9.73
SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 3.24
EFFECTIVE AREA(ACRES) = 4.30 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.3 PEAK FLOW RATE(CFS) = 4.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.52 FLOW VELOCITY(FEET/SEC.) = 6.05
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 523.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 548.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.1350
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.715
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.30 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.78
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.01
AVERAGE FLOW DEPTH(FEET) = 0.61 TRAVEL TIME(MIN.) = 0.55
Tc(MIN.) = 10.29
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 3.61
EFFECTIVE AREA(ACRES) = 7.60 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 7.6 PEAK FLOW RATE(CFS) = 8.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.66 FLOW VELOCITY(FEET/SEC.) = 6.34
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 723.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 548.00 DOWNSTREAM(FEET) = 524.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 318.00 CHANNEL SLOPE = 0.0755
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.626
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.30 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.48
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.25
AVERAGE FLOW DEPTH(FEET) = 0.78 TRAVEL TIME(MIN.) = 1.01
Tc(MIN.) = 11.30

SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 2.33  
EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 10.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.79 FLOW VELOCITY (FEET/SEC.) = 5.35  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 1041.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 524.00 DOWNSTREAM (FEET) = 515.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 94.00 CHANNEL SLOPE = 0.0957  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.603

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.86

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.09

AVERAGE FLOW DEPTH (FEET) = 0.81 TRAVEL TIME (MIN.) = 0.26

Tc (MIN.) = 11.55

SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 3.67

EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 13.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.85 FLOW VELOCITY (FEET/SEC.) = 6.23  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 1135.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 507.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 207.00 CHANNEL SLOPE = 0.0386  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.538

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.30	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.37

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.76

AVERAGE FLOW DEPTH (FEET) = 1.10 TRAVEL TIME (MIN.) = 0.73  
Tc (MIN.) = 12.28  
SUBAREA AREA (ACRES) = 8.30 SUBAREA RUNOFF (CFS) = 7.75  
EFFECTIVE AREA (ACRES) = 21.90 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 21.9 PEAK FLOW RATE (CFS) = 20.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.17 FLOW VELOCITY (FEET/SEC.) = 4.96  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 1342.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 507.00 DOWNSTREAM (FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 338.00 CHANNEL SLOPE = 0.0207  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.417

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	0.400	-
USER-DEFINED	-	13.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 26.32

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.16

AVERAGE FLOW DEPTH (FEET) = 1.45 TRAVEL TIME (MIN.) = 1.35

Tc (MIN.) = 13.63

SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 11.72

EFFECTIVE AREA (ACRES) = 36.00 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 36.0 PEAK FLOW RATE (CFS) = 29.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.52 FLOW VELOCITY (FEET/SEC.) = 4.29  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 1680.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 137.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 500.00 DOWNSTREAM (FEET) = 496.00  
FLOW LENGTH (FEET) = 726.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.3 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 6.97

ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 29.80

PIPE TRAVEL TIME (MIN.) = 1.74 Tc (MIN.) = 15.37

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

```

*****
FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 15.37
RAINFALL INTENSITY(INCH/HR) = 1.28
AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 36.00
TOTAL STREAM AREA(ACRES) = 36.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 29.80

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 49.74 10.31 1.714 0.50( 0.16) 0.32 35.6 100.00
2 29.80 15.37 1.282 0.50( 0.50) 1.00 36.0 130.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 79.54 10.31 1.714 0.50( 0.30) 0.59 59.7 100.00
2 65.71 15.37 1.282 0.50( 0.33) 0.66 71.6 130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 79.54 Tc(MIN.) = 10.31
EFFECTIVE AREA(ACRES) = 59.74 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59
TOTAL AREA(ACRES) = 71.6
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

*****
FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 444.00
FLOW LENGTH(FEET) = 888.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.51
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 79.54
PIPE TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 10.99
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 125.00 = 3294.00 FEET.

*****
FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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*****
MAINLINE Tc(MIN.) = 10.99
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.653
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.50 0.400 -
USER-DEFINED - 7.50 0.50 0.400 -
USER-DEFINED - 0.10 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.407
SUBAREA AREA(ACRES) = 8.60 SUBAREA RUNOFF(CFS) = 11.22
EFFECTIVE AREA(ACRES) = 68.34 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.57
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 84.08

*****
FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 444.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.74
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 84.08
PIPE TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 12.02
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 12.02
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.561
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.30 0.50 0.200 -
USER-DEFINED - 0.70 0.50 0.400 -
USER-DEFINED - 0.90 0.50 0.100 -
USER-DEFINED - 0.60 0.50 0.350 -
USER-DEFINED - 0.40 0.50 0.200 -
USER-DEFINED - 0.20 0.50 0.400 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.225
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 9.26
EFFECTIVE AREA(ACRES) = 75.44 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 87.3 PEAK FLOW RATE(CFS) = 87.73

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 12.02
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.561
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.50     0.100    -
USER-DEFINED        -         0.10     0.50     0.350    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225
SUBAREA AREA(ACRES) = 0.20   SUBAREA RUNOFF(CFS) = 0.26
EFFECTIVE AREA(ACRES) = 75.64   AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 87.5     PEAK FLOW RATE(CFS) = 87.99

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*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

```

=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.02
RAINFALL INTENSITY(INCH/HR) = 1.56
AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.54
EFFECTIVE STREAM AREA(ACRES) = 75.64
TOTAL STREAM AREA(ACRES) = 87.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 87.99

```

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*****
FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21
-----

```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

```

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 557.00   DOWNSTREAM(FEET) = 546.00

```

```

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.105
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.413
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS   Tc
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          -         0.50     0.50     0.100    0   6.11
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 1.06
TOTAL AREA(ACRES) = 0.50   PEAK FLOW RATE(CFS) = 1.06

```

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*****
FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62
-----

```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

```

UPSTREAM ELEVATION(FEET) = 546.00   DOWNSTREAM ELEVATION(FEET) = 488.00
STREET LENGTH(FEET) = 671.00   CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

```

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.65

```

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.27
HALFSTREET FLOOD WIDTH(FEET) = 5.97
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.52
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.48
STREET FLOW TRAVEL TIME(MIN.) = 2.03   Tc(MIN.) = 8.13

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* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.063
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50     0.50     0.200    -
USER-DEFINED        -         0.90     0.50     0.100    -
USER-DEFINED        -         3.90     0.50     0.350    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
SUBAREA AREA(ACRES) = 5.30   SUBAREA RUNOFF(CFS) = 9.14
EFFECTIVE AREA(ACRES) = 5.80   AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 5.8     PEAK FLOW RATE(CFS) = 10.05

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```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) = 8.47
FLOW VELOCITY(FEET/SEC.) = 6.02   DEPTH*VELOCITY(FT*FT/SEC.) = 1.89
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1001.00 FEET.

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*****
FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 8.13
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.063
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         14.60    0.50     0.200    -
USER-DEFINED        -         1.10     0.50     0.100    -
USER-DEFINED        -         4.30     0.50     0.350    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.227
SUBAREA AREA(ACRES) = 20.00   SUBAREA RUNOFF(CFS) = 35.10
EFFECTIVE AREA(ACRES) = 25.80   AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 25.8     PEAK FLOW RATE(CFS) = 45.15

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*****
FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 488.00 DOWNSTREAM ELEVATION(FEET) = 460.00
STREET LENGTH(FEET) = 371.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 56.45
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.50
HALFSTREET FLOOD WIDTH(FEET) = 18.79
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.43
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 4.20
STREET FLOW TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 8.87
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.937
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.50 0.200 -
USER-DEFINED - 10.00 0.50 0.200 -
USER-DEFINED - 1.70 0.50 0.200 -
USER-DEFINED - 0.50 0.50 0.100 -
USER-DEFINED - 1.00 0.50 0.350 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.207
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 22.60
EFFECTIVE AREA(ACRES) = 39.50 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 39.5 PEAK FLOW RATE(CFS) = 64.81

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 19.80
FLOW VELOCITY(FEET/SEC.) = 8.77 DEPTH*VELOCITY(FT*FT/SEC.) = 4.53
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1372.00 FEET.

*****
FLOW PROCESS FROM NODE 113.00 TO NODE 126.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.45

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ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 64.81
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 9.32
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 1872.00 FEET.

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 9.32
RAINFALL INTENSITY(INCH/HR) = 1.86
AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.23
EFFECTIVE STREAM AREA(ACRES) = 39.50
TOTAL STREAM AREA(ACRES) = 39.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 64.81

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 87.99 12.02 1.561 0.50( 0.27) 0.54 75.6 100.00
1 71.99 17.18 1.214 0.50( 0.30) 0.60 87.5 130.00
2 64.81 9.32 1.859 0.50( 0.11) 0.23 39.5 110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 148.72 9.32 1.859 0.50( 0.21) 0.41 98.1 110.00
2 141.75 12.02 1.561 0.50( 0.22) 0.43 115.1 100.00
3 112.86 17.18 1.214 0.50( 0.24) 0.48 127.0 130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 148.72 Tc(MIN.) = 9.32
EFFECTIVE AREA(ACRES) = 98.14 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41
TOTAL AREA(ACRES) = 127.0
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 435.00
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.90
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 148.72

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PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 9.70  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.70  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.793  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 0.200 -  
USER-DEFINED - 5.10 0.50 0.400 -  
USER-DEFINED - 0.30 0.50 0.100 -  
USER-DEFINED - 0.10 0.50 0.850 -  
USER-DEFINED - 0.80 0.50 0.200 -  
USER-DEFINED - 0.80 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.366  
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 11.30  
EFFECTIVE AREA(ACRES) = 105.94 AREA-AVERAGED Fm(INCH/HR) = 0.20  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 134.8 PEAK FLOW RATE(CFS) = 151.42

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.70  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.793  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.10 0.50 0.400 -  
USER-DEFINED - 0.30 0.50 0.100 -  
USER-DEFINED - 1.50 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 6.76  
EFFECTIVE AREA(ACRES) = 110.84 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 139.7 PEAK FLOW RATE(CFS) = 158.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\*\*\*\* MAIN STREAM CONFLUENCE DATA \*\*\*\*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 158.18 9.70 1.793 0.50( 0.21) 0.41 110.8 110.00  
2 150.93 12.40 1.527 0.50( 0.22) 0.43 127.8 100.00  
3 120.60 17.59 1.198 0.50( 0.24) 0.48 139.7 130.00

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 81.94 13.98 1.386 0.50( 0.15) 0.29 71.2 100.00  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 233.64 9.70 1.793 0.50( 0.19) 0.38 160.2 110.00  
2 231.85 12.40 1.527 0.50( 0.19) 0.38 191.0 100.00  
3 223.62 13.98 1.386 0.50( 0.20) 0.39 202.6 100.00  
4 190.12 17.59 1.198 0.50( 0.21) 0.42 210.9 130.00  
TOTAL AREA(ACRES) = 210.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 233.64 Tc(MIN.) = 9.700  
EFFECTIVE AREA(ACRES) = 160.22 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.38  
TOTAL AREA(ACRES) = 210.9  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 370.00  
FLOW LENGTH(FEET) = 500.20 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 38.04  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 233.64  
PIPE TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 9.92  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.10 = 4750.20 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.10 TO NODE 127.20 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 353.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 595.30 CHANNEL SLOPE = 0.0218  
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.601  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.50 0.100 -  
USER-DEFINED - 0.10 0.50 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 236.16

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.98  
 AVERAGE FLOW DEPTH (FEET) = 0.77 TRAVEL TIME (MIN.) = 1.66  
 Tc (MIN.) = 11.58  
 SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 5.02  
 EFFECTIVE AREA (ACRES) = 163.82 AREA-AVERAGED Fm (INCH/HR) = 0.19  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA (ACRES) = 214.5 PEAK FLOW RATE (CFS) = 233.64  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.76 FLOW VELOCITY (FEET/SEC.) = 5.97  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.20 = 5345.50 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.20 TO NODE 127.30 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 353.00 DOWNSTREAM (FEET) = 340.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 476.00 CHANNEL SLOPE = 0.0273  
 CHANNEL BASE (FEET) = 50.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.50  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.491

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.10	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 235.72  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.42  
 AVERAGE FLOW DEPTH (FEET) = 0.71 TRAVEL TIME (MIN.) = 1.24  
 Tc (MIN.) = 12.81

SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 4.15  
 EFFECTIVE AREA (ACRES) = 167.02 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA (ACRES) = 217.7 PEAK FLOW RATE (CFS) = 233.64  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.71 FLOW VELOCITY (FEET/SEC.) = 6.38  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.30 = 5821.50 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.30 TO NODE 13569.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 340.00 DOWNSTREAM (FEET) = 338.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 506.00 CHANNEL SLOPE = 0.0040  
 CHANNEL BASE (FEET) = 150.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.50  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.244

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.10	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.100	-

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.80 0.50 0.100 -  
 USER-DEFINED - 0.60 0.50 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 235.47  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.35  
 AVERAGE FLOW DEPTH (FEET) = 0.66 TRAVEL TIME (MIN.) = 3.58  
 Tc (MIN.) = 16.39

SUBAREA AREA (ACRES) = 3.40 SUBAREA RUNOFF (CFS) = 3.65  
 EFFECTIVE AREA (ACRES) = 170.42 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36  
 TOTAL AREA (ACRES) = 221.1 PEAK FLOW RATE (CFS) = 233.64  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.66 FLOW VELOCITY (FEET/SEC.) = 2.34  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 13569.00 = 6327.50 FEET.

END OF STUDY SUMMARY:  
 TOTAL AREA (ACRES) = 221.1 TC (MIN.) = 16.39  
 EFFECTIVE AREA (ACRES) = 170.42 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.360  
 PEAK FLOW RATE (CFS) = 233.64

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	233.64	16.39	1.244	0.50 ( 0.18)	0.36	170.4	110.00
2	231.85	19.13	1.141	0.50 ( 0.19)	0.37	201.2	100.00
3	223.62	20.82	1.085	0.50 ( 0.19)	0.38	212.8	100.00
4	190.12	24.85	0.972	0.50 ( 0.20)	0.40	221.1	130.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 5-YR ULTIMATE EV DECEMBER 2013 MCHANDOO/TMULI \*  
\*\*\*\*\*

FILE NAME: 2P05EVBB.DAT  
TIME/DATE OF STUDY: 16:37 12/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.630
- 2) 10.00; 1.755
- 3) 15.00; 1.301
- 4) 20.00; 1.113
- 5) 25.00; 0.972
- 6) 30.00; 0.874
- 7) 40.00; 0.746
- 8) 50.00; 0.664
- 9) 60.00; 0.602
- 10) 90.00; 0.498
- 11) 120.00; 0.439
- 12) 180.00; 0.368
- 13) 360.00; 0.270
- 14) 1200.00; 0.118

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00  
ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 543.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.596  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.176  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.80	0.50	0.100	56	7.60

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 1.53  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 1.53

\*\*\*\*\*  
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 543.00 DOWNSTREAM ELEVATION(FEET) = 523.00  
STREET LENGTH(FEET) = 502.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.87  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.25  
HALFSTREET FLOOD WIDTH(FEET) = 4.43  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.72  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.92  
STREET FLOW TRAVEL TIME(MIN.) = 2.25 Tc(MIN.) = 9.85  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.782

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.200	-
USER-DEFINED	-	1.30	0.50	0.100	-

USER-DEFINED - 0.30 0.50 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.261  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 2.68  
 EFFECTIVE AREA(ACRES) = 2.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 3.92  
  
 END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 5.66  
 FLOW VELOCITY(FEET/SEC.) = 3.84 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.04  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 810.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.85  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.782  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	1.40	0.50	0.100	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.18  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 6.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 523.00 DOWNSTREAM ELEVATION(FEET) = 468.00  
 STREET LENGTH(FEET) = 987.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 32.00  
  
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.49  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.32  
 HALFSTREET FLOOD WIDTH(FEET) = 8.06  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.06  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.62  
 STREET FLOW TRAVEL TIME(MIN.) = 3.25 Tc(MIN.) = 13.10  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.474  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	0.500	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	0.500	-
USER-DEFINED	-	1.90	0.50	0.100	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 3.19  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.14  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 11.36

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.50 0.50 0.500 -  
 USER-DEFINED - 2.40 0.50 0.100 -  
 USER-DEFINED - 1.30 0.50 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.426  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 4.76  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.15  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 9.76

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.65  
 FLOW VELOCITY(FEET/SEC.) = 5.20 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.72  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 1797.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 468.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.35  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.34  
 HALFSTREET FLOOD WIDTH(FEET) = 9.84  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.36  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.81  
 STREET FLOW TRAVEL TIME(MIN.) = 3.04 Tc(MIN.) = 16.14

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.258  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	0.500	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	0.500	-
USER-DEFINED	-	1.90	0.50	0.100	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 3.19  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.14  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 11.36

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 9.91
FLOW VELOCITY(FEET/SEC.) = 5.31 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.80
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2774.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.14
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.258
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.30 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 0.89
EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 12.24

\*\*\*\*\*
FLOW PROCESS FROM NODE 204.00 TO NODE 218.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 343.00
STREET LENGTH(FEET) = 1228.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.85
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.36
HALFSTREET FLOOD WIDTH(FEET) = 11.05
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.39
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.94
STREET FLOW TRAVEL TIME(MIN.) = 3.80 Tc(MIN.) = 19.94
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.115

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.50 0.500 -
USER-DEFINED - 0.50 0.50 0.100 -
USER-DEFINED - 0.40 0.50 1.000 -
USER-DEFINED - 0.70 0.50 0.500 -

USER-DEFINED - 1.50 0.50 0.100 -
USER-DEFINED - 0.80 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 3.20
EFFECTIVE AREA(ACRES) = 16.60 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 16.6 PEAK FLOW RATE(CFS) = 13.83

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.05
FLOW VELOCITY(FEET/SEC.) = 5.38 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.94
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.94
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.115
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.20 0.50 0.500 -
USER-DEFINED - 0.10 0.50 0.100 -
USER-DEFINED - 0.20 0.50 0.500 -
USER-DEFINED - 0.10 0.50 0.100 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450
SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 1.28
EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 15.11

\*\*\*\*\*
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 19.94
RAINFALL INTENSITY(INCH/HR) = 1.12
AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.39
EFFECTIVE STREAM AREA(ACRES) = 18.20
TOTAL STREAM AREA(ACRES) = 18.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 15.11

\*\*\*\*\*
FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
INITIAL SUBAREA FLOW-LENGTH(FEET) = 268.00



ELEVATION DATA: UPSTREAM(FEET) = 514.00 DOWNSTREAM(FEET) = 511.50

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.724  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.153

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	-	2.30	0.50	0.500	56	9.27
APARTMENTS	-	0.40	0.50	0.200	56	7.72

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.456  
SUBAREA RUNOFF(CFS) = 4.68  
TOTAL AREA(ACRES) = 2.70 PEAK FLOW RATE(CFS) = 4.68

\*\*\*\*\*  
FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 511.50 DOWNSTREAM ELEVATION(FEET) = 503.00  
STREET LENGTH(FEET) = 503.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.50  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 12.15  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.14  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.19  
STREET FLOW TRAVEL TIME(MIN.) = 2.67 Tc(MIN.) = 10.39  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.719

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	0.500	-
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	0.60	0.50	0.200	-
USER-DEFINED	-	6.20	0.50	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.475  
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 9.60  
EFFECTIVE AREA(ACRES) = 9.90 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.47  
TOTAL AREA(ACRES) = 9.9 PEAK FLOW RATE(CFS) = 13.23

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 14.02  
FLOW VELOCITY(FEET/SEC.) = 3.39 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.40  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 771.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.39  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.719

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.50	0.200	-
USER-DEFINED	-	0.30	0.50	0.500	-
USER-DEFINED	-	0.10	0.50	0.350	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.281  
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 1.85  
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 15.07

\*\*\*\*\*

FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 503.00 DOWNSTREAM ELEVATION(FEET) = 476.00  
STREET LENGTH(FEET) = 423.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.82

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 11.37  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.87  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.15  
STREET FLOW TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 11.59  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.610

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.50	0.500	-
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.350	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.454  
SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 1.49  
EFFECTIVE AREA (ACRES) = 12.40 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.45  
TOTAL AREA (ACRES) = 12.4 PEAK FLOW RATE (CFS) = 15.47

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.36 HALFSTREET FLOOD WIDTH (FEET) = 11.21  
FLOW VELOCITY (FEET/SEC.) = 5.88 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.13  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 11.59  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.610  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.50 0.200 -  
USER-DEFINED - 0.20 0.50 0.500 -  
USER-DEFINED - 0.30 0.50 0.100 -  
USER-DEFINED - 3.30 0.50 0.350 -  
USER-DEFINED - 0.20 0.50 0.200 -  
USER-DEFINED - 0.40 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.332  
SUBAREA AREA (ACRES) = 4.90 SUBAREA RUNOFF (CFS) = 6.37  
EFFECTIVE AREA (ACRES) = 17.30 AREA-AVERAGED Fm (INCH/HR) = 0.21  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.42  
TOTAL AREA (ACRES) = 17.3 PEAK FLOW RATE (CFS) = 21.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 11.59  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.610  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.40 0.50 0.100 -  
USER-DEFINED - 8.10 0.50 0.350 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.276  
SUBAREA AREA (ACRES) = 11.50 SUBAREA RUNOFF (CFS) = 15.24  
EFFECTIVE AREA (ACRES) = 28.80 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36  
TOTAL AREA (ACRES) = 28.8 PEAK FLOW RATE (CFS) = 37.08

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 476.00 DOWNSTREAM ELEVATION (FEET) = 460.00  
STREET LENGTH (FEET) = 789.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 37.08

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.53  
HALFSTREET FLOOD WIDTH (FEET) = 20.66  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.63  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.46  
STREET FLOW TRAVEL TIME (MIN.) = 2.84 Tc (MIN.) = 14.43  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.352  
SUBAREA AREA (ACRES) = 0.00 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 28.80 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36  
TOTAL AREA (ACRES) = 28.8 PEAK FLOW RATE (CFS) = 37.08  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.53 HALFSTREET FLOOD WIDTH (FEET) = 20.66  
FLOW VELOCITY (FEET/SEC.) = 4.63 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.46  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1983.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.43  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.352  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.00 0.50 0.500 -  
USER-DEFINED - 6.40 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 14.40 SUBAREA RUNOFF (CFS) = 14.29  
EFFECTIVE AREA (ACRES) = 43.20 AREA-AVERAGED Fm (INCH/HR) = 0.20  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41  
TOTAL AREA (ACRES) = 43.2 PEAK FLOW RATE (CFS) = 44.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 460.00 DOWNSTREAM ELEVATION (FEET) = 419.00  
STREET LENGTH (FEET) = 529.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 46.53  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.47  
HALFSTREET FLOOD WIDTH (FEET) = 17.23  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 8.18  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.85  
STREET FLOW TRAVEL TIME (MIN.) = 1.08 Tc (MIN.) = 15.51

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.282  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.20 0.50 0.500 -  
USER-DEFINED - 2.80 0.50 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 3.71  
EFFECTIVE AREA (ACRES) = 47.20 AREA-AVERAGED Fm (INCH/HR) = 0.21  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41  
TOTAL AREA (ACRES) = 47.2 PEAK FLOW RATE (CFS) = 45.64

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.47 HALFSTREET FLOOD WIDTH (FEET) = 17.15  
FLOW VELOCITY (FEET/SEC.) = 8.09 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.79  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 2512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 15.51  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.282  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.50 0.500 -  
USER-DEFINED - 4.10 0.50 0.500 -  
USER-DEFINED - 0.70 0.50 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 5.20  
EFFECTIVE AREA (ACRES) = 52.80 AREA-AVERAGED Fm (INCH/HR) = 0.21  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.42  
TOTAL AREA (ACRES) = 52.8 PEAK FLOW RATE (CFS) = 50.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 15.51  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.282  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.50 0.500 -  
USER-DEFINED - 4.10 0.50 0.500 -  
USER-DEFINED - 2.50 0.50 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 6.96  
EFFECTIVE AREA (ACRES) = 60.30 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43  
TOTAL AREA (ACRES) = 60.3 PEAK FLOW RATE (CFS) = 57.81

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 419.00 DOWNSTREAM ELEVATION (FEET) = 405.00  
STREET LENGTH (FEET) = 174.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 57.81  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.50  
HALFSTREET FLOOD WIDTH (FEET) = 18.71  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 8.71  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 4.32  
STREET FLOW TRAVEL TIME (MIN.) = 0.33 Tc (MIN.) = 15.85

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.269  
SUBAREA AREA (ACRES) = 0.00 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 60.30 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43  
TOTAL AREA (ACRES) = 60.3 PEAK FLOW RATE (CFS) = 57.81  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.50 HALFSTREET FLOOD WIDTH (FEET) = 18.71  
FLOW VELOCITY (FEET/SEC.) = 8.71 DEPTH\*VELOCITY (FT\*FT/SEC.) = 4.32  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 2686.00 FEET.

```

*****
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 372.00
FLOW LENGTH(FEET) = 395.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.43
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 57.81
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 16.14
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 3081.00 FEET.
*****
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.14
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.258
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.50 0.500 -
USER-DEFINED - 1.00 0.50 0.500 -
USER-DEFINED - 1.00 0.50 0.500 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 2.00
EFFECTIVE AREA(ACRES) = 62.50 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 62.5 PEAK FLOW RATE(CFS) = 58.52
*****
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.14
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.258
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.50 0.500 -
USER-DEFINED - 6.90 0.50 0.500 -
USER-DEFINED - 0.20 0.50 0.500 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 9.62
EFFECTIVE AREA(ACRES) = 73.10 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 73.1 PEAK FLOW RATE(CFS) = 68.14
*****
FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31
-----

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 343.00
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.25
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 68.14
PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 16.66
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 3688.00 FEET.
*****
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.66
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.238
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.50 0.500 -
USER-DEFINED - 0.40 0.50 0.400 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.443
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.64
EFFECTIVE AREA(ACRES) = 73.80 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 73.8 PEAK FLOW RATE(CFS) = 68.14
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 16.66
RAINFALL INTENSITY(INCH/HR) = 1.24
AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.44
EFFECTIVE STREAM AREA(ACRES) = 73.80
TOTAL STREAM AREA(ACRES) = 73.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 68.14

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 15.11 19.94 1.115 0.50( 0.19) 0.39 18.2 200.00
2 68.14 16.66 1.238 0.50( 0.22) 0.44 73.8 210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

```

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	82.45	16.66	1.238	0.50( 0.22)	0.43	89.0	210.00
2	75.00	19.94	1.115	0.50( 0.22)	0.43	92.0	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 82.45 Tc(MIN.) = 16.66  
EFFECTIVE AREA(ACRES) = 89.01 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 92.0  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 343.00 DOWNSTREAM(FEET) = 326.50  
FLOW LENGTH(FEET) = 734.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.12  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 82.45  
PIPE TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 17.47  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 219.00 = 4736.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.47  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.208  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	0.30	0.50	0.400	-
USER-DEFINED	-	0.60	0.50	0.100	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 2.44  
EFFECTIVE AREA(ACRES) = 91.91 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 94.9 PEAK FLOW RATE(CFS) = 82.45  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.47

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.208

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.54  
EFFECTIVE AREA(ACRES) = 92.51 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 95.5 PEAK FLOW RATE(CFS) = 82.45  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 326.50 DOWNSTREAM(FEET) = 325.00  
FLOW LENGTH(FEET) = 161.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.83  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 82.45  
PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 17.72  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 220.00 = 4897.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.72  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.199  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.90	0.50	0.500	-
USER-DEFINED	-	3.60	0.50	0.400	-
USER-DEFINED	-	18.40	0.50	0.500	-
USER-DEFINED	-	4.30	0.50	0.400	-
USER-DEFINED	-	0.50	0.50	0.500	-
USER-DEFINED	-	6.90	0.50	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462  
SUBAREA AREA(ACRES) = 38.60 SUBAREA RUNOFF(CFS) = 33.62  
EFFECTIVE AREA(ACRES) = 131.11 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 134.1 PEAK FLOW RATE(CFS) = 115.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 220.00 TO NODE 245.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 315.00  
FLOW LENGTH(FEET) = 1019.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.07  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 115.18  
PIPE TRAVEL TIME(MIN.) = 1.41 Tc(MIN.) = 19.13  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 19.13  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.146  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 0.400 -  
USER-DEFINED - 0.40 0.50 0.100 -  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 0.40 0.50 0.400 -  
USER-DEFINED - 0.40 0.50 0.100 -  
USER-DEFINED - 1.00 0.50 0.400 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379  
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 2.50  
EFFECTIVE AREA(ACRES) = 134.01 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 137.0 PEAK FLOW RATE(CFS) = 115.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 19.13  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.146  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.50 0.100 -  
USER-DEFINED - 0.20 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.264  
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 1.00  
EFFECTIVE AREA(ACRES) = 135.11 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 138.1 PEAK FLOW RATE(CFS) = 115.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.13  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.146  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.50 0.500 -  
USER-DEFINED - 0.30 0.50 0.400 -  
USER-DEFINED - 0.10 0.50 0.100 -  
USER-DEFINED - 0.30 0.50 0.500 -  
USER-DEFINED - 1.40 0.50 0.400 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.434  
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 2.67  
EFFECTIVE AREA(ACRES) = 138.31 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 141.3 PEAK FLOW RATE(CFS) = 115.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 10  
-----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 220.50 TO NODE 221.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 251.00  
ELEVATION DATA: UPSTREAM(FEET) = 551.00 DOWNSTREAM(FEET) = 547.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.785  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.793  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
RESIDENTIAL  
"1 DWELLING/ACRE" - 3.10 0.50 0.200 56 9.79  
RESIDENTIAL  
"1 DWELLING/ACRE" - 3.10 0.50 0.100 56 9.79  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.150  
SUBAREA RUNOFF(CFS) = 9.58  
TOTAL AREA(ACRES) = 6.20 PEAK FLOW RATE(CFS) = 9.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 542.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0130  
CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.646  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.50 0.200 -  
USER-DEFINED - 0.10 0.50 0.200 -  
USER-DEFINED - 3.70 0.50 0.100 -  
USER-DEFINED - 0.30 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.163  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.90  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.53  
AVERAGE FLOW DEPTH (FEET) = 0.27 TRAVEL TIME (MIN.) = 1.42  
Tc (MIN.) = 11.20  
SUBAREA AREA (ACRES) = 4.70 SUBAREA RUNOFF (CFS) = 6.62  
EFFECTIVE AREA (ACRES) = 10.90 AREA-AVERAGED Fm (INCH/HR) = 0.08  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.16  
TOTAL AREA (ACRES) = 10.9 PEAK FLOW RATE (CFS) = 15.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.30 FLOW VELOCITY (FEET/SEC.) = 4.83  
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 222.00 = 637.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 542.00 DOWNSTREAM ELEVATION (FEET) = 531.00  
STREET LENGTH (FEET) = 1146.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.97  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.52  
HALFSTREET FLOOD WIDTH (FEET) = 20.12  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.15  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.64  
STREET FLOW TRAVEL TIME (MIN.) = 6.07 Tc (MIN.) = 17.27

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.216  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 11.50 0.50 0.200 -  
USER-DEFINED - 2.90 0.50 0.200 -  
USER-DEFINED - 0.70 0.50 0.100 -  
USER-DEFINED - 2.60 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.292  
SUBAREA AREA (ACRES) = 17.70 SUBAREA RUNOFF (CFS) = 17.04  
EFFECTIVE AREA (ACRES) = 28.60 AREA-AVERAGED Fm (INCH/HR) = 0.12  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24  
TOTAL AREA (ACRES) = 28.6 PEAK FLOW RATE (CFS) = 28.20

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.55 HALFSTREET FLOOD WIDTH (FEET) = 21.45  
FLOW VELOCITY (FEET/SEC.) = 3.28 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.79  
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 223.00 = 1783.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 62

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 531.00 DOWNSTREAM ELEVATION (FEET) = 520.00  
STREET LENGTH (FEET) = 702.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 33.72  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.54  
HALFSTREET FLOOD WIDTH (FEET) = 20.90  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.12  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.21  
STREET FLOW TRAVEL TIME (MIN.) = 2.84 Tc (MIN.) = 20.11

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.110  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.50 0.200 -  
USER-DEFINED - 0.30 0.50 0.100 -  
USER-DEFINED - 6.40 0.50 0.200 -  
USER-DEFINED - 3.70 0.50 0.100 -  
USER-DEFINED - 0.70 0.50 0.350 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.175  
SUBAREA AREA (ACRES) = 12.00 SUBAREA RUNOFF (CFS) = 11.04  
EFFECTIVE AREA (ACRES) = 40.60 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.22  
TOTAL AREA (ACRES) = 40.6 PEAK FLOW RATE (CFS) = 36.52

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.55 HALFSTREET FLOOD WIDTH (FEET) = 21.60  
FLOW VELOCITY (FEET/SEC.) = 4.19 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.30  
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 224.00 = 2485.00 FEET.

```

*****
FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 463.00
FLOW LENGTH(FEET) = 1760.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.99
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 36.52
PIPE TRAVEL TIME(MIN.) = 2.10 Tc(MIN.) = 22.21
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 225.00 = 4245.00 FEET.

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*****
FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.21
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.051
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.20 0.50 0.200 -
USER-DEFINED - 0.10 0.50 0.500 -
USER-DEFINED - 0.30 0.50 0.350 -
USER-DEFINED - 6.80 0.50 0.200 -
USER-DEFINED - 0.10 0.50 0.500 -
USER-DEFINED - 2.00 0.50 0.350 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.235
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 9.66
EFFECTIVE AREA(ACRES) = 52.10 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 52.1 PEAK FLOW RATE(CFS) = 44.01

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```

*****
FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.21
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.051
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.40 0.50 0.500 -
USER-DEFINED - 0.90 0.50 0.350 -
USER-DEFINED - 5.20 0.50 0.500 -
USER-DEFINED - 0.80 0.50 0.350 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.481
SUBAREA AREA(ACRES) = 13.30 SUBAREA RUNOFF(CFS) = 9.70
EFFECTIVE AREA(ACRES) = 65.40 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 65.4 PEAK FLOW RATE(CFS) = 53.71

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*****
FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 425.00
FLOW LENGTH(FEET) = 639.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.77
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 53.71
PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 22.75
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 226.00 = 4884.00 FEET.

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*****
FLOW PROCESS FROM NODE 226.00 TO NODE 226.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.75
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.035
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.90 0.50 0.200 -
USER-DEFINED - 2.90 0.50 0.500 -
USER-DEFINED - 6.30 0.50 0.200 -
USER-DEFINED - 6.00 0.50 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 14.04
EFFECTIVE AREA(ACRES) = 83.50 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.29
TOTAL AREA(ACRES) = 83.5 PEAK FLOW RATE(CFS) = 66.85

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```

*****
FLOW PROCESS FROM NODE 226.00 TO NODE 243.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 653.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.14
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 66.85
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 23.32
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 243.00 = 5537.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 23.32

```



\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.019  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.90 0.50 0.200 -  
 USER-DEFINED - 1.60 0.50 0.500 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
 SUBAREA AREA (ACRES) = 4.50 SUBAREA RUNOFF (CFS) = 3.51  
 EFFECTIVE AREA (ACRES) = 88.00 AREA-AVERAGED Fm (INCH/HR) = 0.15  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA (ACRES) = 88.0 PEAK FLOW RATE (CFS) = 69.15

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 23.32  
 RAINFALL INTENSITY (INCH/HR) = 1.02  
 AREA-AVERAGED Fm (INCH/HR) = 0.15  
 AREA-AVERAGED Fp (INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.29  
 EFFECTIVE STREAM AREA (ACRES) = 88.00  
 TOTAL STREAM AREA (ACRES) = 88.00  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 69.15

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 547.50

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.751  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.974  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 APARTMENTS - 0.60 0.50 0.200 56 8.75  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF (CFS) = 1.01  
 TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 1.01

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 547.50 DOWNSTREAM (FEET) = 541.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 802.00 CHANNEL SLOPE = 0.0081

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 3.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.593  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.20 0.50 0.200 -  
 USER-DEFINED - 5.90 0.50 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.27  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.40  
 AVERAGE FLOW DEPTH (FEET) = 0.77 TRAVEL TIME (MIN.) = 3.04  
 Tc (MIN.) = 11.79  
 SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 8.46  
 EFFECTIVE AREA (ACRES) = 6.70 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA (ACRES) = 6.7 PEAK FLOW RATE (CFS) = 9.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.96 FLOW VELOCITY (FEET/SEC.) = 5.06  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1132.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 541.00 DOWNSTREAM (FEET) = 533.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 849.00 CHANNEL SLOPE = 0.0094  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 5.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.390  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 14.90 0.50 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.28  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.34  
 AVERAGE FLOW DEPTH (FEET) = 1.20 TRAVEL TIME (MIN.) = 2.23  
 Tc (MIN.) = 14.02  
 SUBAREA AREA (ACRES) = 14.90 SUBAREA RUNOFF (CFS) = 17.97  
 EFFECTIVE AREA (ACRES) = 21.60 AREA-AVERAGED Fm (INCH/HR) = 0.05  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 21.6 PEAK FLOW RATE (CFS) = 26.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.37 FLOW VELOCITY (FEET/SEC.) = 6.93  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1981.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.02  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.390  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.50 0.400 -  
 USER-DEFINED - 0.20 0.50 0.200 -  
 USER-DEFINED - 1.80 0.50 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124  
 SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 2.51  
 EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 28.53

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.02  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.390  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.50 0.100 -  
 USER-DEFINED - 0.10 0.50 0.400 -  
 USER-DEFINED - 1.30 0.50 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.117  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 2.16  
 EFFECTIVE AREA(ACRES) = 25.50 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 25.5 PEAK FLOW RATE(CFS) = 30.68

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 537.00 DOWNSTREAM(FEET) = 510.00  
 FLOW LENGTH(FEET) = 513.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.20  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 30.68  
 PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 14.55  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2494.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.55  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.342  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 9.40 0.50 0.400 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 9.66  
 EFFECTIVE AREA(ACRES) = 34.90 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.19  
 TOTAL AREA(ACRES) = 34.9 PEAK FLOW RATE(CFS) = 39.25

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.55  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.342  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.70 0.50 0.200 -  
 USER-DEFINED - 2.50 0.50 0.400 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356  
 SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 3.35  
 EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.20  
 TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 42.60

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 478.00  
 FLOW LENGTH(FEET) = 474.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.55  
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 42.60  
 PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 14.95  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 2968.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.95  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.305  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.70 0.50 0.200 -  
 USER-DEFINED - 1.60 0.50 0.400 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297

SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 3.44  
EFFECTIVE AREA (ACRES) = 41.40 AREA-AVERAGED Fm (INCH/HR) = 0.10  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.21  
TOTAL AREA (ACRES) = 41.4 PEAK FLOW RATE (CFS) = 44.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	478.00	DOWNSTREAM (FEET) =	471.00
FLOW LENGTH (FEET) =	473.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	30.0 INCH PIPE IS	23.2 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	10.97		
ESTIMATED PIPE DIAMETER (INCH) =	30.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	44.78		
PIPE TRAVEL TIME (MIN.) =	0.72	Tc (MIN.) =	15.67
LONGEST FLOWPATH FROM NODE	230.00 TO NODE	236.00 =	3441.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 15.67  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.276  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.50	0.200	-
USER-DEFINED	-	7.10	0.50	0.400	-
USER-DEFINED	-	2.70	0.50	0.200	-
USER-DEFINED	-	1.10	0.50	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.307  
SUBAREA AREA (ACRES) = 12.30 SUBAREA RUNOFF (CFS) = 12.43  
EFFECTIVE AREA (ACRES) = 53.70 AREA-AVERAGED Fm (INCH/HR) = 0.12  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.23  
TOTAL AREA (ACRES) = 53.7 PEAK FLOW RATE (CFS) = 56.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 15.67  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.276  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.50	0.200	-
USER-DEFINED	-	5.40	0.50	0.500	-
USER-DEFINED	-	1.00	0.50	0.400	-
USER-DEFINED	-	0.60	0.50	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.378  
SUBAREA AREA (ACRES) = 9.90 SUBAREA RUNOFF (CFS) = 9.68

EFFECTIVE AREA (ACRES) = 63.60 AREA-AVERAGED Fm (INCH/HR) = 0.13  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.25  
TOTAL AREA (ACRES) = 63.6 PEAK FLOW RATE (CFS) = 65.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	471.00	DOWNSTREAM (FEET) =	468.00
FLOW LENGTH (FEET) =	283.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	39.0 INCH PIPE IS	26.8 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	10.84		
ESTIMATED PIPE DIAMETER (INCH) =	39.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	65.78		
PIPE TRAVEL TIME (MIN.) =	0.44	Tc (MIN.) =	16.10
LONGEST FLOWPATH FROM NODE	230.00 TO NODE	237.00 =	3724.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.10  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.259  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.10	0.50	0.200	-
USER-DEFINED	-	0.60	0.50	0.400	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.218  
SUBAREA AREA (ACRES) = 6.70 SUBAREA RUNOFF (CFS) = 6.94  
EFFECTIVE AREA (ACRES) = 70.30 AREA-AVERAGED Fm (INCH/HR) = 0.12  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.25  
TOTAL AREA (ACRES) = 70.3 PEAK FLOW RATE (CFS) = 71.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	468.00	DOWNSTREAM (FEET) =	461.00
FLOW LENGTH (FEET) =	698.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	39.0 INCH PIPE IS	29.3 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	10.72		
ESTIMATED PIPE DIAMETER (INCH) =	39.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	71.78		
PIPE TRAVEL TIME (MIN.) =	1.08	Tc (MIN.) =	17.19
LONGEST FLOWPATH FROM NODE	230.00 TO NODE	238.00 =	4422.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.19  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.219  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.40	0.50	0.200	-
USER-DEFINED	-	0.60	0.50	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.220  
 SUBAREA AREA(ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 8.98  
 EFFECTIVE AREA(ACRES) = 79.30 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 79.3 PEAK FLOW RATE(CFS) = 78.18

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.19  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.219  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.50	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 2.11  
 EFFECTIVE AREA(ACRES) = 81.40 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 81.4 PEAK FLOW RATE(CFS) = 80.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 461.00 DOWNSTREAM(FEET) = 440.00  
 FLOW LENGTH(FEET) = 582.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.99  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 80.29  
 PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 17.73  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 5004.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.73  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.198  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.00	0.50	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 4.94  
 EFFECTIVE AREA(ACRES) = 86.40 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 86.4 PEAK FLOW RATE(CFS) = 83.75

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 418.00  
 FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.60  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 83.75  
 PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 18.34  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 5654.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.34  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.175  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.30	0.50	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA(ACRES) = 5.30 SUBAREA RUNOFF(CFS) = 5.13  
 EFFECTIVE AREA(ACRES) = 91.70 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 91.7 PEAK FLOW RATE(CFS) = 87.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.34  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.175  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.50	0.200	-
USER-DEFINED	-	0.20	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.36  
 EFFECTIVE AREA(ACRES) = 93.10 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 93.1 PEAK FLOW RATE(CFS) = 88.45

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*****
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.34
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.175
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.20 0.50 0.200 -
USER-DEFINED - 0.70 0.50 0.600 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 1.71
EFFECTIVE AREA(ACRES) = 95.00 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 95.0 PEAK FLOW RATE(CFS) = 90.16

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*****
FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 418.00 DOWNSTREAM(FEET) = 404.00
FLOW LENGTH(FEET) = 1279.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.75
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.16
PIPE TRAVEL TIME(MIN.) = 1.81 Tc(MIN.) = 20.16
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 241.00 = 6933.00 FEET.

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*****
FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.16
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.109
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.10 0.50 0.200 -
USER-DEFINED - 1.20 0.50 0.100 -
USER-DEFINED - 6.30 0.50 0.850 -
USER-DEFINED - 4.60 0.50 0.600 -
USER-DEFINED - 1.60 0.50 0.200 -
USER-DEFINED - 4.00 0.50 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 18.80 SUBAREA RUNOFF(CFS) = 14.63
EFFECTIVE AREA(ACRES) = 113.80 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 113.8 PEAK FLOW RATE(CFS) = 99.08

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*****
FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.16
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.109
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.90 0.50 0.850 -
USER-DEFINED - 10.80 0.50 0.600 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.666
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 10.26
EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 109.34

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*****
FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 403.00
FLOW LENGTH(FEET) = 66.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.87
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 109.34
PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 20.24
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 6999.00 FEET.

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*****
FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.24
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.106
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.50 0.200 -
USER-DEFINED - 16.40 0.50 0.200 -
USER-DEFINED - 1.30 0.50 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.193
SUBAREA AREA(ACRES) = 19.10 SUBAREA RUNOFF(CFS) = 17.36
EFFECTIVE AREA(ACRES) = 147.60 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 147.6 PEAK FLOW RATE(CFS) = 126.43

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*****
FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

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>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 1270.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 39.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.80
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 126.43
PIPE TRAVEL TIME(MIN.) = 1.96 Tc(MIN.) = 22.20
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.20
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.051
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.50 0.200 -
USER-DEFINED - 2.00 0.50 0.850 -
USER-DEFINED - 2.80 0.50 0.200 -
USER-DEFINED - 1.50 0.50 0.100 -
USER-DEFINED - 0.10 0.50 0.350 -
USER-DEFINED - 1.10 0.50 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.421
SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 6.43
EFFECTIVE AREA(ACRES) = 156.10 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 156.1 PEAK FLOW RATE(CFS) = 126.43
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 22.20
RAINFALL INTENSITY(INCH/HR) = 1.05
AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA(ACRES) = 156.10
TOTAL STREAM AREA(ACRES) = 156.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 126.43

\*\* CONFLUENCE DATA \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 69.15 23.32 1.019 0.50( 0.15) 0.29 88.0 220.50
2 126.43 22.20 1.051 0.50( 0.16) 0.32 156.1 230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 194.64 22.20 1.051 0.50( 0.15) 0.31 239.9 230.00
2 191.11 23.32 1.019 0.50( 0.15) 0.31 244.1 220.50

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 194.64 Tc(MIN.) = 22.20
EFFECTIVE AREA(ACRES) = 239.86 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 244.1
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 243.00 TO NODE 244.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 394.00 DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 849.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.15
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 194.64
PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 22.72
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 244.00 = 9118.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 244.00 TO NODE 244.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.72
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.50 0.200 -
USER-DEFINED - 1.70 0.50 0.500 -
USER-DEFINED - 0.30 0.50 0.850 -
USER-DEFINED - 0.80 0.50 0.500 -
USER-DEFINED - 0.10 0.50 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.537
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 2.07
EFFECTIVE AREA(ACRES) = 242.86 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 247.1 PEAK FLOW RATE(CFS) = 194.64
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 244.00 TO NODE 245.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 315.00
FLOW LENGTH(FEET) = 777.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.20
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 194.64
PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 23.33
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.33
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.019
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.50 0.500 -
USER-DEFINED - 0.20 0.50 0.850 -
USER-DEFINED - 0.20 0.50 0.500 -
USER-DEFINED - 0.10 0.50 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631
SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 0.51
EFFECTIVE AREA(ACRES) = 243.66 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 247.9 PEAK FLOW RATE(CFS) = 194.64
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 194.64 23.33 1.019 0.50( 0.16) 0.31 243.7 230.00
2 191.11 24.45 0.987 0.50( 0.16) 0.31 247.9 220.50
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 115.18 19.13 1.146 0.50( 0.22) 0.44 138.3 210.00
2 104.55 22.50 1.043 0.50( 0.22) 0.44 141.3 200.00
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 298.19 19.13 1.146 0.50( 0.18) 0.36 338.1 210.00
2 297.35 22.50 1.043 0.50( 0.18) 0.36 376.3 200.00

3 296.21 23.33 1.019 0.50( 0.18) 0.36 385.0 230.00
4 288.64 24.45 0.987 0.50( 0.18) 0.36 389.2 220.50
TOTAL AREA(ACRES) = 389.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 298.19 Tc(MIN.) = 19.129
EFFECTIVE AREA(ACRES) = 338.11 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 389.2
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 3 <<<<

\*\*\*\*\*
FLOW PROCESS FROM NODE 245.00 TO NODE 246.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 306.00
FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 45.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.68
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 298.19
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 19.71
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 246.00 = 10514.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.71
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.124
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.90 0.50 0.500 -
USER-DEFINED - 0.30 0.50 0.400 -
USER-DEFINED - 2.50 0.50 0.500 -
USER-DEFINED - 0.70 0.50 0.400 -
USER-DEFINED - 9.10 0.50 0.350 -
USER-DEFINED - 2.80 0.50 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.410
SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 13.48
EFFECTIVE AREA(ACRES) = 354.41 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 405.5 PEAK FLOW RATE(CFS) = 299.96

\*\*\*\*\*
FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.71
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.124
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.60 0.50 0.400 -
USER-DEFINED - 7.40 0.50 0.350 -
USER-DEFINED - 0.30 0.50 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.375
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 7.84
EFFECTIVE AREA(ACRES) = 363.71 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 414.8 PEAK FLOW RATE(CFS) = 307.80

\*\*\*\*\*
FLOW PROCESS FROM NODE 246.00 TO NODE 247.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 306.00 DOWNSTREAM(FEET) = 300.00
FLOW LENGTH(FEET) = 185.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.96
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 307.80
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 19.84
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 247.00 = 10699.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.84
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.119
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.50 0.400 -
USER-DEFINED - 0.30 0.50 0.100 -
USER-DEFINED - 0.10 0.50 1.000 -
USER-DEFINED - 0.10 0.50 0.850 -
USER-DEFINED - 0.10 0.50 0.500 -
USER-DEFINED - 1.30 0.50 0.400 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.413
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 1.64
EFFECTIVE AREA(ACRES) = 365.71 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 416.8 PEAK FLOW RATE(CFS) = 307.86

\*\*\*\*\*
FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.84
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.119
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.90 0.50 0.100 -
USER-DEFINED - 0.40 0.50 1.000 -
USER-DEFINED - 0.80 0.50 0.400 -
USER-DEFINED - 0.40 0.50 0.100 -
USER-DEFINED - 0.10 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.365
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 2.19
EFFECTIVE AREA(ACRES) = 368.31 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 419.4 PEAK FLOW RATE(CFS) = 310.05

\*\*\*\*\*
FLOW PROCESS FROM NODE 247.00 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 271.00
FLOW LENGTH(FEET) = 859.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.41
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 310.05
PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 20.43
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.43
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.101
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.50 0.400 -
USER-DEFINED - 0.30 0.50 0.100 -
USER-DEFINED - 0.10 0.50 1.000 -
USER-DEFINED - 2.60 0.50 0.400 -
USER-DEFINED - 1.00 0.50 0.100 -
USER-DEFINED - 0.20 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356
SUBAREA AREA(ACRES) = 4.80 SUBAREA RUNOFF(CFS) = 3.99
EFFECTIVE AREA(ACRES) = 373.11 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 424.2 PEAK FLOW RATE(CFS) = 310.05
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE



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*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.43
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.101
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50     0.50     0.400   -
USER-DEFINED        -         0.30     0.50     0.100   -
USER-DEFINED        -         0.10     0.50     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367
SUBAREA AREA(ACRES) = 0.90   SUBAREA RUNOFF(CFS) = 0.74
EFFECTIVE AREA(ACRES) = 374.01   AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 425.1   PEAK FLOW RATE(CFS) = 310.05
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.43
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.101
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.50     0.500   -
USER-DEFINED        -         0.70     0.50     0.400   -
USER-DEFINED        -         2.20     0.50     0.500   -
USER-DEFINED        -         1.80     0.50     0.400   -
USER-DEFINED        -         0.20     0.50     0.350   -
USER-DEFINED        -         3.20     0.50     0.500   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.466
SUBAREA AREA(ACRES) = 8.20   SUBAREA RUNOFF(CFS) = 6.41
EFFECTIVE AREA(ACRES) = 382.21   AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 433.3   PEAK FLOW RATE(CFS) = 315.20

*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.43
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.101
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         5.70     0.50     0.400   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 5.70   SUBAREA RUNOFF(CFS) = 4.62

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EFFECTIVE AREA(ACRES) = 387.91   AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 439.0   PEAK FLOW RATE(CFS) = 319.83

*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.43
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.101
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         6.40     0.50     1.000   -
USER-DEFINED        -         1.40     0.50     1.000   -
USER-DEFINED        -         0.60     0.50     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 8.40   SUBAREA RUNOFF(CFS) = 4.54
EFFECTIVE AREA(ACRES) = 396.31   AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 447.4   PEAK FLOW RATE(CFS) = 324.37

*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====
*****
FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 413.04   DOWNSTREAM(FEET) = 405.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.928
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.293
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS   Tc
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
CONDOMINIUMS        -         0.20     0.50     0.350   56   7.70
RESIDENTIAL
"11+ DWELLINGS/ACRE" -         0.10     0.50     0.200   56   6.93
CONDOMINIUMS        -         0.10     0.50     0.350   56   7.70
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.312
SUBAREA RUNOFF(CFS) = 0.77
TOTAL AREA(ACRES) = 0.40   PEAK FLOW RATE(CFS) = 0.77

*****
FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

```

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 405.00 DOWNSTREAM ELEVATION(FEET) = 385.00  
STREET LENGTH(FEET) = 587.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.81

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.25  
HALFSTREET FLOOD WIDTH(FEET) = 5.03  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.35  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.84  
STREET FLOW TRAVEL TIME(MIN.) = 2.92 Tc(MIN.) = 9.85

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.781

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	0.350	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	0.200	-
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	0.40	0.50	0.350	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.224  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 4.06  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 4.64

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 7.16  
FLOW VELOCITY(FEET/SEC.) = 3.56 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.03  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 917.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 385.00 DOWNSTREAM(FEET) = 378.50  
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.20  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 4.64  
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 10.14

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1079.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.14  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.742  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN  
USER-DEFINED - 1.10 0.50 0.100 -  
USER-DEFINED - 1.30 0.50 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 3.65  
EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.09  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 8.19

\*\*\*\*\*  
FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 378.50 DOWNSTREAM(FEET) = 348.50  
FLOW LENGTH(FEET) = 637.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.39  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 8.19  
PIPE TRAVEL TIME(MIN.) = 0.93 Tc(MIN.) = 11.08  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 1716.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.08  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.657  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN  
USER-DEFINED - 0.60 0.50 0.500 -  
USER-DEFINED - 1.70 0.50 0.100 -  
USER-DEFINED - 1.00 0.50 0.350 -  
USER-DEFINED - 0.10 0.50 0.500 -  
USER-DEFINED - 0.70 0.50 0.100 -  
USER-DEFINED - 0.40 0.50 0.350 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.240  
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 6.23  
EFFECTIVE AREA(ACRES) = 10.00 AREA-AVERAGED Fm(INCH/HR) = 0.10  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.20

TOTAL AREA (ACRES) = 10.0 PEAK FLOW RATE (CFS) = 13.99

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 348.50 DOWNSTREAM(FEET) = 306.00
FLOW LENGTH(FEET) = 944.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.79
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.99
PIPE TRAVEL TIME(MIN.) = 1.23 Tc(MIN.) = 12.31
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.31
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.546
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.30 0.50 0.500 -
USER-DEFINED - 0.40 0.50 0.400 -
USER-DEFINED - 0.20 0.50 0.100 -
USER-DEFINED - 1.50 0.50 0.500 -
USER-DEFINED - 1.90 0.50 0.400 -
USER-DEFINED - 2.00 0.50 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 9.01
EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.27
TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 22.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.31
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.546
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.40 0.50 0.200 -
USER-DEFINED - 0.10 0.50 0.100 -
USER-DEFINED - 6.70 0.50 0.200 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.199
SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 14.57
EFFECTIVE AREA(ACRES) = 28.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24

TOTAL AREA (ACRES) = 28.5 PEAK FLOW RATE (CFS) = 36.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.31
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.546
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.10 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 2.92
EFFECTIVE AREA(ACRES) = 31.60 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 39.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.31
RAINFALL INTENSITY(INCH/HR) = 1.55
AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 31.60
TOTAL STREAM AREA(ACRES) = 31.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 39.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 400.00 TO NODE 420.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
INITIAL SUBAREA FLOW-LENGTH(FEET) = 300.40
ELEVATION DATA: UPSTREAM(FEET) = 312.80 DOWNSTREAM(FEET) = 310.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.115
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.085
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL - 0.50 0.50 0.100 56 8.11
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 0.92
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.92

\*\*\*\*\*

FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 307.00
STREET LENGTH(FEET) = 266.50 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 67.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 62.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.37
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 6.97
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.26
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.64
STREET FLOW TRAVEL TIME(MIN.) = 1.97 Tc(MIN.) = 10.08

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.748

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.50 0.100 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.92

EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.05

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 1.68

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.88

FLOW VELOCITY(FEET/SEC.) = 2.33 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.69

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.00 = 566.90 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 421.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 307.00 DOWNSTREAM(FEET) = 305.50
FLOW LENGTH(FEET) = 105.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 4.76

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 1.68

PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 10.45

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.10 = 671.90 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 10.45

RAINFALL INTENSITY(INCH/HR) = 1.71

AREA-AVERAGED Fm(INCH/HR) = 0.05

AREA-AVERAGED Fp(INCH/HR) = 0.50

AREA-AVERAGED Ap = 0.10

EFFECTIVE STREAM AREA(ACRES) = 1.10

TOTAL STREAM AREA(ACRES) = 1.10

PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.68

\*\* CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 39.49 12.31 1.546 0.50( 0.16) 0.31 31.6 300.00
2 1.68 10.45 1.714 0.50( 0.05) 0.10 1.1 400.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 39.28 10.45 1.714 0.50( 0.15) 0.31 27.9 400.00
2 41.00 12.31 1.546 0.50( 0.15) 0.31 32.7 300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 41.00 Tc(MIN.) = 12.31

EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31

TOTAL AREA(ACRES) = 32.7

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 421.10 TO NODE 426.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 305.50 DOWNSTREAM(FEET) = 301.00

FLOW LENGTH(FEET) = 261.40 MANNING'S N = 0.013

DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.56

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 41.00

PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 12.68

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.10 = 2921.40 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 426.10 TO NODE 426.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN.) = 12.68
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.511
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.20     0.50     0.400    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.20      SUBAREA RUNOFF(CFS) = 0.24
EFFECTIVE AREA(ACRES) = 32.90   AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.9      PEAK FLOW RATE(CFS) = 41.00
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 426.10 TO NODE 426.20 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 289.00
FLOW LENGTH(FEET) = 448.56 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.57
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 41.00
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 13.23
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.20 = 3369.96 FEET.

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*****
FLOW PROCESS FROM NODE 426.20 TO NODE 426.20 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 13.23
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.461
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.20     0.50     0.400    -
USER-DEFINED         -        0.30     0.50     0.400    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.50      SUBAREA RUNOFF(CFS) = 0.57
EFFECTIVE AREA(ACRES) = 33.40   AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 33.4      PEAK FLOW RATE(CFS) = 41.00
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 426.20 TO NODE 426.30 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 289.00 DOWNSTREAM(FEET) = 282.00
FLOW LENGTH(FEET) = 260.45 MANNING'S N = 0.013

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```

DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.60
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 41.00
PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 13.55
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.30 = 3630.41 FEET.

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*****
FLOW PROCESS FROM NODE 426.30 TO NODE 426.30 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 13.55
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.432
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.30     0.50     0.400    -
USER-DEFINED         -        0.80     0.50     0.400    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 1.10      SUBAREA RUNOFF(CFS) = 1.22
EFFECTIVE AREA(ACRES) = 34.50   AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 34.5      PEAK FLOW RATE(CFS) = 41.00
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 426.30 TO NODE 248.00 IS CODE = 31
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```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 271.00
FLOW LENGTH(FEET) = 411.44 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.57
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 41.00
PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 14.06
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

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*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1
-----

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

```

```

=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 14.06
RAINFALL INTENSITY(INCH/HR) = 1.39
AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 34.50
TOTAL STREAM AREA(ACRES) = 34.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 41.00

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*****
FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 233.60
ELEVATION DATA: UPSTREAM (FEET) = 306.50 DOWNSTREAM (FEET) = 301.80

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.882
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.476
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS   Tc
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          -         0.20     0.50     0.100   56   5.88
COMMERCIAL          -         0.20     0.50     0.100   56   5.88
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 0.87
TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 0.87

*****
FLOW PROCESS FROM NODE 426.00 TO NODE 427.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====
UPSTREAM ELEVATION (FEET) = 301.80 DOWNSTREAM ELEVATION (FEET) = 294.00
STREET LENGTH (FEET) = 478.70 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 51.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.46
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.28
HALFSTREET FLOOD WIDTH (FEET) = 6.94
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.41
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.68
STREET FLOW TRAVEL TIME (MIN.) = 3.31 Tc (MIN.) = 9.19
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.896
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.50     0.100   -
USER-DEFINED        -         0.50     0.50     0.100   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.16
EFFECTIVE AREA (ACRES) = 1.10 AREA-AVERAGED Fm (INCH/HR) = 0.05

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AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 1.83

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.30 HALFSTREET FLOOD WIDTH (FEET) = 7.94
FLOW VELOCITY (FEET/SEC.) = 2.50 DEPTH*VELOCITY (FT*FT/SEC.) = 0.75
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 427.00 = 712.30 FEET.

*****
FLOW PROCESS FROM NODE 427.00 TO NODE 428.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====
UPSTREAM ELEVATION (FEET) = 294.00 DOWNSTREAM ELEVATION (FEET) = 286.00
STREET LENGTH (FEET) = 300.80 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 55.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.20
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.29
HALFSTREET FLOOD WIDTH (FEET) = 7.63
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.18
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.93
STREET FLOW TRAVEL TIME (MIN.) = 1.58 Tc (MIN.) = 10.77
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.685
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.50     0.100   -
USER-DEFINED        -         0.40     0.50     0.100   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.50 SUBAREA RUNOFF (CFS) = 0.74
EFFECTIVE AREA (ACRES) = 1.60 AREA-AVERAGED Fm (INCH/HR) = 0.05
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 1.6 PEAK FLOW RATE (CFS) = 2.35

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.30 HALFSTREET FLOOD WIDTH (FEET) = 7.95
FLOW VELOCITY (FEET/SEC.) = 3.21 DEPTH*VELOCITY (FT*FT/SEC.) = 0.96
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 428.00 = 1013.10 FEET.

*****
FLOW PROCESS FROM NODE 428.00 TO NODE 429.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====

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UPSTREAM ELEVATION(FEET) = 286.00 DOWNSTREAM ELEVATION(FEET) = 276.00  
STREET LENGTH(FEET) = 242.40 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.63

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.29  
HALFSTREET FLOOD WIDTH(FEET) = 7.52  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.89  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.14  
STREET FLOW TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 11.81

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.591

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.55  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 2.77

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.74  
FLOW VELOCITY(FEET/SEC.) = 3.94 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.16  
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 429.00 = 1255.50 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 429.00 TO NODE 429.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.81

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.591

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.400	-
USER-DEFINED	-	1.50	0.50	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 2.50  
EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.25  
TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 5.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 429.00 TO NODE 248.00 IS CODE = 31  
-----

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 273.00  
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.58  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 5.28  
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 12.00  
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 248.00 = 1355.50 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 12.00  
RAINFALL INTENSITY(INCH/HR) = 1.57  
AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.25  
EFFECTIVE STREAM AREA(ACRES) = 4.00  
TOTAL STREAM AREA(ACRES) = 4.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.28

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	39.28	12.21	1.554	0.50( 0.16)	0.31	29.7	400.00
1	41.00	14.06	1.386	0.50( 0.16)	0.31	34.5	300.00
2	5.28	12.00	1.573	0.50( 0.13)	0.25	4.0	425.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	44.41	12.00	1.573	0.50( 0.15)	0.30	33.2	425.00
2	44.49	12.21	1.554	0.50( 0.15)	0.30	33.7	400.00
3	45.60	14.06	1.386	0.50( 0.15)	0.31	38.5	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 45.60 Tc(MIN.) = 14.06  
EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31  
TOTAL AREA(ACRES) = 38.5  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	44.41	12.00	1.573	0.50( 0.15)	0.30	33.2	425.00
2	44.49	12.21	1.554	0.50( 0.15)	0.30	33.7	400.00
3	45.60	14.06	1.386	0.50( 0.15)	0.31	38.5	300.00

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	324.37	20.43	1.101	0.50( 0.19)	0.38	396.3	210.00
2	319.45	23.81	1.006	0.50( 0.19)	0.38	434.5	200.00
3	316.73	24.64	0.982	0.50( 0.19)	0.38	443.2	230.00
4	309.79	25.77	0.957	0.50( 0.19)	0.38	447.4	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	333.96	12.00	1.573	0.50( 0.19)	0.37	266.1	425.00
2	335.04	12.21	1.554	0.50( 0.19)	0.37	270.7	400.00
3	338.92	14.06	1.386	0.50( 0.19)	0.37	311.3	300.00
4	359.41	20.43	1.101	0.50( 0.19)	0.38	434.8	210.00
5	350.97	23.81	1.006	0.50( 0.19)	0.37	473.0	200.00
6	347.39	24.64	0.982	0.50( 0.19)	0.37	481.7	230.00
7	339.51	25.77	0.957	0.50( 0.18)	0.37	485.9	220.50

TOTAL AREA (ACRES) = 485.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 359.41 Tc(MIN.) = 20.428  
EFFECTIVE AREA(ACRES) = 434.81 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.38  
TOTAL AREA (ACRES) = 485.9  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 249.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 261.00  
FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.60  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 359.41  
PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 20.67

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 429.00 TO NODE 430.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 262.70

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.459

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.375

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL AREA GROUP (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	- 0.20	0.50	0.100	56	6.46
COMMERCIAL	- 0.40	0.50	0.100	56	6.46

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF(CFS) = 1.26

TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.26

\*\*\*\*\*

FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 262.70 DOWNSTREAM ELEVATION(FEET) = 258.98  
STREET LENGTH(FEET) = 345.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.75

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.31

HALFSTREET FLOOD WIDTH(FEET) = 8.64

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.12

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.66

STREET FLOW TRAVEL TIME(MIN.) = 2.72 Tc(MIN.) = 9.18

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.898

SUBAREA LOSS RATE DATA(AMC II):



DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.50	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.00  
EFFECTIVE AREA(ACRES) = 1.20 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 2.00

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 9.23  
FLOW VELOCITY(FEET/SEC.) = 2.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.70  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.00 = 675.60 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.00 TO NODE 431.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 258.98 DOWNSTREAM(FEET) = 258.00  
FLOW LENGTH(FEET) = 91.03 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.52  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 2.00  
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 9.52  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.10 = 766.63 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 9.52  
RAINFALL INTENSITY(INCH/HR) = 1.84  
AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 1.20  
TOTAL STREAM AREA(ACRES) = 1.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 410.00 TO NODE 440.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 299.70  
ELEVATION DATA: UPSTREAM(FEET) = 312.69 DOWNSTREAM(FEET) = 310.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.40	0.50	0.100	56	8.20

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 0.73  
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 0.73

\*\*\*\*\*  
FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 306.50  
STREET LENGTH(FEET) = 299.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.03  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.26  
HALFSTREET FLOOD WIDTH(FEET) = 5.70  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.18  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.57  
STREET FLOW TRAVEL TIME(MIN.) = 2.29 Tc(MIN.) = 10.48  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.711

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.60  
EFFECTIVE AREA(ACRES) = 0.80 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 1.20

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 6.34  
FLOW VELOCITY(FEET/SEC.) = 2.23 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.61  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 441.00 = 598.70 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 61  
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 306.50  DOWNSTREAM ELEVATION(FEET) = 299.00
STREET LENGTH(FEET) = 341.60  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.59
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 6.64
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.79
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.77
STREET FLOW TRAVEL TIME(MIN.) = 2.04  Tc(MIN.) = 12.52
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.526
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	0.40	0.50	0.100	-

```

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.60  SUBAREA RUNOFF(CFS) = 0.80
EFFECTIVE AREA(ACRES) = 1.40  AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.4  PEAK FLOW RATE(CFS) = 1.86

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29  HALFSTREET FLOOD WIDTH(FEET) = 7.34
FLOW VELOCITY(FEET/SEC.) = 2.85  DEPTH*VELOCITY(FT*FT/SEC.) = 0.82
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 442.00 = 940.30 FEET.

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*****
FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 61
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 299.00  DOWNSTREAM ELEVATION(FEET) = 288.50
STREET LENGTH(FEET) = 390.10  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

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Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.21
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.29
HALFSTREET FLOOD WIDTH(FEET) = 7.64
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.19
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.94
STREET FLOW TRAVEL TIME(MIN.) = 2.04  Tc(MIN.) = 14.56
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.341
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	0.100	-

```

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.60  SUBAREA RUNOFF(CFS) = 0.70
EFFECTIVE AREA(ACRES) = 2.00  AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 2.0  PEAK FLOW RATE(CFS) = 2.32

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30  HALFSTREET FLOOD WIDTH(FEET) = 7.84
FLOW VELOCITY(FEET/SEC.) = 3.24  DEPTH*VELOCITY(FT*FT/SEC.) = 0.96
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 443.00 = 1330.40 FEET.

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*****
FLOW PROCESS FROM NODE 443.00 TO NODE 444.00 IS CODE = 61
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 288.50  DOWNSTREAM ELEVATION(FEET) = 281.00
STREET LENGTH(FEET) = 272.60  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.54
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.30
HALFSTREET FLOOD WIDTH(FEET) = 8.24
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.29
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.00
STREET FLOW TRAVEL TIME(MIN.) = 1.38  Tc(MIN.) = 15.94
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.266
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.44  
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 2.63

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 8.34  
FLOW VELOCITY(FEET/SEC.) = 3.34 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.02  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 444.00 = 1603.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 444.00 TO NODE 445.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 281.00 DOWNSTREAM ELEVATION(FEET) = 268.10  
STREET LENGTH(FEET) = 462.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.98  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 8.93  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.41  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.08  
STREET FLOW TRAVEL TIME(MIN.) = 2.26 Tc(MIN.) = 18.20  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.181

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.71  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 3.15

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 9.23  
FLOW VELOCITY(FEET/SEC.) = 3.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.10  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 445.00 = 2065.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 445.00 TO NODE 446.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 268.10 DOWNSTREAM ELEVATION(FEET) = 257.00  
STREET LENGTH(FEET) = 532.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.62  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 10.53  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.18  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.09  
STREET FLOW TRAVEL TIME(MIN.) = 2.79 Tc(MIN.) = 20.99  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.085

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 0.100 -  
USER-DEFINED - 0.60 0.50 0.100 -  
USER-DEFINED - 0.30 0.50 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 0.93  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 3.82

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.85  
FLOW VELOCITY(FEET/SEC.) = 3.19 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.11  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 446.00 = 2598.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 446.00 TO NODE 431.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 257.00 DOWNSTREAM(FEET) = 256.50  
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.07  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 3.82  
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 21.40  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

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*****
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 21.40
RAINFALL INTENSITY(INCH/HR) = 1.07
AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 4.10
TOTAL STREAM AREA(ACRES) = 4.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.82

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 2.00 9.52 1.839 0.50( 0.05) 0.10 1.2 429.00
2 3.82 21.40 1.073 0.50( 0.05) 0.10 4.1 410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 4.97 9.52 1.839 0.50( 0.05) 0.10 3.0 429.00
2 4.96 21.40 1.073 0.50( 0.05) 0.10 5.3 410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 4.97 Tc(MIN.) = 9.52
EFFECTIVE AREA(ACRES) = 3.02 AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 5.3
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

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*****
FLOW PROCESS FROM NODE 431.10 TO NODE 249.00 IS CODE = 31
-----

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 258.00 DOWNSTREAM(FEET) = 257.00
FLOW LENGTH(FEET) = 230.42 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.08
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.97
PIPE TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 10.46
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

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*****
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 11
-----
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

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*****
** MAIN STREAM CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 4.97 10.46 1.713 0.50( 0.05) 0.10 3.0 429.00
2 4.96 22.34 1.047 0.50( 0.05) 0.10 5.3 410.00
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 333.96 12.25 1.551 0.50( 0.19) 0.37 266.1 425.00
2 335.04 12.46 1.532 0.50( 0.19) 0.37 270.7 400.00
3 338.92 14.30 1.364 0.50( 0.19) 0.37 311.3 300.00
4 359.41 20.67 1.094 0.50( 0.19) 0.38 434.8 210.00
5 350.97 24.05 0.999 0.50( 0.19) 0.37 473.0 200.00
6 347.39 24.89 0.975 0.50( 0.19) 0.37 481.7 230.00
7 339.51 26.01 0.952 0.50( 0.18) 0.37 485.9 220.50
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 324.09 10.46 1.713 0.50( 0.18) 0.37 230.2 429.00
2 338.93 12.25 1.551 0.50( 0.18) 0.37 269.4 425.00
3 340.01 12.46 1.532 0.50( 0.18) 0.37 274.1 400.00
4 343.88 14.30 1.364 0.50( 0.19) 0.37 315.0 300.00
5 364.37 20.67 1.094 0.50( 0.19) 0.37 439.8 210.00
6 360.20 22.34 1.047 0.50( 0.19) 0.37 459.0 410.00
7 355.69 24.05 0.999 0.50( 0.18) 0.37 478.3 200.00
8 351.99 24.89 0.975 0.50( 0.18) 0.37 487.0 230.00
9 344.00 26.01 0.952 0.50( 0.18) 0.37 491.2 220.50
TOTAL AREA(ACRES) = 491.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 364.37 Tc(MIN.) = 20.671
EFFECTIVE AREA(ACRES) = 439.79 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 491.2
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

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*****
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 12
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>>>>CLEAR MEMORY BANK # 1 <<<<
-----
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 491.2 TC(MIN.) = 20.67
EFFECTIVE AREA(ACRES) = 439.79 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.373
PEAK FLOW RATE(CFS) = 364.37

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** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 324.09 10.46 1.713 0.50( 0.18) 0.37 230.2 429.00

```

2	338.93	12.25	1.551	0.50	( 0.18)	0.37	269.4	425.00
3	340.01	12.46	1.532	0.50	( 0.18)	0.37	274.1	400.00
4	343.88	14.30	1.364	0.50	( 0.19)	0.37	315.0	300.00
5	364.37	20.67	1.094	0.50	( 0.19)	0.37	439.8	210.00
6	360.20	22.34	1.047	0.50	( 0.19)	0.37	459.0	410.00
7	355.69	24.05	0.999	0.50	( 0.18)	0.37	478.3	200.00
8	351.99	24.89	0.975	0.50	( 0.18)	0.37	487.0	230.00
9	344.00	26.01	0.952	0.50	( 0.18)	0.37	491.2	220.50

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=====  
END OF RATIONAL METHOD ANALYSIS



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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.50      0.50       1.000      -
USER-DEFINED  -        0.30      0.50       1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.80  SUBAREA RUNOFF (CFS) = 0.71
EFFECTIVE AREA (ACRES) = 1.20  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.2  PEAK FLOW RATE (CFS) = 1.06

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*****
FLOW PROCESS FROM NODE 10102.00 TO NODE 10103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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ELEVATION DATA: UPSTREAM(FEET) = 790.00  DOWNSTREAM(FEET) = 762.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00  CHANNEL SLOPE = 0.1400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.06
FLOW VELOCITY(FEET/SEC.) = 3.86  FLOW DEPTH(FEET) = 0.30
TRAVEL TIME(MIN.) = 0.86  Tc(MIN.) = 11.23
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10103.00 = 679.00 FEET.

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.23
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.414
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.40  0.50  1.000  -
USER-DEFINED      -        0.80  0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.20  SUBAREA RUNOFF (CFS) = 0.99
EFFECTIVE AREA (ACRES) = 2.40  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 2.4  PEAK FLOW RATE (CFS) = 1.97

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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```

ELEVATION DATA: UPSTREAM(FEET) = 762.00  DOWNSTREAM(FEET) = 754.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 124.00  CHANNEL SLOPE = 0.0645
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.97
FLOW VELOCITY(FEET/SEC.) = 3.32  FLOW DEPTH(FEET) = 0.45
TRAVEL TIME(MIN.) = 0.62  Tc(MIN.) = 11.85
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10104.00 = 803.00 FEET.

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.85
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.371
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.70  0.50  1.000  -
USER-DEFINED      -        1.10  0.50  1.000  -
USER-DEFINED      -        0.10  0.50  1.000  -
USER-DEFINED      -        0.40  0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 1.80
EFFECTIVE AREA (ACRES) = 4.70  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.7  PEAK FLOW RATE (CFS) = 3.68

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 754.00  DOWNSTREAM(FEET) = 740.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00  CHANNEL SLOPE = 0.0255
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.68
FLOW VELOCITY(FEET/SEC.) = 2.75  FLOW DEPTH(FEET) = 0.67
TRAVEL TIME(MIN.) = 3.34  Tc(MIN.) = 15.19
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10105.00 = 1353.00 FEET.

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.19
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.193
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        3.40  0.50  1.000  -
USER-DEFINED      -        0.60  0.50  1.000  -
USER-DEFINED      -        6.00  0.50  1.000  -
USER-DEFINED      -        0.60  0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 10.60  SUBAREA RUNOFF (CFS) = 6.61
EFFECTIVE AREA (ACRES) = 15.30  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 15.3  PEAK FLOW RATE (CFS) = 9.54

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10106.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 740.00 DOWNSTREAM(FEET) = 623.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 929.00 CHANNEL SLOPE = 0.1259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 9.54
FLOW VELOCITY(FEET/SEC.) = 6.37 FLOW DEPTH(FEET) = 0.71
TRAVEL TIME(MIN.) = 2.43 Tc(MIN.) = 17.62
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10106.00 = 2282.00 FEET.
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10106.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.62
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.106
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.50 1.000 -
USER-DEFINED - 0.10 0.50 1.000 -
USER-DEFINED - 10.40 0.50 1.000 -
USER-DEFINED - 0.40 0.50 1.000 -
USER-DEFINED - 4.50 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 8.45
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 16.79
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 592.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 417.00 CHANNEL SLOPE = 0.0743
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 16.79
FLOW VELOCITY(FEET/SEC.) = 6.02 FLOW DEPTH(FEET) = 0.96
TRAVEL TIME(MIN.) = 1.15 Tc(MIN.) = 18.77
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10107.00 = 2699.00 FEET.
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10107.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.77

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* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.064
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.50 1.000 -
USER-DEFINED - 0.60 0.50 1.000 -
USER-DEFINED - 5.10 0.50 1.000 -
USER-DEFINED - 1.10 0.50 1.000 -
USER-DEFINED - 0.20 0.50 1.000 -
USER-DEFINED - 2.30 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 4.82
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 20.46
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 592.00 DOWNSTREAM(FEET) = 590.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0333
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.000
CHANNEL FLOW THRU SUBAREA(CFS) = 20.46
FLOW VELOCITY(FEET/SEC.) = 4.67 FLOW DEPTH(FEET) = 1.21
TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 18.99
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10108.00 = 2759.00 FEET.
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.99
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.057
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.50 1.000 -
USER-DEFINED - 1.10 0.50 1.000 -
USER-DEFINED - 7.00 0.50 1.000 -
USER-DEFINED - 0.40 0.50 1.000 -
USER-DEFINED - 7.50 0.50 1.000 -
USER-DEFINED - 1.80 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 9.06
EFFECTIVE AREA(ACRES) = 58.40 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.4 PEAK FLOW RATE(CFS) = 29.24
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.99
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.057
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.10
EFFECTIVE AREA(ACRES) = 58.60 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.6 PEAK FLOW RATE(CFS) = 29.34

\*\*\*\*\*
FLOW PROCESS FROM NODE 10108.00 TO NODE 10109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 526.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 973.00 CHANNEL SLOPE = 0.0658
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 29.34
FLOW VELOCITY(FEET/SEC.) = 6.61 FLOW DEPTH(FEET) = 1.22
TRAVEL TIME(MIN.) = 2.45 Tc(MIN.) = 21.44
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10109.00 = 3732.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10109.00 TO NODE 10109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.44
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.986
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 16.40 0.50 1.000 -
USER-DEFINED - 0.60 0.50 1.000 -
USER-DEFINED - 3.00 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 8.74
EFFECTIVE AREA(ACRES) = 78.60 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.6 PEAK FLOW RATE(CFS) = 34.33

\*\*\*\*\*
FLOW PROCESS FROM NODE 10109.00 TO NODE 10110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 526.00 DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1045.00 CHANNEL SLOPE = 0.0679

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 34.33
FLOW VELOCITY(FEET/SEC.) = 6.93 FLOW DEPTH(FEET) = 1.28
TRAVEL TIME(MIN.) = 2.51 Tc(MIN.) = 23.95
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10110.00 = 4777.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10110.00 TO NODE 10110.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.95
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.925
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.50 1.000 -
USER-DEFINED - 0.50 0.50 1.000 -
USER-DEFINED - 31.60 0.50 1.000 -
USER-DEFINED - 1.60 0.50 1.000 -
USER-DEFINED - 0.40 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.10 SUBAREA RUNOFF(CFS) = 13.43
EFFECTIVE AREA(ACRES) = 113.70 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.7 PEAK FLOW RATE(CFS) = 43.49

\*\*\*\*\*
FLOW PROCESS FROM NODE 10110.00 TO NODE 10111.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 675.00 CHANNEL SLOPE = 0.0667
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 43.49
FLOW VELOCITY(FEET/SEC.) = 7.33 FLOW DEPTH(FEET) = 1.41
TRAVEL TIME(MIN.) = 1.54 Tc(MIN.) = 25.48
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10111.00 = 5452.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10111.00 TO NODE 10111.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 25.48
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.891
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.40 0.50 1.000 -
USER-DEFINED - 6.00 0.50 1.000 -
USER-DEFINED - 24.80 0.50 1.000 -
USER-DEFINED - 0.90 0.50 1.000 -

USER-DEFINED - 4.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 43.20 SUBAREA RUNOFF (CFS) = 15.21  
EFFECTIVE AREA (ACRES) = 156.90 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 156.9 PEAK FLOW RATE (CFS) = 55.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10111.00 TO NODE 10112.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 410.00 DOWNSTREAM (FEET) = 405.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 143.00 CHANNEL SLOPE = 0.0350  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 55.23  
FLOW VELOCITY (FEET/SEC.) = 6.10 FLOW DEPTH (FEET) = 1.74  
TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 25.87  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10112.00 = 5595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 25.87

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.884

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	7.90	0.50	1.000	-
USER-DEFINED	-	25.90	0.50	1.000	-
USER-DEFINED	-	19.30	0.50	1.000	-
USER-DEFINED	-	2.10	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 56.20 SUBAREA RUNOFF (CFS) = 19.43

EFFECTIVE AREA (ACRES) = 213.10 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 213.1 PEAK FLOW RATE (CFS) = 73.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10113.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 363.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1642.00 CHANNEL SLOPE = 0.0256  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 73.66  
FLOW VELOCITY (FEET/SEC.) = 5.85 FLOW DEPTH (FEET) = 2.05

TRAVEL TIME (MIN.) = 4.68 Tc (MIN.) = 30.56  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10113.00 = 7237.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 30.56

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.803

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.50	1.000	-
USER-DEFINED	-	33.10	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 35.40 SUBAREA RUNOFF (CFS) = 9.66

EFFECTIVE AREA (ACRES) = 248.50 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 248.5 PEAK FLOW RATE (CFS) = 73.66

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10114.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 363.00 DOWNSTREAM (FEET) = 340.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 918.00 CHANNEL SLOPE = 0.0251  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 73.66  
FLOW VELOCITY (FEET/SEC.) = 5.80 FLOW DEPTH (FEET) = 2.06  
TRAVEL TIME (MIN.) = 2.64 Tc (MIN.) = 33.19  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10114.00 = 8155.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 33.19

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.772

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	10.10	0.50	1.000	-
USER-DEFINED	-	17.70	0.50	1.000	-
USER-DEFINED	-	52.90	0.50	1.000	-
USER-DEFINED	-	1.00	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 83.10 SUBAREA RUNOFF (CFS) = 20.30  
EFFECTIVE AREA (ACRES) = 331.60 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 331.6 PEAK FLOW RATE (CFS) = 81.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 33.19  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.772  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.50 SUBAREA RUNOFF (CFS) = 0.37  
EFFECTIVE AREA (ACRES) = 333.10 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 333.1 PEAK FLOW RATE (CFS) = 81.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10115.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 340.00 DOWNSTREAM (FEET) = 301.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1467.00 CHANNEL SLOPE = 0.0266  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 81.39  
FLOW VELOCITY (FEET/SEC.) = 6.06 FLOW DEPTH (FEET) = 2.12  
TRAVEL TIME (MIN.) = 4.04 Tc (MIN.) = 37.23  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10115.00 = 9622.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10115.00 TO NODE 10115.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 37.23  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.723  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.60 0.50 1.000 -  
USER-DEFINED - 24.30 0.50 1.000 -  
USER-DEFINED - 47.70 0.50 1.000 -  
USER-DEFINED - 9.80 0.50 1.000 -  
USER-DEFINED - 1.60 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 94.00 SUBAREA RUNOFF (CFS) = 18.87  
EFFECTIVE AREA (ACRES) = 427.10 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 427.1 PEAK FLOW RATE (CFS) = 85.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10115.00 TO NODE 10116.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 301.00 DOWNSTREAM (FEET) = 272.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1696.00 CHANNEL SLOPE = 0.0171  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 85.74  
FLOW VELOCITY (FEET/SEC.) = 5.22 FLOW DEPTH (FEET) = 2.34  
TRAVEL TIME (MIN.) = 5.41 Tc (MIN.) = 42.64  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10116.00 = 11318.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 42.64  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.669  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 1.000 -  
USER-DEFINED - 4.90 0.50 1.000 -  
USER-DEFINED - 4.10 0.50 1.000 -  
USER-DEFINED - 0.40 0.50 1.000 -  
USER-DEFINED - 32.00 0.50 1.000 -  
USER-DEFINED - 3.80 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 45.60 SUBAREA RUNOFF (CFS) = 6.92  
EFFECTIVE AREA (ACRES) = 472.70 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 472.7 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 42.64  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.669  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.50 1.000 -  
USER-DEFINED - 7.70 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 9.70 SUBAREA RUNOFF (CFS) = 1.47  
EFFECTIVE AREA (ACRES) = 482.40 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 482.4 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10116.00 TO NODE 10117.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 272.00 DOWNSTREAM (FEET) = 252.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 878.00 CHANNEL SLOPE = 0.0228  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 85.74  
FLOW VELOCITY (FEET/SEC.) = 5.81 FLOW DEPTH (FEET) = 2.22  
TRAVEL TIME (MIN.) = 2.52 Tc (MIN.) = 45.16  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10117.00 = 12196.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 45.16

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.649

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	0.850	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	8.20	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.993

SUBAREA AREA (ACRES) = 12.30 SUBAREA RUNOFF (CFS) = 1.68

EFFECTIVE AREA (ACRES) = 494.70 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 494.7 PEAK FLOW RATE (CFS) = 85.74

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 45.16

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.649

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	0.850	-
USER-DEFINED	-	14.60	0.50	1.000	-
USER-DEFINED	-	6.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	3.50	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.996

SUBAREA AREA (ACRES) = 25.00 SUBAREA RUNOFF (CFS) = 3.38

EFFECTIVE AREA (ACRES) = 519.70 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 519.7 PEAK FLOW RATE (CFS) = 85.74

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10117.00 TO NODE 10118.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 252.00 DOWNSTREAM (FEET) = 249.00  
FLOW LENGTH (FEET) = 280.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.56  
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 85.74  
PIPE TRAVEL TIME (MIN.) = 0.40 Tc (MIN.) = 45.56  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10118.00 = 12476.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10118.00 TO NODE 10119.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 249.00 DOWNSTREAM (FEET) = 240.00  
FLOW LENGTH (FEET) = 892.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.0 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.27  
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 85.74  
PIPE TRAVEL TIME (MIN.) = 1.32 Tc (MIN.) = 46.88  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10119.00 = 13368.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 46.88

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.635

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	0.100	-
USER-DEFINED	-	1.00	0.50	0.600	-
USER-DEFINED	-	0.80	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.706

SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 0.91

EFFECTIVE AREA (ACRES) = 523.30 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 523.3 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 46.88					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.635					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.80	0.50	1.000	-
USER-DEFINED	-	1.20	0.50	0.100	-
USER-DEFINED	-	9.60	0.50	0.600	-
USER-DEFINED	-	1.00	0.50	0.850	-
USER-DEFINED	-	0.80	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.627  
SUBAREA AREA (ACRES) = 13.60 SUBAREA RUNOFF (CFS) = 3.93  
EFFECTIVE AREA (ACRES) = 536.90 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 536.9 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 46.88					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.635					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.01  
EFFECTIVE AREA (ACRES) = 537.00 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 537.0 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10119.00 TO NODE 10120.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 240.00 DOWNSTREAM (FEET) = 239.00  
FLOW LENGTH (FEET) = 120.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.32  
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 85.74

PIPE TRAVEL TIME (MIN.) = 0.19 Tc (MIN.) = 47.08  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10120.00 = 13488.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 47.08					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.633					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	1.20	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	2.80	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.657  
SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 1.54  
EFFECTIVE AREA (ACRES) = 542.60 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 542.6 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 47.08					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.633					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	1.50	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	0.600	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	2.90	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.717  
SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 1.26  
EFFECTIVE AREA (ACRES) = 547.70 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 547.7 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 47.08					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.633					
SUBAREA LOSS RATE DATA (AMC II):					

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	1.00	0.50	1.000	-
USER-DEFINED	-	2.70	0.50	1.000	-
USER-DEFINED	-	11.20	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 15.80 SUBAREA RUNOFF (CFS) = 1.89  
EFFECTIVE AREA (ACRES) = 563.50 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 563.5 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10121.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----  
ELEVATION DATA: UPSTREAM(FEET) = 239.00 DOWNSTREAM(FEET) = 213.00  
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 30.03  
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 85.74  
PIPE TRAVEL TIME (MIN.) = 0.11 Tc (MIN.) = 47.18  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10121.00 = 13682.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10121.00 TO NODE 10122.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
-----  
ELEVATION DATA: UPSTREAM(FEET) = 213.00 DOWNSTREAM(FEET) = 176.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 995.00 CHANNEL SLOPE = 0.0372  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 85.74  
FLOW VELOCITY (FEET/SEC.) = 6.97 FLOW DEPTH (FEET) = 2.02  
TRAVEL TIME (MIN.) = 2.38 Tc (MIN.) = 49.56  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10122.00 = 14677.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc (MIN.) = 49.56  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.614  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 1.40 0.50 1.000 -

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	4.80	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 7.30 SUBAREA RUNOFF (CFS) = 0.74  
EFFECTIVE AREA (ACRES) = 570.80 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 570.8 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc (MIN.) = 49.56  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.614  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.80 0.50 1.000 -  
USER-DEFINED - 3.30 0.50 1.000 -  
USER-DEFINED - 1.40 0.50 1.000 -  
USER-DEFINED - 3.00 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 10.50 SUBAREA RUNOFF (CFS) = 1.07  
EFFECTIVE AREA (ACRES) = 581.30 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 581.3 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc (MIN.) = 49.56  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.614  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 3.30 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 0.60 0.50 1.000 -  
USER-DEFINED - 3.50 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 7.90 SUBAREA RUNOFF (CFS) = 0.81  
EFFECTIVE AREA (ACRES) = 589.20 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 589.2 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 49.56

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.614

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 0.18

EFFECTIVE AREA(ACRES) = 591.00 AREA-AVERAGED Fm(INCH/HR) = 0.49

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98

TOTAL AREA(ACRES) = 591.0 PEAK FLOW RATE(CFS) = 85.74

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====  
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 591.0 TC(MIN.) = 49.56

EFFECTIVE AREA(ACRES) = 591.00 AREA-AVERAGED Fm(INCH/HR)= 0.49

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.984

PEAK FLOW RATE(CFS) = 85.74

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2007 Advanced Engineering Software (aes)  
Ver. 13.4 Release Date: 01/25/2007 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506102F.DAT  
TIME/DATE OF STUDY: 14:01 01/08/2009  
=====

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.184
- 2) 10.00; 1.510
- 3) 15.00; 1.203
- 4) 20.00; 1.023
- 5) 25.00; 0.902
- 6) 30.00; 0.826
- 7) 40.00; 0.693
- 8) 50.00; 0.611
- 9) 60.00; 0.546
- 10) 90.00; 0.439
- 11) 120.00; 0.374
- 12) 180.00; 0.306
- 13) 360.00; 0.211
- 14) 1440.00; 0.088

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10200.00 TO NODE 10201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 293.00  
ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 617.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.991  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.511

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	-	0.73	0.50	0.600	0	9.99

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA RUNOFF(CFS) = 0.80  
TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 0.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10201.00 TO NODE 10202.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 617.00 DOWNSTREAM ELEVATION(FEET) = 613.00  
STREET LENGTH(FEET) = 323.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.22  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.28  
HALFSTREET FLOOD WIDTH(FEET) = 6.07  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.18  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.61  
STREET FLOW TRAVEL TIME(MIN.) = 2.47 Tc(MIN.) = 12.46  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.359

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.88	0.50	0.600	-



SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 0.84  
EFFECTIVE AREA(ACRES) = 1.62 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 1.54

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.00  
FLOW VELOCITY(FEET/SEC.) = 2.26 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.68  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10202.00 = 616.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10202.00 TO NODE 10203.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 613.00 DOWNSTREAM ELEVATION(FEET) = 594.00  
STREET LENGTH(FEET) = 613.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.27  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.29  
HALFSTREET FLOOD WIDTH(FEET) = 6.73  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.53  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.03  
STREET FLOW TRAVEL TIME(MIN.) = 2.90 Tc(MIN.) = 15.35  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.190

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.82 0.50 0.614 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.614  
SUBAREA AREA(ACRES) = 1.82 SUBAREA RUNOFF(CFS) = 1.45  
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 2.74

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 7.50  
FLOW VELOCITY(FEET/SEC.) = 3.65 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.12  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10203.00 = 1229.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10203.00 TO NODE 10204.00 IS CODE = 63  
-----

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 594.00 DOWNSTREAM ELEVATION(FEET) = 578.00  
STREET LENGTH(FEET) = 433.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.18  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.71  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.05  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.27  
STREET FLOW TRAVEL TIME(MIN.) = 1.78 Tc(MIN.) = 17.14  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.126

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.21 0.50 0.655 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.655  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 0.87  
EFFECTIVE AREA(ACRES) = 4.64 AREA-AVERAGED Fm(INCH/HR) = 0.31  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 3.41

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 8.04  
FLOW VELOCITY(FEET/SEC.) = 4.08 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.30  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10204.00 = 1662.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 578.00 DOWNSTREAM(FEET) = 575.00  
FLOW LENGTH(FEET) = 147.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.62  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 3.41  
PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 17.51  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10205.00 = 1809.00 FEET.

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*****
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.51
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.113
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -        3.61    0.50    0.917  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917
SUBAREA AREA(ACRES) = 3.61    SUBAREA RUNOFF(CFS) = 2.12
EFFECTIVE AREA(ACRES) = 8.25    AREA-AVERAGED Fm(INCH/HR) = 0.37
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 0.75
TOTAL AREA(ACRES) = 8.3    PEAK FLOW RATE(CFS) = 5.48

*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 563.00
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.64
ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.48
PIPE TRAVEL TIME(MIN.) = 1.23    Tc(MIN.) = 18.74
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10206.00 = 2374.00 FEET.

*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.74
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.068
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -        4.75    0.50    0.669  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.669
SUBAREA AREA(ACRES) = 4.75    SUBAREA RUNOFF(CFS) = 3.13
EFFECTIVE AREA(ACRES) = 13.00    AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 13.0    PEAK FLOW RATE(CFS) = 8.28

*****
FLOW PROCESS FROM NODE 10206.00 TO NODE 10207.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 563.00 DOWNSTREAM(FEET) = 547.00
FLOW LENGTH(FEET) = 599.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.25
ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.28
PIPE TRAVEL TIME(MIN.) = 1.08    Tc(MIN.) = 19.82
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10207.00 = 2973.00 FEET.

*****
FLOW PROCESS FROM NODE 10206.10 TO NODE 10207.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.82
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.030
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -        4.59    0.50    0.664  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.664
SUBAREA AREA(ACRES) = 4.59    SUBAREA RUNOFF(CFS) = 2.88
EFFECTIVE AREA(ACRES) = 17.58    AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 17.6    PEAK FLOW RATE(CFS) = 10.71

*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 516.00
FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.64
ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.71
PIPE TRAVEL TIME(MIN.) = 0.79    Tc(MIN.) = 20.61
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10208.00 = 3573.00 FEET.

*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.61
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.008
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -        3.60    0.50    0.697  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.697
SUBAREA AREA(ACRES) = 3.60    SUBAREA RUNOFF(CFS) = 2.14

```

EFFECTIVE AREA(ACRES) = 21.18 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 21.2 PEAK FLOW RATE(CFS) = 12.51

\*\*\*\*\*

FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 516.00 DOWNSTREAM(FEET) = 480.00

FLOW LENGTH(FEET) = 604.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 13.86

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 12.51

PIPE TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 21.34

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10209.00 = 4177.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 21.34

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.991

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.21	0.50	0.645	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645

SUBAREA AREA(ACRES) = 8.21 SUBAREA RUNOFF(CFS) = 4.94

EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.34

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.69

TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 17.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 438.00

FLOW LENGTH(FEET) = 678.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.14

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 17.11

PIPE TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 22.08

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10210.00 = 4855.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.08

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.973

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.49	0.50	0.986	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986

SUBAREA AREA(ACRES) = 10.49 SUBAREA RUNOFF(CFS) = 4.53

EFFECTIVE AREA(ACRES) = 39.89 AREA-AVERAGED Fm(INCH/HR) = 0.38

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.77

TOTAL AREA(ACRES) = 39.9 PEAK FLOW RATE(CFS) = 21.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 280.00

FLOW LENGTH(FEET) = 2662.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.48

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 21.16

PIPE TRAVEL TIME(MIN.) = 2.87 Tc(MIN.) = 24.95

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10211.00 = 7517.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.95

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.903

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.00	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 3.63

EFFECTIVE AREA(ACRES) = 49.89 AREA-AVERAGED Fm(INCH/HR) = 0.41

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81

TOTAL AREA(ACRES) = 49.9 PEAK FLOW RATE(CFS) = 22.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 280.00 DOWNSTREAM(FEET) = 176.00

FLOW LENGTH(FEET) = 935.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 20.16

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 22.30

PIPE TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 25.72  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10212.00 = 8452.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 25.72  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.891  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	18.37	0.50	0.926	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.926  
SUBAREA AREA(ACRES) = 18.37 SUBAREA RUNOFF(CFS) = 7.07  
EFFECTIVE AREA(ACRES) = 68.26 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 68.3 PEAK FLOW RATE(CFS) = 28.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10212.00 TO NODE 10242.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 176.00 DOWNSTREAM(FEET) = 169.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00 CHANNEL SLOPE = 0.0211  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.872  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.97	0.50	0.970	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.17  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.32  
AVERAGE FLOW DEPTH(FEET) = 1.50 TRAVEL TIME(MIN.) = 1.28  
Tc(MIN.) = 27.00  
SUBAREA AREA(ACRES) = 1.97 SUBAREA RUNOFF(CFS) = 0.68  
EFFECTIVE AREA(ACRES) = 70.23 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 28.82  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.50 FLOW VELOCITY(FEET/SEC.) = 4.28  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 10  
-----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10220.00 TO NODE 10221.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 308.00 DOWNSTREAM(FEET) = 300.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.111  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.199  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	1.03	0.50	1.000	0	15.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.65  
TOTAL AREA(ACRES) = 1.03 PEAK FLOW RATE(CFS) = 0.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10221.10 TO NODE 10222.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 300.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.13  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.51  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.29  
STREET FLOW TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 16.22  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.159

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.64	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 0.97  
EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 2.7 PEAK FLOW RATE (CFS) = 1.58

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.20 HALFSTREET FLOOD WIDTH (FEET) = 2.00  
FLOW VELOCITY (FEET/SEC.) = 6.51 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.29  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10222.00 = 764.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10221.20 TO NODE 10222.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 16.22  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.159  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.12 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 3.12 SUBAREA RUNOFF (CFS) = 1.85  
EFFECTIVE AREA (ACRES) = 5.78 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 5.8 PEAK FLOW RATE (CFS) = 3.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.10 TO NODE 10223.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

-----  
UPSTREAM ELEVATION (FEET) = 261.00 DOWNSTREAM ELEVATION (FEET) = 208.00  
STREET LENGTH (FEET) = 622.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.89  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.24  
HALFSTREET FLOOD WIDTH (FEET) = 4.11  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.44  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.31  
STREET FLOW TRAVEL TIME (MIN.) = 1.91 Tc (MIN.) = 18.13

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.090  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.75 0.50 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.75 SUBAREA RUNOFF (CFS) = 0.93  
EFFECTIVE AREA (ACRES) = 7.54 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 7.5 PEAK FLOW RATE (CFS) = 4.00

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.24 HALFSTREET FLOOD WIDTH (FEET) = 4.21  
FLOW VELOCITY (FEET/SEC.) = 5.46 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.32  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10223.00 = 1386.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.20 TO NODE 10223.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 18.13  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.090  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.91 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 7.91 SUBAREA RUNOFF (CFS) = 4.20  
EFFECTIVE AREA (ACRES) = 15.45 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 15.4 PEAK FLOW RATE (CFS) = 8.21

\*\*\*\*\*

FLOW PROCESS FROM NODE 10223.10 TO NODE 10224.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

-----  
UPSTREAM ELEVATION (FEET) = 208.00 DOWNSTREAM ELEVATION (FEET) = 204.00  
STREET LENGTH (FEET) = 758.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.09  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.44  
HALFSTREET FLOOD WIDTH (FEET) = 14.26  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.04  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.91  
STREET FLOW TRAVEL TIME (MIN.) = 6.18 Tc (MIN.) = 24.31  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.919

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.70	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 1.77  
EFFECTIVE AREA(ACRES) = 20.15 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.1 PEAK FLOW RATE(CFS) = 8.21  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 13.65  
FLOW VELOCITY(FEET/SEC.) = 2.00 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.86  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10224.00 = 2144.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.20 TO NODE 10224.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc(MIN.) = 24.31  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.919  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.21	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 0.45  
EFFECTIVE AREA(ACRES) = 21.35 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 8.21  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 204.00 DOWNSTREAM(FEET) = 201.00  
FLOW LENGTH(FEET) = 422.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.42  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 8.21  
PIPE TRAVEL TIME(MIN.) = 1.30 Tc(MIN.) = 25.61  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10225.00 = 2566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 25.61  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.893

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.81	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.81 SUBAREA RUNOFF(CFS) = 1.70  
EFFECTIVE AREA(ACRES) = 26.17 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 26.2 PEAK FLOW RATE(CFS) = 9.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 201.00 DOWNSTREAM(FEET) = 197.00  
FLOW LENGTH(FEET) = 799.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.98  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 9.25  
PIPE TRAVEL TIME(MIN.) = 2.67 Tc(MIN.) = 28.28  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10238.00 = 3365.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 28.28  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.852  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.24	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.24 SUBAREA RUNOFF(CFS) = 1.34  
EFFECTIVE AREA(ACRES) = 30.41 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.4 PEAK FLOW RATE(CFS) = 9.63

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 28.28  
RAINFALL INTENSITY(INCH/HR) = 0.85  
AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 30.41  
TOTAL STREAM AREA(ACRES) = 30.41

PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 10230.00 TO NODE 10231.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 276.00

ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 390.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.944

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.057

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
AGRICULTURAL POOR COVER "FALLOW"	-	0.95	0.50	1.000	0	5.94

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.33  
TOTAL AREA(ACRES) = 0.95 PEAK FLOW RATE(CFS) = 1.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10231.10 TO NODE 10232.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 390.00 DOWNSTREAM(FEET) = 301.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 394.00 CHANNEL SLOPE = 0.2259

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.929

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.68	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.42  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.95  
AVERAGE FLOW DEPTH(FEET) = 0.34 TRAVEL TIME(MIN.) = 0.95  
Tc(MIN.) = 6.89  
SUBAREA AREA(ACRES) = 1.68 SUBAREA RUNOFF(CFS) = 2.17  
EFFECTIVE AREA(ACRES) = 2.63 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 3.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 FLOW VELOCITY(FEET/SEC.) = 7.57

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10232.00 = 670.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10231.20 TO NODE 10232.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 6.89

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.929

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.38	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.38 SUBAREA RUNOFF(CFS) = 8.20  
EFFECTIVE AREA(ACRES) = 9.01 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 9.0 PEAK FLOW RATE(CFS) = 11.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 10232.00 TO NODE 10233.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 301.00 DOWNSTREAM ELEVATION(FEET) = 277.00

STREET LENGTH(FEET) = 341.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.61

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.65

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.35

HALFSTREET FLOOD WIDTH(FEET) = 9.64

AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.10

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.14

STREET FLOW TRAVEL TIME(MIN.) = 0.93 Tc(MIN.) = 7.82

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.804

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 4.11  
EFFECTIVE AREA(ACRES) = 12.52 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 12.5 PEAK FLOW RATE(CFS) = 14.68

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 10.00

FLOW VELOCITY(FEET/SEC.) = 6.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.21

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10233.00 = 1011.00 FEET.

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*****
FLOW PROCESS FROM NODE 10233.10 TO NODE 10234.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 277.00 DOWNSTREAM ELEVATION(FEET) = 226.00
STREET LENGTH(FEET) = 682.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.74
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 10.46
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.52
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.40
STREET FLOW TRAVEL TIME(MIN.) = 1.74 Tc(MIN.) = 9.56
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.569
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.27 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 4.27 SUBAREA RUNOFF(CFS) = 4.11
EFFECTIVE AREA(ACRES) = 16.78 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 16.14

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 10.30
FLOW VELOCITY(FEET/SEC.) = 6.45 DEPTH*VELOCITY(FT*FT/SEC.) = 2.35
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10234.00 = 1693.00 FEET.

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*****
FLOW PROCESS FROM NODE 10233.20 TO NODE 10234.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 9.56
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.569
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 15.60 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 15.00

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EFFECTIVE AREA(ACRES) = 32.38 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 31.14
*****
FLOW PROCESS FROM NODE 10234.10 TO NODE 10235.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 3 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 226.00 DOWNSTREAM ELEVATION(FEET) = 205.00
STREET LENGTH(FEET) = 759.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.04
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.50
HALFSTREET FLOOD WIDTH(FEET) = 17.29
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.19
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.62
STREET FLOW TRAVEL TIME(MIN.) = 2.44 Tc(MIN.) = 12.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.387
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.74 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 3.79
EFFECTIVE AREA(ACRES) = 37.13 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 31.14
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.50 HALFSTREET FLOOD WIDTH(FEET) = 16.87
FLOW VELOCITY(FEET/SEC.) = 5.13 DEPTH*VELOCITY(FT*FT/SEC.) = 2.54
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10235.00 = 2452.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10234.20 TO NODE 10235.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 12.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.387
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

```



LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            8.02       0.50       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) =    8.02            SUBAREA RUNOFF(CFS) =    6.40  
 EFFECTIVE AREA(ACRES) =    45.15        AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) =    45.1            PEAK FLOW RATE(CFS) =    36.04

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10234.30 TO NODE 10235.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.387  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/        SCS SOIL    AREA        Fp            Ap        SCS  
   LAND USE                GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED            -            2.62       0.50       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) =    2.62            SUBAREA RUNOFF(CFS) =    2.09  
 EFFECTIVE AREA(ACRES) =    47.76        AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) =    47.8            PEAK FLOW RATE(CFS) =    38.13

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10235.00 TO NODE 10236.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 205.00    DOWNSTREAM(FEET) = 201.00  
 FLOW LENGTH(FEET) = 489.00    MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.56  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00    NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 38.13  
 PIPE TRAVEL TIME(MIN.) = 0.95    Tc(MIN.) = 12.95  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10236.00 = 2941.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10235.10 TO NODE 10236.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.95  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.329  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/        SCS SOIL    AREA        Fp            Ap        SCS  
   LAND USE                GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED            -            2.89       0.50       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) =    2.89            SUBAREA RUNOFF(CFS) =    2.16  
 EFFECTIVE AREA(ACRES) =    50.65        AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) =    50.7            PEAK FLOW RATE(CFS) =    38.13  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10235.20 TO NODE 10236.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.95  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.329  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/        SCS SOIL    AREA        Fp            Ap        SCS  
   LAND USE                GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED            -            4.84       0.50       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) =    4.84            SUBAREA RUNOFF(CFS) =    3.61  
 EFFECTIVE AREA(ACRES) =    55.49        AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) =    55.5            PEAK FLOW RATE(CFS) =    41.38

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 201.00    DOWNSTREAM(FEET) = 199.00  
 FLOW LENGTH(FEET) = 278.00    MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.16  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00    NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 41.38  
 PIPE TRAVEL TIME(MIN.) = 0.57    Tc(MIN.) = 13.52  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10237.00 = 3219.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.52  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.294  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/        SCS SOIL    AREA        Fp            Ap        SCS  
   LAND USE                GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED            -            1.62       0.50       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) =    1.62            SUBAREA RUNOFF(CFS) =    1.16  
 EFFECTIVE AREA(ACRES) =    57.11        AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) =    57.1            PEAK FLOW RATE(CFS) =    41.38  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 31  
 -----

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 197.00
FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.66
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 41.38
PIPE TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 14.27
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.27
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.248
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         1.38   0.50  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.38 SUBAREA RUNOFF(CFS) = 0.93
EFFECTIVE AREA(ACRES) = 58.49 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 41.38
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1
-----

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 14.27
RAINFALL INTENSITY(INCH/HR) = 1.25
AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 58.49
TOTAL STREAM AREA(ACRES) = 58.49
PEAK FLOW RATE(CFS) AT CONFLUENCE = 41.38

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** CONFLUENCE DATA **

```

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.63	28.28	0.852	0.50( 0.50)	1.00	30.4	10220.00
2	41.38	14.27	1.248	0.50( 0.50)	1.00	58.5	10230.00

```

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

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** PEAK FLOW RATE TABLE **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	51.01	14.27	1.248	0.50( 0.50)	1.00	73.8	10230.00
2	29.11	28.28	0.852	0.50( 0.50)	1.00	88.9	10220.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 51.01 Tc(MIN.) = 14.27
EFFECTIVE AREA(ACRES) = 73.83 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 88.9
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10238.00 TO NODE 10239.00 IS CODE = 31
-----

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```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 197.00 DOWNSTREAM(FEET) = 193.00
FLOW LENGTH(FEET) = 753.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.78
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 51.01
PIPE TRAVEL TIME(MIN.) = 1.61 Tc(MIN.) = 15.88
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10239.00 = 4317.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10238.10 TO NODE 10239.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.88
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.171
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         2.72   0.50  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.72 SUBAREA RUNOFF(CFS) = 1.64
EFFECTIVE AREA(ACRES) = 76.55 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 91.6 PEAK FLOW RATE(CFS) = 51.01
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

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*****
FLOW PROCESS FROM NODE 10238.20 TO NODE 10239.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.88
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.171
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         34.37  0.50  0.991  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

```

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991  
 SUBAREA AREA (ACRES) = 34.37 SUBAREA RUNOFF (CFS) = 20.90  
 EFFECTIVE AREA (ACRES) = 110.92 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 126.0 PEAK FLOW RATE (CFS) = 67.13

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 193.00 DOWNSTREAM (FEET) = 191.00  
 FLOW LENGTH (FEET) = 301.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.1 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.10  
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 67.13  
 PIPE TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 16.43  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10240.00 = 4618.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.43  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.151  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.22	0.50	0.916	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.916  
 SUBAREA AREA (ACRES) = 2.22 SUBAREA RUNOFF (CFS) = 1.39  
 EFFECTIVE AREA (ACRES) = 113.15 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 128.2 PEAK FLOW RATE (CFS) = 67.13  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10240.00 TO NODE 10241.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 191.00 DOWNSTREAM (FEET) = 180.00  
 FLOW LENGTH (FEET) = 150.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.0 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 22.44  
 ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 67.13  
 PIPE TRAVEL TIME (MIN.) = 0.11 Tc (MIN.) = 16.54  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10241.00 = 4768.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10241.00 TO NODE 10242.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 180.00 DOWNSTREAM (FEET) = 169.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 267.00 CHANNEL SLOPE = 0.0412  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.129

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.16	0.50	0.958	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 67.76  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.50  
 AVERAGE FLOW DEPTH (FEET) = 1.63 TRAVEL TIME (MIN.) = 0.52  
 Tc (MIN.) = 17.07  
 SUBAREA AREA (ACRES) = 2.16 SUBAREA RUNOFF (CFS) = 1.26  
 EFFECTIVE AREA (ACRES) = 115.31 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 130.4 PEAK FLOW RATE (CFS) = 67.13  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.63 FLOW VELOCITY (FEET/SEC.) = 8.44  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

=====

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	67.13	17.07	1.129	0.50 ( 0.50)	0.99	115.3	10230.00
2	36.90	31.50	0.806	0.50 ( 0.50)	1.00	130.4	10220.00

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	28.82	27.00	0.872	0.50 ( 0.42)	0.85	70.2	10200.00

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	95.80	17.07	1.129	0.50 ( 0.48)	0.95	159.7	10230.00
2	75.15	27.00	0.872	0.50 ( 0.47)	0.94	195.9	10200.00
3	61.51	31.50	0.806	0.50 ( 0.47)	0.94	200.6	10220.00
TOTAL AREA (ACRES) =		200.6					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 95.80 Tc (MIN.) = 17.068  
 EFFECTIVE AREA (ACRES) = 159.70 AREA-AVERAGED Fm (INCH/HR) = 0.48

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95  
TOTAL AREA (ACRES) = 200.6  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 169.00 DOWNSTREAM(FEET) = 163.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 315.00 CHANNEL SLOPE = 0.0190  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.101

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.10	0.50	0.995	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.995

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 98.28

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.96

AVERAGE FLOW DEPTH (FEET) = 2.17 TRAVEL TIME (MIN.) = 0.75

Tc (MIN.) = 17.82

SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 4.95

EFFECTIVE AREA (ACRES) = 168.81 AREA-AVERAGED Fm (INCH/HR) = 0.48

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96

TOTAL AREA (ACRES) = 209.7 PEAK FLOW RATE (CFS) = 95.80

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.15 FLOW VELOCITY (FEET/SEC.) = 6.92

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10243.00 TO NODE 10256.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.82

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.101

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.01	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 7.01 SUBAREA RUNOFF (CFS) = 3.79

EFFECTIVE AREA (ACRES) = 175.81 AREA-AVERAGED Fm (INCH/HR) = 0.48

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96

TOTAL AREA (ACRES) = 216.7 PEAK FLOW RATE (CFS) = 98.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 17.82

RAINFALL INTENSITY (INCH/HR) = 1.10

AREA-AVERAGED Fm (INCH/HR) = 0.48

AREA-AVERAGED Fp (INCH/HR) = 0.50

AREA-AVERAGED Ap = 0.96

EFFECTIVE STREAM AREA (ACRES) = 175.81

TOTAL STREAM AREA (ACRES) = 216.71

PEAK FLOW RATE (CFS) AT CONFLUENCE = 98.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10250.00 TO NODE 10251.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 284.00

ELEVATION DATA: UPSTREAM (FEET) = 246.00 DOWNSTREAM (FEET) = 243.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 16.802

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.138

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "WOODLAND, GRASS"	-	1.04	0.50	1.000	0	16.80

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 0.60

TOTAL AREA (ACRES) = 1.04 PEAK FLOW RATE (CFS) = 0.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10251.00 TO NODE 10252.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 243.00 DOWNSTREAM ELEVATION (FEET) = 240.00

STREET LENGTH (FEET) = 301.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.96  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.17  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.43  
STREET FLOW TRAVEL TIME(MIN.) = 2.31 Tc(MIN.) = 19.12  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.055  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.47	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 0.73  
EFFECTIVE AREA(ACRES) = 2.51 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 1.25

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.24 HALFSTREET FLOOD WIDTH(FEET) = 3.84  
FLOW VELOCITY(FEET/SEC.) = 1.86 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.44  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10252.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10252.00 TO NODE 10253.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 240.00 DOWNSTREAM ELEVATION(FEET) = 234.00  
STREET LENGTH(FEET) = 544.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.16  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.28  
HALFSTREET FLOOD WIDTH(FEET) = 5.84  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.03  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.56  
STREET FLOW TRAVEL TIME(MIN.) = 4.46 Tc(MIN.) = 23.57  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.936  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.60 SUBAREA RUNOFF(CFS) = 1.81  
EFFECTIVE AREA(ACRES) = 7.12 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 2.79

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 6.84  
FLOW VELOCITY(FEET/SEC.) = 2.12 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.63  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10253.00 = 1129.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 234.00 DOWNSTREAM(FEET) = 219.00  
FLOW LENGTH(FEET) = 362.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.05  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 2.79  
PIPE TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 24.32  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10254.00 = 1491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc(MIN.) = 24.32  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.918  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.55	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 3.22  
EFFECTIVE AREA(ACRES) = 15.66 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.7 PEAK FLOW RATE(CFS) = 5.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10254.00 TO NODE 10255.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 219.00 DOWNSTREAM(FEET) = 182.00  
FLOW LENGTH(FEET) = 716.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.77  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 5.89

PIPE TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 25.43  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10255.00 = 2207.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10255.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 182.00 DOWNSTREAM(FEET) = 163.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.0833  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.887

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	13.88	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.31

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.53

AVERAGE FLOW DEPTH(FEET) = 0.65 TRAVEL TIME(MIN.) = 0.58

Tc(MIN.) = 26.01

SUBAREA AREA(ACRES) = 13.88 SUBAREA RUNOFF(CFS) = 4.83

EFFECTIVE AREA(ACRES) = 29.54 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 29.5 PEAK FLOW RATE(CFS) = 10.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.70 FLOW VELOCITY(FEET/SEC.) = 6.89

LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10256.00 = 2435.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 26.01

RAINFALL INTENSITY(INCH/HR) = 0.89

AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50

AREA-AVERAGED Ap = 1.00

EFFECTIVE STREAM AREA(ACRES) = 29.54

TOTAL STREAM AREA(ACRES) = 29.54

PEAK FLOW RATE(CFS) AT CONFLUENCE = 10.27

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	98.47	17.82	1.101	0.50( 0.48)	0.96	175.8	10230.00
1	75.15	27.80	0.859	0.50( 0.47)	0.95	212.0	10200.00
1	62.59	32.34	0.795	0.50( 0.47)	0.95	216.7	10220.00
2	10.27	26.01	0.887	0.50( 0.50)	1.00	29.5	10250.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	108.74	17.82	1.101	0.50( 0.48)	0.96	196.1	10230.00
2	89.60	26.01	0.887	0.50( 0.48)	0.95	235.1	10250.00
3	84.70	27.80	0.859	0.50( 0.48)	0.95	241.6	10200.00
4	70.42	32.34	0.795	0.50( 0.48)	0.95	246.3	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 108.74 Tc(MIN.) = 17.82

EFFECTIVE AREA(ACRES) = 196.05 AREA-AVERAGED Fm(INCH/HR) = 0.48

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96

TOTAL AREA(ACRES) = 246.3

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 246.3 TC(MIN.) = 17.82

EFFECTIVE AREA(ACRES) = 196.05 AREA-AVERAGED Fm(INCH/HR) = 0.48

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.962

PEAK FLOW RATE(CFS) = 108.74

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	108.74	17.82	1.101	0.50( 0.48)	0.96	196.1	10230.00
2	89.60	26.01	0.887	0.50( 0.48)	0.95	235.1	10250.00
3	84.70	27.80	0.859	0.50( 0.48)	0.95	241.6	10200.00
4	70.42	32.34	0.795	0.50( 0.48)	0.95	246.3	10220.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506103F.DAT  
TIME/DATE OF STUDY: 12:44 04/15/2013  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 2.230
- 2) 6.00; 2.010
- 3) 7.00; 1.850
- 4) 8.00; 1.710
- 5) 9.00; 1.600
- 6) 10.00; 1.510
- 7) 11.00; 1.430
- 8) 12.00; 1.360
- 9) 13.00; 1.300
- 10) 14.00; 1.250
- 11) 15.00; 1.200
- 12) 20.00; 1.020
- 13) 25.00; 0.900
- 14) 30.00; 0.810
- 15) 40.00; 0.690
- 16) 50.00; 0.610
- 17) 60.00; 0.550
- 18) 90.00; 0.440
- 19) 120.00; 0.370
- 20) 180.00; 0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH	LIP	HIKE	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

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FLOW PROCESS FROM NODE 10300.00 TO NODE 10301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 627.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 5.147  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.198  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "5-7 DWELLINGS/ACRE"	-	1.20	0.50	0.500	95	5.15

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.500  
 SUBAREA RUNOFF(CFS) = 2.10  
 TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 2.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 10301.00 TO NODE 10302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 510.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.2609  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 2.10  
 FLOW VELOCITY(FEET/SEC.) = 5.79 FLOW DEPTH(FEET) = 0.35  
 TRAVEL TIME(MIN.) = 0.33  $T_c$ (MIN.) = 5.48  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10302.00 = 443.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10302.00 TO NODE 10302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 5.48  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.125  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.50	0.500	-



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 2.53  
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 4.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10302.00 TO NODE 10303.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 467.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.2575  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.56  
FLOW VELOCITY(FEET/SEC.) = 6.93 FLOW DEPTH(FEET) = 0.47  
TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 5.88  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10303.00 = 610.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10303.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.88  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 3.54  
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 7.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10304.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 467.00 DOWNSTREAM(FEET) = 446.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.88  
FLOW VELOCITY(FEET/SEC.) = 6.98 FLOW DEPTH(FEET) = 0.61  
TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 6.15  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10304.00 = 725.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10304.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.15  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.985  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.50 0.500 -  
USER-DEFINED - 0.40 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 3.66  
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 11.31

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10305.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 446.00 DOWNSTREAM(FEET) = 366.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 423.00 CHANNEL SLOPE = 0.1891  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 11.31  
FLOW VELOCITY(FEET/SEC.) = 7.71 FLOW DEPTH(FEET) = 0.70  
TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 7.07  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10305.00 = 1148.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10305.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 7.07  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.840  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.50 0.500 -  
USER-DEFINED - 1.30 0.50 1.000 -  
USER-DEFINED - 1.50 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.912  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 4.24  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.32  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.65  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 14.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10306.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 300.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 574.00 CHANNEL SLOPE = 0.1150  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 14.59  
 FLOW VELOCITY (FEET/SEC.) = 6.83 FLOW DEPTH (FEET) = 0.84  
 TRAVEL TIME (MIN.) = 1.40 Tc (MIN.) = 8.47  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10306.00 = 1722.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10306.00 TO NODE 10306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 8.47  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.658  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	2.80	0.50	1.000	-
USER-DEFINED	-	0.50	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.986  
 SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 3.77  
 EFFECTIVE AREA (ACRES) = 14.30 AREA-AVERAGED Fm (INCH/HR) = 0.37  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 14.3 PEAK FLOW RATE (CFS) = 16.62

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10306.00 TO NODE 10307.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 300.00 DOWNSTREAM (FEET) = 293.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0350  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 16.62  
 FLOW VELOCITY (FEET/SEC.) = 4.50 FLOW DEPTH (FEET) = 1.11  
 TRAVEL TIME (MIN.) = 0.74 Tc (MIN.) = 9.21  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10307.00 = 1922.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10307.00 TO NODE 10307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 9.21  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.581  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 0.68  
 EFFECTIVE AREA (ACRES) = 15.00 AREA-AVERAGED Fm (INCH/HR) = 0.37  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.75  
 TOTAL AREA (ACRES) = 15.0 PEAK FLOW RATE (CFS) = 16.62  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10307.00 TO NODE 10308.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 293.00 DOWNSTREAM (FEET) = 276.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0850  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 16.62  
 FLOW VELOCITY (FEET/SEC.) = 7.81 FLOW DEPTH (FEET) = 0.84  
 TRAVEL TIME (MIN.) = 0.43 Tc (MIN.) = 9.64  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10308.00 = 2122.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10308.00 TO NODE 10308.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 9.64  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.543  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.50	1.000	-
USER-DEFINED	-	8.50	0.50	0.500	-
USER-DEFINED	-	3.80	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.696  
 SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 15.05  
 EFFECTIVE AREA (ACRES) = 29.00 AREA-AVERAGED Fm (INCH/HR) = 0.36  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 29.0 PEAK FLOW RATE (CFS) = 30.83

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10308.00 TO NODE 10309.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 250.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 600.00 CHANNEL SLOPE = 0.0433  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 30.83  
 FLOW VELOCITY (FEET/SEC.) = 7.11 FLOW DEPTH (FEET) = 1.20  
 TRAVEL TIME (MIN.) = 1.41 Tc (MIN.) = 11.04  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10309.00 = 2722.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.04

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.427

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.00	0.50	0.600	-
USER-DEFINED	-	1.80	0.50	0.850	-
USER-DEFINED	-	1.40	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	3.40	0.50	0.500	-
USER-DEFINED	-	2.10	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.662

SUBAREA AREA(ACRES) = 15.40 SUBAREA RUNOFF(CFS) = 15.19

EFFECTIVE AREA(ACRES) = 44.40 AREA-AVERAGED Fm(INCH/HR) = 0.35

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.70

TOTAL AREA(ACRES) = 44.4 PEAK FLOW RATE(CFS) = 43.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.04

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.427

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.50	0.850	-
USER-DEFINED	-	8.80	0.50	1.000	-
USER-DEFINED	-	3.50	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.967

SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 13.41

EFFECTIVE AREA(ACRES) = 60.20 AREA-AVERAGED Fm(INCH/HR) = 0.39

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.77

TOTAL AREA(ACRES) = 60.2 PEAK FLOW RATE(CFS) = 56.42

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 250.00 DOWNSTREAM(FEET) = 208.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 1021.00 CHANNEL SLOPE = 0.0411

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00

CHANNEL FLOW THRU SUBAREA(CFS) = 56.42

FLOW VELOCITY(FEET/SEC.) = 8.11 FLOW DEPTH(FEET) = 1.52

TRAVEL TIME(MIN.) = 2.10 Tc(MIN.) = 13.14

LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10310.00 = 3743.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.14

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.293

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	4.00	0.50	0.600	-
USER-DEFINED	-	1.80	0.50	0.850	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.668

SUBAREA AREA(ACRES) = 6.60 SUBAREA RUNOFF(CFS) = 5.69

EFFECTIVE AREA(ACRES) = 66.80 AREA-AVERAGED Fm(INCH/HR) = 0.38

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76

TOTAL AREA(ACRES) = 66.8 PEAK FLOW RATE(CFS) = 56.42

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.14

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.293

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.500	-
USER-DEFINED	-	8.00	0.50	0.600	-
USER-DEFINED	-	7.10	0.50	0.850	-
USER-DEFINED	-	8.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA(ACRES) = 23.50 SUBAREA RUNOFF(CFS) = 18.73

EFFECTIVE AREA(ACRES) = 90.30 AREA-AVERAGED Fm(INCH/HR) = 0.39

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.77

TOTAL AREA(ACRES) = 90.3 PEAK FLOW RATE(CFS) = 73.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 10310.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 208.00 DOWNSTREAM(FEET) = 189.00

FLOW LENGTH(FEET) = 1595.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.9 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.59

ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 73.58

PIPE TRAVEL TIME(MIN.) = 2.29 Tc(MIN.) = 15.44

LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10335.00 = 5338.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 15.44
RAINFALL INTENSITY(INCH/HR) = 1.18
AREA-AVERAGED Fm(INCH/HR) = 0.39
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.77
EFFECTIVE STREAM AREA(ACRES) = 90.30
TOTAL STREAM AREA(ACRES) = 90.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 73.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 10320.00 TO NODE 10321.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 671.00 DOWNSTREAM(FEET) = 622.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.795
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.055
SUBAREA Tc AND LOSS RATE DATA(AMC II):

Table with 7 columns: DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.). Includes data for Residential (5-7 dwellings/acre).

\*\*\*\*\*

FLOW PROCESS FROM NODE 10321.00 TO NODE 10322.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 622.00 DOWNSTREAM(FEET) = 599.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 227.00 CHANNEL SLOPE = 0.1013
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.62
FLOW VELOCITY(FEET/SEC.) = 4.67 FLOW DEPTH(FEET) = 0.34
TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 6.60
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10322.00 = 557.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10322.00 TO NODE 10322.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.60
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.913
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN
USER-DEFINED, SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.10
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 3.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 10322.00 TO NODE 10323.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 599.00 DOWNSTREAM(FEET) = 539.00
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.80
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.59
PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 6.75
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10323.00 = 719.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10323.00 TO NODE 10323.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.75
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.890
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN
USER-DEFINED, SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 0.74
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 4.28

\*\*\*\*\*

FLOW PROCESS FROM NODE 10323.00 TO NODE 10324.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 539.00 DOWNSTREAM(FEET) = 530.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 97.00 CHANNEL SLOPE = 0.0928
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.28  
FLOW VELOCITY(FEET/SEC.) = 4.65 FLOW DEPTH(FEET) = 0.55  
TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 7.10  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10324.00 = 816.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10324.00 TO NODE 10324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 7.10  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.837  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.80 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 2.57  
EFFECTIVE AREA(ACRES) = 4.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.7 PEAK FLOW RATE(CFS) = 6.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10324.00 TO NODE 10325.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 210.00 CHANNEL SLOPE = 0.1429  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 6.71  
FLOW VELOCITY(FEET/SEC.) = 6.10 FLOW DEPTH(FEET) = 0.61  
TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 7.67  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10325.00 = 1026.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10325.00 TO NODE 10325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 7.67  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.756  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 2.30  
EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 8.68

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10326.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 460.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 345.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 8.68  
FLOW VELOCITY(FEET/SEC.) = 6.05 FLOW DEPTH(FEET) = 0.69  
TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 8.62  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10326.00 = 1371.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10326.00 TO NODE 10326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 8.62  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.642  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.90 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 2.38  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 10.40

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10326.00 TO NODE 10327.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 430.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 263.00 CHANNEL SLOPE = 0.1141  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.40  
FLOW VELOCITY(FEET/SEC.) = 6.28 FLOW DEPTH(FEET) = 0.74  
TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 9.32  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10327.00 = 1634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.32  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.571  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.50 0.500 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 4.88  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 14.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10328.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 375.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 437.00 CHANNEL SLOPE = 0.1259  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 14.75  
FLOW VELOCITY(FEET/SEC.) = 8.86 FLOW DEPTH(FEET) = 0.74  
TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 10.14  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10328.00 = 2071.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10328.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 10.14  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.499  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.50 0.500 -  
USER-DEFINED - 1.20 0.50 0.850 -  
USER-DEFINED - 0.90 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.772  
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 3.20  
EFFECTIVE AREA(ACRES) = 15.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 15.6 PEAK FLOW RATE(CFS) = 17.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10329.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 375.00 DOWNSTREAM(FEET) = 372.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 224.00 CHANNEL SLOPE = 0.0134  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 17.14  
FLOW VELOCITY(FEET/SEC.) = 3.95 FLOW DEPTH(FEET) = 1.20  
TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 11.09  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10329.00 = 2295.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10329.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 11.09  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.424  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.20 0.50 0.500 -  
USER-DEFINED - 1.40 0.50 0.850 -  
USER-DEFINED - 0.60 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.571  
SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 11.48  
EFFECTIVE AREA(ACRES) = 26.80 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 26.8 PEAK FLOW RATE(CFS) = 27.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10329.00 TO NODE 10330.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 300.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 452.00 CHANNEL SLOPE = 0.1593  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 27.57  
FLOW VELOCITY(FEET/SEC.) = 11.22 FLOW DEPTH(FEET) = 0.91  
TRAVEL TIME(MIN.) = 0.67 Tc(MIN.) = 11.76  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10330.00 = 2747.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10330.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 11.76  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.377  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.50 0.850 -  
USER-DEFINED - 4.20 0.50 0.500 -  
USER-DEFINED - 2.50 0.50 0.850 -  
USER-DEFINED - 0.60 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.673  
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 7.30  
EFFECTIVE AREA(ACRES) = 34.60 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 34.6 PEAK FLOW RATE(CFS) = 33.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10331.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 295.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 182.00 CHANNEL SLOPE = 0.0275
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 33.74
FLOW VELOCITY(FEET/SEC.) = 6.12 FLOW DEPTH(FEET) = 1.36
TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 12.25
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10331.00 = 2929.00 FEET.

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*****
FLOW PROCESS FROM NODE 10331.00 TO NODE 10331.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.25
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.345
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.70   0.50  0.850 -
USER-DEFINED        -        11.30   0.50  0.500 -
USER-DEFINED        -         0.20   0.50  0.600 -
USER-DEFINED        -         4.20   0.50  0.850 -
USER-DEFINED        -         1.60   0.50  1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.652
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 17.42
EFFECTIVE AREA(ACRES) = 53.60 AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 53.6 PEAK FLOW RATE(CFS) = 50.16

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*****
FLOW PROCESS FROM NODE 10331.00 TO NODE 10332.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 295.00 DOWNSTREAM(FEET) = 245.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.00 CHANNEL SLOPE = 0.0542
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 50.16
FLOW VELOCITY(FEET/SEC.) = 8.71 FLOW DEPTH(FEET) = 1.39
TRAVEL TIME(MIN.) = 1.76 Tc(MIN.) = 14.02
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10332.00 = 3851.00 FEET.

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*****
FLOW PROCESS FROM NODE 10332.00 TO NODE 10332.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.02
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.249
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS

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LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.50  0.850 -
USER-DEFINED        -         1.40   0.50  0.500 -
USER-DEFINED        -        15.40   0.50  0.850 -
USER-DEFINED        -         8.60   0.50  1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.881
SUBAREA AREA(ACRES) = 25.60 SUBAREA RUNOFF(CFS) = 18.62
EFFECTIVE AREA(ACRES) = 79.20 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 79.2 PEAK FLOW RATE(CFS) = 64.16

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*****
FLOW PROCESS FROM NODE 10332.00 TO NODE 10333.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 199.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 564.00 CHANNEL SLOPE = 0.0816
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 64.16
FLOW VELOCITY(FEET/SEC.) = 10.81 FLOW DEPTH(FEET) = 1.41
TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 14.89
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10333.00 = 4415.00 FEET.

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*****
FLOW PROCESS FROM NODE 10333.00 TO NODE 10333.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.89
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.206
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.50   0.50  0.500 -
USER-DEFINED        -         0.50   0.50  0.850 -
USER-DEFINED        -         0.60   0.50  0.500 -
USER-DEFINED        -         5.70   0.50  0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.761
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 6.16
EFFECTIVE AREA(ACRES) = 87.50 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 87.5 PEAK FLOW RATE(CFS) = 67.23

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*****
FLOW PROCESS FROM NODE 10333.00 TO NODE 10334.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 195.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 454.00 CHANNEL SLOPE = 0.0088
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 4.00

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CHANNEL FLOW THRU SUBAREA(CFS) = 67.23  
FLOW VELOCITY(FEET/SEC.) = 4.75 FLOW DEPTH(FEET) = 2.17  
TRAVEL TIME(MIN.) = 1.59 Tc(MIN.) = 16.48  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10334.00 = 4869.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10334.00 TO NODE 10334.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 16.48  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.147  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.50 0.800 -  
USER-DEFINED - 2.60 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 2.43  
EFFECTIVE AREA(ACRES) = 91.20 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.71  
TOTAL AREA(ACRES) = 91.2 PEAK FLOW RATE(CFS) = 67.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10334.00 TO NODE 10335.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 195.00 DOWNSTREAM(FEET) = 189.00  
FLOW LENGTH(FEET) = 1291.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.96  
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 67.23  
PIPE TRAVEL TIME(MIN.) = 2.70 Tc(MIN.) = 19.18  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 19.18  
RAINFALL INTENSITY(INCH/HR) = 1.05  
AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.71  
EFFECTIVE STREAM AREA(ACRES) = 91.20  
TOTAL STREAM AREA(ACRES) = 91.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 67.23

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	73.58	15.44	1.184	0.50( 0.39)	0.77	90.3	10300.00
2	67.23	19.18	1.049	0.50( 0.35)	0.71	91.2	10320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	138.18	15.44	1.184	0.50( 0.37)	0.75	163.7	10300.00
2	128.35	19.18	1.049	0.50( 0.37)	0.74	181.5	10320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 138.18 Tc(MIN.) = 15.44  
EFFECTIVE AREA(ACRES) = 163.69 AREA-AVERAGED Fm(INCH/HR) = 0.37  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.75  
TOTAL AREA(ACRES) = 181.5  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10335.00 TO NODE 10336.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 189.00 DOWNSTREAM(FEET) = 188.00  
FLOW LENGTH(FEET) = 103.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 37.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.54  
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 138.18  
PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 15.57  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10336.00 = 6263.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10336.00 TO NODE 10337.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.78  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 138.18  
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 15.74  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10337.00 = 6475.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10337.00 TO NODE 10338.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 161.00



CHANNEL LENGTH THRU SUBAREA (FEET) = 872.00 CHANNEL SLOPE = 0.0218  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 138.18  
FLOW VELOCITY (FEET/SEC.) = 7.99 FLOW DEPTH (FEET) = 2.40  
TRAVEL TIME (MIN.) = 1.82 Tc (MIN.) = 17.56  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10338.00 = 7347.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 17.56  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.108  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 0.850 -  
USER-DEFINED - 0.80 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 1.30 0.50 1.000 -  
USER-DEFINED - 0.90 0.50 0.850 -  
USER-DEFINED - 0.20 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.943  
SUBAREA AREA (ACRES) = 4.20 SUBAREA RUNOFF (CFS) = 2.40  
EFFECTIVE AREA (ACRES) = 167.89 AREA-AVERAGED Fm (INCH/HR) = 0.38  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 185.7 PEAK FLOW RATE (CFS) = 138.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 17.56  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.108  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 1.000 -  
USER-DEFINED - 4.60 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 2.73  
EFFECTIVE AREA (ACRES) = 172.89 AREA-AVERAGED Fm (INCH/HR) = 0.38  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 190.7 PEAK FLOW RATE (CFS) = 138.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10339.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
-----

ELEVATION DATA: UPSTREAM (FEET) = 161.00 DOWNSTREAM (FEET) = 159.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 328.00 CHANNEL SLOPE = 0.0061  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 138.18  
FLOW VELOCITY (FEET/SEC.) = 4.95 FLOW DEPTH (FEET) = 3.05  
TRAVEL TIME (MIN.) = 1.10 Tc (MIN.) = 18.66  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10339.00 = 7675.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 18.66  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.068  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.50 0.850 -  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 0.40 0.50 0.500 -  
USER-DEFINED - 2.30 0.50 0.850 -  
USER-DEFINED - 0.40 0.50 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.767  
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 4.25  
EFFECTIVE AREA (ACRES) = 179.79 AREA-AVERAGED Fm (INCH/HR) = 0.38  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 138.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 18.66  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.068  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 0.500 -  
USER-DEFINED - 6.30 0.50 0.850 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 2.20 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.876  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 5.22  
EFFECTIVE AREA (ACRES) = 188.99 AREA-AVERAGED Fm (INCH/HR) = 0.38  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 206.8 PEAK FLOW RATE (CFS) = 138.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10390.00 IS CODE = 51

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-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 159.00 DOWNSTREAM(FEET) = 155.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 782.00 CHANNEL SLOPE = 0.0051
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 138.18
FLOW VELOCITY(FEET/SEC.) = 4.63 FLOW DEPTH(FEET) = 3.15
TRAVEL TIME(MIN.) = 2.81 Tc(MIN.) = 21.48
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 21.48
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.985
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.30     0.50     0.800   -
USER-DEFINED        -         3.70     0.50     0.850   -
USER-DEFINED        -         0.10     0.50     1.000   -
USER-DEFINED        -         2.10     0.50     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.901
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 2.98
EFFECTIVE AREA(ACRES) = 195.19 AREA-AVERAGED Fm(INCH/HR) = 0.38
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 213.0 PEAK FLOW RATE(CFS) = 138.18
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
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*****
FLOW PROCESS FROM NODE 10340.00 TO NODE 10341.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

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```

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 585.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.581
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.464
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS   Tc
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE"   -         0.10     0.50     0.800   95   10.58

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PUBLIC PARK - 0.50 0.50 0.850 95 10.90
AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW" - 0.40 0.50 1.000 95 21.09
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA RUNOFF(CFS) = 0.91
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 0.91

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*****
FLOW PROCESS FROM NODE 10341.00 TO NODE 10342.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====

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```

UPSTREAM ELEVATION(FEET) = 585.00 DOWNSTREAM ELEVATION(FEET) = 570.00
STREET LENGTH(FEET) = 250.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

```

```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.80
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.32
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.05
STREET FLOW TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 11.36
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.405

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70     0.50     0.800   -
USER-DEFINED        -         1.40     0.50     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 1.77
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.46
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 2.63

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.22 HALFSTREET FLOOD WIDTH(FEET) = 2.99
FLOW VELOCITY(FEET/SEC.) = 4.71 DEPTH*VELOCITY(FT*FT/SEC.) = 1.03
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10342.00 = 558.00 FEET.

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*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

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```

=====
UPSTREAM ELEVATION(FEET) = 570.00  DOWNSTREAM ELEVATION(FEET) = 560.00
STREET LENGTH(FEET) = 415.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.55
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 6.29
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.04
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.86
STREET FLOW TRAVEL TIME(MIN.) = 2.28  Tc(MIN.) = 13.64
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.268
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -  1.20  0.50  0.800  -
USER-DEFINED  -  1.20  0.50  0.850  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.825
SUBAREA AREA(ACRES) = 2.40  SUBAREA RUNOFF(CFS) = 1.85
EFFECTIVE AREA(ACRES) = 5.50  AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 5.5  PEAK FLOW RATE(CFS) = 4.09

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30  HALFSTREET FLOOD WIDTH(FEET) = 6.85
FLOW VELOCITY(FEET/SEC.) = 3.11  DEPTH*VELOCITY(FT*FT/SEC.) = 0.92
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10343.00 = 973.00 FEET.

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*****
FLOW PROCESS FROM NODE 10343.00 TO NODE 10344.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

```

```

=====
UPSTREAM ELEVATION(FEET) = 560.00  DOWNSTREAM ELEVATION(FEET) = 550.00
STREET LENGTH(FEET) = 616.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.02
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.33
HALFSTREET FLOOD WIDTH(FEET) = 8.47
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.77
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.91
STREET FLOW TRAVEL TIME(MIN.) = 3.71  Tc(MIN.) = 17.35
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.115
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -  2.10  0.50  0.800  -
USER-DEFINED  -  0.80  0.50  0.850  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814
SUBAREA AREA(ACRES) = 2.90  SUBAREA RUNOFF(CFS) = 1.85
EFFECTIVE AREA(ACRES) = 8.40  AREA-AVERAGED Fm(INCH/HR) = 0.43
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.86
TOTAL AREA(ACRES) = 8.4  PEAK FLOW RATE(CFS) = 5.19

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.33  HALFSTREET FLOOD WIDTH(FEET) = 8.63
FLOW VELOCITY(FEET/SEC.) = 2.78  DEPTH*VELOCITY(FT*FT/SEC.) = 0.92
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10344.00 = 1589.00 FEET.

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*****
FLOW PROCESS FROM NODE 10344.00 TO NODE 10345.00 IS CODE = 63
-----

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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

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=====
UPSTREAM ELEVATION(FEET) = 550.00  DOWNSTREAM ELEVATION(FEET) = 510.00
STREET LENGTH(FEET) = 474.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.08
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 5.94
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.61
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.55
STREET FLOW TRAVEL TIME(MIN.) = 1.41  Tc(MIN.) = 18.76
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.065
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN

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USER-DEFINED          -      2.80      0.50      0.800      -
USER-DEFINED          -      0.20      0.50      0.850      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803
SUBAREA AREA(ACRES) = 3.00      SUBAREA RUNOFF(CFS) = 1.79
EFFECTIVE AREA(ACRES) = 11.40      AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50      AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 11.4      PEAK FLOW RATE(CFS) = 6.59

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.28      HALFSTREET FLOOD WIDTH(FEET) = 6.24
FLOW VELOCITY(FEET/SEC.) = 5.70      DEPTH*VELOCITY(FT*FT/SEC.) = 1.61
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10345.00 = 2063.00 FEET.

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*****
FLOW PROCESS FROM NODE 10345.00 TO NODE 10346.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 510.00      DOWNSTREAM ELEVATION(FEET) = 484.00
STREET LENGTH(FEET) = 231.00      CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.54

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.29
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 6.09
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.51
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.82
STREET FLOW TRAVEL TIME(MIN.) = 0.59      Tc(MIN.) = 19.35
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.043
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN
USER-DEFINED      -      2.40      0.50      0.800      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 2.40      SUBAREA RUNOFF(CFS) = 1.39
EFFECTIVE AREA(ACRES) = 13.80      AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50      AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 13.8      PEAK FLOW RATE(CFS) = 7.76

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.28      HALFSTREET FLOOD WIDTH(FEET) = 6.29
FLOW VELOCITY(FEET/SEC.) = 6.63      DEPTH*VELOCITY(FT*FT/SEC.) = 1.88
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10346.00 = 2294.00 FEET.

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*****
FLOW PROCESS FROM NODE 10346.00 TO NODE 10347.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 484.00      DOWNSTREAM ELEVATION(FEET) = 378.00
STREET LENGTH(FEET) = 995.00      CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.55

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.83
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.30
HALFSTREET FLOOD WIDTH(FEET) = 6.90
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.63
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.96
STREET FLOW TRAVEL TIME(MIN.) = 2.50      Tc(MIN.) = 21.86
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.975
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN
USER-DEFINED      -      4.10      0.50      0.800      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 4.10      SUBAREA RUNOFF(CFS) = 2.12
EFFECTIVE AREA(ACRES) = 17.90      AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50      AREA-AVERAGED Ap = 0.83
TOTAL AREA(ACRES) = 17.9      PEAK FLOW RATE(CFS) = 9.05

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30      HALFSTREET FLOOD WIDTH(FEET) = 7.00
FLOW VELOCITY(FEET/SEC.) = 6.65      DEPTH*VELOCITY(FT*FT/SEC.) = 1.98
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10347.00 = 3289.00 FEET.

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*****
FLOW PROCESS FROM NODE 10347.00 TO NODE 10348.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 378.00      DOWNSTREAM ELEVATION(FEET) = 303.00
STREET LENGTH(FEET) = 751.00      CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.56

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.00  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 7.97  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.67  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.12  
STREET FLOW TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 23.73  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.930

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.20 0.50 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 3.91  
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 12.23

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.37  
FLOW VELOCITY(FEET/SEC.) = 6.87 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.24  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10348.00 = 4040.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10348.00 TO NODE 10349.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 303.00 DOWNSTREAM ELEVATION(FEET) = 252.00  
STREET LENGTH(FEET) = 607.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.50  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 9.54  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.59  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.30  
STREET FLOW TRAVEL TIME(MIN.) = 1.54 Tc(MIN.) = 25.27  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.895

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.30 0.50 0.800 -  
USER-DEFINED - 3.00 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.815  
SUBAREA AREA(ACRES) = 10.30 SUBAREA RUNOFF(CFS) = 4.52  
EFFECTIVE AREA(ACRES) = 36.40 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 36.4 PEAK FLOW RATE(CFS) = 15.93

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 9.95  
FLOW VELOCITY(FEET/SEC.) = 6.75 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.41  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10349.00 = 4647.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10349.00 TO NODE 10350.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 252.00 DOWNSTREAM ELEVATION(FEET) = 246.00  
STREET LENGTH(FEET) = 224.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.75  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.43  
HALFSTREET FLOOD WIDTH(FEET) = 13.76  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.50  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.95  
STREET FLOW TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 26.09  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.880

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 12.60 0.50 0.800 -  
USER-DEFINED - 0.50 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.802  
SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 5.65  
EFFECTIVE AREA(ACRES) = 49.50 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 49.5 PEAK FLOW RATE(CFS) = 21.09

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 HALFSTREET FLOOD WIDTH(FEET) = 14.47  
FLOW VELOCITY(FEET/SEC.) = 4.62 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.07  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10350.00 = 4871.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10350.00 TO NODE 10351.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 237.00  
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.86  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 21.09  
PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 26.97  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10351.00 = 5390.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10351.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 26.97  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.865  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 0.100 -  
USER-DEFINED - 5.60 0.50 0.800 -  
USER-DEFINED - 0.70 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.784  
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 2.76  
EFFECTIVE AREA(ACRES) = 56.00 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 56.0 PEAK FLOW RATE(CFS) = 23.15

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10352.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 237.00 DOWNSTREAM(FEET) = 230.00  
FLOW LENGTH(FEET) = 675.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.31  
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 23.15  
PIPE TRAVEL TIME(MIN.) = 1.35 Tc(MIN.) = 28.33  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10352.00 = 6065.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 28.33  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.840

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.00 0.50 0.100 -  
USER-DEFINED - 0.40 0.50 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.300  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 0.87  
EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.40  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 23.15  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 28.33  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.840  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.50 0.100 -  
USER-DEFINED - 9.40 0.50 0.800 -  
USER-DEFINED - 1.10 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.755  
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 4.70  
EFFECTIVE AREA(ACRES) = 68.70 AREA-AVERAGED Fm(INCH/HR) = 0.40  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.79  
TOTAL AREA(ACRES) = 68.7 PEAK FLOW RATE(CFS) = 27.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10353.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 230.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.69  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 27.49  
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 28.53  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10353.00 = 6366.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10353.00 TO NODE 10353.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 28.53  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.836

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	6.00	0.50	0.800	-
USER-DEFINED	-	1.30	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.799  
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 2.91  
EFFECTIVE AREA(ACRES) = 76.10 AREA-AVERAGED Fm(INCH/HR) = 0.40  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.79  
TOTAL AREA(ACRES) = 76.1 PEAK FLOW RATE(CFS) = 30.17

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10353.00 TO NODE 10354.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----  
ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 172.00  
FLOW LENGTH(FEET) = 458.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.79  
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 30.17  
PIPE TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 29.24  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10354.00 = 6824.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10354.00 TO NODE 10390.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
-----  
ELEVATION DATA: UPSTREAM(FEET) = 172.00 DOWNSTREAM(FEET) = 155.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00 CHANNEL SLOPE = 0.0411  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 30.17  
FLOW VELOCITY(FEET/SEC.) = 6.89 FLOW DEPTH(FEET) = 1.21  
TRAVEL TIME(MIN.) = 1.00 Tc(MIN.) = 30.24  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc(MIN.) = 30.24  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.807  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	0.90	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.520  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 0.98  
EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.39  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.78  
TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 30.17  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc(MIN.) = 30.24  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.807  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	2.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.964  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 1.11  
EFFECTIVE AREA(ACRES) = 81.90 AREA-AVERAGED Fm(INCH/HR) = 0.40  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.79  
TOTAL AREA(ACRES) = 81.9 PEAK FLOW RATE(CFS) = 30.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc(MIN.) = 30.24  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.807  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.50	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 0.69  
EFFECTIVE AREA(ACRES) = 84.40 AREA-AVERAGED Fm(INCH/HR) = 0.40  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 84.4 PEAK FLOW RATE(CFS) = 30.95

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
-----  
\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
------------------	------------	--------------	------------------------	---------------------	---------------	---------------	-------------------

1 30.95 30.24 0.807 0.50( 0.40) 0.80 84.4 10340.00  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	138.18	21.48	0.985	0.50( 0.38)	0.77	195.2	10300.00
2	128.35	25.33	0.894	0.50( 0.38)	0.76	213.0	10320.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	169.13	21.48	0.985	0.50( 0.39)	0.78	255.1	10300.00
2	159.30	25.33	0.894	0.50( 0.39)	0.77	283.7	10320.00
3	137.55	30.24	0.807	0.50( 0.39)	0.77	297.4	10340.00

TOTAL AREA (ACRES) = 297.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 169.13 Tc(MIN.) = 21.479  
EFFECTIVE AREA(ACRES) = 255.15 AREA-AVERAGED Fm(INCH/HR) = 0.39  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.77  
TOTAL AREA(ACRES) = 297.4  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10360.00 TO NODE 10361.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 337.00 DOWNSTREAM(FEET) = 292.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.697

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.454

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.50	1.000	95	10.70
NATURAL FAIR COVER "GRASS"	-	0.50	0.50	1.000	95	10.70
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.10	0.50	1.000	95	10.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.77  
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 0.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10361.00 TO NODE 10362.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 292.00 DOWNSTREAM(FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 199.00 CHANNEL SLOPE = 0.0101  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.77  
FLOW VELOCITY(FEET/SEC.) = 1.61 FLOW DEPTH(FEET) = 0.40  
TRAVEL TIME(MIN.) = 2.06 Tc(MIN.) = 12.75  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10362.00 = 529.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10362.00 TO NODE 10362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 12.75

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.315

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986

SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 0.81

EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 1.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10362.00 TO NODE 10363.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 290.00 DOWNSTREAM(FEET) = 288.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.47  
FLOW VELOCITY(FEET/SEC.) = 2.15 FLOW DEPTH(FEET) = 0.48  
TRAVEL TIME(MIN.) = 1.14 Tc(MIN.) = 13.89  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10363.00 = 676.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10363.00 TO NODE 10363.00 IS CODE = 81



>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 13.89
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.255
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
  LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         1.40     0.50     1.000     -
USER-DEFINED        -         0.20     0.50     0.850     -
USER-DEFINED        -         0.80     0.50     1.000     -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.988
SUBAREA AREA(ACRES) = 2.40   SUBAREA RUNOFF(CFS) = 1.64
EFFECTIVE AREA(ACRES) = 4.40   AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 4.4   PEAK FLOW RATE(CFS) = 3.01

```

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10363.00 TO NODE 10364.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 288.00   DOWNSTREAM(FEET) = 286.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00   CHANNEL SLOPE = 0.0136
CHANNEL BASE(FEET) = 0.00   "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.01
FLOW VELOCITY(FEET/SEC.) = 2.59   FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 0.95   Tc(MIN.) = 14.84
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10364.00 = 823.00 FEET.

```

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10364.00 TO NODE 10364.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 14.84
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.208
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
  LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.10     0.50     0.850     -
USER-DEFINED        -         1.40     0.50     1.000     -
USER-DEFINED        -         0.20     0.50     1.000     -
USER-DEFINED        -         0.10     0.50     0.850     -
USER-DEFINED        -         0.10     0.50     1.000     -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.984
SUBAREA AREA(ACRES) = 1.90   SUBAREA RUNOFF(CFS) = 1.22
EFFECTIVE AREA(ACRES) = 6.30   AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 6.3   PEAK FLOW RATE(CFS) = 4.05

```

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10364.00 TO NODE 10365.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 286.00   DOWNSTREAM(FEET) = 284.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00   CHANNEL SLOPE = 0.0081
CHANNEL BASE(FEET) = 0.00   "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.05
FLOW VELOCITY(FEET/SEC.) = 2.29   FLOW DEPTH(FEET) = 0.77
TRAVEL TIME(MIN.) = 1.81   Tc(MIN.) = 16.64
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10365.00 = 1071.00 FEET.

```

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10365.00 TO NODE 10365.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 16.64
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.141
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
  LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.90     0.50     1.000     -
USER-DEFINED        -         1.80     0.50     1.000     -
USER-DEFINED        -         0.30     0.50     0.850     -
USER-DEFINED        -         0.50     0.50     1.000     -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.987
SUBAREA AREA(ACRES) = 3.50   SUBAREA RUNOFF(CFS) = 2.04
EFFECTIVE AREA(ACRES) = 9.80   AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 9.8   PEAK FLOW RATE(CFS) = 5.70

```

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10365.00 TO NODE 10366.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 284.00   DOWNSTREAM(FEET) = 282.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00   CHANNEL SLOPE = 0.0081
CHANNEL BASE(FEET) = 0.00   "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.70
FLOW VELOCITY(FEET/SEC.) = 2.49   FLOW DEPTH(FEET) = 0.87
TRAVEL TIME(MIN.) = 1.66   Tc(MIN.) = 18.31
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10366.00 = 1319.00 FEET.

```

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10366.00 TO NODE 10366.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 18.31
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.081
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
  LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.10     0.50     0.850     -

```

USER-DEFINED - 3.20 0.50 1.000 -  
USER-DEFINED - 2.30 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 0.850 -  
USER-DEFINED - 2.70 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995  
SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 4.46  
EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 9.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10366.00 TO NODE 10367.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 279.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 292.00 CHANNEL SLOPE = 0.0103  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.64  
FLOW VELOCITY(FEET/SEC.) = 3.09 FLOW DEPTH(FEET) = 1.02  
TRAVEL TIME(MIN.) = 1.57 Tc(MIN.) = 19.88  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10367.00 = 1611.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10367.00 TO NODE 10367.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 19.88  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.024  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 0.850 -  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 1.10 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 0.850 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972  
SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 0.77  
EFFECTIVE AREA (ACRES) = 19.90 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 19.9 PEAK FLOW RATE (CFS) = 9.64  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10367.00 TO NODE 10368.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 279.00 DOWNSTREAM(FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 378.00 CHANNEL SLOPE = 0.0079  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.64  
FLOW VELOCITY(FEET/SEC.) = 2.80 FLOW DEPTH(FEET) = 1.07  
TRAVEL TIME(MIN.) = 2.25 Tc(MIN.) = 22.13  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10368.00 = 1989.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10368.00 TO NODE 10368.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 22.13  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.969  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 0.850 -  
USER-DEFINED - 0.90 0.50 1.000 -  
USER-DEFINED - 0.90 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.973  
SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 0.95  
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 9.64  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10368.00 TO NODE 10369.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 247.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 229.00 CHANNEL SLOPE = 0.1266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.64  
FLOW VELOCITY(FEET/SEC.) = 7.94 FLOW DEPTH(FEET) = 0.64  
TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 22.61  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10369.00 = 2218.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10369.00 TO NODE 10369.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 22.61  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.957  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.50 0.850 -  
USER-DEFINED - 9.70 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 1.40 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996

SUBAREA AREA (ACRES) = 11.60 SUBAREA RUNOFF (CFS) = 4.79  
EFFECTIVE AREA (ACRES) = 33.70 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 33.7 PEAK FLOW RATE (CFS) = 14.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10369.00 TO NODE 10370.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 247.00 DOWNSTREAM (FEET) = 226.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 179.00 CHANNEL SLOPE = 0.1173  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 14.01  
FLOW VELOCITY (FEET/SEC.) = 8.46 FLOW DEPTH (FEET) = 0.74  
TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 22.96  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10370.00 = 2397.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10370.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 22.96  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.949  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 0.850 -  
USER-DEFINED - 3.60 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 5.60 0.50 1.000 -  
USER-DEFINED - 1.50 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
SUBAREA AREA (ACRES) = 11.10 SUBAREA RUNOFF (CFS) = 4.50  
EFFECTIVE AREA (ACRES) = 44.80 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 44.8 PEAK FLOW RATE (CFS) = 18.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10371.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 226.00 DOWNSTREAM (FEET) = 188.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 434.00 CHANNEL SLOPE = 0.0876  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 18.25  
FLOW VELOCITY (FEET/SEC.) = 8.09 FLOW DEPTH (FEET) = 0.87  
TRAVEL TIME (MIN.) = 0.89 Tc (MIN.) = 23.86  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10371.00 = 2831.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10371.00 TO NODE 10371.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 23.86  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.927  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 0.100 -  
USER-DEFINED - 1.20 0.50 0.850 -  
USER-DEFINED - 1.60 0.50 1.000 -  
USER-DEFINED - 0.40 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 0.100 -  
USER-DEFINED - 7.20 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958  
SUBAREA AREA (ACRES) = 10.70 SUBAREA RUNOFF (CFS) = 4.32  
EFFECTIVE AREA (ACRES) = 55.50 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 21.70

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10371.00 TO NODE 10389.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 188.00 DOWNSTREAM (FEET) = 157.00  
FLOW LENGTH (FEET) = 1918.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.64  
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 21.70  
PIPE TRAVEL TIME (MIN.) = 3.32 Tc (MIN.) = 27.17  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 27.17  
RAINFALL INTENSITY (INCH/HR) = 0.86  
AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.99  
EFFECTIVE STREAM AREA (ACRES) = 55.50  
TOTAL STREAM AREA (ACRES) = 55.50  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 21.70

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10380.00 TO NODE 10381.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 241.00
ELEVATION DATA: UPSTREAM (FEET) = 275.00 DOWNSTREAM (FEET) = 273.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.110
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.835
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL - 0.20 0.50 0.100 95 7.11
PUBLIC PARK - 1.10 0.50 0.850 95 11.30
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.735
SUBAREA RUNOFF (CFS) = 1.72
TOTAL AREA (ACRES) = 1.30 PEAK FLOW RATE (CFS) = 1.72

\*\*\*\*\*
FLOW PROCESS FROM NODE 10381.00 TO NODE 10382.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 273.00 DOWNSTREAM ELEVATION (FEET) = 271.00
STREET LENGTH (FEET) = 238.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.65
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.30
HALFSTREET FLOOD WIDTH (FEET) = 7.22
AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.87
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.56
STREET FLOW TRAVEL TIME (MIN.) = 2.13 Tc (MIN.) = 9.24
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.579
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.50 0.100 -
USER-DEFINED - 1.40 0.50 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.718
SUBAREA AREA (ACRES) = 1.70 SUBAREA RUNOFF (CFS) = 1.87
EFFECTIVE AREA (ACRES) = 3.00 AREA-AVERAGED Fm (INCH/HR) = 0.36
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73
TOTAL AREA (ACRES) = 3.0 PEAK FLOW RATE (CFS) = 3.28

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.32 HALFSTREET FLOOD WIDTH (FEET) = 8.09
FLOW VELOCITY (FEET/SEC.) = 1.94 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.62
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10382.00 = 479.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10382.00 TO NODE 10383.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 271.00 DOWNSTREAM ELEVATION (FEET) = 268.00
STREET LENGTH (FEET) = 357.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.81
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.35
HALFSTREET FLOOD WIDTH (FEET) = 9.72
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.12
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.75
STREET FLOW TRAVEL TIME (MIN.) = 2.80 Tc (MIN.) = 12.04
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.358

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.50 0.50 0.100 -
USER-DEFINED - 0.20 0.50 0.500 -
USER-DEFINED - 1.30 0.50 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.452
SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 3.06
EFFECTIVE AREA (ACRES) = 6.00 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59
TOTAL AREA (ACRES) = 6.0 PEAK FLOW RATE (CFS) = 5.74

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 10.59
FLOW VELOCITY (FEET/SEC.) = 2.19 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.81
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10383.00 = 836.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10383.00 TO NODE 10384.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 268.00 DOWNSTREAM ELEVATION (FEET) = 264.00
STREET LENGTH (FEET) = 473.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.51  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.40  
HALFSTREET FLOOD WIDTH(FEET) = 11.91  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.33  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.93  
STREET FLOW TRAVEL TIME(MIN.) = 3.38 Tc(MIN.) = 15.42  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.185

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.50 0.500 -  
USER-DEFINED - 0.10 0.50 0.850 -  
USER-DEFINED - 0.10 0.50 0.100 -  
USER-DEFINED - 3.00 0.50 0.500 -  
USER-DEFINED - 0.60 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.548  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 3.53  
EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.57  
TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 8.33

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 12.46  
FLOW VELOCITY(FEET/SEC.) = 2.39 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.97  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10384.00 = 1309.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10384.00 TO NODE 10385.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 264.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
STREET LENGTH(FEET) = 463.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.46  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.45  
HALFSTREET FLOOD WIDTH(FEET) = 14.49  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.28  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.02  
STREET FLOW TRAVEL TIME(MIN.) = 3.38 Tc(MIN.) = 18.80  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.063

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 0.600 -  
USER-DEFINED - 0.30 0.50 0.600 -  
USER-DEFINED - 0.60 0.50 0.850 -  
USER-DEFINED - 0.30 0.50 0.500 -  
USER-DEFINED - 4.00 0.50 0.600 -  
USER-DEFINED - 0.80 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.650  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 4.25  
EFFECTIVE AREA(ACRES) = 16.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 16.7 PEAK FLOW RATE(CFS) = 11.46

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 15.04  
FLOW VELOCITY(FEET/SEC.) = 2.34 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.07  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10385.00 = 1772.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10385.00 TO NODE 10385.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc(MIN.) = 18.80  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.063  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.15  
EFFECTIVE AREA(ACRES) = 16.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 16.9 PEAK FLOW RATE(CFS) = 11.61

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10385.00 TO NODE 10386.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 261.00 DOWNSTREAM(FEET) = 200.00  
FLOW LENGTH(FEET) = 712.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.56  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 11.61  
PIPE TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 19.56  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10386.00 = 2484.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 19.56  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.50 0.100 -  
USER-DEFINED - 0.20 0.50 0.850 -  
USER-DEFINED - 0.30 0.50 0.100 -  
USER-DEFINED - 0.30 0.50 0.850 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.561  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 0.95  
EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 12.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 19.56  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.50 0.100 -  
USER-DEFINED - 0.10 0.50 0.600 -  
USER-DEFINED - 1.70 0.50 0.850 -  
USER-DEFINED - 0.20 0.50 0.100 -  
USER-DEFINED - 0.30 0.50 0.850 -  
USER-DEFINED - 0.30 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.544  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 2.82  
EFFECTIVE AREA(ACRES) = 22.40 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 22.4 PEAK FLOW RATE(CFS) = 14.96

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.56  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.50 0.100 -  
USER-DEFINED - 0.20 0.50 0.500 -  
USER-DEFINED - 0.10 0.50 0.600 -  
USER-DEFINED - 0.30 0.50 0.850 -  
USER-DEFINED - 0.70 0.50 0.100 -  
USER-DEFINED - 0.10 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 2.91  
EFFECTIVE AREA(ACRES) = 25.90 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.54  
TOTAL AREA(ACRES) = 25.9 PEAK FLOW RATE(CFS) = 17.87

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 19.56  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 1.70 0.50 0.100 -  
USER-DEFINED - 0.10 0.50 0.850 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.228  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 1.66  
EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.52  
TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 19.53

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 19.56  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 0.100 -  
USER-DEFINED - 0.50 0.50 0.850 -  
USER-DEFINED - 2.10 0.50 0.100 -  
USER-DEFINED - 0.20 0.50 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 2.49  
EFFECTIVE AREA(ACRES) = 30.90 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.49

TOTAL AREA (ACRES) = 30.9 PEAK FLOW RATE (CFS) = 22.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====
MAINLINE Tc (MIN.) = 19.56
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.036
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.00 0.50 0.100 -
USER-DEFINED - 1.50 0.50 0.600 -
USER-DEFINED - 1.70 0.50 0.100 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.204
SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 6.05
EFFECTIVE AREA (ACRES) = 38.10 AREA-AVERAGED Fm (INCH/HR) = 0.22
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43
TOTAL AREA (ACRES) = 38.1 PEAK FLOW RATE (CFS) = 28.07

\*\*\*\*\*
FLOW PROCESS FROM NODE 10386.00 TO NODE 10387.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM (FEET) = 200.00 DOWNSTREAM (FEET) = 163.00
FLOW LENGTH (FEET) = 1145.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.39
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 28.07
PIPE TRAVEL TIME (MIN.) = 1.42 Tc (MIN.) = 20.98
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10387.00 = 3629.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====
MAINLINE Tc (MIN.) = 20.98
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.996
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.50 0.100 -
USER-DEFINED - 23.80 0.50 0.850 -
USER-DEFINED - 0.30 0.50 1.000 -
USER-DEFINED - 0.80 0.50 1.000 -
USER-DEFINED - 0.60 0.50 0.100 -
USER-DEFINED - 6.90 0.50 0.850 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.830
SUBAREA AREA (ACRES) = 32.90 SUBAREA RUNOFF (CFS) = 17.21
EFFECTIVE AREA (ACRES) = 71.00 AREA-AVERAGED Fm (INCH/HR) = 0.31
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.62

TOTAL AREA (ACRES) = 71.0 PEAK FLOW RATE (CFS) = 43.93

\*\*\*\*\*
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====
MAINLINE Tc (MIN.) = 20.98
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.996
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.50 1.000 -
USER-DEFINED - 0.20 0.50 0.850 -
USER-DEFINED - 1.20 0.50 0.100 -
USER-DEFINED - 1.70 0.50 0.850 -
USER-DEFINED - 0.30 0.50 1.000 -
USER-DEFINED - 0.10 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.641
SUBAREA AREA (ACRES) = 3.80 SUBAREA RUNOFF (CFS) = 2.31
EFFECTIVE AREA (ACRES) = 74.80 AREA-AVERAGED Fm (INCH/HR) = 0.31
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.62
TOTAL AREA (ACRES) = 74.8 PEAK FLOW RATE (CFS) = 46.24

\*\*\*\*\*
FLOW PROCESS FROM NODE 10387.00 TO NODE 10388.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM (FEET) = 163.00 DOWNSTREAM (FEET) = 158.00
FLOW LENGTH (FEET) = 150.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 15.18
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 46.24
PIPE TRAVEL TIME (MIN.) = 0.16 Tc (MIN.) = 21.15
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10388.00 = 3779.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====
MAINLINE Tc (MIN.) = 21.15
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.992
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.80 0.50 0.100 -
USER-DEFINED - 0.40 0.50 0.400 -
USER-DEFINED - 0.60 0.50 0.850 -
USER-DEFINED - 0.10 0.50 1.000 -
USER-DEFINED - 0.10 0.50 1.000 -
USER-DEFINED - 0.10 0.50 0.100 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223

SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 4.84  
EFFECTIVE AREA (ACRES) = 80.90 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 80.9 PEAK FLOW RATE (CFS) = 50.81

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 21.15  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.992  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 0.100 -  
USER-DEFINED - 10.70 0.50 0.400 -  
USER-DEFINED - 2.30 0.50 0.850 -  
USER-DEFINED - 0.50 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 0.70 0.50 0.400 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.502  
SUBAREA AREA (ACRES) = 14.60 SUBAREA RUNOFF (CFS) = 9.74  
EFFECTIVE AREA (ACRES) = 95.50 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.58  
TOTAL AREA (ACRES) = 95.5 PEAK FLOW RATE (CFS) = 60.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 21.15  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.992  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 0.36  
EFFECTIVE AREA (ACRES) = 96.20 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.58  
TOTAL AREA (ACRES) = 96.2 PEAK FLOW RATE (CFS) = 60.91

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10389.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 158.00 DOWNSTREAM (FEET) = 157.00  
FLOW LENGTH (FEET) = 51.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.7 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.32  
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 60.91

PIPE TRAVEL TIME (MIN.) = 0.06 Tc (MIN.) = 21.21  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10389.00 = 3830.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION (MIN.) = 21.21  
RAINFALL INTENSITY (INCH/HR) = 0.99  
AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.58  
EFFECTIVE STREAM AREA (ACRES) = 96.20  
TOTAL STREAM AREA (ACRES) = 96.20  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 60.91

\*\* CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 21.70 27.17 0.861 0.50 ( 0.49) 0.99 55.5 10360.00  
2 60.91 21.21 0.991 0.50 ( 0.29) 0.58 96.2 10380.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 82.61 21.21 0.991 0.50 ( 0.35) 0.70 139.5 10380.00  
2 71.33 27.17 0.861 0.50 ( 0.36) 0.73 151.7 10360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE (CFS) = 82.61 Tc (MIN.) = 21.21  
EFFECTIVE AREA (ACRES) = 139.52 AREA-AVERAGED Fm (INCH/HR) = 0.35  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.70  
TOTAL AREA (ACRES) = 151.7  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10390.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 157.00 DOWNSTREAM (FEET) = 155.00  
FLOW LENGTH (FEET) = 312.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.41  
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 82.61  
PIPE TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 21.77  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\*\*\*\*



FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.77

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.978

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	3.10	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	5.70	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997

SUBAREA AREA (ACRES) = 9.50 SUBAREA RUNOFF (CFS) = 4.10

EFFECTIVE AREA (ACRES) = 149.02 AREA-AVERAGED Fm (INCH/HR) = 0.36

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.72

TOTAL AREA (ACRES) = 161.2 PEAK FLOW RATE (CFS) = 82.62

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.77

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.978

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 0.95  
EFFECTIVE AREA (ACRES) = 151.22 AREA-AVERAGED Fm (INCH/HR) = 0.36  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73  
TOTAL AREA (ACRES) = 163.4 PEAK FLOW RATE (CFS) = 83.57

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	83.57	21.77	0.978	0.50( 0.36)	0.73	151.2	10380.00
2	71.33	27.75	0.850	0.50( 0.37)	0.75	163.4	10360.00

LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	169.13	21.48	0.985	0.50( 0.39)	0.78	255.1	10300.00
2	159.30	25.33	0.894	0.50( 0.39)	0.77	283.7	10320.00

3 137.55 30.24 0.807 0.50( 0.39) 0.77 297.4 10340.00  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	252.52	21.48	0.985	0.50( 0.38)	0.76	404.4	10300.00
2	251.96	21.77	0.978	0.50( 0.38)	0.76	408.5	10380.00
3	235.57	25.33	0.894	0.50( 0.38)	0.76	442.2	10320.00
4	219.91	27.75	0.850	0.50( 0.38)	0.76	453.9	10360.00
5	202.40	30.24	0.807	0.50( 0.38)	0.76	460.8	10340.00
TOTAL AREA (ACRES) =		460.8					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 252.52 Tc (MIN.) = 21.479

EFFECTIVE AREA (ACRES) = 404.38 AREA-AVERAGED Fm (INCH/HR) = 0.38

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76

TOTAL AREA (ACRES) = 460.8

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 460.8 TC (MIN.) = 21.48

EFFECTIVE AREA (ACRES) = 404.38 AREA-AVERAGED Fm (INCH/HR) = 0.38

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.757

PEAK FLOW RATE (CFS) = 252.52

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	252.52	21.48	0.985	0.50( 0.38)	0.76	404.4	10300.00
2	251.96	21.77	0.978	0.50( 0.38)	0.76	408.5	10380.00
3	235.57	25.33	0.894	0.50( 0.38)	0.76	442.2	10320.00
4	219.91	27.75	0.850	0.50( 0.38)	0.76	453.9	10360.00
5	202.40	30.24	0.807	0.50( 0.38)	0.76	460.8	10340.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506104F.DAT  
TIME/DATE OF STUDY: 12:47 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 2.230
- 2) 6.00; 2.010
- 3) 7.00; 1.850
- 4) 8.00; 1.710
- 5) 9.00; 1.600
- 6) 10.00; 1.510
- 7) 11.00; 1.430
- 8) 12.00; 1.360
- 9) 13.00; 1.300
- 10) 14.00; 1.250
- 11) 15.00; 1.200
- 12) 20.00; 1.020
- 13) 25.00; 0.900
- 14) 30.00; 0.810
- 15) 40.00; 0.690
- 16) 50.00; 0.610
- 17) 60.00; 0.550
- 18) 90.00; 0.440
- 19) 120.00; 0.370
- 20) 180.00; 0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10400.00 TO NODE 10401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00  
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 540.00  
=====

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.434  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.941  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
PUBLIC PARK	-	0.50	0.50	0.850	95	6.43

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.850  
SUBAREA RUNOFF(CFS) = 0.68  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.68

\*\*\*\*\*

FLOW PROCESS FROM NODE 10401.00 TO NODE 10402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.3419  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.68  
FLOW VELOCITY(FEET/SEC.) = 4.77 FLOW DEPTH(FEET) = 0.22  
TRAVEL TIME(MIN.) = 0.41  $T_c$ (MIN.) = 6.84  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10402.00 = 424.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 6.84  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.875  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.850	-
USER-DEFINED	-	0.30	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.940  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 0.63  
EFFECTIVE AREA(ACRES) = 1.00 AREA-AVERAGED Fm(INCH/HR) = 0.45  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 1.28

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10403.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.2439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.28  
FLOW VELOCITY(FEET/SEC.) = 4.93 FLOW DEPTH(FEET) = 0.29  
TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 7.26  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10403.00 = 547.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10403.00 TO NODE 10403.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.26  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.814

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.850	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.10  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.45  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.91  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 2.33

\*\*\*\*\*

FLOW PROCESS FROM NODE 10403.00 TO NODE 10404.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 420.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 266.00 CHANNEL SLOPE = 0.1880  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.33  
FLOW VELOCITY(FEET/SEC.) = 5.20 FLOW DEPTH(FEET) = 0.39  
TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 8.11  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10404.00 = 813.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10404.00 TO NODE 10404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.11  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.698

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.50	0.850	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.863  
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 2.62  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.44  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 4.75

\*\*\*\*\*

FLOW PROCESS FROM NODE 10404.00 TO NODE 10405.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 370.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 289.00 CHANNEL SLOPE = 0.1730  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.75  
FLOW VELOCITY(FEET/SEC.) = 5.99 FLOW DEPTH(FEET) = 0.51  
TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 8.91  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10405.00 = 1102.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10405.00 TO NODE 10405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.91  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.609

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 4.26  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.43  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 8.68

\*\*\*\*\*

FLOW PROCESS FROM NODE 10405.00 TO NODE 10406.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 367.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 23.00 CHANNEL SLOPE = 0.1304

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 8.68  
FLOW VELOCITY (FEET/SEC.) = 6.33 FLOW DEPTH (FEET) = 0.68  
TRAVEL TIME (MIN.) = 0.06 Tc (MIN.) = 8.98  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10406.00 = 1125.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.98  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.603  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 2.23  
EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.43  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 10.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 367.00 DOWNSTREAM (FEET) = 344.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 214.00 CHANNEL SLOPE = 0.1075  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 10.85  
FLOW VELOCITY (FEET/SEC.) = 6.17 FLOW DEPTH (FEET) = 0.77  
TRAVEL TIME (MIN.) = 0.58 Tc (MIN.) = 9.55  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10407.00 = 1339.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.55  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.550  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 2.03  
EFFECTIVE AREA (ACRES) = 12.30 AREA-AVERAGED Fm (INCH/HR) = 0.43  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 12.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 344.00 DOWNSTREAM (FEET) = 327.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 919.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 12.39  
FLOW VELOCITY (FEET/SEC.) = 4.11 FLOW DEPTH (FEET) = 1.00  
TRAVEL TIME (MIN.) = 3.72 Tc (MIN.) = 13.28  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10408.00 = 2258.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10408.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 13.28  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.286  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 0.800 -  
USER-DEFINED - 7.90 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.849  
SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 6.20  
EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.43  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 15.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 327.00 DOWNSTREAM (FEET) = 314.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 807.00 CHANNEL SLOPE = 0.0161  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 15.67  
FLOW VELOCITY (FEET/SEC.) = 4.13 FLOW DEPTH (FEET) = 1.12  
TRAVEL TIME (MIN.) = 3.26 Tc (MIN.) = 16.53  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10409.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10409.00 TO NODE 10409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 16.53  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.145  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED -      6.90     0.50      0.800      -
USER-DEFINED -      5.70     0.50      0.850      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.823
SUBAREA AREA (ACRES) = 12.60  SUBAREA RUNOFF (CFS) = 8.32
EFFECTIVE AREA (ACRES) = 32.90  AREA-AVERAGED Fm (INCH/HR) = 0.42
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.84
TOTAL AREA (ACRES) = 32.9  PEAK FLOW RATE (CFS) = 21.40

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*****
FLOW PROCESS FROM NODE 10409.00 TO NODE 10410.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 314.00  DOWNSTREAM(FEET) = 266.00
FLOW LENGTH(FEET) = 213.00  MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 26.10
ESTIMATED PIPE DIAMETER (INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 21.40
PIPE TRAVEL TIME (MIN.) = 0.14  Tc (MIN.) = 16.67
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10410.00 = 3278.00 FEET.

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*****
FLOW PROCESS FROM NODE 10410.00 TO NODE 10411.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 266.00  DOWNSTREAM(FEET) = 170.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 1470.00  CHANNEL SLOPE = 0.0653
CHANNEL BASE (FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 21.40
FLOW VELOCITY (FEET/SEC.) = 7.55  FLOW DEPTH (FEET) = 0.97
TRAVEL TIME (MIN.) = 3.24  Tc (MIN.) = 19.91
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10411.00 = 4748.00 FEET.

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*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10411.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 19.91
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.023
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED - 0.60 0.50 0.100 -
USER-DEFINED - 0.10 0.50 0.850 -
USER-DEFINED - 0.40 0.50 0.100 -
USER-DEFINED - 6.60 0.50 0.800 -
USER-DEFINED - 0.80 0.50 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.723

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SUBAREA AREA (ACRES) = 8.50  SUBAREA RUNOFF (CFS) = 5.06
EFFECTIVE AREA (ACRES) = 41.40  AREA-AVERAGED Fm (INCH/HR) = 0.41
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.82
TOTAL AREA (ACRES) = 41.4  PEAK FLOW RATE (CFS) = 22.86

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*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10412.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 170.00  DOWNSTREAM(FEET) = 161.00
FLOW LENGTH(FEET) = 1129.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 7.43
ESTIMATED PIPE DIAMETER (INCH) = 27.00  NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 22.86
PIPE TRAVEL TIME (MIN.) = 2.53  Tc (MIN.) = 22.44
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10412.00 = 5877.00 FEET.

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*****
FLOW PROCESS FROM NODE 10412.00 TO NODE 10413.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 161.00  DOWNSTREAM(FEET) = 141.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 360.00  CHANNEL SLOPE = 0.0556
CHANNEL BASE (FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 22.86
FLOW VELOCITY (FEET/SEC.) = 7.22  FLOW DEPTH (FEET) = 1.03
TRAVEL TIME (MIN.) = 0.83  Tc (MIN.) = 23.27
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10413.00 = 6237.00 FEET.

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*****
FLOW PROCESS FROM NODE 10413.00 TO NODE 10413.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 23.27
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.941
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED - 1.20 0.50 0.100 -
USER-DEFINED - 0.40 0.50 0.850 -
USER-DEFINED - 0.30 0.50 0.100 -
USER-DEFINED - 0.10 0.50 0.850 -
USER-DEFINED - 0.90 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.509
SUBAREA AREA (ACRES) = 2.90  SUBAREA RUNOFF (CFS) = 1.79
EFFECTIVE AREA (ACRES) = 44.30  AREA-AVERAGED Fm (INCH/HR) = 0.40
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.80
TOTAL AREA (ACRES) = 44.3  PEAK FLOW RATE (CFS) = 22.86
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
=====

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END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 44.3 TC (MIN.) = 23.27  
EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED Fm (INCH/HR) = 0.40  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.798  
PEAK FLOW RATE (CFS) = 22.86

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=====  
END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

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FILE NAME: 0506105M.DAT  
TIME/DATE OF STUDY: 12:50 04/15/2013  
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--\*TIME-OF-CONCENTRATION MODEL\*--  
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\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

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FLOW PROCESS FROM NODE 10500.00 TO NODE 10501.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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INITIAL SUBAREA FLOW-LENGTH (FEET) = 326.00

ELEVATION DATA: UPSTREAM (FEET) = 1123.00 DOWNSTREAM (FEET) = 1085.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.984

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.431

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER

"GRASS" - 0.20 0.50 1.000 95 10.98

NATURAL FAIR COVER

"GRASS" - 0.30 0.50 1.000 95 10.98

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 0.42

TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 0.42

\*\*\*\*\*

FLOW PROCESS FROM NODE 10501.00 TO NODE 10502.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 1085.00 DOWNSTREAM (FEET) = 1050.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 181.00 CHANNEL SLOPE = 0.1934

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00

CHANNEL FLOW THRU SUBAREA (CFS) = 0.42

FLOW VELOCITY (FEET/SEC.) = 3.45 FLOW DEPTH (FEET) = 0.20

TRAVEL TIME (MIN.) = 0.87 Tc (MIN.) = 11.86

LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10502.00 = 507.00 FEET.

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FLOW PROCESS FROM NODE 10502.00 TO NODE 10502.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc (MIN.) = 11.86

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.370

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS



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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.10     0.50      1.000     -
USER-DEFINED  -        0.80     0.50      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 0.70
EFFECTIVE AREA (ACRES) = 1.40  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.4    PEAK FLOW RATE (CFS) = 1.10

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*****
FLOW PROCESS FROM NODE 10502.00 TO NODE 10503.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1025.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 193.00  CHANNEL SLOPE = 0.1295
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.10
FLOW VELOCITY(FEET/SEC.) = 3.80  FLOW DEPTH(FEET) = 0.31
TRAVEL TIME(MIN.) = 0.85  Tc(MIN.) = 12.71
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10503.00 = 700.00 FEET.

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10503.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.71
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.318
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.50   0.50  1.000  -
USER-DEFINED      -        1.80   0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 1.69
EFFECTIVE AREA (ACRES) = 3.70  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 3.7    PEAK FLOW RATE (CFS) = 2.72

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10504.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1025.00  DOWNSTREAM(FEET) = 1020.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00  CHANNEL SLOPE = 0.0151
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.72
FLOW VELOCITY(FEET/SEC.) = 2.60  FLOW DEPTH(FEET) = 0.59
TRAVEL TIME(MIN.) = 2.13  Tc(MIN.) = 14.83
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10504.00 = 1032.00 FEET.

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10504.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.83
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.208
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.10   0.50  1.000  -
USER-DEFINED      -        0.80   0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 0.57
EFFECTIVE AREA (ACRES) = 4.60  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.6    PEAK FLOW RATE (CFS) = 2.93

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10505.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1020.00  DOWNSTREAM(FEET) = 975.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 397.00  CHANNEL SLOPE = 0.1134
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.93
FLOW VELOCITY(FEET/SEC.) = 5.63  FLOW DEPTH(FEET) = 0.42
TRAVEL TIME(MIN.) = 1.18  Tc(MIN.) = 16.01
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10505.00 = 1429.00 FEET.

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FLOW PROCESS FROM NODE 10505.00 TO NODE 10505.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 16.01
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.164
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.20   0.50  1.000  -
USER-DEFINED      -        1.20   0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.40  SUBAREA RUNOFF (CFS) = 0.84
EFFECTIVE AREA (ACRES) = 6.00  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.0    PEAK FLOW RATE (CFS) = 3.58

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10506.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 905.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 334.00 CHANNEL SLOPE = 0.2096
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.58
FLOW VELOCITY(FEET/SEC.) = 7.48 FLOW DEPTH(FEET) = 0.40
TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 16.75
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10506.00 = 1763.00 FEET.

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FLOW PROCESS FROM NODE 10506.00 TO NODE 10506.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 16.75
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.137
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -        6.10   0.50   1.000  -
USER-DEFINED       -        3.70   0.50   1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 5.62
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 9.06

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10507.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 790.00 CHANNEL SLOPE = 0.0380
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 9.06
FLOW VELOCITY(FEET/SEC.) = 4.02 FLOW DEPTH(FEET) = 0.87
TRAVEL TIME(MIN.) = 3.28 Tc(MIN.) = 20.03
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10507.00 = 2553.00 FEET.

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10507.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 20.03
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.019
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -        2.70   0.50   1.000  -
USER-DEFINED       -        6.30   0.50   1.000  -
USER-DEFINED       -        0.30   0.50   1.000  -

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```

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 4.35
EFFECTIVE AREA(ACRES) = 25.10 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 11.73

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10508.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 755.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 11.73
FLOW VELOCITY(FEET/SEC.) = 6.28 FLOW DEPTH(FEET) = 0.79
TRAVEL TIME(MIN.) = 2.97 Tc(MIN.) = 23.00
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10508.00 = 3673.00 FEET.

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10508.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 23.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.948
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -        0.80   0.50   1.000  -
USER-DEFINED       -       11.10   0.50   1.000  -
USER-DEFINED       -        3.10   0.50   1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 6.05
EFFECTIVE AREA(ACRES) = 40.10 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 16.16

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10509.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 755.00 DOWNSTREAM(FEET) = 533.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1578.00 CHANNEL SLOPE = 0.1407
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 16.16
FLOW VELOCITY(FEET/SEC.) = 7.56 FLOW DEPTH(FEET) = 0.84
TRAVEL TIME(MIN.) = 3.48 Tc(MIN.) = 26.48
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10509.00 = 5251.00 FEET.

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FLOW PROCESS FROM NODE 10509.00 TO NODE 10509.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 26.48

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.873

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.80	0.50	1.000	-
USER-DEFINED	-	11.40	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-
USER-DEFINED	-	8.30	0.50	1.000	-
USER-DEFINED	-	38.10	0.50	1.000	-
USER-DEFINED	-	8.70	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 77.40 SUBAREA RUNOFF (CFS) = 26.00

EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 39.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 10509.00 TO NODE 10510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 415.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1236.00 CHANNEL SLOPE = 0.0955  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 39.47  
 FLOW VELOCITY (FEET/SEC.) = 8.17 FLOW DEPTH (FEET) = 1.27  
 TRAVEL TIME (MIN.) = 2.52 Tc (MIN.) = 29.00  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10510.00 = 6487.00 FEET.

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FLOW PROCESS FROM NODE 10510.00 TO NODE 10510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 29.00

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.828

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	30.10	0.50	1.000	-
USER-DEFINED	-	15.30	0.50	1.000	-
USER-DEFINED	-	2.00	0.50	1.000	-
USER-DEFINED	-	11.30	0.50	1.000	-
USER-DEFINED	-	5.10	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 64.90 SUBAREA RUNOFF (CFS) = 19.15

EFFECTIVE AREA (ACRES) = 182.40 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 182.4 PEAK FLOW RATE (CFS) = 53.81

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10511.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1161.00 CHANNEL SLOPE = 0.0973  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 53.81  
 FLOW VELOCITY (FEET/SEC.) = 8.87 FLOW DEPTH (FEET) = 1.42  
 TRAVEL TIME (MIN.) = 2.18 Tc (MIN.) = 31.18  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10511.00 = 7648.00 FEET.

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FLOW PROCESS FROM NODE 10511.00 TO NODE 10511.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 31.18

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.796

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.50	0.50	1.000	-
USER-DEFINED	-	10.80	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-
USER-DEFINED	-	22.10	0.50	1.000	-
USER-DEFINED	-	4.30	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 54.80 SUBAREA RUNOFF (CFS) = 14.58

EFFECTIVE AREA (ACRES) = 237.20 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 237.2 PEAK FLOW RATE (CFS) = 63.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 302.00 DOWNSTREAM (FEET) = 190.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1644.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 63.11  
 FLOW VELOCITY (FEET/SEC.) = 8.09 FLOW DEPTH (FEET) = 1.61  
 TRAVEL TIME (MIN.) = 3.39 Tc (MIN.) = 34.57  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10512.00 = 9292.00 FEET.

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FLOW PROCESS FROM NODE 10512.00 TO NODE 10512.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN.) = 34.57
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.755
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50     0.50     1.000    -
USER-DEFINED        -         0.20     0.50     1.000    -
USER-DEFINED        -         1.70     0.50     1.000    -
USER-DEFINED        -         0.10     0.50     1.000    -
USER-DEFINED        -        14.20     0.50     1.000    -
USER-DEFINED        -         2.80     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 19.50     SUBAREA RUNOFF(CFS) = 4.48
EFFECTIVE AREA(ACRES) = 256.70   AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 256.7       PEAK FLOW RATE(CFS) = 63.11
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10512.00 TO NODE 10513.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 190.00  DOWNSTREAM(FEET) = 183.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 86.00  CHANNEL SLOPE = 0.0814
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 4.00
CHANNEL FLOW THRU SUBAREA(CFS) = 63.11
FLOW VELOCITY(FEET/SEC.) = 8.65  FLOW DEPTH(FEET) = 1.56
TRAVEL TIME(MIN.) = 0.17  Tc(MIN.) = 34.73
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10513.00 = 9378.00 FEET.

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*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 34.73
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.50     0.100    -
USER-DEFINED        -         1.30     0.50     1.000    -
USER-DEFINED        -        29.90     0.50     1.000    -
USER-DEFINED        -        11.90     0.50     1.000    -
USER-DEFINED        -         1.70     0.50     1.000    -
USER-DEFINED        -         0.60     0.50     0.100    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 45.50     SUBAREA RUNOFF(CFS) = 10.64
EFFECTIVE AREA(ACRES) = 302.20   AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 302.2       PEAK FLOW RATE(CFS) = 69.10

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*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 34.73
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         9.30     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30     SUBAREA RUNOFF(CFS) = 2.12
EFFECTIVE AREA(ACRES) = 311.50   AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 311.5       PEAK FLOW RATE(CFS) = 71.21

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*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10514.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 183.00  DOWNSTREAM(FEET) = 171.00
FLOW LENGTH(FEET) = 1209.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.66
ESTIMATED PIPE DIAMETER(INCH) = 39.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 71.21
PIPE TRAVEL TIME(MIN.) = 1.89  Tc(MIN.) = 36.62
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10514.00 = 10587.00 FEET.

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FLOW PROCESS FROM NODE 10514.00 TO NODE 10514.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 36.62
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.731
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.50     0.100    -
USER-DEFINED        -         0.40     0.50     1.000    -
USER-DEFINED        -         1.70     0.50     0.100    -
USER-DEFINED        -        31.30     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 33.60     SUBAREA RUNOFF(CFS) = 7.73
EFFECTIVE AREA(ACRES) = 345.10   AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 345.1       PEAK FLOW RATE(CFS) = 72.59

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*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10515.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

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>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 171.00 DOWNSTREAM(FEET) = 165.00
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.01
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 72.59
PIPE TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 37.48
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10515.00 = 11152.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10515.00 TO NODE 10515.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 37.48
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.720
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.50 0.850 -
USER-DEFINED - 1.30 0.50 0.100 -
USER-DEFINED - 0.90 0.50 0.850 -
USER-DEFINED - 15.30 0.50 0.100 -
USER-DEFINED - 1.10 0.50 0.850 -
USER-DEFINED - 0.10 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.202
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 10.70
EFFECTIVE AREA(ACRES) = 364.30 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 364.3 PEAK FLOW RATE(CFS) = 80.10

\*\*\*\*\*
FLOW PROCESS FROM NODE 10515.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00
FLOW LENGTH(FEET) = 709.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.05
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 80.10
PIPE TRAVEL TIME(MIN.) = 1.07 Tc(MIN.) = 38.55
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 38.55
RAINFALL INTENSITY(INCH/HR) = 0.71

AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.95
EFFECTIVE STREAM AREA(ACRES) = 364.30
TOTAL STREAM AREA(ACRES) = 364.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 80.10

\*\*\*\*\*
FLOW PROCESS FROM NODE 10520.00 TO NODE 10521.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 289.00
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 180.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.311
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.806
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL - 0.30 0.50 0.100 95 7.31
PUBLIC PARK - 1.20 0.50 0.850 95 11.62
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.700
SUBAREA RUNOFF(CFS) = 1.97
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 1.97

\*\*\*\*\*
FLOW PROCESS FROM NODE 10521.00 TO NODE 10522.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<

UPSTREAM ELEVATION(FEET) = 180.00 DOWNSTREAM ELEVATION(FEET) = 176.00
STREET LENGTH(FEET) = 408.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.32
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.31
HALFSTREET FLOOD WIDTH(FEET) = 7.78
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.09
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.66
STREET FLOW TRAVEL TIME(MIN.) = 3.25 Tc(MIN.) = 10.56
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.465
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	0.850	-
USER-DEFINED	-	0.60	0.50	0.100	-
USER-DEFINED	-	0.80	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.520  
SUBAREA AREA (ACRES) = 2.50 SUBAREA RUNOFF (CFS) = 2.71  
EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 4.22

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.33 HALFSTREET FLOOD WIDTH (FEET) = 8.78  
FLOW VELOCITY (FEET/SEC.) = 2.19 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.73  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10522.00 = 697.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10522.00 TO NODE 10523.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION (FEET) = 176.00 DOWNSTREAM ELEVATION (FEET) = 173.00  
STREET LENGTH (FEET) = 333.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.25  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.39  
HALFSTREET FLOOD WIDTH (FEET) = 11.52  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.39  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.93  
STREET FLOW TRAVEL TIME (MIN.) = 2.32 Tc (MIN.) = 12.89  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.307

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.100	-
USER-DEFINED	-	4.70	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.600	-
USER-DEFINED	-	0.10	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.109  
SUBAREA AREA (ACRES) = 5.40 SUBAREA RUNOFF (CFS) = 6.09  
EFFECTIVE AREA (ACRES) = 9.40 AREA-AVERAGED Fm (INCH/HR) = 0.16  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31

TOTAL AREA (ACRES) = 9.4 PEAK FLOW RATE (CFS) = 9.73  
END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 13.16  
FLOW VELOCITY (FEET/SEC.) = 2.53 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.07  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10523.00 = 1030.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10523.00 TO NODE 10523.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 12.89  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.307  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	1.90	0.50	0.850	-
USER-DEFINED	-	0.80	0.50	0.100	-
USER-DEFINED	-	4.80	0.50	0.850	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	4.90	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785  
SUBAREA AREA (ACRES) = 12.70 SUBAREA RUNOFF (CFS) = 10.45  
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.58  
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 20.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10523.00 TO NODE 10524.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM (FEET) = 173.00 DOWNSTREAM (FEET) = 165.00  
FLOW LENGTH (FEET) = 736.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 8.06  
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 20.18  
PIPE TRAVEL TIME (MIN.) = 1.52 Tc (MIN.) = 14.41  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10524.00 = 1766.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10524.00 TO NODE 10524.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 14.41  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.230  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	0.100	-

USER-DEFINED - 0.40 0.50 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.308  
 SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 1.74  
 EFFECTIVE AREA (ACRES) = 23.90 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.56  
 TOTAL AREA (ACRES) = 23.9 PEAK FLOW RATE (CFS) = 20.39

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10524.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 165.00 DOWNSTREAM (FEET) = 158.00  
 FLOW LENGTH (FEET) = 623.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.19  
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 20.39  
 PIPE TRAVEL TIME (MIN.) = 1.27 Tc (MIN.) = 15.68  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10525.00 = 2389.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 15.68  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.176  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.90	0.50	0.850	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	6.80	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
 SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 6.13  
 EFFECTIVE AREA (ACRES) = 33.00 AREA-AVERAGED Fm (INCH/HR) = 0.32  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.64  
 TOTAL AREA (ACRES) = 33.0 PEAK FLOW RATE (CFS) = 25.36

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 15.68  
 RAINFALL INTENSITY (INCH/HR) = 1.18  
 AREA-AVERAGED Fm (INCH/HR) = 0.32  
 AREA-AVERAGED Fp (INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.64

EFFECTIVE STREAM AREA (ACRES) = 33.00  
 TOTAL STREAM AREA (ACRES) = 33.00  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 25.36

\*\* CONFLUENCE DATA \*\*

STREAM	Q	Tc	Intensity	Fp (Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	80.10	38.55	0.707	0.50 (0.48)	0.95	364.3	10500.00
2	25.36	15.68	1.176	0.50 (0.32)	0.64	33.0	10520.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM	Q	Tc	Intensity	Fp (Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	105.46	15.68	1.176	0.50 (0.45)	0.90	181.1	10520.00
2	91.55	38.55	0.707	0.50 (0.46)	0.93	397.3	10500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 105.46 Tc (MIN.) = 15.68  
 EFFECTIVE AREA (ACRES) = 181.15 AREA-AVERAGED Fm (INCH/HR) = 0.45  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.90  
 TOTAL AREA (ACRES) = 397.3  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10525.00 TO NODE 10526.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 158.00 DOWNSTREAM (FEET) = 148.00  
 FLOW LENGTH (FEET) = 30.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.0 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 44.28  
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 105.46  
 PIPE TRAVEL TIME (MIN.) = 0.01 Tc (MIN.) = 15.69  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10526.00 = 11891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10526.00 TO NODE 10527.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 148.00 DOWNSTREAM (FEET) = 135.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 296.00 CHANNEL SLOPE = 0.0439  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 105.46  
 FLOW VELOCITY (FEET/SEC.) = 9.69 FLOW DEPTH (FEET) = 1.90  
 TRAVEL TIME (MIN.) = 0.51 Tc (MIN.) = 16.20  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10527.00 = 12187.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 16.20  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.157  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 0.80 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 0.83  
EFFECTIVE AREA(ACRES) = 182.55 AREA-AVERAGED Fm(INCH/HR) = 0.45  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 398.7 PEAK FLOW RATE(CFS) = 116.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 16.20  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.157  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 0.100 -  
USER-DEFINED - 1.10 0.50 1.000 -  
USER-DEFINED - 0.40 0.50 1.000 -  
USER-DEFINED - 1.10 0.50 1.000 -  
USER-DEFINED - 2.20 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 2.94  
EFFECTIVE AREA(ACRES) = 187.45 AREA-AVERAGED Fm(INCH/HR) = 0.45  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 403.6 PEAK FLOW RATE(CFS) = 119.37

=====  
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 403.6 TC(MIN.) = 16.20  
EFFECTIVE AREA(ACRES) = 187.45 AREA-AVERAGED Fm(INCH/HR) = 0.45  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.898  
PEAK FLOW RATE(CFS) = 119.37

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	119.37	16.20	1.157	0.50( 0.45)	0.90	187.4	10520.00
2	91.55	39.09	0.701	0.50( 0.46)	0.93	403.6	10500.00

=====  
END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506106F.DAT  
TIME/DATE OF STUDY: 12:52 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 2.230
- 2) 6.00; 2.010
- 3) 7.00; 1.850
- 4) 8.00; 1.710
- 5) 9.00; 1.600
- 6) 10.00; 1.510
- 7) 11.00; 1.430
- 8) 12.00; 1.360
- 9) 13.00; 1.300
- 10) 14.00; 1.250
- 11) 15.00; 1.200
- 12) 20.00; 1.020
- 13) 25.00; 0.900
- 14) 30.00; 0.810
- 15) 40.00; 0.690
- 16) 50.00; 0.610
- 17) 60.00; 0.550
- 18) 90.00; 0.440
- 19) 120.00; 0.370
- 20) 180.00; 0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH	LIP	HIKE	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10600.00 TO NODE 10601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 311.00  
ELEVATION DATA: UPSTREAM(FEET) = 166.00 DOWNSTREAM(FEET) = 164.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.602  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.462  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	-	0.50	0.50	0.500	95	10.60
PUBLIC PARK	-	0.60	0.50	0.850	95	13.16

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.691  
 SUBAREA RUNOFF(CFS) = 1.11  
 TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 1.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 10601.00 TO NODE 10602.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 164.00 DOWNSTREAM ELEVATION(FEET) = 162.00  
STREET LENGTH(FEET) = 220.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.11  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.28  
HALFSTREET FLOOD WIDTH(FEET) = 6.16  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.86

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.52  
 STREET FLOW TRAVEL TIME (MIN.) = 1.97 Tc (MIN.) = 12.57  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.326  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.500	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	1.80	0.50	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.517  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 2.02  
 EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 2.99

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.31 HALFSTREET FLOOD WIDTH (FEET) = 7.53  
 FLOW VELOCITY (FEET/SEC.) = 1.97 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.61  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10602.00 = 531.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10602.00 TO NODE 10603.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 162.00 DOWNSTREAM ELEVATION (FEET) = 159.00  
 STREET LENGTH (FEET) = 328.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.63  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.35  
 HALFSTREET FLOOD WIDTH (FEET) = 9.34  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.18  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.75  
 STREET FLOW TRAVEL TIME (MIN.) = 2.51 Tc (MIN.) = 15.09  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.197

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.50	0.500	-
USER-DEFINED	-	0.30	0.50	0.850	-
USER-DEFINED	-	2.40	0.50	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527  
 SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 3.28

EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 5.89

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 10.51  
 FLOW VELOCITY (FEET/SEC.) = 2.28 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.84  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10603.00 = 859.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10603.00 TO NODE 10604.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 159.00 DOWNSTREAM ELEVATION (FEET) = 155.00  
 STREET LENGTH (FEET) = 465.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.68  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.41  
 HALFSTREET FLOOD WIDTH (FEET) = 12.62  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.44  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.00  
 STREET FLOW TRAVEL TIME (MIN.) = 3.18 Tc (MIN.) = 18.27  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.082

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.50	0.500	-
USER-DEFINED	-	0.40	0.50	0.850	-
USER-DEFINED	-	3.00	0.50	0.500	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	0.10	0.50	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.513  
 SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 5.58  
 EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 10.74

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.43 HALFSTREET FLOOD WIDTH (FEET) = 13.79  
 FLOW VELOCITY (FEET/SEC.) = 2.57 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.11  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10604.00 = 1324.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10604.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.27
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.082
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.50    0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.10    SUBAREA RUNOFF(CFS) = 0.06
EFFECTIVE AREA(ACRES) = 14.70  AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 14.7    PEAK FLOW RATE(CFS) = 10.80

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10605.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 155.00  DOWNSTREAM(FEET) = 140.00
FLOW LENGTH(FEET) = 214.00  MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.18
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.80
PIPE TRAVEL TIME(MIN.) = 0.25  Tc(MIN.) = 18.52
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10605.00 = 1538.00 FEET.

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10605.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.52
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.073
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20    0.50    0.100  -
USER-DEFINED        -         1.70    0.50    0.100  -
USER-DEFINED        -        10.20    0.50    0.800  -
USER-DEFINED        -         2.90    0.50    0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.682
SUBAREA AREA(ACRES) = 16.00  SUBAREA RUNOFF(CFS) = 10.54
EFFECTIVE AREA(ACRES) = 30.70  AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 30.7    PEAK FLOW RATE(CFS) = 21.22

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10606.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 140.00  DOWNSTREAM(FEET) = 133.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00  CHANNEL SLOPE = 0.0400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 21.22
FLOW VELOCITY(FEET/SEC.) = 6.26  FLOW DEPTH(FEET) = 1.06
TRAVEL TIME(MIN.) = 0.47  Tc(MIN.) = 18.98
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10606.00 = 1713.00 FEET.

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.98
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.057
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.50    0.500  -
USER-DEFINED        -         0.30    0.50    0.850  -
USER-DEFINED        -         0.10    0.50    1.000  -
USER-DEFINED        -         1.10    0.50    1.000  -
USER-DEFINED        -         0.10    0.50    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 1.80  SUBAREA RUNOFF(CFS) = 0.97
EFFECTIVE AREA(ACRES) = 32.50  AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 32.5    PEAK FLOW RATE(CFS) = 21.72

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.98
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.057
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.50    0.850  -
USER-DEFINED        -         1.20    0.50    1.000  -
USER-DEFINED        -         0.10    0.50    1.000  -
USER-DEFINED        -         1.80    0.50    1.000  -
USER-DEFINED        -         0.10    0.50    0.850  -
USER-DEFINED        -         0.20    0.50    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980
SUBAREA AREA(ACRES) = 3.80  SUBAREA RUNOFF(CFS) = 1.94
EFFECTIVE AREA(ACRES) = 36.30  AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.66
TOTAL AREA(ACRES) = 36.3    PEAK FLOW RATE(CFS) = 23.66

*****

```

FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.98

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.057

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.30

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.34

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.67

TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 23.96

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 36.9 TC(MIN.) = 18.98

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR)= 0.34

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.670

PEAK FLOW RATE(CFS) = 23.96

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 5 Yr \*  
\* From Node: 40300 To Node: 40313 \*  
\*\*\*\*\*

FILE NAME: 0610403U.DAT  
TIME/DATE OF STUDY: 10:11 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.737
- 2) 10.00; 1.814
- 3) 15.00; 1.325
- 4) 20.00; 1.135
- 5) 25.00; 0.988
- 6) 30.00; 0.885
- 7) 40.00; 0.759
- 8) 50.00; 0.676
- 9) 60.00; 0.615
- 10) 90.00; 0.513
- 11) 120.00; 0.455
- 12) 180.00; 0.383
- 13) 360.00; 0.284
- 14) 1440.00; 0.125

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40300.00 TO NODE 40301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 316.00  
ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 720.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.541  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.899  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.39	0.50	1.000	0	9.54

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.50  
TOTAL AREA(ACRES) = 0.39 PEAK FLOW RATE(CFS) = 0.50

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40301.00 TO NODE 40302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 191.00 CHANNEL SLOPE = 0.2356  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.792  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.88	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.01  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.62  
AVERAGE FLOW DEPTH(FEET) = 0.27 TRAVEL TIME(MIN.) = 0.69  
Tc(MIN.) = 10.23  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 1.03  
EFFECTIVE AREA(ACRES) = 1.28 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.3 PEAK FLOW RATE(CFS) = 1.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 4.97  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40302.00 = 507.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40302.00 TO NODE 40303.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 625.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 179.00 CHANNEL SLOPE = 0.2793  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.740

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.84	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.95

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.68

AVERAGE FLOW DEPTH(FEET) = 0.34 TRAVEL TIME(MIN.) = 0.53

Tc(MIN.) = 10.76

SUBAREA AREA(ACRES) = 0.84 SUBAREA RUNOFF(CFS) = 0.93

EFFECTIVE AREA(ACRES) = 2.12 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.1 PEAK FLOW RATE(CFS) = 2.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 FLOW VELOCITY(FEET/SEC.) = 6.02

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40303.00 = 686.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40303.00 TO NODE 40304.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 625.00 DOWNSTREAM(FEET) = 557.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.4224  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.707

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.94	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.96

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.96

AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 0.34

Tc(MIN.) = 11.09

SUBAREA AREA(ACRES) = 2.94 SUBAREA RUNOFF(CFS) = 3.19

EFFECTIVE AREA(ACRES) = 5.06 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.1 PEAK FLOW RATE(CFS) = 5.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.46 FLOW VELOCITY(FEET/SEC.) = 8.63

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40304.00 = 847.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40304.00 TO NODE 40305.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 557.00 DOWNSTREAM(FEET) = 548.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 42.00 CHANNEL SLOPE = 0.2143  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.697

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.68	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.40

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.99

AVERAGE FLOW DEPTH(FEET) = 0.55 TRAVEL TIME(MIN.) = 0.10

Tc(MIN.) = 11.19

SUBAREA AREA(ACRES) = 1.68 SUBAREA RUNOFF(CFS) = 1.81

EFFECTIVE AREA(ACRES) = 6.73 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 7.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.58 FLOW VELOCITY(FEET/SEC.) = 7.26

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40305.00 = 889.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40305.00 TO NODE 40306.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 548.00 DOWNSTREAM(FEET) = 515.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 217.00 CHANNEL SLOPE = 0.1521  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.646

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.67	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.66

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.89

AVERAGE FLOW DEPTH(FEET) = 0.68 TRAVEL TIME(MIN.) = 0.52

Tc(MIN.) = 11.72

SUBAREA AREA(ACRES) = 4.67 SUBAREA RUNOFF(CFS) = 4.82

EFFECTIVE AREA(ACRES) = 11.41 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.4 PEAK FLOW RATE (CFS) = 11.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.74 FLOW VELOCITY (FEET/SEC.) = 7.22  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40306.00 = 1106.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40306.00 TO NODE 40307.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 502.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 180.00 CHANNEL SLOPE = 0.0722  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.596

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.44	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.93  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.87  
AVERAGE FLOW DEPTH (FEET) = 0.95 TRAVEL TIME (MIN.) = 0.51  
Tc (MIN.) = 12.23  
SUBAREA AREA (ACRES) = 8.44 SUBAREA RUNOFF (CFS) = 8.32  
EFFECTIVE AREA (ACRES) = 19.84 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 19.8 PEAK FLOW RATE (CFS) = 19.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.03 FLOW VELOCITY (FEET/SEC.) = 6.18  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40307.00 = 1286.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40307.00 TO NODE 40308.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 502.00 DOWNSTREAM (FEET) = 469.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 553.00 CHANNEL SLOPE = 0.0597  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.447

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.07	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.87  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.05  
AVERAGE FLOW DEPTH (FEET) = 1.15 TRAVEL TIME (MIN.) = 1.52  
Tc (MIN.) = 13.75

SUBAREA AREA (ACRES) = 10.07 SUBAREA RUNOFF (CFS) = 8.58  
EFFECTIVE AREA (ACRES) = 29.92 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 29.9 PEAK FLOW RATE (CFS) = 25.50

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.18 FLOW VELOCITY (FEET/SEC.) = 6.13  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40308.00 = 1839.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40308.00 TO NODE 40309.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 469.00 DOWNSTREAM (FEET) = 433.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 631.00 CHANNEL SLOPE = 0.0571  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.308

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.09	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 28.80  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.24  
AVERAGE FLOW DEPTH (FEET) = 1.24 TRAVEL TIME (MIN.) = 1.69  
Tc (MIN.) = 15.44  
SUBAREA AREA (ACRES) = 9.09 SUBAREA RUNOFF (CFS) = 6.61  
EFFECTIVE AREA (ACRES) = 39.01 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 39.0 PEAK FLOW RATE (CFS) = 28.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.23 FLOW VELOCITY (FEET/SEC.) = 6.22  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40309.00 = 2470.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40309.00 TO NODE 40310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 433.00 DOWNSTREAM (FEET) = 406.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 595.00 CHANNEL SLOPE = 0.0454  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.244

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.61	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 32.26  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.87

AVERAGE FLOW DEPTH (FEET) = 1.35 TRAVEL TIME (MIN.) = 1.69  
Tc (MIN.) = 17.13  
SUBAREA AREA (ACRES) = 11.61 SUBAREA RUNOFF (CFS) = 7.77  
EFFECTIVE AREA (ACRES) = 50.62 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 50.6 PEAK FLOW RATE (CFS) = 33.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.38 FLOW VELOCITY (FEET/SEC.) = 5.96  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40310.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40310.00 TO NODE 40311.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 406.00 DOWNSTREAM (FEET) = 353.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1122.00 CHANNEL SLOPE = 0.0472  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.152  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 15.32 0.50 0.897 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 38.73  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.73  
AVERAGE FLOW DEPTH (FEET) = 1.29 TRAVEL TIME (MIN.) = 2.42  
Tc (MIN.) = 19.55  
SUBAREA AREA (ACRES) = 15.32 SUBAREA RUNOFF (CFS) = 9.70  
EFFECTIVE AREA (ACRES) = 65.94 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 65.9 PEAK FLOW RATE (CFS) = 39.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.30 FLOW VELOCITY (FEET/SEC.) = 7.77  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40311.00 = 4187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40311.00 TO NODE 40312.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 353.00 DOWNSTREAM (FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 843.00 CHANNEL SLOPE = 0.0451  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.097  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 26.00 0.50 0.886 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.886

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 47.02  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.01  
AVERAGE FLOW DEPTH (FEET) = 1.40 TRAVEL TIME (MIN.) = 1.75  
Tc (MIN.) = 21.30  
SUBAREA AREA (ACRES) = 26.00 SUBAREA RUNOFF (CFS) = 15.29  
EFFECTIVE AREA (ACRES) = 91.94 AREA-AVERAGED Fm (INCH/HR) = 0.48  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95  
TOTAL AREA (ACRES) = 91.9 PEAK FLOW RATE (CFS) = 51.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.45 FLOW VELOCITY (FEET/SEC.) = 8.18  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40312.00 = 5030.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40312.00 TO NODE 40313.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 315.00 DOWNSTREAM (FEET) = 310.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 226.00 CHANNEL SLOPE = 0.0221  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.079  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.53 0.50 0.896 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.896  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 52.11  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.30  
AVERAGE FLOW DEPTH (FEET) = 1.66 TRAVEL TIME (MIN.) = 0.60  
Tc (MIN.) = 21.90  
SUBAREA AREA (ACRES) = 2.53 SUBAREA RUNOFF (CFS) = 1.44  
EFFECTIVE AREA (ACRES) = 94.47 AREA-AVERAGED Fm (INCH/HR) = 0.47  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95  
TOTAL AREA (ACRES) = 94.5 PEAK FLOW RATE (CFS) = 51.39  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.65 FLOW VELOCITY (FEET/SEC.) = 6.27  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40313.00 = 5256.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40313.00 TO NODE 40313.00 IS CODE = 81

-----  
>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 21.90  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.079  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 80.58 0.50 0.984 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
SUBAREA AREA (ACRES) = 80.58 SUBAREA RUNOFF (CFS) = 42.56



EFFECTIVE AREA (ACRES) = 175.05 AREA-AVERAGED Fm (INCH/HR) = 0.48  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97  
TOTAL AREA (ACRES) = 175.0 PEAK FLOW RATE (CFS) = 93.93

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 175.0 TC (MIN.) = 21.90  
EFFECTIVE AREA (ACRES) = 175.05 AREA-AVERAGED Fm (INCH/HR) = 0.48  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.965  
PEAK FLOW RATE (CFS) = 93.93

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 5 Yr \*  
\* From Node: 40400 To Node: 40453 \*  
\*\*\*\*\*

FILE NAME: 0610404U.DAT  
TIME/DATE OF STUDY: 10:11 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.737
- 2) 10.00; 1.814
- 3) 15.00; 1.325
- 4) 20.00; 1.135
- 5) 25.00; 0.988
- 6) 30.00; 0.885
- 7) 40.00; 0.759
- 8) 50.00; 0.676
- 9) 60.00; 0.615
- 10) 90.00; 0.513
- 11) 120.00; 0.455
- 12) 180.00; 0.383
- 13) 360.00; 0.284
- 14) 1440.00; 0.125

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40400.00 TO NODE 40401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 928.00 DOWNSTREAM(FEET) = 750.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.081  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.169  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.75	0.50	1.000	0	8.08

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.13  
TOTAL AREA(ACRES) = 0.75 PEAK FLOW RATE(CFS) = 1.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40401.00 TO NODE 40402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 710.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 107.00 CHANNEL SLOPE = 0.3738  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.118  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.17	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.98  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.56  
AVERAGE FLOW DEPTH(FEET) = 0.32 TRAVEL TIME(MIN.) = 0.27  
Tc(MIN.) = 8.35  
SUBAREA AREA(ACRES) = 1.17 SUBAREA RUNOFF(CFS) = 1.71  
EFFECTIVE AREA(ACRES) = 1.93 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 2.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 FLOW VELOCITY(FEET/SEC.) = 7.09  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40402.00 = 434.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40402.00 TO NODE 40403.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 710.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.2756  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.059

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.05	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.54

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.61

AVERAGE FLOW DEPTH(FEET) = 0.42 TRAVEL TIME(MIN.) = 0.32

Tc(MIN.) = 8.67

SUBAREA AREA(ACRES) = 1.05 SUBAREA RUNOFF(CFS) = 1.47

EFFECTIVE AREA(ACRES) = 2.97 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 4.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 6.95

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40403.00 = 561.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40403.00 TO NODE 40404.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 113.00 CHANNEL SLOPE = 0.2212  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.009

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.95	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.50

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.88

AVERAGE FLOW DEPTH(FEET) = 0.52 TRAVEL TIME(MIN.) = 0.27

Tc(MIN.) = 8.95

SUBAREA AREA(ACRES) = 1.95 SUBAREA RUNOFF(CFS) = 2.65

EFFECTIVE AREA(ACRES) = 4.92 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 6.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.55 FLOW VELOCITY(FEET/SEC.) = 7.26

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40404.00 = 674.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40404.00 TO NODE 40405.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 650.00 DOWNSTREAM(FEET) = 610.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 219.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.912

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.15	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.05

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.96

AVERAGE FLOW DEPTH(FEET) = 0.62 TRAVEL TIME(MIN.) = 0.52

Tc(MIN.) = 9.47

SUBAREA AREA(ACRES) = 2.15 SUBAREA RUNOFF(CFS) = 2.73

EFFECTIVE AREA(ACRES) = 7.07 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 8.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.64 FLOW VELOCITY(FEET/SEC.) = 7.22

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40405.00 = 893.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40405.00 TO NODE 40406.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 605.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 43.00 CHANNEL SLOPE = 0.1163  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.891

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.80

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.36

AVERAGE FLOW DEPTH(FEET) = 0.75 TRAVEL TIME(MIN.) = 0.11

Tc(MIN.) = 9.58

SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 3.63

EFFECTIVE AREA(ACRES) = 9.97 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 10.0 PEAK FLOW RATE (CFS) = 12.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.80 FLOW VELOCITY (FEET/SEC.) = 6.56  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40406.00 = 936.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40406.00 TO NODE 40407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 605.00 DOWNSTREAM (FEET) = 602.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 52.00 CHANNEL SLOPE = 0.0577  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.861

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.51	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.36  
AVERAGE FLOW DEPTH (FEET) = 0.97 TRAVEL TIME (MIN.) = 0.16  
Tc (MIN.) = 9.75

SUBAREA AREA (ACRES) = 4.51 SUBAREA RUNOFF (CFS) = 5.52  
EFFECTIVE AREA (ACRES) = 14.48 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 14.5 PEAK FLOW RATE (CFS) = 17.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.03 FLOW VELOCITY (FEET/SEC.) = 5.54  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40407.00 = 988.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40407.00 TO NODE 40408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 602.00 DOWNSTREAM (FEET) = 559.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 533.00 CHANNEL SLOPE = 0.0807  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.707

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.99	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 20.99  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.56  
AVERAGE FLOW DEPTH (FEET) = 1.03 TRAVEL TIME (MIN.) = 1.35  
Tc (MIN.) = 11.10

SUBAREA AREA (ACRES) = 5.99 SUBAREA RUNOFF (CFS) = 6.50  
EFFECTIVE AREA (ACRES) = 20.47 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.5 PEAK FLOW RATE (CFS) = 22.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.06 FLOW VELOCITY (FEET/SEC.) = 6.65  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40408.00 = 1521.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40408.00 TO NODE 40409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 559.00 DOWNSTREAM (FEET) = 509.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 702.00 CHANNEL SLOPE = 0.0712  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.531

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.05	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 25.03  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.51  
AVERAGE FLOW DEPTH (FEET) = 1.13 TRAVEL TIME (MIN.) = 1.80  
Tc (MIN.) = 12.90

SUBAREA AREA (ACRES) = 6.05 SUBAREA RUNOFF (CFS) = 5.61  
EFFECTIVE AREA (ACRES) = 26.51 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.5 PEAK FLOW RATE (CFS) = 24.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.12 FLOW VELOCITY (FEET/SEC.) = 6.48  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40409.00 = 2223.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40409.00 TO NODE 40447.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 509.00 DOWNSTREAM (FEET) = 482.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 440.00 CHANNEL SLOPE = 0.0614  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.417

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.09	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.10  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.33

AVERAGE FLOW DEPTH(FEET) = 1.19 TRAVEL TIME(MIN.) = 1.16  
Tc(MIN.) = 14.06  
SUBAREA AREA(ACRES) = 6.09 SUBAREA RUNOFF(CFS) = 5.02  
EFFECTIVE AREA(ACRES) = 32.60 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 32.6 PEAK FLOW RATE(CFS) = 26.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.19 FLOW VELOCITY(FEET/SEC.) = 6.30  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.06  
RAINFALL INTENSITY(INCH/HR) = 1.42  
AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 32.60  
TOTAL STREAM AREA(ACRES) = 32.60  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 26.91

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40410.00 TO NODE 40411.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00  
ELEVATION DATA: UPSTREAM(FEET) = 878.00 DOWNSTREAM(FEET) = 726.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.371  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.115  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.69	0.50	1.000	0	8.37

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.00  
TOTAL AREA(ACRES) = 0.69 PEAK FLOW RATE(CFS) = 1.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40411.00 TO NODE 40412.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 726.00 DOWNSTREAM(FEET) = 687.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 101.00 CHANNEL SLOPE = 0.3861  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.066  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.91	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.64  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.29  
AVERAGE FLOW DEPTH(FEET) = 0.29 TRAVEL TIME(MIN.) = 0.27  
Tc(MIN.) = 8.64  
SUBAREA AREA(ACRES) = 0.91 SUBAREA RUNOFF(CFS) = 1.28  
EFFECTIVE AREA(ACRES) = 1.60 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 2.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.33 FLOW VELOCITY(FEET/SEC.) = 6.77  
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40412.00 = 430.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40412.00 TO NODE 40413.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 687.00 DOWNSTREAM(FEET) = 658.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 153.00 CHANNEL SLOPE = 0.1895  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.981  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.96	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.88  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.54  
AVERAGE FLOW DEPTH(FEET) = 0.42 TRAVEL TIME(MIN.) = 0.46  
Tc(MIN.) = 9.10  
SUBAREA AREA(ACRES) = 0.96 SUBAREA RUNOFF(CFS) = 1.27  
EFFECTIVE AREA(ACRES) = 2.55 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 3.40

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 5.71  
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40413.00 = 583.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40413.00 TO NODE 40414.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 658.00 DOWNSTREAM(FEET) = 615.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 247.00 CHANNEL SLOPE = 0.1741  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.855  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.51	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.93  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.04  
 AVERAGE FLOW DEPTH (FEET) = 0.52 TRAVEL TIME (MIN.) = 0.68  
 Tc (MIN.) = 9.78  
 SUBAREA AREA (ACRES) = 2.51 SUBAREA RUNOFF (CFS) = 3.06  
 EFFECTIVE AREA (ACRES) = 5.06 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.1 PEAK FLOW RATE (CFS) = 6.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.57 FLOW VELOCITY (FEET/SEC.) = 6.39  
 LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40414.00 = 830.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40414.00 TO NODE 40415.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 615.00 DOWNSTREAM (FEET) = 567.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 414.00 CHANNEL SLOPE = 0.1159  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.723  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.38	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.58  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.02  
 AVERAGE FLOW DEPTH (FEET) = 0.69 TRAVEL TIME (MIN.) = 1.15  
 Tc (MIN.) = 10.93  
 SUBAREA AREA (ACRES) = 4.38 SUBAREA RUNOFF (CFS) = 4.82  
 EFFECTIVE AREA (ACRES) = 9.44 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.4 PEAK FLOW RATE (CFS) = 10.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.74 FLOW VELOCITY (FEET/SEC.) = 6.28  
 LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40415.00 = 1244.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40415.00 TO NODE 40416.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 567.00 DOWNSTREAM (FEET) = 538.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 301.00 CHANNEL SLOPE = 0.0963  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.647  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.77	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 14.40  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.39  
 AVERAGE FLOW DEPTH (FEET) = 0.87 TRAVEL TIME (MIN.) = 0.79  
 Tc (MIN.) = 11.71  
 SUBAREA AREA (ACRES) = 7.77 SUBAREA RUNOFF (CFS) = 8.01  
 EFFECTIVE AREA (ACRES) = 17.21 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 17.2 PEAK FLOW RATE (CFS) = 17.75

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.94 FLOW VELOCITY (FEET/SEC.) = 6.76  
 LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40416.00 = 1545.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40416.00 TO NODE 40417.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 538.00 DOWNSTREAM (FEET) = 529.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 116.00 CHANNEL SLOPE = 0.0776  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.619  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 25.91  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.81  
 AVERAGE FLOW DEPTH (FEET) = 1.13 TRAVEL TIME (MIN.) = 0.28  
 Tc (MIN.) = 12.00  
 SUBAREA AREA (ACRES) = 16.20 SUBAREA RUNOFF (CFS) = 16.31  
 EFFECTIVE AREA (ACRES) = 33.41 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 33.4 PEAK FLOW RATE (CFS) = 33.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.24 FLOW VELOCITY (FEET/SEC.) = 7.28  
 LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40417.00 = 1661.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40417.00 TO NODE 40447.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 529.00 DOWNSTREAM(FEET) = 482.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 891.00 CHANNEL SLOPE = 0.0527
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.398
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 14.55 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 39.52
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.57
AVERAGE FLOW DEPTH(FEET) = 1.42 TRAVEL TIME(MIN.) = 2.26
Tc(MIN.) = 14.26
SUBAREA AREA(ACRES) = 14.55 SUBAREA RUNOFF(CFS) = 11.75
EFFECTIVE AREA(ACRES) = 47.96 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 48.0 PEAK FLOW RATE(CFS) = 38.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.41 FLOW VELOCITY(FEET/SEC.) = 6.53
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40447.00 = 2552.00 FEET.

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*****
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====

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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 14.26
RAINFALL INTENSITY(INCH/HR) = 1.40
AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 47.96
TOTAL STREAM AREA(ACRES) = 47.96
PEAK FLOW RATE(CFS) AT CONFLUENCE = 38.74

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\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	26.91	14.06	1.417	0.50( 0.50)	1.00	32.6	40400.00
2	38.74	14.26	1.398	0.50( 0.50)	1.00	48.0	40410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	65.65	14.06	1.417	0.50( 0.50)	1.00	79.9	40400.00
2	65.07	14.26	1.398	0.50( 0.50)	1.00	80.6	40410.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 65.65 Tc(MIN.) = 14.06
EFFECTIVE AREA(ACRES) = 79.88 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 80.6
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

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*****
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
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*****
FLOW PROCESS FROM NODE 40420.00 TO NODE 40421.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00
ELEVATION DATA: UPSTREAM(FEET) = 925.00 DOWNSTREAM(FEET) = 815.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.799
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.036
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" - 0.31 0.50 1.000 0 8.80
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.43
TOTAL AREA(ACRES) = 0.31 PEAK FLOW RATE(CFS) = 0.43

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*****
FLOW PROCESS FROM NODE 40421.00 TO NODE 40422.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 815.00 DOWNSTREAM(FEET) = 743.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.5854
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.971
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.62
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.87
AVERAGE FLOW DEPTH(FEET) = 0.19 TRAVEL TIME(MIN.) = 0.35
Tc(MIN.) = 9.15
SUBAREA AREA(ACRES) = 0.30 SUBAREA RUNOFF(CFS) = 0.39

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EFFECTIVE AREA (ACRES) = 0.60 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 0.6 PEAK FLOW RATE (CFS) = 0.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.21 FLOW VELOCITY (FEET/SEC.) = 6.11  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40422.00 = 444.00 FEET.

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FLOW PROCESS FROM NODE 40422.00 TO NODE 40423.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 743.00 DOWNSTREAM (FEET) = 665.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 142.00 CHANNEL SLOPE = 0.5493  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.906

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.31

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.72

AVERAGE FLOW DEPTH (FEET) = 0.25 TRAVEL TIME (MIN.) = 0.35

Tc (MIN.) = 9.50

SUBAREA AREA (ACRES) = 0.80 SUBAREA RUNOFF (CFS) = 1.01

EFFECTIVE AREA (ACRES) = 1.40 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 1.4 PEAK FLOW RATE (CFS) = 1.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.29 FLOW VELOCITY (FEET/SEC.) = 7.29  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40423.00 = 586.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40423.00 TO NODE 40424.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 665.00 DOWNSTREAM (FEET) = 630.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 99.00 CHANNEL SLOPE = 0.3535  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.858

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.32	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.97

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.29

AVERAGE FLOW DEPTH (FEET) = 0.32 TRAVEL TIME (MIN.) = 0.26

Tc (MIN.) = 9.76  
SUBAREA AREA (ACRES) = 0.32 SUBAREA RUNOFF (CFS) = 0.39  
EFFECTIVE AREA (ACRES) = 1.72 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 1.7 PEAK FLOW RATE (CFS) = 2.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.33 FLOW VELOCITY (FEET/SEC.) = 6.41  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40424.00 = 685.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40424.00 TO NODE 40425.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 630.00 DOWNSTREAM (FEET) = 615.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 35.00 CHANNEL SLOPE = 0.4286  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.844

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.87	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.24

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.60

AVERAGE FLOW DEPTH (FEET) = 0.38 TRAVEL TIME (MIN.) = 0.08

Tc (MIN.) = 9.84

SUBAREA AREA (ACRES) = 1.87 SUBAREA RUNOFF (CFS) = 2.26

EFFECTIVE AREA (ACRES) = 3.59 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 3.6 PEAK FLOW RATE (CFS) = 4.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.42 FLOW VELOCITY (FEET/SEC.) = 8.33  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40425.00 = 720.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40425.00 TO NODE 40426.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 615.00 DOWNSTREAM (FEET) = 574.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 260.00 CHANNEL SLOPE = 0.1577  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.758

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.19	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.02



TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.92  
AVERAGE FLOW DEPTH (FEET) = 0.53 TRAVEL TIME (MIN.) = 0.73  
Tc (MIN.) = 10.57  
SUBAREA AREA (ACRES) = 1.19 SUBAREA RUNOFF (CFS) = 1.35  
EFFECTIVE AREA (ACRES) = 4.78 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 4.8 PEAK FLOW RATE (CFS) = 5.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.55 FLOW VELOCITY (FEET/SEC.) = 6.04  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40426.00 = 980.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40426.00 TO NODE 40427.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 574.00 DOWNSTREAM (FEET) = 533.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 322.00 CHANNEL SLOPE = 0.1273  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.668  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.82 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.37  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.79  
AVERAGE FLOW DEPTH (FEET) = 0.61 TRAVEL TIME (MIN.) = 0.93  
Tc (MIN.) = 11.50  
SUBAREA AREA (ACRES) = 1.82 SUBAREA RUNOFF (CFS) = 1.91  
EFFECTIVE AREA (ACRES) = 6.60 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 6.6 PEAK FLOW RATE (CFS) = 6.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.63 FLOW VELOCITY (FEET/SEC.) = 5.85  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40427.00 = 1302.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40427.00 TO NODE 40428.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 521.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 160.00 CHANNEL SLOPE = 0.0750  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.619  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 6.79 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.35  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.34  
AVERAGE FLOW DEPTH (FEET) = 0.80 TRAVEL TIME (MIN.) = 0.50  
Tc (MIN.) = 12.00  
SUBAREA AREA (ACRES) = 6.79 SUBAREA RUNOFF (CFS) = 6.84  
EFFECTIVE AREA (ACRES) = 13.39 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 13.4 PEAK FLOW RATE (CFS) = 13.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.89 FLOW VELOCITY (FEET/SEC.) = 5.70  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40428.00 = 1462.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40428.00 TO NODE 40429.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 521.00 DOWNSTREAM (FEET) = 508.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 221.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.552  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.74 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.25  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.38  
AVERAGE FLOW DEPTH (FEET) = 0.97 TRAVEL TIME (MIN.) = 0.68  
Tc (MIN.) = 12.68  
SUBAREA AREA (ACRES) = 3.74 SUBAREA RUNOFF (CFS) = 3.54  
EFFECTIVE AREA (ACRES) = 17.13 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.1 PEAK FLOW RATE (CFS) = 16.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.99 FLOW VELOCITY (FEET/SEC.) = 5.46  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40429.00 = 1683.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40429.00 TO NODE 40446.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 508.00 DOWNSTREAM (FEET) = 489.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 306.00 CHANNEL SLOPE = 0.0621  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.463  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 0.99 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 16.64  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.61  
AVERAGE FLOW DEPTH (FEET) = 0.99 TRAVEL TIME (MIN.) = 0.91  
Tc (MIN.) = 13.59  
SUBAREA AREA (ACRES) = 0.99 SUBAREA RUNOFF (CFS) = 0.86  
EFFECTIVE AREA (ACRES) = 18.12 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 18.1 PEAK FLOW RATE (CFS) = 16.21  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.99 FLOW VELOCITY (FEET/SEC.) = 5.55  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40446.00 = 1989.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40446.00 TO NODE 40446.00 IS CODE = 10  
-----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40430.00 TO NODE 40431.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 302.00  
ELEVATION DATA: UPSTREAM (FEET) = 1035.00 DOWNSTREAM (FEET) = 875.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.870  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.207  
SUBAREA Tc AND LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"CHAPARRAL, BROADLEAF" - 0.40 0.50 1.000 0 7.87  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF (CFS) = 0.62  
TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 0.62

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40431.00 TO NODE 40432.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 875.00 DOWNSTREAM (FEET) = 800.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 160.00 CHANNEL SLOPE = 0.4688  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.125  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.65 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.10  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.98  
AVERAGE FLOW DEPTH (FEET) = 0.25 TRAVEL TIME (MIN.) = 0.45  
Tc (MIN.) = 8.32  
SUBAREA AREA (ACRES) = 0.65 SUBAREA RUNOFF (CFS) = 0.95  
EFFECTIVE AREA (ACRES) = 1.05 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 1.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.28 FLOW VELOCITY (FEET/SEC.) = 6.57  
LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40432.00 = 462.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40432.00 TO NODE 40433.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 800.00 DOWNSTREAM (FEET) = 712.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 150.00 CHANNEL SLOPE = 0.5867  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.067  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.08 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.30  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.99  
AVERAGE FLOW DEPTH (FEET) = 0.31 TRAVEL TIME (MIN.) = 0.31  
Tc (MIN.) = 8.63  
SUBAREA AREA (ACRES) = 1.08 SUBAREA RUNOFF (CFS) = 1.53  
EFFECTIVE AREA (ACRES) = 2.13 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 2.1 PEAK FLOW RATE (CFS) = 3.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.35 FLOW VELOCITY (FEET/SEC.) = 8.37  
LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40433.00 = 612.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40433.00 TO NODE 40434.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 657.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 120.00 CHANNEL SLOPE = 0.4583  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.024

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.98	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.37  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.46  
AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 0.24  
Tc(MIN.) = 8.87  
SUBAREA AREA(ACRES) = 1.98 SUBAREA RUNOFF(CFS) = 2.72  
EFFECTIVE AREA(ACRES) = 4.11 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 5.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 9.09  
LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40434.00 = 732.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40434.00 TO NODE 40435.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 657.00 DOWNSTREAM(FEET) = 620.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.2298  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.957

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.34	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.18  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.43  
AVERAGE FLOW DEPTH(FEET) = 0.57 TRAVEL TIME(MIN.) = 0.36  
Tc(MIN.) = 9.23  
SUBAREA AREA(ACRES) = 2.34 SUBAREA RUNOFF(CFS) = 3.07  
EFFECTIVE AREA(ACRES) = 6.46 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 6.5 PEAK FLOW RATE(CFS) = 8.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.61 FLOW VELOCITY(FEET/SEC.) = 7.69  
LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40435.00 = 893.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40435.00 TO NODE 40445.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 579.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 358.00 CHANNEL SLOPE = 0.1145  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.794

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.75	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.49  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.10  
AVERAGE FLOW DEPTH(FEET) = 0.72 TRAVEL TIME(MIN.) = 0.98  
Tc(MIN.) = 10.20  
SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 2.04  
EFFECTIVE AREA(ACRES) = 8.21 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 9.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.72 FLOW VELOCITY(FEET/SEC.) = 6.15  
LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40445.00 = 1251.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40445.00 TO NODE 40445.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

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TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 10.20  
RAINFALL INTENSITY(INCH/HR) = 1.79  
AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 8.21  
TOTAL STREAM AREA(ACRES) = 8.21  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40440.00 TO NODE 40441.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 1020.00 DOWNSTREAM(FEET) = 898.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.586  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.075

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.75	0.50	1.000	0	8.59

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.06  
TOTAL AREA(ACRES) = 0.75 PEAK FLOW RATE(CFS) = 1.06

\*\*\*\*\*

FLOW PROCESS FROM NODE 40441.00 TO NODE 40442.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 898.00 DOWNSTREAM(FEET) = 760.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 253.00 CHANNEL SLOPE = 0.5455
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.966

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.89 0.50 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.65

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.14

AVERAGE FLOW DEPTH(FEET) = 0.28 TRAVEL TIME(MIN.) = 0.59

Tc(MIN.) = 9.18

SUBAREA AREA(ACRES) = 0.89 SUBAREA RUNOFF(CFS) = 1.17

EFFECTIVE AREA(ACRES) = 1.64 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 2.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 FLOW VELOCITY(FEET/SEC.) = 7.59

LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40442.00 = 572.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40442.00 TO NODE 40443.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 760.00 DOWNSTREAM(FEET) = 653.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 188.00 CHANNEL SLOPE = 0.5691

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.899

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.80 0.50 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.30

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.68

AVERAGE FLOW DEPTH(FEET) = 0.36 TRAVEL TIME(MIN.) = 0.36

Tc(MIN.) = 9.54

SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 2.27

EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 4.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 FLOW VELOCITY(FEET/SEC.) = 9.31
LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40443.00 = 760.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40443.00 TO NODE 40444.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 653.00 DOWNSTREAM(FEET) = 605.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 198.00 CHANNEL SLOPE = 0.2424

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.816

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.16 0.50 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.20

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.33

AVERAGE FLOW DEPTH(FEET) = 0.53 TRAVEL TIME(MIN.) = 0.45

Tc(MIN.) = 9.99

SUBAREA AREA(ACRES) = 3.16 SUBAREA RUNOFF(CFS) = 3.74

EFFECTIVE AREA(ACRES) = 6.60 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 6.6 PEAK FLOW RATE(CFS) = 7.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.58 FLOW VELOCITY(FEET/SEC.) = 7.67

LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40444.00 = 958.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40444.00 TO NODE 40445.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 605.00 DOWNSTREAM(FEET) = 579.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 243.00 CHANNEL SLOPE = 0.1070

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.748

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.67 0.50 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.76

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.85

AVERAGE FLOW DEPTH(FEET) = 0.71 TRAVEL TIME(MIN.) = 0.69

Tc(MIN.) = 10.68

SUBAREA AREA(ACRES) = 1.67 SUBAREA RUNOFF(CFS) = 1.88

EFFECTIVE AREA(ACRES) = 8.27 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 9.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.72 FLOW VELOCITY (FEET/SEC.) = 5.94  
 LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40445.00 = 1201.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40445.00 TO NODE 40445.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 10.68  
 RAINFALL INTENSITY (INCH/HR) = 1.75  
 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 8.27  
 TOTAL STREAM AREA (ACRES) = 8.27  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 9.29

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.56	10.20	1.794	0.50 (0.50)	1.00	8.2	40430.00
2	9.29	10.68	1.748	0.50 (0.50)	1.00	8.3	40440.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	18.77	10.20	1.794	0.50 (0.50)	1.00	16.1	40430.00
2	18.51	10.68	1.748	0.50 (0.50)	1.00	16.5	40440.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 18.77 Tc (MIN.) = 10.20  
 EFFECTIVE AREA (ACRES) = 16.12 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 16.5  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40445.00 = 1251.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40445.00 TO NODE 40446.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 579.00 DOWNSTREAM (FEET) = 489.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 636.00 CHANNEL SLOPE = 0.1415  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.666  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 3.79 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 20.75  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.07  
 AVERAGE FLOW DEPTH (FEET) = 0.93 TRAVEL TIME (MIN.) = 1.31  
 Tc (MIN.) = 11.52  
 SUBAREA AREA (ACRES) = 3.79 SUBAREA RUNOFF (CFS) = 3.97  
 EFFECTIVE AREA (ACRES) = 19.90 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 20.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.93 FLOW VELOCITY (FEET/SEC.) = 8.08  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40446.00 = 1887.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	20.87	11.52	1.666	0.50 (0.50)	1.00	19.9	40430.00
2	20.40	12.00	1.618	0.50 (0.50)	1.00	20.3	40440.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 20.87 Tc (MIN.) = 11.52  
 AREA-AVERAGED Fm (INCH/HR) = 0.50 AREA-AVERAGED Fp (INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA (ACRES) = 19.90

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40446.00 TO NODE 40446.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<  
 =====

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	20.87	11.52	1.666	0.50 (0.50)	1.00	19.9	40430.00
2	20.40	12.00	1.618	0.50 (0.50)	1.00	20.3	40440.00

LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40446.00 = 1887.00 FEET.

\*\* MEMORY BANK # 2 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	16.21	13.59	1.463	0.50 (0.50)	1.00	18.1	40420.00

LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40446.00 = 1989.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	37.09	11.52	1.666	0.50 (0.50)	1.00	35.3	40430.00
2	36.61	12.00	1.618	0.50 (0.50)	1.00	36.3	40440.00
3	33.78	13.59	1.463	0.50 (0.50)	1.00	38.4	40420.00

TOTAL AREA (ACRES) = 38.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 37.09 Tc (MIN.) = 11.519  
 EFFECTIVE AREA (ACRES) = 35.26 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 38.4

LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40446.00 = 1989.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40446.00 TO NODE 40446.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 40446.00 TO NODE 40447.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 489.00 DOWNSTREAM(FEET) = 482.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.0419

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.620

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN USER-DEFINED - 0.59 0.50 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.38

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.91

AVERAGE FLOW DEPTH(FEET) = 1.45 TRAVEL TIME(MIN.) = 0.47

Tc(MIN.) = 11.99

SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 0.60

EFFECTIVE AREA(ACRES) = 35.85 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 39.0 PEAK FLOW RATE(CFS) = 37.09

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.44 FLOW VELOCITY(FEET/SEC.) = 5.92

LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40447.00 = 2156.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE 1 37.09 11.99 1.620 0.50( 0.50) 1.00 35.8 40430.00 2 36.61 12.47 1.572 0.50( 0.50) 1.00 36.9 40440.00 3 33.78 14.07 1.416 0.50( 0.50) 1.00 39.0 40420.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 37.09 Tc(MIN.) = 11.99

AREA-AVERAGED Fm(INCH/HR) = 0.50 AREA-AVERAGED Fp(INCH/HR) = 0.50

AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 35.85

\*\*\*\*\*

FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER

NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE 1 37.09 11.99 1.620 0.50( 0.50) 1.00 35.8 40430.00 2 36.61 12.47 1.572 0.50( 0.50) 1.00 36.9 40440.00 3 33.78 14.07 1.416 0.50( 0.50) 1.00 39.0 40420.00 LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40447.00 = 2156.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE 1 65.65 14.06 1.417 0.50( 0.50) 1.00 79.9 40400.00 2 65.07 14.26 1.398 0.50( 0.50) 1.00 80.6 40410.00 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE 1 102.74 11.99 1.620 0.50( 0.50) 1.00 104.0 40430.00 2 102.27 12.47 1.572 0.50( 0.50) 1.00 107.7 40440.00 3 99.46 14.06 1.417 0.50( 0.50) 1.00 118.8 40400.00 4 99.38 14.07 1.416 0.50( 0.50) 1.00 118.9 40420.00 5 98.18 14.26 1.398 0.50( 0.50) 1.00 119.5 40410.00 TOTAL AREA(ACRES) = 119.5

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 102.74 Tc(MIN.) = 11.990

EFFECTIVE AREA(ACRES) = 103.99 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 119.5

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

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FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 40447.00 TO NODE 40448.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 482.00 DOWNSTREAM(FEET) = 447.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 926.00 CHANNEL SLOPE = 0.0378

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.418

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN USER-DEFINED - 24.32 0.50 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 112.79

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.50

AVERAGE FLOW DEPTH(FEET) = 2.24 TRAVEL TIME(MIN.) = 2.06

Tc(MIN.) = 14.05

SUBAREA AREA(ACRES) = 24.32 SUBAREA RUNOFF(CFS) = 20.09

EFFECTIVE AREA(ACRES) = 128.30 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 143.9 PEAK FLOW RATE(CFS) = 106.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.18 FLOW VELOCITY(FEET/SEC.) = 7.40  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40448.00 = 3589.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	106.03	14.05	1.418	0.50( 0.50)	1.00	128.3	40430.00
2	103.47	14.53	1.371	0.50( 0.50)	1.00	132.1	40440.00
3	100.73	16.13	1.282	0.50( 0.50)	1.00	143.2	40400.00
4	100.70	16.15	1.281	0.50( 0.50)	1.00	143.2	40420.00
5	100.17	16.34	1.274	0.50( 0.50)	1.00	143.9	40410.00

NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 106.03 Tc(MIN.) = 14.05  
AREA-AVERAGED Fm(INCH/HR) = 0.50 AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 128.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40448.00 TO NODE 40449.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 447.00 DOWNSTREAM(FEET) = 433.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 443.00 CHANNEL SLOPE = 0.0316  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.324

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	108.49	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 146.25  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.49  
AVERAGE FLOW DEPTH(FEET) = 2.55 TRAVEL TIME(MIN.) = 0.99  
Tc(MIN.) = 15.03  
SUBAREA AREA(ACRES) = 108.49 SUBAREA RUNOFF(CFS) = 80.43  
EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 252.3 PEAK FLOW RATE(CFS) = 175.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.73 FLOW VELOCITY(FEET/SEC.) = 7.86  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40449.00 = 4032.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	175.54	15.03	1.324	0.50( 0.50)	1.00	236.8	40430.00
2	174.26	15.53	1.305	0.50( 0.50)	1.00	240.6	40440.00
3	168.41	17.13	1.244	0.50( 0.50)	1.00	251.6	40400.00
4	168.31	17.15	1.243	0.50( 0.50)	1.00	251.7	40420.00

5 167.03 17.35 1.236 0.50( 0.50) 1.00 252.3 40410.00  
NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 175.54 Tc(MIN.) = 15.03  
AREA-AVERAGED Fm(INCH/HR) = 0.50 AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 236.79

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40449.00 TO NODE 40450.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 433.00 DOWNSTREAM(FEET) = 398.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1065.00 CHANNEL SLOPE = 0.0329  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.240

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	36.85	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 187.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.10  
AVERAGE FLOW DEPTH(FEET) = 2.78 TRAVEL TIME(MIN.) = 2.19  
Tc(MIN.) = 17.22  
SUBAREA AREA(ACRES) = 36.85 SUBAREA RUNOFF(CFS) = 24.55  
EFFECTIVE AREA(ACRES) = 273.64 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 289.2 PEAK FLOW RATE(CFS) = 182.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.75 FLOW VELOCITY(FEET/SEC.) = 8.04  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40450.00 = 5097.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	182.29	17.22	1.240	0.50( 0.50)	1.00	273.6	40430.00
2	180.03	17.72	1.221	0.50( 0.50)	1.00	277.4	40440.00
3	171.11	19.35	1.159	0.50( 0.50)	1.00	288.5	40400.00
4	170.96	19.37	1.158	0.50( 0.50)	1.00	288.6	40420.00
5	169.33	19.57	1.151	0.50( 0.50)	1.00	289.2	40410.00

NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 182.29 Tc(MIN.) = 17.22  
AREA-AVERAGED Fm(INCH/HR) = 0.50 AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 273.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40450.00 TO NODE 40451.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 398.00 DOWNSTREAM(FEET) = 386.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 401.00 CHANNEL SLOPE = 0.0299  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.209  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 71.80 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 205.17  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.99  
 AVERAGE FLOW DEPTH (FEET) = 2.92 TRAVEL TIME (MIN.) = 0.84  
 Tc (MIN.) = 18.06  
 SUBAREA AREA (ACRES) = 71.80 SUBAREA RUNOFF (CFS) = 45.77  
 EFFECTIVE AREA (ACRES) = 345.44 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 361.0 PEAK FLOW RATE (CFS) = 220.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.00 FLOW VELOCITY (FEET/SEC.) = 8.14  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40451.00 = 5498.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	220.21	18.06	1.209	0.50 (0.50)	1.00	345.4	40430.00
2	216.58	18.56	1.189	0.50 (0.50)	1.00	349.2	40440.00
3	203.76	20.20	1.129	0.50 (0.50)	1.00	360.3	40400.00
4	203.62	20.22	1.128	0.50 (0.50)	1.00	360.4	40420.00
5	202.03	20.43	1.122	0.50 (0.50)	1.00	361.0	40410.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 220.21 Tc (MIN.) = 18.06  
 AREA-AVERAGED Fm (INCH/HR) = 0.50 AREA-AVERAGED Fp (INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA (ACRES) = 345.44

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40451.00 TO NODE 40452.00 IS CODE = 51

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 386.00 DOWNSTREAM (FEET) = 358.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 957.00 CHANNEL SLOPE = 0.0293  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.148  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	12.07	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 223.73  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.03  
 AVERAGE FLOW DEPTH (FEET) = 2.73 TRAVEL TIME (MIN.) = 1.59  
 Tc (MIN.) = 19.65  
 SUBAREA AREA (ACRES) = 12.07 SUBAREA RUNOFF (CFS) = 7.04  
 EFFECTIVE AREA (ACRES) = 357.51 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 373.1 PEAK FLOW RATE (CFS) = 220.21  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.71 FLOW VELOCITY (FEET/SEC.) = 10.03  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40452.00 = 6455.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	220.21	19.65	1.148	0.50 (0.50)	1.00	357.5	40430.00
2	216.58	20.15	1.130	0.50 (0.50)	1.00	361.3	40440.00
3	203.76	21.82	1.081	0.50 (0.50)	1.00	372.4	40400.00
4	203.62	21.84	1.081	0.50 (0.50)	1.00	372.4	40420.00
5	202.03	22.05	1.075	0.50 (0.50)	1.00	373.1	40410.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 220.21 Tc (MIN.) = 19.65  
 AREA-AVERAGED Fm (INCH/HR) = 0.50 AREA-AVERAGED Fp (INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA (ACRES) = 357.51

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40452.00 TO NODE 40453.00 IS CODE = 51

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 358.00 DOWNSTREAM (FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 973.00 CHANNEL SLOPE = 0.0576  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.108  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.14	0.50	0.970	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 222.78  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.97  
 AVERAGE FLOW DEPTH (FEET) = 2.39 TRAVEL TIME (MIN.) = 1.25  
 Tc (MIN.) = 20.90  
 SUBAREA AREA (ACRES) = 9.14 SUBAREA RUNOFF (CFS) = 5.12  
 EFFECTIVE AREA (ACRES) = 366.65 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 382.2 PEAK FLOW RATE (CFS) = 220.21  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.39 FLOW VELOCITY (FEET/SEC.) = 12.90  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40453.00 = 7428.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	220.21	20.90	1.108	0.50 (0.50)	1.00	366.6	40430.00
2	216.58	21.42	1.093	0.50 (0.50)	1.00	370.4	40440.00
3	203.76	23.10	1.044	0.50 (0.50)	1.00	381.5	40400.00
4	203.62	23.12	1.043	0.50 (0.50)	1.00	381.6	40420.00



5 202.03 23.33 1.037 0.50( 0.50) 1.00 382.2 40410.00  
 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 220.21 Tc(MIN.) = 20.90  
 AREA-AVERAGED Fm(INCH/HR) = 0.50 AREA-AVERAGED Fp(INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 366.65

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40453.00 TO NODE 40453.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 20.90  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.108  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 28.26 0.50 0.882 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.882  
 SUBAREA AREA(ACRES) = 28.26 SUBAREA RUNOFF(CFS) = 16.97  
 EFFECTIVE AREA(ACRES) = 394.91 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 410.5 PEAK FLOW RATE(CFS) = 220.21  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 410.5 TC(MIN.) = 20.90  
 EFFECTIVE AREA(ACRES) = 394.91 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.991  
 PEAK FLOW RATE(CFS) = 220.21

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	220.21	20.90	1.108	0.50( 0.50)	0.99	394.9	40430.00
2	216.58	21.42	1.093	0.50( 0.50)	0.99	398.7	40440.00
3	203.76	23.10	1.044	0.50( 0.50)	0.99	409.8	40400.00
4	203.62	23.12	1.043	0.50( 0.50)	0.99	409.8	40420.00
5	202.03	23.33	1.037	0.50( 0.50)	0.99	410.5	40410.00

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 5 Yr \*  
\* From Node: 40500 To Node: 40519 \*  
\*\*\*\*\*

FILE NAME: 0610405U.DAT  
TIME/DATE OF STUDY: 10:11 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.737
- 2) 10.00; 1.814
- 3) 15.00; 1.325
- 4) 20.00; 1.135
- 5) 25.00; 0.988
- 6) 30.00; 0.885
- 7) 40.00; 0.759
- 8) 50.00; 0.676
- 9) 60.00; 0.615
- 10) 90.00; 0.513
- 11) 120.00; 0.455
- 12) 180.00; 0.383
- 13) 360.00; 0.284
- 14) 1440.00; 0.125

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40500.00 TO NODE 40501.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 961.00 DOWNSTREAM(FEET) = 845.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.819  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.032  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.63	0.50	1.000	0	8.82

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.87  
TOTAL AREA(ACRES) = 0.63 PEAK FLOW RATE(CFS) = 0.87

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40501.00 TO NODE 40502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 845.00 DOWNSTREAM(FEET) = 788.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 141.00 CHANNEL SLOPE = 0.4043  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.962  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.11	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.60  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.22  
AVERAGE FLOW DEPTH(FEET) = 0.29 TRAVEL TIME(MIN.) = 0.38  
Tc(MIN.) = 9.20  
SUBAREA AREA(ACRES) = 1.11 SUBAREA RUNOFF(CFS) = 1.46  
EFFECTIVE AREA(ACRES) = 1.74 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 2.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.33 FLOW VELOCITY(FEET/SEC.) = 6.89  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40502.00 = 469.00 FEET.

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FLOW PROCESS FROM NODE 40502.00 TO NODE 40503.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 788.00 DOWNSTREAM(FEET) = 719.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 187.00 CHANNEL SLOPE = 0.3690  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.882

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.44	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.19

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.19

AVERAGE FLOW DEPTH(FEET) = 0.38 TRAVEL TIME(MIN.) = 0.43

Tc(MIN.) = 9.63

SUBAREA AREA(ACRES) = 1.44 SUBAREA RUNOFF(CFS) = 1.79

EFFECTIVE AREA(ACRES) = 3.18 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 3.96

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 FLOW VELOCITY(FEET/SEC.) = 7.66

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40503.00 = 656.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40503.00 TO NODE 40504.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 719.00 DOWNSTREAM(FEET) = 545.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 302.00 CHANNEL SLOPE = 0.5762  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.801

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.36	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.92

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.95

AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.51

Tc(MIN.) = 10.14

SUBAREA AREA(ACRES) = 3.36 SUBAREA RUNOFF(CFS) = 3.93

EFFECTIVE AREA(ACRES) = 6.54 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 6.5 PEAK FLOW RATE(CFS) = 7.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.49 FLOW VELOCITY(FEET/SEC.) = 10.58

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40504.00 = 958.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40504.00 TO NODE 40505.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 545.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 328.00 CHANNEL SLOPE = 0.2287  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.738

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.58	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.00

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.54

AVERAGE FLOW DEPTH(FEET) = 0.71 TRAVEL TIME(MIN.) = 0.64

Tc(MIN.) = 10.78

SUBAREA AREA(ACRES) = 9.58 SUBAREA RUNOFF(CFS) = 10.67

EFFECTIVE AREA(ACRES) = 16.12 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 17.96

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.80 FLOW VELOCITY(FEET/SEC.) = 9.26

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40505.00 = 1286.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40505.00 TO NODE 40506.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 410.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 507.00 CHANNEL SLOPE = 0.1183  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.632

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.98	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.56

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.79

AVERAGE FLOW DEPTH(FEET) = 1.00 TRAVEL TIME(MIN.) = 1.09

Tc(MIN.) = 11.86

SUBAREA AREA(ACRES) = 10.98 SUBAREA RUNOFF(CFS) = 11.19

EFFECTIVE AREA(ACRES) = 27.10 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 27.1 PEAK FLOW RATE (CFS) = 27.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.07 FLOW VELOCITY (FEET/SEC.) = 8.11  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40506.00 = 1793.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40506.00 TO NODE 40507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 410.00 DOWNSTREAM (FEET) = 355.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 698.00 CHANNEL SLOPE = 0.0788  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.472

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.53	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 29.59

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.09

AVERAGE FLOW DEPTH (FEET) = 1.18 TRAVEL TIME (MIN.) = 1.64

Tc (MIN.) = 13.50

SUBAREA AREA (ACRES) = 4.53 SUBAREA RUNOFF (CFS) = 3.96

EFFECTIVE AREA (ACRES) = 31.63 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 31.6 PEAK FLOW RATE (CFS) = 27.65

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.15 FLOW VELOCITY (FEET/SEC.) = 6.98

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40507.00 = 2491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40507.00 TO NODE 40518.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 355.00 DOWNSTREAM (FEET) = 341.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 604.00 CHANNEL SLOPE = 0.0232  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.314

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.02	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 30.96

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.62

AVERAGE FLOW DEPTH (FEET) = 1.36 TRAVEL TIME (MIN.) = 1.79

Tc (MIN.) = 15.29

SUBAREA AREA (ACRES) = 9.02 SUBAREA RUNOFF (CFS) = 6.61  
EFFECTIVE AREA (ACRES) = 40.66 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 40.7 PEAK FLOW RATE (CFS) = 29.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.34 FLOW VELOCITY (FEET/SEC.) = 5.54

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40518.00 = 3095.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40518.00 TO NODE 40518.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 15.29

RAINFALL INTENSITY (INCH/HR) = 1.31

AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50

AREA-AVERAGED Ap = 1.00

EFFECTIVE STREAM AREA (ACRES) = 40.66

TOTAL STREAM AREA (ACRES) = 40.66

PEAK FLOW RATE (CFS) AT CONFLUENCE = 29.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40510.00 TO NODE 40511.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 329.00

ELEVATION DATA: UPSTREAM (FEET) = 851.00 DOWNSTREAM (FEET) = 735.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.835

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.029

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	-	0.48	0.50	1.000	0	8.84

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 0.66

TOTAL AREA (ACRES) = 0.48 PEAK FLOW RATE (CFS) = 0.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40511.00 TO NODE 40512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 735.00 DOWNSTREAM (FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 116.00 CHANNEL SLOPE = 0.7328

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.979

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.73	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.14  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.07  
AVERAGE FLOW DEPTH(FEET) = 0.23 TRAVEL TIME(MIN.) = 0.27  
Tc(MIN.) = 9.11  
SUBAREA AREA(ACRES) = 0.73 SUBAREA RUNOFF(CFS) = 0.96  
EFFECTIVE AREA(ACRES) = 1.20 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 1.60

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.26 FLOW VELOCITY(FEET/SEC.) = 7.75  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40512.00 = 445.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40512.00 TO NODE 40513.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 650.00 DOWNSTREAM(FEET) = 581.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 152.00 CHANNEL SLOPE = 0.4539  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.916

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.36	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.46  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.41  
AVERAGE FLOW DEPTH(FEET) = 0.33 TRAVEL TIME(MIN.) = 0.34  
Tc(MIN.) = 9.45  
SUBAREA AREA(ACRES) = 1.36 SUBAREA RUNOFF(CFS) = 1.73  
EFFECTIVE AREA(ACRES) = 2.56 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 3.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.37 FLOW VELOCITY(FEET/SEC.) = 7.90  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40513.00 = 597.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40513.00 TO NODE 40514.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 581.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00 CHANNEL SLOPE = 0.4629  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.853

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.32	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.67  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.65  
AVERAGE FLOW DEPTH(FEET) = 0.42 TRAVEL TIME(MIN.) = 0.34  
Tc(MIN.) = 9.79  
SUBAREA AREA(ACRES) = 2.32 SUBAREA RUNOFF(CFS) = 2.82  
EFFECTIVE AREA(ACRES) = 4.88 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 5.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.46 FLOW VELOCITY(FEET/SEC.) = 9.25  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40514.00 = 772.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40514.00 TO NODE 40515.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 440.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 206.00 CHANNEL SLOPE = 0.2913  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.793

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.15	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.19  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.08  
AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 0.42  
Tc(MIN.) = 10.21  
SUBAREA AREA(ACRES) = 2.15 SUBAREA RUNOFF(CFS) = 2.50  
EFFECTIVE AREA(ACRES) = 7.03 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.0 PEAK FLOW RATE(CFS) = 8.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.57 FLOW VELOCITY(FEET/SEC.) = 8.41  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40515.00 = 978.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40515.00 TO NODE 40516.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 390.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 269.00 CHANNEL SLOPE = 0.1859  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.736  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.24	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.10  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.61  
 AVERAGE FLOW DEPTH (FEET) = 0.70 TRAVEL TIME (MIN.) = 0.59  
 Tc (MIN.) = 10.80  
 SUBAREA AREA (ACRES) = 5.24 SUBAREA RUNOFF (CFS) = 5.83  
 EFFECTIVE AREA (ACRES) = 12.27 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 13.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.75 FLOW VELOCITY (FEET/SEC.) = 8.03  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40516.00 = 1247.00 FEET.

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FLOW PROCESS FROM NODE 40516.00 TO NODE 40517.00 IS CODE = 51

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 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 390.00 DOWNSTREAM (FEET) = 355.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 384.00 CHANNEL SLOPE = 0.0911  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.638  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.01	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.70  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.39  
 AVERAGE FLOW DEPTH (FEET) = 0.91 TRAVEL TIME (MIN.) = 1.00  
 Tc (MIN.) = 11.80  
 SUBAREA AREA (ACRES) = 4.01 SUBAREA RUNOFF (CFS) = 4.11  
 EFFECTIVE AREA (ACRES) = 16.28 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 16.3 PEAK FLOW RATE (CFS) = 16.67

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.93 FLOW VELOCITY (FEET/SEC.) = 6.48  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40517.00 = 1631.00 FEET.

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FLOW PROCESS FROM NODE 40517.00 TO NODE 40518.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 355.00 DOWNSTREAM (FEET) = 341.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 512.00 CHANNEL SLOPE = 0.0273  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.484  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.89	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 20.61  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.42  
 AVERAGE FLOW DEPTH (FEET) = 1.13 TRAVEL TIME (MIN.) = 1.58  
 Tc (MIN.) = 13.38  
 SUBAREA AREA (ACRES) = 8.89 SUBAREA RUNOFF (CFS) = 7.87  
 EFFECTIVE AREA (ACRES) = 25.17 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 25.2 PEAK FLOW RATE (CFS) = 22.28

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.16 FLOW VELOCITY (FEET/SEC.) = 5.50  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40518.00 = 2143.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40518.00 TO NODE 40518.00 IS CODE = 1

-----  
 >>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE <<<<<  
 >>>> AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES <<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 13.38  
 RAINFALL INTENSITY (INCH/HR) = 1.48  
 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 25.17  
 TOTAL STREAM AREA (ACRES) = 25.17  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 22.28

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	29.78	15.29	1.314	0.50 ( 0.50)	1.00	40.7	40500.00
2	22.28	13.38	1.484	0.50 ( 0.50)	1.00	25.2	40510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	52.06	13.38	1.484	0.50 ( 0.50)	1.00	60.7	40510.00
2	48.21	15.29	1.314	0.50 ( 0.50)	1.00	65.8	40500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 52.06 Tc(MIN.) = 13.38  
 EFFECTIVE AREA(ACRES) = 60.74 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 65.8  
 LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40518.00 = 3095.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40518.00 TO NODE 40519.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 341.00 DOWNSTREAM(FEET) = 295.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 996.00 CHANNEL SLOPE = 0.0462  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.311  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.05 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 54.26  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.37  
 AVERAGE FLOW DEPTH(FEET) = 1.47 TRAVEL TIME(MIN.) = 1.98  
 Tc(MIN.) = 15.36  
 SUBAREA AREA(ACRES) = 6.05 SUBAREA RUNOFF(CFS) = 4.41  
 EFFECTIVE AREA(ACRES) = 66.79 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 71.9 PEAK FLOW RATE(CFS) = 52.06  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.45 FLOW VELOCITY(FEET/SEC.) = 8.29  
 LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40519.00 = 4091.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	52.06	15.36	1.311	0.50( 0.50)	1.00	66.8	40510.00
2	48.21	17.32	1.237	0.50( 0.50)	1.00	71.9	40500.00

 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 52.06 Tc(MIN.) = 15.36  
 AREA-AVERAGED Fm(INCH/HR) = 0.50 AREA-AVERAGED Fp(INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 66.79

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FLOW PROCESS FROM NODE 40519.00 TO NODE 40519.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.36  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.311  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 9.50 0.50 0.982 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 7.01  
 EFFECTIVE AREA(ACRES) = 76.29 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 81.4 PEAK FLOW RATE(CFS) = 55.77

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 81.4 Tc(MIN.) = 15.36  
 EFFECTIVE AREA(ACRES) = 76.29 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.998  
 PEAK FLOW RATE(CFS) = 55.77

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	55.77	15.36	1.311	0.50( 0.50)	1.00	76.3	40510.00
2	54.01	17.32	1.237	0.50( 0.50)	1.00	81.4	40500.00

END OF RATIONAL METHOD ANALYSIS







DEPTH(FEET) = 0.39 FLOW VELOCITY(FEET/SEC.) = 3.34  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40602.00 = 478.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40602.00 TO NODE 40603.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) =	985.00	DOWNSTREAM(FEET) =	958.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	282.00	CHANNEL SLOPE =	0.0957
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	1.658		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.11	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.08

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.88

AVERAGE FLOW DEPTH(FEET) = 0.42 TRAVEL TIME(MIN.) = 1.21

Tc(MIN.) = 11.60

SUBAREA AREA(ACRES) = 1.11 SUBAREA RUNOFF(CFS) = 1.16

EFFECTIVE AREA(ACRES) = 2.41 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 2.51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 4.08

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40603.00 = 760.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40603.00 TO NODE 40604.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	958.00	DOWNSTREAM(FEET) =	940.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	219.00	CHANNEL SLOPE =	0.0822
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	1.568		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.36	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.69

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.95

AVERAGE FLOW DEPTH(FEET) = 0.48 TRAVEL TIME(MIN.) = 0.92

Tc(MIN.) = 12.52

SUBAREA AREA(ACRES) = 0.36 SUBAREA RUNOFF(CFS) = 0.34

EFFECTIVE AREA(ACRES) = 2.77 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.8 PEAK FLOW RATE(CFS) = 2.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.48 FLOW VELOCITY(FEET/SEC.) = 3.92

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40604.00 = 979.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40604.00 TO NODE 40605.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	940.00	DOWNSTREAM(FEET) =	800.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	547.00	CHANNEL SLOPE =	0.2559
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	1.432		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.00	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.92

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.59

AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 1.38

Tc(MIN.) = 13.90

SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 2.52

EFFECTIVE AREA(ACRES) = 5.77 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 4.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.48 FLOW VELOCITY(FEET/SEC.) = 7.07

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40605.00 = 1526.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40605.00 TO NODE 40606.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	800.00	DOWNSTREAM(FEET) =	680.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	277.00	CHANNEL SLOPE =	0.4332
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	1.382		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.22	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.72

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.91

AVERAGE FLOW DEPTH(FEET) = 0.46 TRAVEL TIME(MIN.) = 0.52

Tc(MIN.) = 14.42

SUBAREA AREA(ACRES) = 2.22 SUBAREA RUNOFF(CFS) = 1.76

EFFECTIVE AREA(ACRES) = 7.99 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.0 PEAK FLOW RATE (CFS) = 6.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.48 FLOW VELOCITY (FEET/SEC.) = 9.04  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40606.00 = 1803.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40606.00 TO NODE 40607.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 680.00 DOWNSTREAM (FEET) = 670.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 59.00 CHANNEL SLOPE = 0.1695  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.368  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.34	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.99  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.16  
AVERAGE FLOW DEPTH (FEET) = 0.68 TRAVEL TIME (MIN.) = 0.14  
Tc (MIN.) = 14.56  
SUBAREA AREA (ACRES) = 9.34 SUBAREA RUNOFF (CFS) = 7.29  
EFFECTIVE AREA (ACRES) = 17.33 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.3 PEAK FLOW RATE (CFS) = 13.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.76 FLOW VELOCITY (FEET/SEC.) = 7.81  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40607.00 = 1862.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40607.00 TO NODE 40608.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 670.00 DOWNSTREAM (FEET) = 585.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 246.00 CHANNEL SLOPE = 0.3455  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.330  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.64	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.27  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.47  
AVERAGE FLOW DEPTH (FEET) = 0.70 TRAVEL TIME (MIN.) = 0.39  
Tc (MIN.) = 14.95

SUBAREA AREA (ACRES) = 4.64 SUBAREA RUNOFF (CFS) = 3.46  
EFFECTIVE AREA (ACRES) = 21.96 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 16.40

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.71 FLOW VELOCITY (FEET/SEC.) = 10.71  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40608.00 = 2108.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40608.00 TO NODE 40609.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 585.00 DOWNSTREAM (FEET) = 494.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 482.00 CHANNEL SLOPE = 0.1888  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.292  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.61	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 19.47  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.83  
AVERAGE FLOW DEPTH (FEET) = 0.86 TRAVEL TIME (MIN.) = 0.91  
Tc (MIN.) = 15.86  
SUBAREA AREA (ACRES) = 8.61 SUBAREA RUNOFF (CFS) = 6.14  
EFFECTIVE AREA (ACRES) = 30.57 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 30.6 PEAK FLOW RATE (CFS) = 21.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.90 FLOW VELOCITY (FEET/SEC.) = 9.06  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40609.00 = 2590.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40609.00 TO NODE 40610.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 494.00 DOWNSTREAM (FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 236.00 CHANNEL SLOPE = 0.1017  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.273  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	18.33	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 28.17  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.71

AVERAGE FLOW DEPTH(FEET) = 1.10 TRAVEL TIME(MIN.) = 0.51  
Tc(MIN.) = 16.37  
SUBAREA AREA(ACRES) = 18.33 SUBAREA RUNOFF(CFS) = 12.75  
EFFECTIVE AREA(ACRES) = 48.90 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 48.9 PEAK FLOW RATE(CFS) = 34.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.19 FLOW VELOCITY(FEET/SEC.) = 8.07  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40610.00 = 2826.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40610.00 TO NODE 40611.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 425.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 560.00 CHANNEL SLOPE = 0.0804  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.226  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.11 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.31  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.54  
AVERAGE FLOW DEPTH(FEET) = 1.28 TRAVEL TIME(MIN.) = 1.24  
Tc(MIN.) = 17.61  
SUBAREA AREA(ACRES) = 10.11 SUBAREA RUNOFF(CFS) = 6.60  
EFFECTIVE AREA(ACRES) = 59.01 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 59.0 PEAK FLOW RATE(CFS) = 38.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.30 FLOW VELOCITY(FEET/SEC.) = 7.60  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40611.00 = 3386.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40611.00 TO NODE 40612.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 373.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 906.00 CHANNEL SLOPE = 0.0574  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.143  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 20.87 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 44.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.97  
AVERAGE FLOW DEPTH(FEET) = 1.46 TRAVEL TIME(MIN.) = 2.17  
Tc(MIN.) = 19.78  
SUBAREA AREA(ACRES) = 20.87 SUBAREA RUNOFF(CFS) = 12.08  
EFFECTIVE AREA(ACRES) = 79.89 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 79.9 PEAK FLOW RATE(CFS) = 46.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.48 FLOW VELOCITY(FEET/SEC.) = 7.01  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40612.00 = 4292.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40612.00 TO NODE 40613.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 373.00 DOWNSTREAM(FEET) = 326.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1220.00 CHANNEL SLOPE = 0.0385  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.063  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 13.07 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 49.53  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.65  
AVERAGE FLOW DEPTH(FEET) = 1.47 TRAVEL TIME(MIN.) = 2.66  
Tc(MIN.) = 22.44  
SUBAREA AREA(ACRES) = 13.07 SUBAREA RUNOFF(CFS) = 6.62  
EFFECTIVE AREA(ACRES) = 92.95 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 93.0 PEAK FLOW RATE(CFS) = 47.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.44 FLOW VELOCITY(FEET/SEC.) = 7.52  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40613.00 = 5512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40613.00 TO NODE 40614.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 326.00 DOWNSTREAM(FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 209.00 CHANNEL SLOPE = 0.1722  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.056  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 14.71 0.50 0.999 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 50.79  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.53  
AVERAGE FLOW DEPTH(FEET) = 1.12 TRAVEL TIME(MIN.) = 0.26  
Tc(MIN.) = 22.69  
SUBAREA AREA(ACRES) = 14.71 SUBAREA RUNOFF(CFS) = 7.36  
EFFECTIVE AREA(ACRES) = 107.67 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 107.7 PEAK FLOW RATE(CFS) = 53.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.15 FLOW VELOCITY(FEET/SEC.) = 13.64  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40614.00 = 5721.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40614.00 TO NODE 40615.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 290.00 DOWNSTREAM(FEET) = 286.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0104  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.017

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	23.56	0.50	0.971	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.971

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 59.48

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.90

AVERAGE FLOW DEPTH(FEET) = 2.01 TRAVEL TIME(MIN.) = 1.31

Tc(MIN.) = 24.01

SUBAREA AREA(ACRES) = 23.56 SUBAREA RUNOFF(CFS) = 11.28

EFFECTIVE AREA(ACRES) = 131.23 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 131.2 PEAK FLOW RATE(CFS) = 61.40

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.04 FLOW VELOCITY(FEET/SEC.) = 4.92  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40615.00 = 6107.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40615.00 TO NODE 40615.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.01

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.017

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.74	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 3.74 SUBAREA RUNOFF(CFS) = 1.74  
EFFECTIVE AREA(ACRES) = 134.97 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 135.0 PEAK FLOW RATE(CFS) = 63.15

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 135.0 TC(MIN.) = 24.01

EFFECTIVE AREA(ACRES) = 134.97 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.995

PEAK FLOW RATE(CFS) = 63.15

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 5 Yr \*  
\* From Node: 50100 To Node: 50167 \*  
\*\*\*\*\*

FILE NAME: 0610501U.DAT  
TIME/DATE OF STUDY: 10:12 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.720
- 2) 10.00; 1.805
- 3) 15.00; 1.321
- 4) 20.00; 1.131
- 5) 25.00; 0.986
- 6) 30.00; 0.883
- 7) 40.00; 0.757
- 8) 50.00; 0.674
- 9) 60.00; 0.613
- 10) 90.00; 0.510
- 11) 120.00; 0.452
- 12) 180.00; 0.380
- 13) 360.00; 0.282
- 14) 1440.00; 0.124

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50100.00 TO NODE 50101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00  
ELEVATION DATA: UPSTREAM(FEET) = 1072.00 DOWNSTREAM(FEET) = 1063.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.598  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.360  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.50	1.000	0	14.60

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.47  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50101.00 TO NODE 50102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1063.00 DOWNSTREAM(FEET) = 975.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 273.00 CHANNEL SLOPE = 0.3223  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.297  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.29	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.38  
AVERAGE FLOW DEPTH(FEET) = 0.21 TRAVEL TIME(MIN.) = 1.04  
Tc(MIN.) = 15.64  
SUBAREA AREA(ACRES) = 0.29 SUBAREA RUNOFF(CFS) = 0.21  
EFFECTIVE AREA(ACRES) = 0.90 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 0.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.22 FLOW VELOCITY(FEET/SEC.) = 4.59  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50102.00 = 597.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50102.00 TO NODE 50103.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	975.00	DOWNSTREAM(FEET) =	948.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	111.00	CHANNEL SLOPE =	0.2432
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	1.280		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.22	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.72

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.20

AVERAGE FLOW DEPTH(FEET) = 0.24 TRAVEL TIME(MIN.) = 0.44

Tc(MIN.) = 16.08

SUBAREA AREA(ACRES) = 0.22 SUBAREA RUNOFF(CFS) = 0.16

EFFECTIVE AREA(ACRES) = 1.12 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 0.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.25 FLOW VELOCITY(FEET/SEC.) = 4.30

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50103.00 = 708.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50103.00 TO NODE 50104.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	948.00	DOWNSTREAM(FEET) =	914.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	136.00	CHANNEL SLOPE =	0.2500
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	1.262		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.99

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.73

AVERAGE FLOW DEPTH(FEET) = 0.26 TRAVEL TIME(MIN.) = 0.48

Tc(MIN.) = 16.56

SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 0.41

EFFECTIVE AREA(ACRES) = 1.71 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 1.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.29 FLOW VELOCITY(FEET/SEC.) = 4.81

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50104.00 = 844.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50104.00 TO NODE 50105.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	914.00	DOWNSTREAM(FEET) =	895.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	52.00	CHANNEL SLOPE =	0.3654
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	1.257		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.73	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.76

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.19

AVERAGE FLOW DEPTH(FEET) = 0.31 TRAVEL TIME(MIN.) = 0.14

Tc(MIN.) = 16.70

SUBAREA AREA(ACRES) = 1.73 SUBAREA RUNOFF(CFS) = 1.18

EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 2.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.34 FLOW VELOCITY(FEET/SEC.) = 6.74

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50105.00 = 896.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50106.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	895.00	DOWNSTREAM(FEET) =	835.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	280.00	CHANNEL SLOPE =	0.2143
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	1.227		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.59

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.03

AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.77

Tc(MIN.) = 17.47

SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 2.49

EFFECTIVE AREA(ACRES) = 7.24 AREA-AVERAGED Fm(INCH/HR) = 0.50



AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 7.2 PEAK FLOW RATE (CFS) = 4.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.49 FLOW VELOCITY (FEET/SEC.) = 6.50  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50106.00 = 1176.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50106.00 TO NODE 50107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 835.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 413.00 CHANNEL SLOPE = 0.2179  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.190

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.53	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.15  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.06  
AVERAGE FLOW DEPTH (FEET) = 0.54 TRAVEL TIME (MIN.) = 0.98  
Tc (MIN.) = 18.45

SUBAREA AREA (ACRES) = 4.53 SUBAREA RUNOFF (CFS) = 2.81  
EFFECTIVE AREA (ACRES) = 11.77 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.8 PEAK FLOW RATE (CFS) = 7.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.58 FLOW VELOCITY (FEET/SEC.) = 7.32  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50107.00 = 1589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50107.00 TO NODE 50108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 302.00 CHANNEL SLOPE = 0.2318  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.166

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.76	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.04  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.96  
AVERAGE FLOW DEPTH (FEET) = 0.62 TRAVEL TIME (MIN.) = 0.63  
Tc (MIN.) = 19.08

SUBAREA AREA (ACRES) = 5.76 SUBAREA RUNOFF (CFS) = 3.45  
EFFECTIVE AREA (ACRES) = 17.54 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.5 PEAK FLOW RATE (CFS) = 10.51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.65 FLOW VELOCITY (FEET/SEC.) = 8.21  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50108.00 = 1891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50108.00 TO NODE 50109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 655.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 81.00 CHANNEL SLOPE = 0.2469  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.161

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.77	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.20  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.18  
AVERAGE FLOW DEPTH (FEET) = 0.74 TRAVEL TIME (MIN.) = 0.15  
Tc (MIN.) = 19.22

SUBAREA AREA (ACRES) = 15.77 SUBAREA RUNOFF (CFS) = 9.37  
EFFECTIVE AREA (ACRES) = 33.31 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 33.3 PEAK FLOW RATE (CFS) = 19.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.82 FLOW VELOCITY (FEET/SEC.) = 9.83  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50109.00 = 1972.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 655.00 DOWNSTREAM (FEET) = 590.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 379.00 CHANNEL SLOPE = 0.1715  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.134

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.53	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.08  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.94

AVERAGE FLOW DEPTH(FEET) = 0.93 TRAVEL TIME(MIN.) = 0.71  
Tc(MIN.) = 19.93  
SUBAREA AREA(ACRES) = 11.53 SUBAREA RUNOFF(CFS) = 6.58  
EFFECTIVE AREA(ACRES) = 44.84 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 44.8 PEAK FLOW RATE(CFS) = 25.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.97 FLOW VELOCITY(FEET/SEC.) = 9.13  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50110.00 = 2351.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50110.00 TO NODE 50111.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 570.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 340.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.108  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 27.15 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 32.99  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.51  
AVERAGE FLOW DEPTH(FEET) = 1.30 TRAVEL TIME(MIN.) = 0.87  
Tc(MIN.) = 20.80  
SUBAREA AREA(ACRES) = 27.15 SUBAREA RUNOFF(CFS) = 14.85  
EFFECTIVE AREA(ACRES) = 71.99 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 72.0 PEAK FLOW RATE(CFS) = 39.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.39 FLOW VELOCITY(FEET/SEC.) = 6.83  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50111.00 = 2691.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50111.00 TO NODE 50112.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 567.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 403.00 CHANNEL SLOPE = 0.0074  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.051  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 66.68 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 55.89  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.43  
AVERAGE FLOW DEPTH(FEET) = 2.33 TRAVEL TIME(MIN.) = 1.96  
Tc(MIN.) = 22.76  
SUBAREA AREA(ACRES) = 66.68 SUBAREA RUNOFF(CFS) = 33.04  
EFFECTIVE AREA(ACRES) = 138.68 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 138.7 PEAK FLOW RATE(CFS) = 68.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.52 FLOW VELOCITY(FEET/SEC.) = 3.61  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50112.00 = 3094.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50112.00 TO NODE 50140.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 22.76  
RAINFALL INTENSITY(INCH/HR) = 1.05  
AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 138.68  
TOTAL STREAM AREA(ACRES) = 138.68  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 68.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50120.00 TO NODE 50121.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00  
ELEVATION DATA: UPSTREAM(FEET) = 1068.00 DOWNSTREAM(FEET) = 968.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.018  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.984  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	-	0.29	0.50	1.000	0	9.02

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.38  
TOTAL AREA(ACRES) = 0.29 PEAK FLOW RATE(CFS) = 0.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50121.00 TO NODE 50122.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 968.00 DOWNSTREAM(FEET) = 916.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 242.00 CHANNEL SLOPE = 0.2149  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.803  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.55	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 0.71  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.04  
 AVERAGE FLOW DEPTH (FEET) = 0.24 TRAVEL TIME (MIN.) = 1.00  
 Tc (MIN.) = 10.02  
 SUBAREA AREA (ACRES) = 0.55 SUBAREA RUNOFF (CFS) = 0.64  
 EFFECTIVE AREA (ACRES) = 0.83 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 0.8 PEAK FLOW RATE (CFS) = 0.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.27 FLOW VELOCITY (FEET/SEC.) = 4.42  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50122.00 = 566.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50122.00 TO NODE 50123.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 916.00 DOWNSTREAM (FEET) = 906.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 111.00 CHANNEL SLOPE = 0.0901  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.751  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.68	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.36  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.43  
 AVERAGE FLOW DEPTH (FEET) = 0.36 TRAVEL TIME (MIN.) = 0.54  
 Tc (MIN.) = 10.56  
 SUBAREA AREA (ACRES) = 0.68 SUBAREA RUNOFF (CFS) = 0.76  
 EFFECTIVE AREA (ACRES) = 1.51 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.5 PEAK FLOW RATE (CFS) = 1.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.39 FLOW VELOCITY (FEET/SEC.) = 3.66  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50123.00 = 677.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50123.00 TO NODE 50124.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 906.00 DOWNSTREAM (FEET) = 903.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 60.00 CHANNEL SLOPE = 0.0500  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.719  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.03  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.05  
 AVERAGE FLOW DEPTH (FEET) = 0.47 TRAVEL TIME (MIN.) = 0.33  
 Tc (MIN.) = 10.88  
 SUBAREA AREA (ACRES) = 0.59 SUBAREA RUNOFF (CFS) = 0.65  
 EFFECTIVE AREA (ACRES) = 2.10 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.1 PEAK FLOW RATE (CFS) = 2.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.49 FLOW VELOCITY (FEET/SEC.) = 3.16  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50124.00 = 737.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50124.00 TO NODE 50125.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 903.00 DOWNSTREAM (FEET) = 901.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 29.00 CHANNEL SLOPE = 0.0690  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.707  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.44	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.09  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.87  
 AVERAGE FLOW DEPTH (FEET) = 0.52 TRAVEL TIME (MIN.) = 0.13  
 Tc (MIN.) = 11.01  
 SUBAREA AREA (ACRES) = 1.44 SUBAREA RUNOFF (CFS) = 1.56  
 EFFECTIVE AREA (ACRES) = 3.54 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.5 PEAK FLOW RATE (CFS) = 3.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.56 FLOW VELOCITY (FEET/SEC.) = 4.06  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50125.00 = 766.00 FEET.

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FLOW PROCESS FROM NODE 50125.00 TO NODE 50126.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 901.00 DOWNSTREAM(FEET) = 889.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 130.00 CHANNEL SLOPE = 0.0923
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.664
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.69 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.26
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.87
AVERAGE FLOW DEPTH(FEET) = 0.60 TRAVEL TIME(MIN.) = 0.44
Tc(MIN.) = 11.45
SUBAREA AREA(ACRES) = 2.69 SUBAREA RUNOFF(CFS) = 2.82
EFFECTIVE AREA(ACRES) = 6.23 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.2 PEAK FLOW RATE(CFS) = 6.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.65 FLOW VELOCITY(FEET/SEC.) = 5.13
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50126.00 = 896.00 FEET.

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FLOW PROCESS FROM NODE 50126.00 TO NODE 50127.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 889.00 DOWNSTREAM(FEET) = 855.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 231.00 CHANNEL SLOPE = 0.1472
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.606
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.18 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.62
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.39
AVERAGE FLOW DEPTH(FEET) = 0.63 TRAVEL TIME(MIN.) = 0.60
Tc(MIN.) = 12.06
SUBAREA AREA(ACRES) = 2.18 SUBAREA RUNOFF(CFS) = 2.17
EFFECTIVE AREA(ACRES) = 8.41 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 8.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.65 FLOW VELOCITY(FEET/SEC.) = 6.54
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50127.00 = 1127.00 FEET.

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FLOW PROCESS FROM NODE 50127.00 TO NODE 50128.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 855.00 DOWNSTREAM(FEET) = 793.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 211.00 CHANNEL SLOPE = 0.2938
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.569
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 5.70 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.11
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.10
AVERAGE FLOW DEPTH(FEET) = 0.64 TRAVEL TIME(MIN.) = 0.39
Tc(MIN.) = 12.44
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 5.48
EFFECTIVE AREA(ACRES) = 14.11 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.1 PEAK FLOW RATE(CFS) = 13.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.69 FLOW VELOCITY(FEET/SEC.) = 9.51
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50128.00 = 1338.00 FEET.

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FLOW PROCESS FROM NODE 50128.00 TO NODE 50129.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 793.00 DOWNSTREAM(FEET) = 708.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 353.00 CHANNEL SLOPE = 0.2408
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.509
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 9.99 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.11
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.52
AVERAGE FLOW DEPTH(FEET) = 0.80 TRAVEL TIME(MIN.) = 0.62
Tc(MIN.) = 13.06
SUBAREA AREA(ACRES) = 9.99 SUBAREA RUNOFF(CFS) = 9.07
EFFECTIVE AREA(ACRES) = 24.10 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 21.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.86 FLOW VELOCITY(FEET/SEC.) = 9.92
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50129.00 = 1691.00 FEET.

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FLOW PROCESS FROM NODE 50129.00 TO NODE 50130.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 708.00 DOWNSTREAM(FEET) = 571.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 735.00 CHANNEL SLOPE = 0.1864
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.386
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 13.71 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.34
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.61
AVERAGE FLOW DEPTH(FEET) = 0.97 TRAVEL TIME (MIN.) = 1.27
Tc(MIN.) = 14.33
SUBAREA AREA(ACRES) = 13.71 SUBAREA RUNOFF(CFS) = 10.93
EFFECTIVE AREA(ACRES) = 37.82 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 30.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.01 FLOW VELOCITY(FEET/SEC.) = 9.81
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50130.00 = 2426.00 FEET.

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FLOW PROCESS FROM NODE 50130.00 TO NODE 50131.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 571.00 DOWNSTREAM(FEET) = 566.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 709.00 CHANNEL SLOPE = 0.0071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.198
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.71 0.50 0.986 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 36.71
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.03
AVERAGE FLOW DEPTH(FEET) = 2.01 TRAVEL TIME (MIN.) = 3.91
Tc(MIN.) = 18.24
SUBAREA AREA(ACRES) = 20.71 SUBAREA RUNOFF(CFS) = 13.13
EFFECTIVE AREA(ACRES) = 58.52 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 36.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.02 FLOW VELOCITY(FEET/SEC.) = 3.02
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50131.00 = 3135.00 FEET.

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FLOW PROCESS FROM NODE 50132.00 TO NODE 50131.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.24
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.198
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 154.02 0.50 0.949 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 154.02 SUBAREA RUNOFF(CFS) = 100.26
EFFECTIVE AREA(ACRES) = 212.54 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 212.5 PEAK FLOW RATE(CFS) = 137.15

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FLOW PROCESS FROM NODE 50131.00 TO NODE 50140.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 18.24
RAINFALL INTENSITY(INCH/HR) = 1.20
AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 212.54
TOTAL STREAM AREA(ACRES) = 212.54
PEAK FLOW RATE(CFS) AT CONFLUENCE = 137.15

\*\* CONFLUENCE DATA \*\*

Table with 7 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

Table with 7 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 205.86 Tc(MIN.) = 18.24
EFFECTIVE AREA(ACRES) = 323.67 AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 351.2

LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50140.00 = 3135.00 FEET.

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FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 566.00 DOWNSTREAM(FEET) = 416.00
FLOW LENGTH(FEET) = 376.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 56.07
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 205.86
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 18.35
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50141.00 = 3511.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.35
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.194
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 48.73 0.50 0.922 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.922
SUBAREA AREA(ACRES) = 48.73 SUBAREA RUNOFF(CFS) = 32.13
EFFECTIVE AREA(ACRES) = 372.40 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 400.0 PEAK FLOW RATE(CFS) = 237.83

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FLOW PROCESS FROM NODE 50141.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 416.00 DOWNSTREAM(FEET) = 404.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 972.00 CHANNEL SLOPE = 0.0123
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.100
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.56 0.50 0.610 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.610
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 240.53
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.97
AVERAGE FLOW DEPTH(FEET) = 3.66 TRAVEL TIME(MIN.) = 2.71
Tc(MIN.) = 21.07
SUBAREA AREA(ACRES) = 7.56 SUBAREA RUNOFF(CFS) = 5.41
EFFECTIVE AREA(ACRES) = 379.97 AREA-AVERAGED Fm(INCH/HR) = 0.48

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 407.5 PEAK FLOW RATE(CFS) = 237.83
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 3.65 FLOW VELOCITY(FEET/SEC.) = 5.95
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50162.00 = 4483.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 237.83 21.07 1.100 0.50( 0.48) 0.96 380.0 50120.00
2 202.31 25.71 0.971 0.50( 0.48) 0.96 407.5 50100.00

NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 237.83 Tc(MIN.) = 21.07
AREA-AVERAGED Fm(INCH/HR) = 0.48 AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 379.97

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FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 21.07
RAINFALL INTENSITY(INCH/HR) = 1.10
AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 379.97
TOTAL STREAM AREA(ACRES) = 407.52
PEAK FLOW RATE(CFS) AT CONFLUENCE = 237.83

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FLOW PROCESS FROM NODE 50150.00 TO NODE 50151.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00
ELEVATION DATA: UPSTREAM(FEET) = 1076.00 DOWNSTREAM(FEET) = 988.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.235
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.945
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" - 0.46 0.50 1.000 0 9.23
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.59
TOTAL AREA(ACRES) = 0.46 PEAK FLOW RATE(CFS) = 0.59

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FLOW PROCESS FROM NODE 50151.00 TO NODE 50152.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 988.00 DOWNSTREAM(FEET) = 938.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 220.00 CHANNEL SLOPE = 0.2273
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.799
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.59 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.94
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.47
AVERAGE FLOW DEPTH(FEET) = 0.26 TRAVEL TIME(MIN.) = 0.82
Tc(MIN.) = 10.05
SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 0.69
EFFECTIVE AREA(ACRES) = 1.04 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 1.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.29 FLOW VELOCITY(FEET/SEC.) = 4.75
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50152.00 = 543.00 FEET.

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FLOW PROCESS FROM NODE 50152.00 TO NODE 50153.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 938.00 DOWNSTREAM(FEET) = 904.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 218.00 CHANNEL SLOPE = 0.1560
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.722
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.13 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.84
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.51
AVERAGE FLOW DEPTH(FEET) = 0.37 TRAVEL TIME(MIN.) = 0.81
Tc(MIN.) = 10.86
SUBAREA AREA(ACRES) = 1.13 SUBAREA RUNOFF(CFS) = 1.25
EFFECTIVE AREA(ACRES) = 2.18 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.2 PEAK FLOW RATE(CFS) = 2.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.40 FLOW VELOCITY(FEET/SEC.) = 4.95
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50153.00 = 761.00 FEET.

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FLOW PROCESS FROM NODE 50153.00 TO NODE 50154.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 904.00 DOWNSTREAM(FEET) = 881.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 212.00 CHANNEL SLOPE = 0.1085
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.651
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.00 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.95
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.83
AVERAGE FLOW DEPTH(FEET) = 0.52 TRAVEL TIME(MIN.) = 0.73
Tc(MIN.) = 11.59
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 3.11
EFFECTIVE AREA(ACRES) = 5.18 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 5.2 PEAK FLOW RATE(CFS) = 5.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.58 FLOW VELOCITY(FEET/SEC.) = 5.23
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50154.00 = 973.00 FEET.

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FLOW PROCESS FROM NODE 50154.00 TO NODE 50155.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 881.00 DOWNSTREAM(FEET) = 877.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0253
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.573
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.81 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.20
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.25
AVERAGE FLOW DEPTH(FEET) = 0.86 TRAVEL TIME(MIN.) = 0.81
Tc(MIN.) = 12.40
SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 3.68
EFFECTIVE AREA(ACRES) = 8.99 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 9.0 PEAK FLOW RATE(CFS) = 8.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.92 FLOW VELOCITY(FEET/SEC.) = 3.41

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LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50155.00 = 1131.00 FEET.

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FLOW PROCESS FROM NODE 50155.00 TO NODE 50156.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 877.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 195.00 CHANNEL SLOPE = 0.0103
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.448

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.32 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.09
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.52
AVERAGE FLOW DEPTH(FEET) = 1.15 TRAVEL TIME(MIN.) = 1.29
Tc(MIN.) = 13.69
SUBAREA AREA(ACRES) = 3.32 SUBAREA RUNOFF(CFS) = 2.83
EFFECTIVE AREA(ACRES) = 12.31 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 10.50

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.17 FLOW VELOCITY(FEET/SEC.) = 2.55
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50156.00 = 1326.00 FEET.

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FLOW PROCESS FROM NODE 50156.00 TO NODE 50157.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 850.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 424.00 CHANNEL SLOPE = 0.0590
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.318

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.78 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.89
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.03
AVERAGE FLOW DEPTH(FEET) = 0.89 TRAVEL TIME(MIN.) = 1.41
Tc(MIN.) = 15.09
SUBAREA AREA(ACRES) = 3.78 SUBAREA RUNOFF(CFS) = 2.78
EFFECTIVE AREA(ACRES) = 16.09 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 11.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.88 FLOW VELOCITY(FEET/SEC.) = 5.07
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50157.00 = 1750.00 FEET.

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FLOW PROCESS FROM NODE 50157.00 TO NODE 50158.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 835.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0949
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.302

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 11.22 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.89
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.49
AVERAGE FLOW DEPTH(FEET) = 0.90 TRAVEL TIME(MIN.) = 0.41
Tc(MIN.) = 15.50
SUBAREA AREA(ACRES) = 11.22 SUBAREA RUNOFF(CFS) = 8.10
EFFECTIVE AREA(ACRES) = 27.31 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 27.3 PEAK FLOW RATE(CFS) = 19.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.98 FLOW VELOCITY(FEET/SEC.) = 6.85
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50158.00 = 1908.00 FEET.

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FLOW PROCESS FROM NODE 50158.00 TO NODE 50159.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 835.00 DOWNSTREAM(FEET) = 680.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 721.00 CHANNEL SLOPE = 0.2150
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.257

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.87 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.82
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.05
AVERAGE FLOW DEPTH(FEET) = 0.94 TRAVEL TIME(MIN.) = 1.20
Tc(MIN.) = 16.70
SUBAREA AREA(ACRES) = 20.87 SUBAREA RUNOFF(CFS) = 14.21
EFFECTIVE AREA(ACRES) = 48.18 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00



TOTAL AREA (ACRES) = 48.2 PEAK FLOW RATE (CFS) = 32.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.02 FLOW VELOCITY (FEET/SEC.) = 10.56  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50159.00 = 2629.00 FEET.

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FLOW PROCESS FROM NODE 50159.00 TO NODE 50160.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 680.00 DOWNSTREAM (FEET) = 558.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 874.00 CHANNEL SLOPE = 0.1396

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.199

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	32.02	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 42.88

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.64

AVERAGE FLOW DEPTH (FEET) = 1.22 TRAVEL TIME (MIN.) = 1.51

Tc (MIN.) = 18.21

SUBAREA AREA (ACRES) = 32.02 SUBAREA RUNOFF (CFS) = 20.14

EFFECTIVE AREA (ACRES) = 80.20 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 80.2 PEAK FLOW RATE (CFS) = 50.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.29 FLOW VELOCITY (FEET/SEC.) = 10.04  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50160.00 = 3503.00 FEET.

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FLOW PROCESS FROM NODE 50160.00 TO NODE 50161.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 558.00 DOWNSTREAM (FEET) = 463.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 1013.00 CHANNEL SLOPE = 0.0938

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.128

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	13.52	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 54.27

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.83

AVERAGE FLOW DEPTH (FEET) = 1.43 TRAVEL TIME (MIN.) = 1.91

Tc (MIN.) = 20.12

SUBAREA AREA (ACRES) = 13.52 SUBAREA RUNOFF (CFS) = 7.64

EFFECTIVE AREA (ACRES) = 93.72 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 93.7 PEAK FLOW RATE (CFS) = 52.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.42 FLOW VELOCITY (FEET/SEC.) = 8.72

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50161.00 = 4516.00 FEET.

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FLOW PROCESS FROM NODE 50161.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 463.00 DOWNSTREAM (FEET) = 404.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 1126.00 CHANNEL SLOPE = 0.0524

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.052

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	19.35	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 57.72

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.18

AVERAGE FLOW DEPTH (FEET) = 1.64 TRAVEL TIME (MIN.) = 2.62

Tc (MIN.) = 22.74

SUBAREA AREA (ACRES) = 19.35 SUBAREA RUNOFF (CFS) = 9.60

EFFECTIVE AREA (ACRES) = 113.07 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 113.1 PEAK FLOW RATE (CFS) = 56.10

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.62 FLOW VELOCITY (FEET/SEC.) = 7.12  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

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TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION (MIN.) = 22.74

RAINFALL INTENSITY (INCH/HR) = 1.05

AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50

AREA-AVERAGED Ap = 1.00

EFFECTIVE STREAM AREA (ACRES) = 113.07

TOTAL STREAM AREA (ACRES) = 113.07

PEAK FLOW RATE (CFS) AT CONFLUENCE = 56.10

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	237.83	21.07	1.100	0.50( 0.48)	0.96	380.0	50120.00
1	202.31	25.71	0.971	0.50( 0.48)	0.96	407.5	50100.00
2	56.10	22.74	1.052	0.50( 0.50)	1.00	113.1	50150.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	293.93	21.07	1.100	0.50( 0.48)	0.97	484.7	50120.00
2	281.16	22.74	1.052	0.50( 0.49)	0.97	502.9	50150.00
3	250.23	25.71	0.971	0.50( 0.49)	0.97	520.6	50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 293.93 Tc(MIN.) = 21.07  
EFFECTIVE AREA(ACRES) = 484.73 AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 520.6  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50162.00 TO NODE 50163.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 378.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1158.00 CHANNEL SLOPE = 0.0225  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.031  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	151.93	0.50	0.990	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 330.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.09  
AVERAGE FLOW DEPTH(FEET) = 3.69 TRAVEL TIME(MIN.) = 2.38  
Tc(MIN.) = 23.45  
SUBAREA AREA(ACRES) = 151.93 SUBAREA RUNOFF(CFS) = 73.22  
EFFECTIVE AREA(ACRES) = 636.66 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 672.5 PEAK FLOW RATE(CFS) = 311.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.61 FLOW VELOCITY(FEET/SEC.) = 7.96  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50163.00 = 6800.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	311.37	23.45	1.031	0.50( 0.49)	0.97	636.7	50120.00
2	291.72	25.15	0.983	0.50( 0.49)	0.97	654.9	50150.00
3	261.60	28.20	0.920	0.50( 0.49)	0.98	672.5	50100.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 311.37 Tc(MIN.) = 23.45  
AREA-AVERAGED Fm(INCH/HR) = 0.49 AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.97 EFFECTIVE AREA(ACRES) = 636.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50163.00 TO NODE 50164.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 378.00 DOWNSTREAM(FEET) = 356.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 886.00 CHANNEL SLOPE = 0.0248  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.982  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	177.01	0.50	0.989	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.989  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 350.18  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.51  
AVERAGE FLOW DEPTH(FEET) = 3.70 TRAVEL TIME(MIN.) = 1.73  
Tc(MIN.) = 25.19  
SUBAREA AREA(ACRES) = 177.01 SUBAREA RUNOFF(CFS) = 77.61  
EFFECTIVE AREA(ACRES) = 813.67 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 849.5 PEAK FLOW RATE(CFS) = 360.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.74 FLOW VELOCITY(FEET/SEC.) = 8.59  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50164.00 = 7686.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	360.99	25.19	0.982	0.50( 0.49)	0.98	813.7	50120.00
2	342.45	26.91	0.947	0.50( 0.49)	0.98	831.9	50150.00
3	301.12	30.01	0.883	0.50( 0.49)	0.98	849.5	50100.00

NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 360.99 Tc(MIN.) = 25.19  
AREA-AVERAGED Fm(INCH/HR) = 0.49 AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 813.67

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FLOW PROCESS FROM NODE 50164.00 TO NODE 50165.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 356.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1762.00 CHANNEL SLOPE = 0.0233  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.912  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	177.01	0.50	0.989	-

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 155.27 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 389.76  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.54  
 AVERAGE FLOW DEPTH(FEET) = 3.90 TRAVEL TIME(MIN.) = 3.44  
 Tc(MIN.) = 28.63  
 SUBAREA AREA(ACRES) = 155.27 SUBAREA RUNOFF(CFS) = 57.48  
 EFFECTIVE AREA(ACRES) = 968.94 AREA-AVERAGED Fm(INCH/HR) = 0.49  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1004.8 PEAK FLOW RATE(CFS) = 366.96

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.81 FLOW VELOCITY(FEET/SEC.) = 8.42  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50165.00 = 9448.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	366.96	28.63	0.912	0.50( 0.49)	0.98	968.9	50120.00
2	344.28	30.40	0.878	0.50( 0.49)	0.98	987.1	50150.00
3	313.44	33.61	0.838	0.50( 0.49)	0.98	1004.8	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 366.96 Tc(MIN.) = 28.63  
 AREA-AVERAGED Fm(INCH/HR) = 0.49 AREA-AVERAGED Fp(INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 968.94

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50165.00 TO NODE 50166.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 893.00 CHANNEL SLOPE = 0.0347  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.882

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	50.24	0.50	0.997	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 375.61  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.84  
 AVERAGE FLOW DEPTH(FEET) = 3.57 TRAVEL TIME(MIN.) = 1.51  
 Tc(MIN.) = 30.14  
 SUBAREA AREA(ACRES) = 50.24 SUBAREA RUNOFF(CFS) = 17.31  
 EFFECTIVE AREA(ACRES) = 1019.17 AREA-AVERAGED Fm(INCH/HR) = 0.49  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1055.0 PEAK FLOW RATE(CFS) = 366.96  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.54 FLOW VELOCITY(FEET/SEC.) = 9.78  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50166.00 = 10341.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	366.96	30.14	0.882	0.50( 0.49)	0.98	1019.2	50120.00
2	344.28	31.93	0.859	0.50( 0.49)	0.98	1037.4	50150.00
3	313.44	35.19	0.818	0.50( 0.49)	0.98	1055.0	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 366.96 Tc(MIN.) = 30.14  
 AREA-AVERAGED Fm(INCH/HR) = 0.49 AREA-AVERAGED Fp(INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 1019.17

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 FLOW PROCESS FROM NODE 50166.00 TO NODE 50167.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 240.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00 CHANNEL SLOPE = 0.0437  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.862

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.36	0.50	0.892	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.892  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 368.52  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.68  
 AVERAGE FLOW DEPTH(FEET) = 3.39 TRAVEL TIME(MIN.) = 1.57  
 Tc(MIN.) = 31.71  
 SUBAREA AREA(ACRES) = 8.36 SUBAREA RUNOFF(CFS) = 3.13  
 EFFECTIVE AREA(ACRES) = 1027.53 AREA-AVERAGED Fm(INCH/HR) = 0.49  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1063.4 PEAK FLOW RATE(CFS) = 366.96  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.39 FLOW VELOCITY(FEET/SEC.) = 10.64  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50167.00 = 11349.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	366.96	31.71	0.862	0.50( 0.49)	0.98	1027.5	50120.00
2	344.28	33.54	0.839	0.50( 0.49)	0.98	1045.7	50150.00
3	313.44	36.83	0.797	0.50( 0.49)	0.98	1063.4	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 366.96 Tc(MIN.) = 31.71  
 AREA-AVERAGED Fm(INCH/HR) = 0.49 AREA-AVERAGED Fp(INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 1027.53

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1063.4 TC(MIN.) = 31.71  
 EFFECTIVE AREA(ACRES) = 1027.53 AREA-AVERAGED Fm(INCH/HR) = 0.49  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.981

PEAK FLOW RATE (CFS) = 366.96

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	366.96	31.71	0.862	0.50 ( 0.49)	0.98	1027.5	50120.00
2	344.28	33.54	0.839	0.50 ( 0.49)	0.98	1045.7	50150.00
3	313.44	36.83	0.797	0.50 ( 0.49)	0.98	1063.4	50100.00

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END OF RATIONAL METHOD ANALYSIS



DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 5.66  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50502.00 = 830.00 FEET.

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FLOW PROCESS FROM NODE 50502.00 TO NODE 50503.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 832.00 DOWNSTREAM(FEET) = 779.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 255.00 CHANNEL SLOPE = 0.2078  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.687

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.76	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.70

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.01

AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.71

Tc(MIN.) = 10.76

SUBAREA AREA(ACRES) = 3.76 SUBAREA RUNOFF(CFS) = 4.01

EFFECTIVE AREA(ACRES) = 5.26 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.3 PEAK FLOW RATE(CFS) = 5.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.53 FLOW VELOCITY(FEET/SEC.) = 6.69

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50503.00 = 1085.00 FEET.

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FLOW PROCESS FROM NODE 50503.00 TO NODE 50504.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 779.00 DOWNSTREAM(FEET) = 765.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 382.00 CHANNEL SLOPE = 0.0366  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.534

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.56	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.74

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.78

AVERAGE FLOW DEPTH(FEET) = 0.83 TRAVEL TIME(MIN.) = 1.69

Tc(MIN.) = 12.44

SUBAREA AREA(ACRES) = 4.56 SUBAREA RUNOFF(CFS) = 4.24

EFFECTIVE AREA(ACRES) = 9.82 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 9.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.87 FLOW VELOCITY(FEET/SEC.) = 3.98

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50504.00 = 1467.00 FEET.

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FLOW PROCESS FROM NODE 50504.00 TO NODE 50505.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 355.00 CHANNEL SLOPE = 0.0423  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.410

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.79	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.69

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.35

AVERAGE FLOW DEPTH(FEET) = 0.91 TRAVEL TIME(MIN.) = 1.36

Tc(MIN.) = 13.80

SUBAREA AREA(ACRES) = 3.79 SUBAREA RUNOFF(CFS) = 3.10

EFFECTIVE AREA(ACRES) = 13.61 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 13.6 PEAK FLOW RATE(CFS) = 11.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.92 FLOW VELOCITY(FEET/SEC.) = 4.39

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50505.00 = 1822.00 FEET.

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FLOW PROCESS FROM NODE 50505.00 TO NODE 50506.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 712.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 261.00 CHANNEL SLOPE = 0.1456  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.356

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.43	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.63

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.30

AVERAGE FLOW DEPTH(FEET) = 0.79 TRAVEL TIME(MIN.) = 0.60

Tc(MIN.) = 14.40

SUBAREA AREA(ACRES) = 6.43 SUBAREA RUNOFF(CFS) = 4.95

EFFECTIVE AREA(ACRES) = 20.03 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.0 PEAK FLOW RATE (CFS) = 15.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.83 FLOW VELOCITY (FEET/SEC.) = 7.53  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50506.00 = 2083.00 FEET.

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FLOW PROCESS FROM NODE 50506.00 TO NODE 50507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 464.00 CHANNEL SLOPE = 0.2414  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.293

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.57	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 16.35  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.30  
AVERAGE FLOW DEPTH (FEET) = 0.77 TRAVEL TIME (MIN.) = 0.83  
Tc (MIN.) = 15.23

SUBAREA AREA (ACRES) = 2.57 SUBAREA RUNOFF (CFS) = 1.83  
EFFECTIVE AREA (ACRES) = 22.60 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.6 PEAK FLOW RATE (CFS) = 16.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.76 FLOW VELOCITY (FEET/SEC.) = 9.31  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50507.00 = 2547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50507.00 TO NODE 50508.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 535.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 310.00 CHANNEL SLOPE = 0.2097  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.271

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.09	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.06  
AVERAGE FLOW DEPTH (FEET) = 0.82 TRAVEL TIME (MIN.) = 0.57  
Tc (MIN.) = 15.80

SUBAREA AREA (ACRES) = 6.09 SUBAREA RUNOFF (CFS) = 4.23  
EFFECTIVE AREA (ACRES) = 28.69 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 28.7 PEAK FLOW RATE (CFS) = 19.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.84 FLOW VELOCITY (FEET/SEC.) = 9.32  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50508.00 = 2857.00 FEET.

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FLOW PROCESS FROM NODE 50508.00 TO NODE 50509.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 405.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.2658  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.242

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.02	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.27  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.50  
AVERAGE FLOW DEPTH (FEET) = 0.86 TRAVEL TIME (MIN.) = 0.78  
Tc (MIN.) = 16.58

SUBAREA AREA (ACRES) = 10.02 SUBAREA RUNOFF (CFS) = 6.70  
EFFECTIVE AREA (ACRES) = 38.72 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.7 PEAK FLOW RATE (CFS) = 25.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.90 FLOW VELOCITY (FEET/SEC.) = 10.75  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50509.00 = 3346.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50509.00 TO NODE 50510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 285.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 706.00 CHANNEL SLOPE = 0.1700  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.194

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.60	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.92  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.26

AVERAGE FLOW DEPTH (FEET) = 1.00 TRAVEL TIME (MIN.) = 1.27  
Tc (MIN.) = 17.85  
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 4.12  
EFFECTIVE AREA (ACRES) = 45.32 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 28.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.00 FLOW VELOCITY (FEET/SEC.) = 9.36  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50510.00 = 4052.00 FEET.

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FLOW PROCESS FROM NODE 50510.00 TO NODE 50511.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 285.00 DOWNSTREAM (FEET) = 238.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1169.00 CHANNEL SLOPE = 0.0402  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.096  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 22.45 0.50 0.991 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 34.39  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.09  
AVERAGE FLOW DEPTH (FEET) = 1.27 TRAVEL TIME (MIN.) = 2.75  
Tc (MIN.) = 20.59  
SUBAREA AREA (ACRES) = 22.45 SUBAREA RUNOFF (CFS) = 12.14  
EFFECTIVE AREA (ACRES) = 67.77 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 67.8 PEAK FLOW RATE (CFS) = 36.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.30 FLOW VELOCITY (FEET/SEC.) = 7.19  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50511.00 = 5221.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50511.00 TO NODE 50512.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 238.00 DOWNSTREAM (FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.0102  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.046  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 39.83 0.50 0.990 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 46.33  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.58  
AVERAGE FLOW DEPTH (FEET) = 1.84 TRAVEL TIME (MIN.) = 1.78  
Tc (MIN.) = 22.37  
SUBAREA AREA (ACRES) = 39.83 SUBAREA RUNOFF (CFS) = 19.75  
EFFECTIVE AREA (ACRES) = 107.59 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 107.6 PEAK FLOW RATE (CFS) = 53.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.94 FLOW VELOCITY (FEET/SEC.) = 4.73  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50512.00 = 5710.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50512.00 TO NODE 50513.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 233.00 DOWNSTREAM (FEET) = 209.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 537.00 CHANNEL SLOPE = 0.0447  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.016  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.40 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 54.85  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.29  
AVERAGE FLOW DEPTH (FEET) = 1.48 TRAVEL TIME (MIN.) = 1.08  
Tc (MIN.) = 23.45  
SUBAREA AREA (ACRES) = 7.40 SUBAREA RUNOFF (CFS) = 3.43  
EFFECTIVE AREA (ACRES) = 114.99 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 115.0 PEAK FLOW RATE (CFS) = 53.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.47 FLOW VELOCITY (FEET/SEC.) = 8.28  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50513.00 = 6247.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50513.00 TO NODE 50513.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 23.45  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.016  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.19 0.50 0.961 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.961  
SUBAREA AREA (ACRES) = 38.19 SUBAREA RUNOFF (CFS) = 18.39  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED Fm (INCH/HR) = 0.49



AREA-AVERAGED  $F_p$  (INCH/HR) = 0.50    AREA-AVERAGED  $A_p$  = 0.99  
TOTAL AREA (ACRES) = 153.2    PEAK FLOW RATE (CFS) = 72.00

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 153.2    TC (MIN.) = 23.45  
EFFECTIVE AREA (ACRES) = 153.18    AREA-AVERAGED  $F_m$  (INCH/HR) = 0.49  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.50    AREA-AVERAGED  $A_p$  = 0.986  
PEAK FLOW RATE (CFS) = 72.00

=====  
END OF RATIONAL METHOD ANALYSIS



DEPTH(FEET) = 0.42 FLOW VELOCITY(FEET/SEC.) = 5.09  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50602.00 = 671.00 FEET.

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FLOW PROCESS FROM NODE 50602.00 TO NODE 50603.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 258.00 CHANNEL SLOPE = 0.2907  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.571

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.31	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.38

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.74

AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 0.64

Tc(MIN.) = 12.04

SUBAREA AREA(ACRES) = 1.31 SUBAREA RUNOFF(CFS) = 1.26

EFFECTIVE AREA(ACRES) = 4.02 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 3.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.43 FLOW VELOCITY(FEET/SEC.) = 6.98

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50603.00 = 929.00 FEET.

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FLOW PROCESS FROM NODE 50603.00 TO NODE 50604.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 585.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.1293  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.538

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.58	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.61

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.33

AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 0.36

Tc(MIN.) = 12.40

SUBAREA AREA(ACRES) = 1.58 SUBAREA RUNOFF(CFS) = 1.48

EFFECTIVE AREA(ACRES) = 5.60 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.6 PEAK FLOW RATE(CFS) = 5.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.56 FLOW VELOCITY(FEET/SEC.) = 5.53

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50604.00 = 1045.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50604.00 TO NODE 50605.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 584.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 16.00 CHANNEL SLOPE = 0.0625  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.533

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.98	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.55

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.63

AVERAGE FLOW DEPTH(FEET) = 0.74 TRAVEL TIME(MIN.) = 0.06

Tc(MIN.) = 12.46

SUBAREA AREA(ACRES) = 4.98 SUBAREA RUNOFF(CFS) = 4.63

EFFECTIVE AREA(ACRES) = 10.58 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 10.6 PEAK FLOW RATE(CFS) = 9.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.81 FLOW VELOCITY(FEET/SEC.) = 4.95

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50605.00 = 1061.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50605.00 TO NODE 50606.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 584.00 DOWNSTREAM(FEET) = 579.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 122.00 CHANNEL SLOPE = 0.0410  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.491

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.18	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.15

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.42

AVERAGE FLOW DEPTH(FEET) = 0.96 TRAVEL TIME(MIN.) = 0.46

Tc(MIN.) = 12.91

SUBAREA AREA(ACRES) = 5.18 SUBAREA RUNOFF(CFS) = 4.62

EFFECTIVE AREA(ACRES) = 15.76 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 15.8 PEAK FLOW RATE (CFS) = 14.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.01 FLOW VELOCITY (FEET/SEC.) = 4.59  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50606.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50606.00 TO NODE 50607.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 579.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 637.00 CHANNEL SLOPE = 0.0801  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.336  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.34	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 16.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.20  
AVERAGE FLOW DEPTH (FEET) = 0.95 TRAVEL TIME (MIN.) = 1.71  
Tc (MIN.) = 14.63  
SUBAREA AREA (ACRES) = 7.34 SUBAREA RUNOFF (CFS) = 5.52  
EFFECTIVE AREA (ACRES) = 23.11 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 23.1 PEAK FLOW RATE (CFS) = 17.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.96 FLOW VELOCITY (FEET/SEC.) = 6.23  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50607.00 = 1820.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50607.00 TO NODE 50608.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 422.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 529.00 CHANNEL SLOPE = 0.2004  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.279  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.99	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.42  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.94  
AVERAGE FLOW DEPTH (FEET) = 0.83 TRAVEL TIME (MIN.) = 0.99  
Tc (MIN.) = 15.61

SUBAREA AREA (ACRES) = 2.99 SUBAREA RUNOFF (CFS) = 2.10  
EFFECTIVE AREA (ACRES) = 26.10 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.1 PEAK FLOW RATE (CFS) = 18.28

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.83 FLOW VELOCITY (FEET/SEC.) = 8.91  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50608.00 = 2349.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50608.00 TO NODE 50609.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 422.00 DOWNSTREAM (FEET) = 297.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 708.00 CHANNEL SLOPE = 0.1766  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.229  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.94	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 22.20  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.92  
AVERAGE FLOW DEPTH (FEET) = 0.91 TRAVEL TIME (MIN.) = 1.32  
Tc (MIN.) = 16.94  
SUBAREA AREA (ACRES) = 11.94 SUBAREA RUNOFF (CFS) = 7.83  
EFFECTIVE AREA (ACRES) = 38.04 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.0 PEAK FLOW RATE (CFS) = 24.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.95 FLOW VELOCITY (FEET/SEC.) = 9.20  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50609.00 = 3057.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50609.00 TO NODE 50610.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 297.00 DOWNSTREAM (FEET) = 207.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1321.00 CHANNEL SLOPE = 0.0681  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.127  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.38	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.87  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.19

AVERAGE FLOW DEPTH (FEET) = 1.07 TRAVEL TIME (MIN.) = 2.69  
Tc (MIN.) = 19.62  
SUBAREA AREA (ACRES) = 10.38 SUBAREA RUNOFF (CFS) = 5.86  
EFFECTIVE AREA (ACRES) = 48.42 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 27.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.06 FLOW VELOCITY (FEET/SEC.) = 8.14  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50610.00 = 4378.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
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MAINLINE Tc (MIN.) = 19.62  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.127  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.17 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.17 SUBAREA RUNOFF (CFS) = 0.66  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 49.6 PEAK FLOW RATE (CFS) = 27.99

=====

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 49.6 TC (MIN.) = 19.62  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.000  
PEAK FLOW RATE (CFS) = 27.99

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END OF RATIONAL METHOD ANALYSIS



DEPTH(FEET) = 0.24 FLOW VELOCITY(FEET/SEC.) = 5.08  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50702.00 = 456.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50703.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	827.00	DOWNSTREAM(FEET) =	815.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	94.00	CHANNEL SLOPE =	0.1277
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	2.028		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.34	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.11

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.70

AVERAGE FLOW DEPTH(FEET) = 0.32 TRAVEL TIME(MIN.) = 0.42

Tc(MIN.) = 8.44

SUBAREA AREA(ACRES) = 0.34 SUBAREA RUNOFF(CFS) = 0.47

EFFECTIVE AREA(ACRES) = 0.94 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 1.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.33 FLOW VELOCITY(FEET/SEC.) = 3.91

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50703.00 = 550.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50704.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	815.00	DOWNSTREAM(FEET) =	800.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	169.00	CHANNEL SLOPE =	0.0888
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	1.904		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.72	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.39

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.98

AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.71

Tc(MIN.) = 9.15

SUBAREA AREA(ACRES) = 1.72 SUBAREA RUNOFF(CFS) = 2.17

EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 3.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.51 FLOW VELOCITY(FEET/SEC.) = 4.35

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50704.00 = 719.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50705.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	800.00	DOWNSTREAM(FEET) =	785.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	128.00	CHANNEL SLOPE =	0.1172
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	1.832		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.12	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.64

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.18

AVERAGE FLOW DEPTH(FEET) = 0.55 TRAVEL TIME(MIN.) = 0.41

Tc(MIN.) = 9.56

SUBAREA AREA(ACRES) = 2.12 SUBAREA RUNOFF(CFS) = 2.54

EFFECTIVE AREA(ACRES) = 4.79 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 5.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 FLOW VELOCITY(FEET/SEC.) = 5.46

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50705.00 = 847.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50705.00 TO NODE 50706.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	785.00	DOWNSTREAM(FEET) =	775.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	170.00	CHANNEL SLOPE =	0.0588
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	1.739		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.64	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.77

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.57

AVERAGE FLOW DEPTH(FEET) = 0.75 TRAVEL TIME(MIN.) = 0.62

Tc(MIN.) = 10.18

SUBAREA AREA(ACRES) = 3.64 SUBAREA RUNOFF(CFS) = 4.05

EFFECTIVE AREA(ACRES) = 8.42 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.4 PEAK FLOW RATE (CFS) = 9.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.81 FLOW VELOCITY (FEET/SEC.) = 4.75  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50706.00 = 1017.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50706.00 TO NODE 50707.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 775.00 DOWNSTREAM (FEET) = 772.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 162.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.665

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.65	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.83  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.28  
AVERAGE FLOW DEPTH (FEET) = 1.10 TRAVEL TIME (MIN.) = 0.82  
Tc (MIN.) = 11.01

SUBAREA AREA (ACRES) = 4.65 SUBAREA RUNOFF (CFS) = 4.87  
EFFECTIVE AREA (ACRES) = 13.07 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 13.1 PEAK FLOW RATE (CFS) = 13.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.16 FLOW VELOCITY (FEET/SEC.) = 3.38  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50707.00 = 1179.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50707.00 TO NODE 50708.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 772.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 357.00 CHANNEL SLOPE = 0.0756  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.573

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.55	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.41  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.89  
AVERAGE FLOW DEPTH (FEET) = 0.93 TRAVEL TIME (MIN.) = 1.01  
Tc (MIN.) = 12.02

SUBAREA AREA (ACRES) = 3.55 SUBAREA RUNOFF (CFS) = 3.43  
EFFECTIVE AREA (ACRES) = 16.62 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 16.6 PEAK FLOW RATE (CFS) = 16.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.94 FLOW VELOCITY (FEET/SEC.) = 6.01  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50708.00 = 1536.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50708.00 TO NODE 50709.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 733.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 444.00 CHANNEL SLOPE = 0.0270  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.412

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.58	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.34  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.19  
AVERAGE FLOW DEPTH (FEET) = 1.21 TRAVEL TIME (MIN.) = 1.77  
Tc (MIN.) = 13.78

SUBAREA AREA (ACRES) = 5.58 SUBAREA RUNOFF (CFS) = 4.58  
EFFECTIVE AREA (ACRES) = 22.20 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.2 PEAK FLOW RATE (CFS) = 18.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.20 FLOW VELOCITY (FEET/SEC.) = 4.20  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50709.00 = 1980.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50709.00 TO NODE 50710.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 733.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 467.00 CHANNEL SLOPE = 0.1242  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.319

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.17	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 19.76  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.56



AVERAGE FLOW DEPTH (FEET) = 0.93 TRAVEL TIME (MIN.) = 1.03  
Tc (MIN.) = 14.81  
SUBAREA AREA (ACRES) = 4.17 SUBAREA RUNOFF (CFS) = 3.07  
EFFECTIVE AREA (ACRES) = 26.38 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.4 PEAK FLOW RATE (CFS) = 19.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.93 FLOW VELOCITY (FEET/SEC.) = 7.55  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50710.00 = 2447.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50710.00 TO NODE 50711.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 619.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 516.00 CHANNEL SLOPE = 0.1085  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.267  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 21.41 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 26.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.79  
AVERAGE FLOW DEPTH (FEET) = 1.07 TRAVEL TIME (MIN.) = 1.10  
Tc (MIN.) = 15.92  
SUBAREA AREA (ACRES) = 21.41 SUBAREA RUNOFF (CFS) = 14.78  
EFFECTIVE AREA (ACRES) = 47.78 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 32.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.16 FLOW VELOCITY (FEET/SEC.) = 8.22  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50711.00 = 2963.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50711.00 TO NODE 50712.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 619.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 650.00 CHANNEL SLOPE = 0.0292  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.203  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.43 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 35.33  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.34  
AVERAGE FLOW DEPTH (FEET) = 1.36 TRAVEL TIME (MIN.) = 1.71  
Tc (MIN.) = 17.62  
SUBAREA AREA (ACRES) = 7.43 SUBAREA RUNOFF (CFS) = 4.70  
EFFECTIVE AREA (ACRES) = 55.21 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.2 PEAK FLOW RATE (CFS) = 34.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.36 FLOW VELOCITY (FEET/SEC.) = 6.34  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50712.00 = 3613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50713.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 794.00 CHANNEL SLOPE = 0.0907  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.154  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 36.47 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 45.65  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.29  
AVERAGE FLOW DEPTH (FEET) = 1.22 TRAVEL TIME (MIN.) = 1.29  
Tc (MIN.) = 18.91  
SUBAREA AREA (ACRES) = 36.47 SUBAREA RUNOFF (CFS) = 21.47  
EFFECTIVE AREA (ACRES) = 91.68 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 53.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.29 FLOW VELOCITY (FEET/SEC.) = 10.77  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50713.00 = 4407.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50713.00 TO NODE 50714.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 423.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1215.00 CHANNEL SLOPE = 0.0864  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.091  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.52 0.50 0.998 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.998  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 58.90  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.81  
 AVERAGE FLOW DEPTH(FEET) = 1.35 TRAVEL TIME(MIN.) = 1.87  
 Tc(MIN.) = 20.78  
 SUBAREA AREA(ACRES) = 18.52 SUBAREA RUNOFF(CFS) = 9.87  
 EFFECTIVE AREA(ACRES) = 110.21 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 110.2 PEAK FLOW RATE(CFS) = 58.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.35 FLOW VELOCITY(FEET/SEC.) = 10.79  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50714.00 = 5622.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50714.00 TO NODE 50715.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 319.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 768.00 CHANNEL SLOPE = 0.1354  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.063  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.31	0.50	0.993	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 59.98  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.83  
 AVERAGE FLOW DEPTH(FEET) = 1.25 TRAVEL TIME(MIN.) = 1.00  
 Tc(MIN.) = 21.78  
 SUBAREA AREA(ACRES) = 5.31 SUBAREA RUNOFF(CFS) = 2.71  
 EFFECTIVE AREA(ACRES) = 115.52 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 115.5 PEAK FLOW RATE(CFS) = 58.62  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.24 FLOW VELOCITY(FEET/SEC.) = 12.73  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50715.00 = 6390.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50715.00 TO NODE 50716.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 319.00 DOWNSTREAM(FEET) = 182.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1513.00 CHANNEL SLOPE = 0.0905  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.002  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	79.09	0.50	0.979	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 76.87  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.74  
 AVERAGE FLOW DEPTH(FEET) = 1.48 TRAVEL TIME(MIN.) = 2.15  
 Tc(MIN.) = 23.93  
 SUBAREA AREA(ACRES) = 79.09 SUBAREA RUNOFF(CFS) = 36.48  
 EFFECTIVE AREA(ACRES) = 194.61 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 194.6 PEAK FLOW RATE(CFS) = 88.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.56 FLOW VELOCITY(FEET/SEC.) = 12.16  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50716.00 = 7903.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50716.00 TO NODE 50716.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 23.93  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.002  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	42.18	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 42.18 SUBAREA RUNOFF(CFS) = 19.06  
 EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 236.8 PEAK FLOW RATE(CFS) = 107.76

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 236.8 TC(MIN.) = 23.93  
 EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.993  
 PEAK FLOW RATE(CFS) = 107.76

=====

END OF RATIONAL METHOD ANALYSIS





DEPTH(FEET) = 0.55 FLOW VELOCITY(FEET/SEC.) = 4.36  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50802.00 = 566.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50802.00 TO NODE 50803.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	725.00	DOWNSTREAM(FEET) =	700.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	325.00	CHANNEL SLOPE =	0.0769
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	1.519		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.52	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.72

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.40

AVERAGE FLOW DEPTH(FEET) = 0.60 TRAVEL TIME(MIN.) = 1.23

Tc(MIN.) = 12.60

SUBAREA AREA(ACRES) = 1.52 SUBAREA RUNOFF(CFS) = 1.40

EFFECTIVE AREA(ACRES) = 5.47 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 5.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.61 FLOW VELOCITY(FEET/SEC.) = 4.53

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50803.00 = 891.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50803.00 TO NODE 50804.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	700.00	DOWNSTREAM(FEET) =	652.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	594.00	CHANNEL SLOPE =	0.0808
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	1.341		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.12	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.34

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.04

AVERAGE FLOW DEPTH(FEET) = 0.70 TRAVEL TIME(MIN.) = 1.97

Tc(MIN.) = 14.57

SUBAREA AREA(ACRES) = 6.12 SUBAREA RUNOFF(CFS) = 4.63

EFFECTIVE AREA(ACRES) = 11.59 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 11.6 PEAK FLOW RATE(CFS) = 8.77

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.74 FLOW VELOCITY(FEET/SEC.) = 5.27

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50804.00 = 1485.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50804.00 TO NODE 50805.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	652.00	DOWNSTREAM(FEET) =	542.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	499.00	CHANNEL SLOPE =	0.2204
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	1.279		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.17	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.58

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.07

AVERAGE FLOW DEPTH(FEET) = 0.66 TRAVEL TIME(MIN.) = 1.03

Tc(MIN.) = 15.60

SUBAREA AREA(ACRES) = 5.17 SUBAREA RUNOFF(CFS) = 3.63

EFFECTIVE AREA(ACRES) = 16.76 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 11.75

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.69 FLOW VELOCITY(FEET/SEC.) = 8.24

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50805.00 = 1984.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50805.00 TO NODE 50806.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	542.00	DOWNSTREAM(FEET) =	450.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	650.00	CHANNEL SLOPE =	0.1415
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	1.222		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.22	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.45

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.21

AVERAGE FLOW DEPTH(FEET) = 0.79 TRAVEL TIME(MIN.) = 1.50

Tc(MIN.) = 17.10

SUBAREA AREA(ACRES) = 5.22 SUBAREA RUNOFF(CFS) = 3.39

EFFECTIVE AREA(ACRES) = 21.99 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 14.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.80 FLOW VELOCITY (FEET/SEC.) = 7.37  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50806.00 = 2634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50806.00 TO NODE 50807.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 450.00 DOWNSTREAM (FEET) = 400.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 639.00 CHANNEL SLOPE = 0.0782  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.159

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.83	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.99  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.30  
AVERAGE FLOW DEPTH (FEET) = 1.00 TRAVEL TIME (MIN.) = 1.69  
Tc (MIN.) = 18.79

SUBAREA AREA (ACRES) = 15.83 SUBAREA RUNOFF (CFS) = 9.38  
EFFECTIVE AREA (ACRES) = 37.82 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 37.8 PEAK FLOW RATE (CFS) = 22.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.07 FLOW VELOCITY (FEET/SEC.) = 6.58  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50807.00 = 3273.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50807.00 TO NODE 50808.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 400.00 DOWNSTREAM (FEET) = 350.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 448.00 CHANNEL SLOPE = 0.1116  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.122

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.46	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 24.50  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.74  
AVERAGE FLOW DEPTH (FEET) = 1.03 TRAVEL TIME (MIN.) = 0.96  
Tc (MIN.) = 19.76

SUBAREA AREA (ACRES) = 7.46 SUBAREA RUNOFF (CFS) = 4.17  
EFFECTIVE AREA (ACRES) = 45.28 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 25.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.04 FLOW VELOCITY (FEET/SEC.) = 7.78  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50808.00 = 3721.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50808.00 TO NODE 50809.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 350.00 DOWNSTREAM (FEET) = 283.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 438.00 CHANNEL SLOPE = 0.1530  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.097

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.20	0.50	0.972	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.33  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.90  
AVERAGE FLOW DEPTH (FEET) = 1.01 TRAVEL TIME (MIN.) = 0.82  
Tc (MIN.) = 20.58

SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 3.96  
EFFECTIVE AREA (ACRES) = 52.48 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 52.5 PEAK FLOW RATE (CFS) = 28.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.03 FLOW VELOCITY (FEET/SEC.) = 8.97  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50809.00 = 4159.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50809.00 TO NODE 50810.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 283.00 DOWNSTREAM (FEET) = 243.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 665.00 CHANNEL SLOPE = 0.0602  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.061

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	63.52	0.50	0.983	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.983  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 44.55  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.79

AVERAGE FLOW DEPTH (FEET) = 1.30 TRAVEL TIME (MIN.) = 1.26  
Tc (MIN.) = 21.84  
SUBAREA AREA (ACRES) = 63.52 SUBAREA RUNOFF (CFS) = 32.56  
EFFECTIVE AREA (ACRES) = 116.00 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 116.0 PEAK FLOW RATE (CFS) = 59.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.44 FLOW VELOCITY (FEET/SEC.) = 9.44  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50810.00 = 4824.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50810.00 TO NODE 50811.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
-----

ELEVATION DATA: UPSTREAM (FEET) = 243.00 DOWNSTREAM (FEET) = 173.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1122.00 CHANNEL SLOPE = 0.0624  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.994

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.57	0.50	0.980	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 61.76

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.82

AVERAGE FLOW DEPTH (FEET) = 1.62 TRAVEL TIME (MIN.) = 2.39

Tc (MIN.) = 24.23

SUBAREA AREA (ACRES) = 11.57 SUBAREA RUNOFF (CFS) = 5.24

EFFECTIVE AREA (ACRES) = 127.57 AREA-AVERAGED Fm (INCH/HR) = 0.49

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 127.6 PEAK FLOW RATE (CFS) = 59.14

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.60 FLOW VELOCITY (FEET/SEC.) = 7.71

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50811.00 = 5946.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 24.23

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.994

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 1.64

EFFECTIVE AREA (ACRES) = 131.27 AREA-AVERAGED Fm (INCH/HR) = 0.49

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 131.3 PEAK FLOW RATE (CFS) = 59.14

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 131.3 TC (MIN.) = 24.23

EFFECTIVE AREA (ACRES) = 131.27 AREA-AVERAGED Fm (INCH/HR) = 0.49

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.988

PEAK FLOW RATE (CFS) = 59.14

=====

END OF RATIONAL METHOD ANALYSIS





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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 2 \*  
\* HYDROLOGIC ANALYSIS - 5-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E502XX05.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	2.230
2)	6.000;	2.010
3)	7.000;	1.850
4)	8.000;	1.710
5)	9.000;	1.600
6)	10.000;	1.510
7)	11.000;	1.430
8)	12.000;	1.360
9)	13.000;	1.300
10)	14.000;	1.250
11)	15.000;	1.200
12)	20.000;	1.020
13)	25.000;	0.900
14)	30.000;	0.810
15)	40.000;	0.690
16)	50.000;	0.610
17)	60.000;	0.550
18)	90.000;	0.440
19)	120.000;	0.370
20)	180.000;	0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50200.00 TO NODE 50201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 497.00 DOWNSTREAM(FEET) = 365.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.563  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.648  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.50	1.000	95	8.56
NATURAL FAIR COVER "OPEN BRUSH"	-	0.60	0.50	1.000	95	8.56
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.20	0.50	1.000	95	8.56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.45  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 1.45

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50201.00 TO NODE 50202.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 365.00 DOWNSTREAM(FEET) = 335.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 259.00 CHANNEL SLOPE = 0.1158  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.45  
FLOW VELOCITY(FEET/SEC.) = 3.85 FLOW DEPTH(FEET) = 0.35  
TRAVEL TIME(MIN.) = 1.12  $T_c$ (MIN.) = 9.68  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50202.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50202.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.68  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.538  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.50 1.000 -  
USER-DEFINED - 0.70 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 2.52  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 3.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50203.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 335.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.1020  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.83  
FLOW VELOCITY(FEET/SEC.) = 4.69 FLOW DEPTH(FEET) = 0.52  
TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 10.38  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50203.00 = 781.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50203.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.38  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.480  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 2.80 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 3.70  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 7.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50204.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 304.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0696  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.32  
FLOW VELOCITY(FEET/SEC.) = 4.78 FLOW DEPTH(FEET) = 0.71  
TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 10.93  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50204.00 = 939.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50204.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.93  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.436  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 0.100 -  
USER-DEFINED - 0.80 0.50 1.000 -  
USER-DEFINED - 2.80 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 3.90  
EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 10.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50205.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 304.00 DOWNSTREAM(FEET) = 234.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 487.00 CHANNEL SLOPE = 0.1437  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.89  
FLOW VELOCITY(FEET/SEC.) = 8.56 FLOW DEPTH(FEET) = 0.65  
TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 11.88  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50205.00 = 1426.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 11.88  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.368  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.50 0.100 -

USER-DEFINED - 0.40 0.50 1.000 -  
 USER-DEFINED - 0.60 0.50 1.000 -  
 USER-DEFINED - 0.10 0.50 0.850 -  
 USER-DEFINED - 1.90 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 2.94  
 EFFECTIVE AREA(ACRES) = 16.10 AREA-AVERAGED Fm(INCH/HR) = 0.47  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 13.07

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 11.88  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.368  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.50	0.100	-
USER-DEFINED	-	1.10	0.50	1.000	-
USER-DEFINED	-	4.90	0.50	1.000	-
USER-DEFINED	-	1.50	0.50	0.850	-
USER-DEFINED	-	3.70	0.50	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.882  
 SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 10.51  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.46  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.91  
 TOTAL AREA(ACRES) = 28.7 PEAK FLOW RATE(CFS) = 23.59

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 28.7 TC(MIN.) = 11.88  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.46  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.910  
 PEAK FLOW RATE(CFS) = 23.59

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2006 Advanced Engineering Software (aes)  
Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 3 \*  
\* HYDROLOGIC ANALYSIS - 5-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E503XX05.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	2.230
2)	6.000;	2.010
3)	7.000;	1.850
4)	8.000;	1.710
5)	9.000;	1.600
6)	10.000;	1.510
7)	11.000;	1.430
8)	12.000;	1.360
9)	13.000;	1.300
10)	14.000;	1.250
11)	15.000;	1.200
12)	20.000;	1.020
13)	25.000;	0.900
14)	30.000;	0.810
15)	40.000;	0.690
16)	50.000;	0.610
17)	60.000;	0.550
18)	90.000;	0.440
19)	120.000;	0.370
20)	180.000;	0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	(FT)	(FT)	SIDE / SIDE/ WAY	(FT)	(FT)	(FT)	(FT)	(n)
			HALF- CROWN TO STREET-CROSSFALL:				CURB GUTTER-GEOMETRIES:	MANNING
			WIDTH CROSSFALL IN- / OUT-/PARK-				HEIGHT WIDTH LIP HIKE	FACTOR

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50300.00 TO NODE 50301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00  
ELEVATION DATA: UPSTREAM(FEET) = 1110.00 DOWNSTREAM(FEET) = 1035.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.517  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.553  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.60	0.50	1.000	95	9.52
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.50	1.000	95	9.52

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.85  
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 0.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50301.00 TO NODE 50302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 960.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 225.00 CHANNEL SLOPE = 0.3333  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.85  
FLOW VELOCITY(FEET/SEC.) = 4.96 FLOW DEPTH(FEET) = 0.24  
TRAVEL TIME(MIN.) = 0.76  $T_c$ (MIN.) = 10.27  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50302.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50302.00 TO NODE 50302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN) = 10.27
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.488
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.50    1.000   -
USER-DEFINED        -         1.00    0.50    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.10    SUBAREA RUNOFF(CFS) = 0.98
EFFECTIVE AREA(ACRES) = 2.00    AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.0        PEAK FLOW RATE(CFS) = 1.78

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*****
FLOW PROCESS FROM NODE 50302.00 TO NODE 50303.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 84.00 CHANNEL SLOPE = 0.1190
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.78
FLOW VELOCITY(FEET/SEC.) = 4.14 FLOW DEPTH(FEET) = 0.38
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 10.61
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50303.00 = 631.00 FEET.

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*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50303.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 10.61
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.461
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.50    1.000   -
USER-DEFINED        -         0.30    0.50    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.70    SUBAREA RUNOFF(CFS) = 0.61
EFFECTIVE AREA(ACRES) = 2.70    AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.7        PEAK FLOW RATE(CFS) = 2.33

```

```

*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50304.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 940.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 72.00 CHANNEL SLOPE = 0.1389
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

```

```

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.33
FLOW VELOCITY(FEET/SEC.) = 4.65 FLOW DEPTH(FEET) = 0.41
TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 10.87
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50304.00 = 703.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50304.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

```

=====
MAINLINE Tc(MIN) = 10.87
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.440
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.30    0.50    1.000   -
USER-DEFINED        -         0.90    0.50    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.20    SUBAREA RUNOFF(CFS) = 1.86
EFFECTIVE AREA(ACRES) = 4.90    AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.9        PEAK FLOW RATE(CFS) = 4.15

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*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50305.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 940.00 DOWNSTREAM(FEET) = 890.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.2941
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.15
FLOW VELOCITY(FEET/SEC.) = 7.15 FLOW DEPTH(FEET) = 0.44
TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 11.27
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50305.00 = 873.00 FEET.

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*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.27
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.411
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00    0.50    1.000   -
USER-DEFINED        -         0.80    0.50    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.80    SUBAREA RUNOFF(CFS) = 2.30
EFFECTIVE AREA(ACRES) = 7.70    AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 7.7        PEAK FLOW RATE(CFS) = 6.31

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```

*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50306.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 890.00 DOWNSTREAM(FEET) = 785.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 439.00 CHANNEL SLOPE = 0.2392
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 6.31
FLOW VELOCITY(FEET/SEC.) = 7.30 FLOW DEPTH(FEET) = 0.54
TRAVEL TIME(MIN.) = 1.00 Tc(MIN.) = 12.27
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50306.00 = 1312.00 FEET.

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*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.27
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.344
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.80   0.50  1.000  -
USER-DEFINED        -         3.30   0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 5.39
EFFECTIVE AREA(ACRES) = 14.80 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.8 PEAK FLOW RATE(CFS) = 11.24

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*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50307.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 737.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 213.00 CHANNEL SLOPE = 0.2254
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 11.24
FLOW VELOCITY(FEET/SEC.) = 8.24 FLOW DEPTH(FEET) = 0.67
TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 12.70
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50307.00 = 1525.00 FEET.

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*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.70
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.318
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00   0.50  1.000  -
USER-DEFINED        -         0.90   0.50  1.000  -
USER-DEFINED        -         0.20   0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 2.28
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 13.18

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*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50308.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 737.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 527.00 CHANNEL SLOPE = 0.2600
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 13.18
FLOW VELOCITY(FEET/SEC.) = 9.04 FLOW DEPTH(FEET) = 0.70
TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 13.67
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50308.00 = 2052.00 FEET.

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*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 13.67
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.266
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         5.70   0.50  1.000  -
USER-DEFINED        -         1.00   0.50  1.000  -
USER-DEFINED        -         3.30   0.50  1.000  -
USER-DEFINED        -         0.40   0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 7.17
EFFECTIVE AREA(ACRES) = 28.30 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 28.3 PEAK FLOW RATE(CFS) = 19.52

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*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50309.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 555.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 561.00 CHANNEL SLOPE = 0.0802
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00

```

CHANNEL FLOW THRU SUBAREA(CFS) = 19.52  
FLOW VELOCITY(FEET/SEC.) = 6.45 FLOW DEPTH(FEET) = 1.00  
TRAVEL TIME(MIN.) = 1.45 Tc(MIN.) = 15.12  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 2613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 15.12  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.196  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.50	1.000	-
USER-DEFINED	-	0.80	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 1.94  
EFFECTIVE AREA(ACRES) = 31.40 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.4 PEAK FLOW RATE(CFS) = 19.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50310.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 555.00 DOWNSTREAM(FEET) = 509.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 401.00 CHANNEL SLOPE = 0.1147  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 19.65  
FLOW VELOCITY(FEET/SEC.) = 7.36 FLOW DEPTH(FEET) = 0.94  
TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 16.03  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50310.00 = 3014.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 16.03  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.163  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	1.60	0.50	1.000	-
USER-DEFINED	-	7.60	0.50	1.000	-
USER-DEFINED	-	6.60	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 10.32

EFFECTIVE AREA(ACRES) = 48.70 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 48.7 PEAK FLOW RATE(CFS) = 29.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50311.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 509.00 DOWNSTREAM(FEET) = 395.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 685.00 CHANNEL SLOPE = 0.1664  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 29.05  
FLOW VELOCITY(FEET/SEC.) = 9.32 FLOW DEPTH(FEET) = 1.02  
TRAVEL TIME(MIN.) = 1.23 Tc(MIN.) = 17.25  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50311.00 = 3699.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50311.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.25  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.119  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.50	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	2.90	0.50	1.000	-
USER-DEFINED	-	1.50	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 5.23  
EFFECTIVE AREA(ACRES) = 58.10 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 58.1 PEAK FLOW RATE(CFS) = 32.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50312.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 383.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 216.00 CHANNEL SLOPE = 0.0556  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 32.35  
FLOW VELOCITY(FEET/SEC.) = 6.36 FLOW DEPTH(FEET) = 1.30  
TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 17.82  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50312.00 = 3915.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.82

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.099

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.50	1.000	-
USER-DEFINED	-	1.50	0.50	1.000	-
USER-DEFINED	-	18.40	0.50	1.000	-
USER-DEFINED	-	11.60	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	1.80	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 37.70 SUBAREA RUNOFF (CFS) = 20.30

EFFECTIVE AREA (ACRES) = 95.80 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 95.8 PEAK FLOW RATE (CFS) = 51.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.82

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.099

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.30	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 3.40 SUBAREA RUNOFF (CFS) = 1.83

EFFECTIVE AREA (ACRES) = 99.20 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 99.2 PEAK FLOW RATE (CFS) = 53.42

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50313.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 383.00 DOWNSTREAM (FEET) = 350.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 762.00 CHANNEL SLOPE = 0.0433

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00

CHANNEL FLOW THRU SUBAREA (CFS) = 53.42

FLOW VELOCITY (FEET/SEC.) = 6.58 FLOW DEPTH (FEET) = 1.65

TRAVEL TIME (MIN.) = 1.93 Tc (MIN.) = 19.75

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50313.00 = 4677.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 19.75

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.029

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	3.30	0.50	1.000	-
USER-DEFINED	-	0.60	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 3.00

EFFECTIVE AREA (ACRES) = 105.50 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 105.5 PEAK FLOW RATE (CFS) = 53.42

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 19.75

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.029

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.30	0.50	1.000	-
USER-DEFINED	-	1.60	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 10.90 SUBAREA RUNOFF (CFS) = 5.19

EFFECTIVE AREA (ACRES) = 116.40 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 116.4 PEAK FLOW RATE (CFS) = 55.40

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50314.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 350.00 DOWNSTREAM (FEET) = 318.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 957.00 CHANNEL SLOPE = 0.0334

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00

CHANNEL FLOW THRU SUBAREA (CFS) = 55.40

FLOW VELOCITY (FEET/SEC.) = 6.02 FLOW DEPTH (FEET) = 1.75

TRAVEL TIME (MIN.) = 2.65 Tc (MIN.) = 22.40

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50314.00 = 5634.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81



=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.40  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.962  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.30 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 3.70 0.50 1.000 -  
USER-DEFINED - 3.40 0.50 1.000 -  
USER-DEFINED - 2.00 0.50 1.000 -  
USER-DEFINED - 10.20 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 21.80 SUBAREA RUNOFF(CFS) = 9.07  
EFFECTIVE AREA(ACRES) = 138.20 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 138.2 PEAK FLOW RATE(CFS) = 57.49

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.40  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.962  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.80 0.50 1.000 -  
USER-DEFINED - 15.20 0.50 1.000 -  
USER-DEFINED - 5.90 0.50 1.000 -  
USER-DEFINED - 1.30 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 1.30 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 34.70 SUBAREA RUNOFF(CFS) = 14.44  
EFFECTIVE AREA(ACRES) = 172.90 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 172.9 PEAK FLOW RATE(CFS) = 71.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.40  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.962  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 0.33

EFFECTIVE AREA(ACRES) = 173.70 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 173.7 PEAK FLOW RATE(CFS) = 72.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50314.00 TO NODE 50315.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 318.00 DOWNSTREAM(FEET) = 313.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00 CHANNEL SLOPE = 0.0179  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 72.26  
FLOW VELOCITY(FEET/SEC.) = 5.07 FLOW DEPTH(FEET) = 2.18  
TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 23.32  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50315.00 = 5914.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50315.00 TO NODE 50315.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.32  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.940  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 1.000 -  
USER-DEFINED - 0.60 0.50 1.000 -  
USER-DEFINED - 0.50 0.50 1.000 -  
USER-DEFINED - 2.40 0.50 1.000 -  
USER-DEFINED - 2.00 0.50 1.000 -  
USER-DEFINED - 0.50 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 2.65  
EFFECTIVE AREA(ACRES) = 180.40 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 180.4 PEAK FLOW RATE(CFS) = 72.26  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50315.00 TO NODE 50316.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 313.00 DOWNSTREAM(FEET) = 285.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 642.00 CHANNEL SLOPE = 0.0436  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 72.26  
FLOW VELOCITY(FEET/SEC.) = 7.09 FLOW DEPTH(FEET) = 1.84  
TRAVEL TIME(MIN.) = 1.51 Tc(MIN.) = 24.83  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50316.00 = 6556.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 24.83

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.904

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	3.50	0.50	1.000	-
USER-DEFINED	-	1.00	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	2.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 2.65

EFFECTIVE AREA(ACRES) = 187.70 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 187.7 PEAK FLOW RATE(CFS) = 72.26

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 24.83

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.904

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 0.80

EFFECTIVE AREA(ACRES) = 189.90 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 189.9 PEAK FLOW RATE(CFS) = 72.26

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50316.00 TO NODE 50317.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 448.00 CHANNEL SLOPE = 0.0067  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 72.26  
 FLOW VELOCITY(FEET/SEC.) = 3.51 FLOW DEPTH(FEET) = 2.62  
 TRAVEL TIME(MIN.) = 2.13 Tc(MIN.) = 26.96  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50317.00 = 7004.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 26.96

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.865

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.50	1.000	-
USER-DEFINED	-	2.90	0.50	1.000	-
USER-DEFINED	-	2.60	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	10.20	0.50	1.000	-
USER-DEFINED	-	42.80	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997

SUBAREA AREA(ACRES) = 59.70 SUBAREA RUNOFF(CFS) = 19.67

EFFECTIVE AREA(ACRES) = 249.60 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 249.6 PEAK FLOW RATE(CFS) = 81.98

\*\*\*\*\*

FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 26.96

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.865

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.50	1.000	-
USER-DEFINED	-	17.50	0.50	1.000	-
USER-DEFINED	-	22.00	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 65.80 SUBAREA RUNOFF(CFS) = 21.59

EFFECTIVE AREA(ACRES) = 315.40 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 315.4 PEAK FLOW RATE(CFS) = 103.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 50317.00 TO NODE 50318.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 233.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 600.00 CHANNEL SLOPE = 0.0817  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 103.57  
 FLOW VELOCITY(FEET/SEC.) = 9.83 FLOW DEPTH(FEET) = 1.87  
 TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 27.97

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50318.00 = 7604.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 27.97

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.846

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	0.100	-
USER-DEFINED	-	1.50	0.50	1.000	-
USER-DEFINED	-	1.60	0.50	1.000	-
USER-DEFINED	-	2.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.839

SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 2.57

EFFECTIVE AREA(ACRES) = 322.10 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 322.1 PEAK FLOW RATE(CFS) = 103.57

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 27.97

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.846

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	0.90	0.50	0.850	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	5.00	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.935

SUBAREA AREA(ACRES) = 7.60 SUBAREA RUNOFF(CFS) = 2.59

EFFECTIVE AREA(ACRES) = 329.70 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 329.7 PEAK FLOW RATE(CFS) = 103.57

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50318.00 TO NODE 50319.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 233.00 DOWNSTREAM(FEET) = 228.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 201.00 CHANNEL SLOPE = 0.0249

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00

CHANNEL FLOW THRU SUBAREA(CFS) = 103.57

FLOW VELOCITY(FEET/SEC.) = 7.81 FLOW DEPTH(FEET) = 2.10

TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 28.40

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50319.00 = 7805.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 28.40

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.839

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	2.30	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 2.45

EFFECTIVE AREA(ACRES) = 336.00 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 336.0 PEAK FLOW RATE(CFS) = 103.69

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 28.40

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.839

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.50	1.000	-
USER-DEFINED	-	1.60	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	0.850	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	1.40	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.994

SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 2.40

EFFECTIVE AREA(ACRES) = 343.80 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 343.8 PEAK FLOW RATE(CFS) = 106.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50320.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 228.00 DOWNSTREAM(FEET) = 214.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 809.00 CHANNEL SLOPE = 0.0173  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 106.09  
 FLOW VELOCITY(FEET/SEC.) = 6.86 FLOW DEPTH(FEET) = 2.27  
 TRAVEL TIME(MIN.) = 1.97 Tc(MIN.) = 30.37  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50320.00 = 8614.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 30.37

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.806

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.50	0.50	1.000	-
USER-DEFINED	-	4.80	0.50	0.850	-
USER-DEFINED	-	5.80	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.929

SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 3.50

EFFECTIVE AREA(ACRES) = 355.20 AREA-AVERAGED Fm(INCH/HR) = 0.49

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 355.2 PEAK FLOW RATE(CFS) = 106.09

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 30.37

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.806

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.90	0.50	0.850	-
USER-DEFINED	-	0.30	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.854

SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 3.81

EFFECTIVE AREA(ACRES) = 366.40 AREA-AVERAGED Fm(INCH/HR) = 0.49

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 366.4 PEAK FLOW RATE(CFS) = 106.09

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 366.4 TC(MIN.) = 30.37

EFFECTIVE AREA(ACRES) = 366.40 AREA-AVERAGED Fm(INCH/HR) = 0.49

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.985

PEAK FLOW RATE(CFS) = 106.09

\*\*\*\*\*

=====  
 END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 4 \*  
\* HYDROLOGIC ANALYSIS - 5-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E504XX05.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.000; 2.230
- 2) 6.000; 2.010
- 3) 7.000; 1.850
- 4) 8.000; 1.710
- 5) 9.000; 1.600
- 6) 10.000; 1.510
- 7) 11.000; 1.430
- 8) 12.000; 1.360
- 9) 13.000; 1.300
- 10) 14.000; 1.250
- 11) 15.000; 1.200
- 12) 20.000; 1.020
- 13) 25.000; 0.900
- 14) 30.000; 0.810
- 15) 40.000; 0.690
- 16) 50.000; 0.610
- 17) 60.000; 0.550
- 18) 90.000; 0.440
- 19) 120.000; 0.370
- 20) 180.000; 0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.482

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.471

SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.50	0.50	1.000	95	10.48

NATURAL FAIR COVER

"GRASS" - 0.50 0.50 1.000 95 10.48

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF(CFS) = 0.44

TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00

CHANNEL FLOW THRU SUBAREA(CFS) = 0.44

FLOW VELOCITY(FEET/SEC.) = 3.81 FLOW DEPTH(FEET) = 0.20

TRAVEL TIME(MIN.) = 1.15  $T_c$ (MIN.) = 11.63

LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.63

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.386  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.32  
 EFFECTIVE AREA (ACRES) = 0.90 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 0.72

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 239.00 CHANNEL SLOPE = 0.4184  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 0.72  
 FLOW VELOCITY (FEET/SEC.) = 5.10 FLOW DEPTH (FEET) = 0.22  
 TRAVEL TIME (MIN.) = 0.78 Tc (MIN.) = 12.41  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50403.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.41  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.336  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.50 1.000 -  
 USER-DEFINED - 0.20 0.50 1.000 -  
 USER-DEFINED - 0.10 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.30  
 EFFECTIVE AREA (ACRES) = 1.30 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.3 PEAK FLOW RATE (CFS) = 0.98

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00 CHANNEL SLOPE = 0.7042  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 0.98

FLOW VELOCITY (FEET/SEC.) = 6.83 FLOW DEPTH (FEET) = 0.22  
 TRAVEL TIME (MIN.) = 0.17 Tc (MIN.) = 12.58  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50404.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.58  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.325  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.50 1.000 -  
 USER-DEFINED - 0.80 0.50 1.000 -  
 USER-DEFINED - 0.30 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 0.89  
 EFFECTIVE AREA (ACRES) = 2.50 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.5 PEAK FLOW RATE (CFS) = 1.86

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 145.00 CHANNEL SLOPE = 0.3448  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1.86  
 FLOW VELOCITY (FEET/SEC.) = 6.13 FLOW DEPTH (FEET) = 0.32  
 TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 12.98  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50405.00 TO NODE 50405.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.98  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.301  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.50 1.000 -  
 USER-DEFINED - 0.80 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 0.79  
 EFFECTIVE AREA (ACRES) = 3.60 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.6 PEAK FLOW RATE (CFS) = 2.60

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*****
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.60
FLOW VELOCITY(FEET/SEC.) = 6.55 FLOW DEPTH(FEET) = 0.36
TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 13.38
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50406.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 13.38
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.281
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.50    1.000  -
USER-DEFINED        -         0.20    0.50    1.000  -
USER-DEFINED        -         0.80    0.50    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 0.84
EFFECTIVE AREA(ACRES) = 4.80 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 3.37

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*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.2193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.37
FLOW VELOCITY(FEET/SEC.) = 6.03 FLOW DEPTH(FEET) = 0.43
TRAVEL TIME(MIN.) = 0.63 Tc(MIN.) = 14.01
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50407.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.01
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.250
SUBAREA LOSS RATE DATA(AMC II):

```

```

DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.50    0.50    1.000  -
USER-DEFINED        -         1.20    0.50    1.000  -
USER-DEFINED        -         1.70    0.50    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 4.32
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 7.55

```

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*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 325.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 490.00 CHANNEL SLOPE = 0.1531
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.55
FLOW VELOCITY(FEET/SEC.) = 6.49 FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 1.26 Tc(MIN.) = 15.27
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 15.27
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.190
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.50    1.000  -
USER-DEFINED        -         0.10    0.50    1.000  -
USER-DEFINED        -         0.60    0.50    1.000  -
USER-DEFINED        -         1.30    0.50    1.000  -
USER-DEFINED        -         0.50    0.50    1.000  -
USER-DEFINED        -         1.20    0.50    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 2.36
EFFECTIVE AREA(ACRES) = 15.00 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.0 PEAK FLOW RATE(CFS) = 9.32

```

```

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 15.27
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.190
SUBAREA LOSS RATE DATA(AMC II):

```

```

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 15.27
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.190
SUBAREA LOSS RATE DATA(AMC II):

```



DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 0.56  
EFFECTIVE AREA(ACRES) = 15.90 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.9 PEAK FLOW RATE(CFS) = 9.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.88  
FLOW VELOCITY(FEET/SEC.) = 5.09 FLOW DEPTH(FEET) = 0.80  
TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 15.50  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 15.50  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.182  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	1.60	0.50	1.000	-
USER-DEFINED	-	6.40	0.50	1.000	-
USER-DEFINED	-	6.30	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 14.80 SUBAREA RUNOFF(CFS) = 9.08  
EFFECTIVE AREA(ACRES) = 30.70 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.7 PEAK FLOW RATE(CFS) = 18.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 15.50  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.182  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.37  
EFFECTIVE AREA(ACRES) = 31.30 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.3 PEAK FLOW RATE(CFS) = 19.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 19.20  
FLOW VELOCITY(FEET/SEC.) = 6.35 FLOW DEPTH(FEET) = 1.00  
TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 15.77  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 15.77  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.172  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	2.50	0.50	1.000	-
USER-DEFINED	-	1.20	0.50	1.000	-
USER-DEFINED	-	1.80	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 3.87  
EFFECTIVE AREA(ACRES) = 37.70 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 37.7 PEAK FLOW RATE(CFS) = 22.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 15.77  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.172  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.36  
 EFFECTIVE AREA(ACRES) = 38.30 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 38.3 PEAK FLOW RATE(CFS) = 23.16

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 312.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 566.00 CHANNEL SLOPE = 0.0530  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 23.16  
 FLOW VELOCITY(FEET/SEC.) = 5.77 FLOW DEPTH(FEET) = 1.16  
 TRAVEL TIME(MIN.) = 1.63 Tc(MIN.) = 17.41  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.41  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.113  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.50 0.100 -  
 USER-DEFINED - 0.20 0.50 1.000 -  
 USER-DEFINED - 1.60 0.50 1.000 -  
 USER-DEFINED - 0.90 0.50 1.000 -  
 USER-DEFINED - 1.50 0.50 0.100 -  
 USER-DEFINED - 0.40 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658  
 SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 3.53  
 EFFECTIVE AREA(ACRES) = 43.30 AREA-AVERAGED Fm(INCH/HR) = 0.48  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 43.3 PEAK FLOW RATE(CFS) = 24.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.41  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.113  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.80 0.50 1.000 -

USER-DEFINED - 5.80 0.50 1.000 -  
 USER-DEFINED - 0.50 0.50 1.000 -  
 USER-DEFINED - 3.40 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 5.79  
 EFFECTIVE AREA(ACRES) = 53.80 AREA-AVERAGED Fm(INCH/HR) = 0.48  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 53.8 PEAK FLOW RATE(CFS) = 30.46

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 216.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 954.00 CHANNEL SLOPE = 0.0692  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 30.46  
 FLOW VELOCITY(FEET/SEC.) = 8.46 FLOW DEPTH(FEET) = 1.10  
 TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 19.29  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 19.29  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.046  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.50 0.100 -  
 USER-DEFINED - 0.60 0.50 1.000 -  
 USER-DEFINED - 1.00 0.50 1.000 -  
 USER-DEFINED - 1.10 0.50 1.000 -  
 USER-DEFINED - 0.40 0.50 1.000 -  
 USER-DEFINED - 0.20 0.50 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875  
 SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 1.97  
 EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.48  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 30.46  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 19.29  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.046  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	1.30	0.50	1.000	-
USER-DEFINED	-	9.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 5.21  
EFFECTIVE AREA(ACRES) = 68.00 AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 68.0 PEAK FLOW RATE(CFS) = 34.36

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 19.29  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.046  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.50	0.850	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	1.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.934  
SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 1.30  
EFFECTIVE AREA(ACRES) = 70.50 AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 70.5 PEAK FLOW RATE(CFS) = 35.66

END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 70.5 TC(MIN.) = 19.29  
EFFECTIVE AREA(ACRES) = 70.50 AREA-AVERAGED Fm(INCH/HR)= 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.967  
PEAK FLOW RATE(CFS) = 35.66

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2006 Advanced Engineering Software (aes)  
Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 2 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 5-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P201XX05.DAT  
TIME/DATE OF STUDY: 10:20 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.000; 2.230  
2) 6.000; 2.010  
3) 7.000; 1.850  
4) 8.000; 1.710  
5) 9.000; 1.600  
6) 10.000; 1.510  
7) 11.000; 1.430  
8) 12.000; 1.360  
9) 13.000; 1.300  
10) 14.000; 1.250  
11) 15.000; 1.200  
12) 20.000; 1.020  
13) 25.000; 0.900  
14) 30.000; 0.810  
15) 40.000; 0.690  
16) 50.000; 0.610  
17) 60.000; 0.550  
18) 90.000; 0.440  
19) 120.000; 0.370  
20) 180.000; 0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20100.00 TO NODE 20101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 830.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.230  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.579  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.50	1.000	95	9.23
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.50	1.000	95	9.23

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.58  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20101.00 TO NODE 20102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 276.00 CHANNEL SLOPE = 0.2899  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.58  
FLOW VELOCITY(FEET/SEC.) = 4.37 FLOW DEPTH(FEET) = 0.21  
TRAVEL TIME(MIN.) = 1.05  $T_c$ (MIN.) = 10.28  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20102.00 = 595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20102.00 TO NODE 20102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN) = 10.28
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.487
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.80     0.50     1.000    -
USER-DEFINED        -         0.20     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.00    SUBAREA RUNOFF(CFS) = 0.89
EFFECTIVE AREA(ACRES) = 1.60   AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6      PEAK FLOW RATE(CFS) = 1.42

```

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*****
FLOW PROCESS FROM NODE 20102.00 TO NODE 20103.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.1863
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.42
FLOW VELOCITY(FEET/SEC.) = 4.53 FLOW DEPTH(FEET) = 0.32
TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 10.87
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20103.00 = 756.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20103.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 10.87
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.440
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50     0.50     1.000    -
USER-DEFINED        -         0.10     0.50     1.000    -
USER-DEFINED        -         0.30     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90    SUBAREA RUNOFF(CFS) = 0.76
EFFECTIVE AREA(ACRES) = 2.50   AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.5      PEAK FLOW RATE(CFS) = 2.11

```

```

*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20104.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 690.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 64.00 CHANNEL SLOPE = 0.4688

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```

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.11
FLOW VELOCITY(FEET/SEC.) = 7.07 FLOW DEPTH(FEET) = 0.32
TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 11.02
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20104.00 = 820.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20104.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 11.02
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.428
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40     0.50     1.000    -
USER-DEFINED        -         3.30     0.50     1.000    -
USER-DEFINED        -         0.10     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 3.17
EFFECTIVE AREA(ACRES) = 6.30   AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.3      PEAK FLOW RATE(CFS) = 5.26

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20105.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 690.00 DOWNSTREAM(FEET) = 670.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 159.00 CHANNEL SLOPE = 0.1258
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.26
FLOW VELOCITY(FEET/SEC.) = 5.45 FLOW DEPTH(FEET) = 0.57
TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 11.51
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20105.00 = 979.00 FEET.

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*****
FLOW PROCESS FROM NODE 20105.00 TO NODE 20105.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 11.51
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.394
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.50     1.000    -
USER-DEFINED        -         1.50     0.50     1.000    -
USER-DEFINED        -         2.20     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90    SUBAREA RUNOFF(CFS) = 3.14

```

EFFECTIVE AREA(ACRES) = 10.20 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 10.2 PEAK FLOW RATE(CFS) = 8.21

\*\*\*\*\*

FLOW PROCESS FROM NODE 20105.00 TO NODE 20106.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 670.00 DOWNSTREAM(FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 192.00 CHANNEL SLOPE = 0.1042  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 8.21  
FLOW VELOCITY(FEET/SEC.) = 5.72 FLOW DEPTH(FEET) = 0.69  
TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 12.07  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20106.00 = 1171.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 12.07  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.356  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.50 1.000 -  
USER-DEFINED - 2.10 0.50 1.000 -  
USER-DEFINED - 0.90 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 2.93  
EFFECTIVE AREA(ACRES) = 14.00 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 10.78

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 650.00 DOWNSTREAM(FEET) = 640.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 156.00 CHANNEL SLOPE = 0.0641  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.78  
FLOW VELOCITY(FEET/SEC.) = 5.07 FLOW DEPTH(FEET) = 0.84  
TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 12.58  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20107.00 = 1327.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 12.58  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.325

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 1.20 0.50 1.000 -  
USER-DEFINED - 2.30 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 2.97  
EFFECTIVE AREA(ACRES) = 18.00 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 18.0 PEAK FLOW RATE(CFS) = 13.36

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FLOW PROCESS FROM NODE 20107.00 TO NODE 20108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 640.00 DOWNSTREAM(FEET) = 609.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 512.00 CHANNEL SLOPE = 0.0605  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 13.36  
FLOW VELOCITY(FEET/SEC.) = 5.26 FLOW DEPTH(FEET) = 0.92  
TRAVEL TIME(MIN.) = 1.62 Tc(MIN.) = 14.21  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20108.00 = 1839.00 FEET.

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 14.21  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.240  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 0.200 -  
USER-DEFINED - 1.50 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 0.80 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 1.83  
EFFECTIVE AREA(ACRES) = 20.70 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.7 PEAK FLOW RATE(CFS) = 13.81

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 600.00
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.90
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.81
PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 14.46
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20109.00 = 2033.00 FEET.

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FLOW PROCESS FROM NODE 20109.00 TO NODE 20109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 14.46
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.227
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.70    0.50    0.200  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.71
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 14.29

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FLOW PROCESS FROM NODE 20109.00 TO NODE 20110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 594.00
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.82
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 14.29
PIPE TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 15.14
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20110.00 = 2393.00 FEET.

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FLOW PROCESS FROM NODE 20110.00 TO NODE 20110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 15.14
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.195
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.30    0.50    0.100  -
USER-DEFINED        -        3.50    0.50    0.200  -
USER-DEFINED        -        2.70    0.50    1.000  -
USER-DEFINED        -        0.20    0.50    1.000  -
USER-DEFINED        -        1.20    0.50    1.000  -

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USER-DEFINED        -        0.30    0.50    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 6.51
EFFECTIVE AREA(ACRES) = 29.60 AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 29.6 PEAK FLOW RATE(CFS) = 20.18

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FLOW PROCESS FROM NODE 20110.00 TO NODE 20111.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 594.00 DOWNSTREAM(FEET) = 590.00
FLOW LENGTH(FEET) = 246.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.53
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.18
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 15.57
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20111.00 = 2639.00 FEET.

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FLOW PROCESS FROM NODE 20111.00 TO NODE 20111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 15.57
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.180
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN

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USER-DEFINED        -        0.70    0.50    0.100  -
USER-DEFINED        -        2.10    0.50    0.200  -
USER-DEFINED        -        2.10    0.50    1.000  -
USER-DEFINED        -        0.60    0.50    1.000  -
USER-DEFINED        -        4.70    0.50    1.000  -
USER-DEFINED        -        0.90    0.50    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.792
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 7.83
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.43
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 27.60

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FLOW PROCESS FROM NODE 20111.00 TO NODE 20112.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 580.00
FLOW LENGTH(FEET) = 628.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.22
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 27.60

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PIPE TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 16.59  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20112.00 = 3267.00 FEET.

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FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.59

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.143

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.50	0.100	-
USER-DEFINED	-	0.90	0.50	0.200	-
USER-DEFINED	-	4.40	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	7.50	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.797

SUBAREA AREA(ACRES) = 15.20 SUBAREA RUNOFF(CFS) = 10.18

EFFECTIVE AREA(ACRES) = 55.90 AREA-AVERAGED Fm(INCH/HR) = 0.42

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 55.9 PEAK FLOW RATE(CFS) = 36.43

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FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.59

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.143

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	0.850	-
USER-DEFINED	-	0.80	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 1.44

EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.42

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 37.87

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FLOW PROCESS FROM NODE 20112.00 TO NODE 20113.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 580.00 DOWNSTREAM(FEET) = 570.00

FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.65

ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 37.87  
PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 17.33  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20113.00 = 3786.00 FEET.

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FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.33

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.116

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.50	0.100	-
USER-DEFINED	-	4.30	0.50	0.850	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	1.80	0.50	1.000	-
USER-DEFINED	-	4.60	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.877

SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 7.68

EFFECTIVE AREA(ACRES) = 70.90 AREA-AVERAGED Fm(INCH/HR) = 0.42

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 44.14

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.33

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.116

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	0.100	-
USER-DEFINED	-	0.90	0.50	0.850	-
USER-DEFINED	-	1.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.787

SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 2.34

EFFECTIVE AREA(ACRES) = 74.50 AREA-AVERAGED Fm(INCH/HR) = 0.42

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 74.5 PEAK FLOW RATE(CFS) = 46.48

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20114.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00

FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 9.05



ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 46.48  
PIPE TRAVEL TIME(MIN.) = 1.12 Tc(MIN.) = 18.45  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20114.00 = 4393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 18.45  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.076  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.50 0.100 -  
USER-DEFINED - 4.00 0.50 0.850 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 1.40 0.50 1.000 -  
USER-DEFINED - 0.50 0.50 0.100 -  
USER-DEFINED - 0.90 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.747  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 4.99  
EFFECTIVE AREA(ACRES) = 82.40 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 82.4 PEAK FLOW RATE(CFS) = 48.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 18.45  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.076  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.50 1.000 -  
USER-DEFINED - 8.20 0.50 1.000 -  
USER-DEFINED - 3.20 0.50 1.000 -  
USER-DEFINED - 0.70 0.50 0.100 -  
USER-DEFINED - 3.70 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.932  
SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 9.60  
EFFECTIVE AREA(ACRES) = 99.90 AREA-AVERAGED Fm(INCH/HR) = 0.43  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 99.9 PEAK FLOW RATE(CFS) = 58.37

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20115.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 560.00  
FLOW LENGTH(FEET) = 461.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.53  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 58.37  
PIPE TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 19.18  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20115.00 = 4854.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 19.18  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.049  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.60 0.50 0.850 -  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 1.40 0.50 0.100 -  
USER-DEFINED - 6.20 0.50 0.850 -  
USER-DEFINED - 2.20 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798  
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 7.49  
EFFECTIVE AREA(ACRES) = 112.70 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 112.7 PEAK FLOW RATE(CFS) = 63.50

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 19.18  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.049  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.35  
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 63.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20116.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 560.00 DOWNSTREAM(FEET) = 528.00  
FLOW LENGTH(FEET) = 219.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 28.86

ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 63.84  
 PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 19.31  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20116.00 = 5073.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20116.00 TO NODE 20117.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 489.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 174.00 CHANNEL SLOPE = 0.2241  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 63.84  
 FLOW VELOCITY(FEET/SEC.) = 15.75 FLOW DEPTH(FEET) = 1.16  
 TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 19.49  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20117.00 = 5247.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.49  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.038  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.50	0.850	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.910  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 1.31  
 EFFECTIVE AREA(ACRES) = 115.90 AREA-AVERAGED Fm(INCH/HR) = 0.42  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 115.9 PEAK FLOW RATE(CFS) = 64.01

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.49  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.038  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.50	0.200	-
USER-DEFINED	-	3.30	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	6.50	0.50	1.000	-

USER-DEFINED - 0.20 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.855  
 SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 7.03  
 EFFECTIVE AREA(ACRES) = 128.70 AREA-AVERAGED Fm(INCH/HR) = 0.42  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 128.7 PEAK FLOW RATE(CFS) = 71.05

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.49  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.038  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	2.80	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 2.52  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 133.8 PEAK FLOW RATE(CFS) = 73.57

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 133.8 TC(MIN.) = 19.49  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.854  
 PEAK FLOW RATE(CFS) = 73.57

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S31 \*  
\* Rational Method Hydrology Analysis - 5-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S31.DAT  
TIME/DATE OF STUDY: 16:20 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.184
- 2) 10.00; 1.510
- 3) 15.00; 1.203
- 4) 20.00; 1.023
- 5) 25.00; 0.902
- 6) 30.00; 0.826
- 7) 40.00; 0.693
- 8) 50.00; 0.611
- 9) 60.00; 0.546
- 10) 90.00; 0.439
- 11) 120.00; 0.374
- 12) 180.00; 0.306
- 13) 360.00; 0.211
- 14) 1440.00; 0.088

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13100.00 TO NODE 13101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.58  
ELEVATION DATA: UPSTREAM(FEET) = 1069.66 DOWNSTREAM(FEET) = 969.92

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.312  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.738  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.94	0.50	1.000	0	8.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.05  
TOTAL AREA(ACRES) = 0.94 PEAK FLOW RATE(CFS) = 1.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13101.00 TO NODE 13102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 969.92 DOWNSTREAM(FEET) = 807.20  
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.89 CHANNEL SLOPE = 0.2444  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.477  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.67	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.44  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.99  
AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 2.22  
Tc(MIN.) = 10.54  
SUBAREA AREA(ACRES) = 7.67 SUBAREA RUNOFF(CFS) = 6.74  
EFFECTIVE AREA(ACRES) = 8.61 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 7.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.67 FLOW VELOCITY(FEET/SEC.) = 5.68  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13102.00 = 948.47 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13102.00 TO NODE 13103.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 807.20 DOWNSTREAM(FEET) = 769.94
CHANNEL LENGTH THRU SUBAREA(FEET) = 691.01 CHANNEL SLOPE = 0.0539
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.292
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.65 0.50 0.999 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.98
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.83
AVERAGE FLOW DEPTH(FEET) = 1.14 TRAVEL TIME(MIN.) = 3.01
Tc(MIN.) = 13.54
SUBAREA AREA(ACRES) = 20.65 SUBAREA RUNOFF(CFS) = 14.73
EFFECTIVE AREA(ACRES) = 29.26 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 29.3 PEAK FLOW RATE(CFS) = 20.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.29 FLOW VELOCITY(FEET/SEC.) = 4.15
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13103.00 = 1639.48 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 769.94 DOWNSTREAM(FEET) = 693.88
FLOW LENGTH(FEET) = 1563.10 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 9.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.19
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.87
PIPE TRAVEL TIME(MIN.) = 1.84 Tc(MIN.) = 15.38
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13104.00 = 3202.58 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.38
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.189
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 28.00 0.50 0.750 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750

SUBAREA AREA(ACRES) = 28.00 SUBAREA RUNOFF(CFS) = 20.51
EFFECTIVE AREA(ACRES) = 57.26 AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 57.3 PEAK FLOW RATE(CFS) = 38.66

\*\*\*\*\*
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 693.88 DOWNSTREAM(FEET) = 645.69
FLOW LENGTH(FEET) = 1068.98 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 13.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.42
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 38.66
PIPE TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 16.46
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13105.00 = 4271.56 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.46
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.150
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 35.28 0.50 0.867 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867
SUBAREA AREA(ACRES) = 35.28 SUBAREA RUNOFF(CFS) = 22.75
EFFECTIVE AREA(ACRES) = 92.54 AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 59.39

\*\*\*\*\*
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 645.69 DOWNSTREAM(FEET) = 608.48
FLOW LENGTH(FEET) = 1127.55 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 18.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.39
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 59.39
PIPE TRAVEL TIME(MIN.) = 1.15 Tc(MIN.) = 17.61
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 17.61
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.109
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      37.68  0.50    0.889  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.889
SUBAREA AREA(ACRES) = 37.68    SUBAREA RUNOFF(CFS) = 22.52
EFFECTIVE AREA(ACRES) = 130.22  AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 130.2    PEAK FLOW RATE(CFS) = 78.49

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\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 15.1

>>>>DEFINE MEMORY BANK # 2 <<<<

PEAK FLOWRATE TABLE FILE NAME: S30.DNA

MEMORY BANK # 2 DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	497.31	41.52	0.50( 0.40)	0.81	1990.5	13000.00
2	455.52	44.80	0.50( 0.40)	0.81	2016.1	13010.00
TOTAL AREA(ACRES) = 2016.1						

\*\*\*\*\*

FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 14.0

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<

\*\*\*\*\*

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	497.31	41.52	0.50( 0.40)	0.81	1990.5	13000.00
2	455.52	44.80	0.50( 0.40)	0.81	2016.1	13010.00
TOTAL AREA(ACRES) = 2016.1						

\*\*\*\*\*

FLOW PROCESS FROM NODE 13026.00 TO NODE 13106.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

\*\*\*\*\*

ELEVATION DATA: UPSTREAM(FEET) = 662.66 DOWNSTREAM(FEET) = 608.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 3098.88 CHANNEL SLOPE = 0.0175  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.639

SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      75.28  0.50    0.755  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.755
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 506.16
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.15
AVERAGE FLOW DEPTH(FEET) = 4.08    TRAVEL TIME(MIN.) = 5.09
Tc(MIN.) = 46.61
SUBAREA AREA(ACRES) = 75.28    SUBAREA RUNOFF(CFS) = 17.71
EFFECTIVE AREA(ACRES) = 2065.80  AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 2091.4    PEAK FLOW RATE(CFS) = 497.31
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 4.05 FLOW VELOCITY(FEET/SEC.) = 10.11

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\*\*\*\*

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	497.31	46.61	0.639	0.50( 0.40)	0.80	2065.8	13000.00
2	455.52	50.00	0.611	0.50( 0.40)	0.80	2091.4	13010.00
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.							

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	78.49	17.61	1.109	0.50( 0.44)	0.88	130.2	13100.00
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.							

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	575.80	17.61	1.109	0.50( 0.41)	0.81	910.7	13100.00
2	520.73	46.61	0.639	0.50( 0.40)	0.81	2196.0	13000.00
3	475.69	50.00	0.611	0.50( 0.40)	0.81	2221.6	13010.00
TOTAL AREA(ACRES) = 2221.6							

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 575.80 Tc(MIN.) = 17.610

EFFECTIVE AREA(ACRES) = 910.69 AREA-AVERAGED Fm(INCH/HR) = 0.41

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81

TOTAL AREA(ACRES) = 2221.6

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13106.00 TO NODE 13107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 608.48 DOWNSTREAM(FEET) = 584.29
CHANNEL LENGTH THRU SUBAREA(FEET) = 1650.20 CHANNEL SLOPE = 0.0147
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.015
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 190.45 0.50 0.755 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 630.40
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.05
AVERAGE FLOW DEPTH(FEET) = 4.57 TRAVEL TIME(MIN.) = 2.74
Tc(MIN.) = 20.35
SUBAREA AREA(ACRES) = 190.45 SUBAREA RUNOFF(CFS) = 109.19
EFFECTIVE AREA(ACRES) = 1101.14 AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 2412.1 PEAK FLOW RATE(CFS) = 606.99
END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.51 FLOW VELOCITY(FEET/SEC.) = 9.96
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13107.00 = 20924.84 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13107.00 TO NODE 13108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 584.29 DOWNSTREAM(FEET) = 563.78
CHANNEL LENGTH THRU SUBAREA(FEET) = 1061.67 CHANNEL SLOPE = 0.0193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.977
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 314.12 0.50 0.939 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.939
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 678.75
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.34
AVERAGE FLOW DEPTH(FEET) = 4.47 TRAVEL TIME(MIN.) = 1.56
Tc(MIN.) = 21.91
SUBAREA AREA(ACRES) = 314.12 SUBAREA RUNOFF(CFS) = 143.44
EFFECTIVE AREA(ACRES) = 1415.26 AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.83
TOTAL AREA(ACRES) = 2726.2 PEAK FLOW RATE(CFS) = 713.15
END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.55 FLOW VELOCITY(FEET/SEC.) = 11.48
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13108.00 = 21986.51 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13108.00 TO NODE 13109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 563.78 DOWNSTREAM(FEET) = 541.61
CHANNEL LENGTH THRU SUBAREA(FEET) = 1657.28 CHANNEL SLOPE = 0.0134
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.912
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 203.63 0.50 0.785 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 760.72
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.17
AVERAGE FLOW DEPTH(FEET) = 4.99 TRAVEL TIME(MIN.) = 2.72
Tc(MIN.) = 24.62
SUBAREA AREA(ACRES) = 203.63 SUBAREA RUNOFF(CFS) = 95.10
EFFECTIVE AREA(ACRES) = 1618.89 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.83
TOTAL AREA(ACRES) = 2929.8 PEAK FLOW RATE(CFS) = 724.86
END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.90 FLOW VELOCITY(FEET/SEC.) = 10.05
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13109.00 = 23643.79 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13109.00 TO NODE 13110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 541.61 DOWNSTREAM(FEET) = 509.94
CHANNEL LENGTH THRU SUBAREA(FEET) = 2016.96 CHANNEL SLOPE = 0.0157
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.861
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 283.06 0.50 0.791 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.791
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 784.15
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.88
AVERAGE FLOW DEPTH(FEET) = 4.90 TRAVEL TIME(MIN.) = 3.09
Tc(MIN.) = 27.71
SUBAREA AREA(ACRES) = 283.06 SUBAREA RUNOFF(CFS) = 118.55
EFFECTIVE AREA(ACRES) = 1901.95 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82
TOTAL AREA(ACRES) = 3212.9 PEAK FLOW RATE(CFS) = 769.71
END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.86 FLOW VELOCITY(FEET/SEC.) = 10.84
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13110.00 = 25660.75 FEET.

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FLOW PROCESS FROM NODE 13110.00 TO NODE 13111.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 509.94 DOWNSTREAM(FEET) = 461.07
CHANNEL LENGTH THRU SUBAREA(FEET) = 3058.95 CHANNEL SLOPE = 0.0160
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.795
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 248.05 0.50 0.783 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 814.77
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.06
AVERAGE FLOW DEPTH(FEET) = 4.95 TRAVEL TIME(MIN.) = 4.61
Tc(MIN.) = 32.32
SUBAREA AREA(ACRES) = 248.05 SUBAREA RUNOFF(CFS) = 90.08
EFFECTIVE AREA(ACRES) = 2150.00 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82
TOTAL AREA(ACRES) = 3460.9 PEAK FLOW RATE(CFS) = 769.71
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.85 FLOW VELOCITY(FEET/SEC.) = 10.91
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13111.00 = 28719.70 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13111.00 TO NODE 13112.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 461.07 DOWNSTREAM(FEET) = 452.77
CHANNEL LENGTH THRU SUBAREA(FEET) = 1781.78 CHANNEL SLOPE = 0.0047
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.738
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 179.91 0.50 0.694 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.694
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 801.38
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.94
AVERAGE FLOW DEPTH(FEET) = 6.21 TRAVEL TIME(MIN.) = 4.28
Tc(MIN.) = 36.60
SUBAREA AREA(ACRES) = 179.91 SUBAREA RUNOFF(CFS) = 63.32
EFFECTIVE AREA(ACRES) = 2329.91 AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 3640.9 PEAK FLOW RATE(CFS) = 769.71
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 6.11 FLOW VELOCITY(FEET/SEC.) = 6.88
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13112.00 = 30501.48 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13112.00 TO NODE 13222.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 452.77 DOWNSTREAM(FEET) = 427.51
CHANNEL LENGTH THRU SUBAREA(FEET) = 1625.01 CHANNEL SLOPE = 0.0155
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.705
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 155.96 0.50 0.836 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.836
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 789.85
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.86
AVERAGE FLOW DEPTH(FEET) = 4.92 TRAVEL TIME(MIN.) = 2.49
Tc(MIN.) = 39.09
SUBAREA AREA(ACRES) = 155.96 SUBAREA RUNOFF(CFS) = 40.27
EFFECTIVE AREA(ACRES) = 2485.87 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 3796.8 PEAK FLOW RATE(CFS) = 769.71
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.87 FLOW VELOCITY(FEET/SEC.) = 10.81
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13222.00 = 32126.49 FEET.

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 3796.8 TC(MIN.) = 39.09
EFFECTIVE AREA(ACRES) = 2485.87 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81
PEAK FLOW RATE(CFS) = 769.71

\*\* PEAK FLOW RATE TABLE \*\*
Table with 7 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap (ACRES), Ae (ACRES), HEADWATER NODE. Contains 3 rows of data.

END OF RATIONAL METHOD ANALYSIS





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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S32 \*  
\* Rational Method Hydrology Analysis - 5-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S32.DAT  
TIME/DATE OF STUDY: 16:20 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.184
- 2) 10.00; 1.510
- 3) 15.00; 1.203
- 4) 20.00; 1.023
- 5) 25.00; 0.902
- 6) 30.00; 0.826
- 7) 40.00; 0.693
- 8) 50.00; 0.611
- 9) 60.00; 0.546
- 10) 90.00; 0.439
- 11) 120.00; 0.374
- 12) 180.00; 0.306
- 13) 360.00; 0.211
- 14) 1440.00; 0.088

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13200.00 TO NODE 13201.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 298.57  
ELEVATION DATA: UPSTREAM(FEET) = 1069.04 DOWNSTREAM(FEET) = 1005.76

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.590  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.67	0.50	1.000	0	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.66  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 0.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13201.00 TO NODE 13202.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.76 DOWNSTREAM(FEET) = 896.98  
CHANNEL LENGTH THRU SUBAREA(FEET) = 747.55 CHANNEL SLOPE = 0.1455  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.348  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.42	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.52  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.85  
AVERAGE FLOW DEPTH(FEET) = 0.55 TRAVEL TIME(MIN.) = 3.23  
Tc(MIN.) = 12.64  
SUBAREA AREA(ACRES) = 7.42 SUBAREA RUNOFF(CFS) = 5.66  
EFFECTIVE AREA(ACRES) = 8.09 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.1 PEAK FLOW RATE(CFS) = 6.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.68 FLOW VELOCITY(FEET/SEC.) = 4.42  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13202.00 = 1046.12 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 896.98 DOWNSTREAM(FEET) = 840.27
FLOW LENGTH(FEET) = 1789.59 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 5.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.53
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 6.17
PIPE TRAVEL TIME(MIN.) = 3.50 Tc(MIN.) = 16.14
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13203.00 = 2835.71 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.14
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.162
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 38.89 0.50 0.731 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.731
SUBAREA AREA(ACRES) = 38.89 SUBAREA RUNOFF(CFS) = 27.86
EFFECTIVE AREA(ACRES) = 46.98 AREA-AVERAGED Fm(INCH/HR) = 0.39
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.78
TOTAL AREA(ACRES) = 47.0 PEAK FLOW RATE(CFS) = 32.68

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 840.27 DOWNSTREAM(FEET) = 782.97
FLOW LENGTH(FEET) = 992.54 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 11.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.14
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 32.68
PIPE TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 17.10
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13204.00 = 3828.25 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.10
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.127
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 163.73 0.50 0.858 -

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 83.09 0.50 0.645 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645
SUBAREA AREA(ACRES) = 83.09 SUBAREA RUNOFF(CFS) = 60.15
EFFECTIVE AREA(ACRES) = 130.07 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 130.1 PEAK FLOW RATE(CFS) = 91.37

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 782.97 DOWNSTREAM(FEET) = 692.52
FLOW LENGTH(FEET) = 2046.57 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 21.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.28
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 91.37
PIPE TRAVEL TIME(MIN.) = 1.68 Tc(MIN.) = 18.79
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13205.00 = 5874.82 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.79
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.067
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 88.51 0.50 0.679 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.679
SUBAREA AREA(ACRES) = 88.51 SUBAREA RUNOFF(CFS) = 57.91
EFFECTIVE AREA(ACRES) = 218.58 AREA-AVERAGED Fm(INCH/HR) = 0.34
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 218.6 PEAK FLOW RATE(CFS) = 142.21

\*\*\*\*\*

FLOW PROCESS FROM NODE 13205.00 TO NODE 13206.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 692.52 DOWNSTREAM(FEET) = 605.24
CHANNEL LENGTH THRU SUBAREA(FEET) = 2704.69 CHANNEL SLOPE = 0.0323
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.915
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 163.73 0.50 0.858 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.858  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 178.25  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.94  
 AVERAGE FLOW DEPTH(FEET) = 2.74 TRAVEL TIME(MIN.) = 5.68  
 Tc(MIN.) = 24.47  
 SUBAREA AREA(ACRES) = 163.73 SUBAREA RUNOFF(CFS) = 71.64  
 EFFECTIVE AREA(ACRES) = 382.31 AREA-AVERAGED Fm(INCH/HR) = 0.38  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA(ACRES) = 382.3 PEAK FLOW RATE(CFS) = 184.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.77 FLOW VELOCITY(FEET/SEC.) = 8.02  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13206.00 = 8579.51 FEET.

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 FLOW PROCESS FROM NODE 13206.00 TO NODE 13207.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 605.24 DOWNSTREAM(FEET) = 555.41  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2479.15 CHANNEL SLOPE = 0.0201  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.820

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 143.41 0.50 0.888 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.888  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 208.40  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.92  
 AVERAGE FLOW DEPTH(FEET) = 3.17 TRAVEL TIME(MIN.) = 5.97  
 Tc(MIN.) = 30.44  
 SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 48.53  
 EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.40  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 199.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.12 FLOW VELOCITY(FEET/SEC.) = 6.83  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13207.00 = 11058.66 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 555.41 DOWNSTREAM(FEET) = 505.65  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1734.55 CHANNEL SLOPE = 0.0287  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.772

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 123.56 0.50 0.858 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.858  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 218.95  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.01  
 AVERAGE FLOW DEPTH(FEET) = 3.02 TRAVEL TIME(MIN.) = 3.61  
 Tc(MIN.) = 34.05  
 SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 38.14  
 EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.40  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 215.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.00 FLOW VELOCITY(FEET/SEC.) = 7.97  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 34.05  
 RAINFALL INTENSITY(INCH/HR) = 0.77  
 AREA-AVERAGED Fm(INCH/HR) = 0.40  
 AREA-AVERAGED Fp(INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.81  
 EFFECTIVE STREAM AREA(ACRES) = 649.28  
 TOTAL STREAM AREA(ACRES) = 649.28  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 215.29

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 FLOW PROCESS FROM NODE 13210.00 TO NODE 13211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.51  
 ELEVATION DATA: UPSTREAM(FEET) = 949.80 DOWNSTREAM(FEET) = 828.64

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.525  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.709  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 NATURAL FAIR COVER  
 "OPEN BRUSH" - 1.96 0.50 1.000 0 8.53  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 2.13  
 TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 2.13

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 FLOW PROCESS FROM NODE 13211.00 TO NODE 13212.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 828.64 DOWNSTREAM(FEET) = 767.94
CHANNEL LENGTH THRU SUBAREA(FEET) = 652.49 CHANNEL SLOPE = 0.0930
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.430
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 11.95 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.18
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.90
AVERAGE FLOW DEPTH(FEET) = 0.78 TRAVEL TIME(MIN.) = 2.79
Tc(MIN.) = 11.31
SUBAREA AREA(ACRES) = 11.95 SUBAREA RUNOFF(CFS) = 10.00
EFFECTIVE AREA(ACRES) = 13.91 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 11.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.94 FLOW VELOCITY(FEET/SEC.) = 4.38
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13212.00 = 967.00 FEET.

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FLOW PROCESS FROM NODE 13212.00 TO NODE 13213.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 767.94 DOWNSTREAM(FEET) = 706.43
CHANNEL LENGTH THRU SUBAREA(FEET) = 967.91 CHANNEL SLOPE = 0.0635
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.204
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 27.07 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.29
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.39
AVERAGE FLOW DEPTH(FEET) = 1.24 TRAVEL TIME(MIN.) = 3.67
Tc(MIN.) = 14.98
SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 17.13
EFFECTIVE AREA(ACRES) = 40.98 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 41.0 PEAK FLOW RATE(CFS) = 25.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.36 FLOW VELOCITY(FEET/SEC.) = 4.67
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13213.00 = 1934.91 FEET.

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FLOW PROCESS FROM NODE 13213.00 TO NODE 13214.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 706.43 DOWNSTREAM(FEET) = 659.31
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.11 CHANNEL SLOPE = 0.0497
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.076
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 18.09 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.63
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.45
AVERAGE FLOW DEPTH(FEET) = 1.52 TRAVEL TIME(MIN.) = 3.55
Tc(MIN.) = 18.54
SUBAREA AREA(ACRES) = 18.09 SUBAREA RUNOFF(CFS) = 9.37
EFFECTIVE AREA(ACRES) = 59.07 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 30.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.52 FLOW VELOCITY(FEET/SEC.) = 4.44
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13214.00 = 2883.02 FEET.

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FLOW PROCESS FROM NODE 13214.00 TO NODE 13215.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 659.31 DOWNSTREAM(FEET) = 628.91
CHANNEL LENGTH THRU SUBAREA(FEET) = 970.24 CHANNEL SLOPE = 0.0313
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.964
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 71.42 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.54
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.12
AVERAGE FLOW DEPTH(FEET) = 1.92 TRAVEL TIME(MIN.) = 3.93
Tc(MIN.) = 22.46
SUBAREA AREA(ACRES) = 71.42 SUBAREA RUNOFF(CFS) = 29.79
EFFECTIVE AREA(ACRES) = 130.49 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 130.5 PEAK FLOW RATE(CFS) = 54.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.06 FLOW VELOCITY(FEET/SEC.) = 4.29
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13215.00 = 3853.26 FEET.

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FLOW PROCESS FROM NODE 13215.00 TO NODE 13216.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 628.91 DOWNSTREAM(FEET) = 598.39
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.63 CHANNEL SLOPE = 0.0331
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.889
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 36.33 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 60.79
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.52
AVERAGE FLOW DEPTH(FEET) = 2.12 TRAVEL TIME(MIN.) = 3.40
Tc(MIN.) = 25.87
SUBAREA AREA(ACRES) = 36.33 SUBAREA RUNOFF(CFS) = 12.72
EFFECTIVE AREA(ACRES) = 166.82 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 166.8 PEAK FLOW RATE(CFS) = 58.40

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.09 FLOW VELOCITY(FEET/SEC.) = 4.47
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13216.00 = 4775.89 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13216.00 TO NODE 13217.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 598.39 DOWNSTREAM(FEET) = 568.48
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.40 CHANNEL SLOPE = 0.0470
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.858
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 42.51 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 65.25
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.26
AVERAGE FLOW DEPTH(FEET) = 2.03 TRAVEL TIME(MIN.) = 2.02
Tc(MIN.) = 27.89
SUBAREA AREA(ACRES) = 42.51 SUBAREA RUNOFF(CFS) = 13.70
EFFECTIVE AREA(ACRES) = 209.33 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 209.3 PEAK FLOW RATE(CFS) = 67.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.06 FLOW VELOCITY(FEET/SEC.) = 5.28
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13217.00 = 5412.29 FEET.

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FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 568.48 DOWNSTREAM(FEET) = 505.65
CHANNEL LENGTH THRU SUBAREA(FEET) = 1896.50 CHANNEL SLOPE = 0.0331
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.766
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 73.24 0.50 0.951 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.951
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 77.07
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.80
AVERAGE FLOW DEPTH(FEET) = 2.31 TRAVEL TIME(MIN.) = 6.59
Tc(MIN.) = 34.48
SUBAREA AREA(ACRES) = 73.24 SUBAREA RUNOFF(CFS) = 19.16
EFFECTIVE AREA(ACRES) = 282.57 AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 282.6 PEAK FLOW RATE(CFS) = 69.32

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.22 FLOW VELOCITY(FEET/SEC.) = 4.68
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13220.00 = 7308.79 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 34.48
RAINFALL INTENSITY(INCH/HR) = 0.77
AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.99
EFFECTIVE STREAM AREA(ACRES) = 282.57
TOTAL STREAM AREA(ACRES) = 282.57
PEAK FLOW RATE(CFS) AT CONFLUENCE = 69.32

\*\* CONFLUENCE DATA \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 215.29 34.05 0.772 0.50( 0.40) 0.81 649.3 13200.00
2 69.32 34.48 0.766 0.50( 0.49) 0.99 282.6 13210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	284.60	34.05	0.772	0.50 ( 0.43)	0.86	928.3	13200.00
2	281.25	34.48	0.766	0.50 ( 0.43)	0.86	931.8	13210.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 284.60 Tc(MIN.) = 34.05  
EFFECTIVE AREA(ACRES) = 928.31 AREA-AVERAGED Fm(INCH/HR) = 0.43  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.86  
TOTAL AREA(ACRES) = 931.8  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

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FLOW PROCESS FROM NODE 13220.00 TO NODE 13221.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 505.65 DOWNSTREAM(FEET) = 478.94  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1949.14 CHANNEL SLOPE = 0.0137  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.719

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	108.50	0.50	0.637	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.637  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 304.15  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.17  
AVERAGE FLOW DEPTH(FEET) = 3.52 TRAVEL TIME(MIN.) = 3.97  
Tc(MIN.) = 38.02  
SUBAREA AREA(ACRES) = 108.50 SUBAREA RUNOFF(CFS) = 39.12  
EFFECTIVE AREA(ACRES) = 1036.81 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 1040.3 PEAK FLOW RATE(CFS) = 284.60  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.44 FLOW VELOCITY(FEET/SEC.) = 8.04  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13221.00 = 14742.35 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13221.00 TO NODE 13222.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 478.94 DOWNSTREAM(FEET) = 427.51  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2078.70 CHANNEL SLOPE = 0.0247  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.681

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	87.26	0.50	0.699	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.699  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 297.62  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.12  
AVERAGE FLOW DEPTH(FEET) = 3.13 TRAVEL TIME(MIN.) = 3.42  
Tc(MIN.) = 41.45  
SUBAREA AREA(ACRES) = 87.26 SUBAREA RUNOFF(CFS) = 26.04  
EFFECTIVE AREA(ACRES) = 1124.07 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.83  
TOTAL AREA(ACRES) = 1127.6 PEAK FLOW RATE(CFS) = 284.60  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.08 FLOW VELOCITY(FEET/SEC.) = 10.02  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13222.00 = 16821.05 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1127.6 TC(MIN.) = 41.45  
EFFECTIVE AREA(ACRES) = 1124.07 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.827  
PEAK FLOW RATE(CFS) = 284.60

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	284.60	41.45	0.681	0.50 ( 0.41)	0.83	1124.1	13200.00
2	281.25	41.90	0.677	0.50 ( 0.41)	0.83	1127.6	13210.00

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S35 \*  
\* Rational Method Hydrology Analysis - 5-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S35.DAT  
TIME/DATE OF STUDY: 16:21 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.184
- 2) 10.00; 1.510
- 3) 15.00; 1.203
- 4) 20.00; 1.023
- 5) 25.00; 0.902
- 6) 30.00; 0.826
- 7) 40.00; 0.693
- 8) 50.00; 0.611
- 9) 60.00; 0.546
- 10) 90.00; 0.439
- 11) 120.00; 0.374
- 12) 180.00; 0.306
- 13) 360.00; 0.211
- 14) 1440.00; 0.088

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.00 TO NODE 13500.50 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 548.43  
ELEVATION DATA: UPSTREAM(FEET) = 1183.47 DOWNSTREAM(FEET) = 1065.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.390  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	5.11	0.50	1.000	0	11.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 4.09  
TOTAL AREA(ACRES) = 5.11 PEAK FLOW RATE(CFS) = 4.09

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.50 TO NODE 13501.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1033.15  
CHANNEL LENGTH THRU SUBAREA(FEET) = 431.71 CHANNEL SLOPE = 0.0738  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.265  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.87	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.16  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.56  
AVERAGE FLOW DEPTH(FEET) = 0.82 TRAVEL TIME(MIN.) = 2.02  
Tc(MIN.) = 13.98  
SUBAREA AREA(ACRES) = 8.87 SUBAREA RUNOFF(CFS) = 6.11  
EFFECTIVE AREA(ACRES) = 13.98 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 9.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.91 FLOW VELOCITY(FEET/SEC.) = 3.85  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13501.00 = 980.14 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13501.00 TO NODE 13502.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1033.15 DOWNSTREAM(FEET) = 990.26
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.63 CHANNEL SLOPE = 0.0452
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.077
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 16.82 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.03
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.51
AVERAGE FLOW DEPTH(FEET) = 1.15 TRAVEL TIME(MIN.) = 4.51
Tc(MIN.) = 18.49
SUBAREA AREA(ACRES) = 16.82 SUBAREA RUNOFF(CFS) = 8.74
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 16.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.21 FLOW VELOCITY(FEET/SEC.) = 3.64
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13502.00 = 1928.77 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13502.00 TO NODE 13503.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.26 DOWNSTREAM(FEET) = 956.06
CHANNEL LENGTH THRU SUBAREA(FEET) = 940.98 CHANNEL SLOPE = 0.0363
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.959
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 46.02 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 25.55
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.76
AVERAGE FLOW DEPTH(FEET) = 1.51 TRAVEL TIME(MIN.) = 4.18
Tc(MIN.) = 22.66
SUBAREA AREA(ACRES) = 46.02 SUBAREA RUNOFF(CFS) = 18.99
EFFECTIVE AREA(ACRES) = 76.82 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 76.8 PEAK FLOW RATE(CFS) = 31.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.63 FLOW VELOCITY(FEET/SEC.) = 3.98
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13503.00 = 2869.75 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13503.00 TO NODE 13504.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 956.06 DOWNSTREAM(FEET) = 889.48
CHANNEL LENGTH THRU SUBAREA(FEET) = 2131.31 CHANNEL SLOPE = 0.0312
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.805
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 58.46 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 39.78
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.98
AVERAGE FLOW DEPTH(FEET) = 1.83 TRAVEL TIME(MIN.) = 8.93
Tc(MIN.) = 31.60
SUBAREA AREA(ACRES) = 58.46 SUBAREA RUNOFF(CFS) = 16.02
EFFECTIVE AREA(ACRES) = 135.28 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 135.3 PEAK FLOW RATE(CFS) = 37.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.78 FLOW VELOCITY(FEET/SEC.) = 3.90
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13504.00 = 5001.06 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13504.00 TO NODE 13505.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 889.48 DOWNSTREAM(FEET) = 848.10
CHANNEL LENGTH THRU SUBAREA(FEET) = 1661.97 CHANNEL SLOPE = 0.0249
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.705
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 49.30 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.66
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.69
AVERAGE FLOW DEPTH(FEET) = 1.94 TRAVEL TIME(MIN.) = 7.51
Tc(MIN.) = 39.11
SUBAREA AREA(ACRES) = 49.30 SUBAREA RUNOFF(CFS) = 9.08
EFFECTIVE AREA(ACRES) = 184.58 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 184.6 PEAK FLOW RATE(CFS) = 37.08

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.86 FLOW VELOCITY(FEET/SEC.) = 3.58  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.00 = 6663.03 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13505.00 TO NODE 13505.50 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 848.10 DOWNSTREAM(FEET) = 811.10  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1234.61 CHANNEL SLOPE = 0.0300  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.658

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.35	0.50	0.811	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.811

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.54

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.95

AVERAGE FLOW DEPTH(FEET) = 1.87 TRAVEL TIME(MIN.) = 5.21

Tc(MIN.) = 44.32

SUBAREA AREA(ACRES) = 39.35 SUBAREA RUNOFF(CFS) = 8.93

EFFECTIVE AREA(ACRES) = 223.93 AREA-AVERAGED Fm(INCH/HR) = 0.48

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97

TOTAL AREA(ACRES) = 223.9 PEAK FLOW RATE(CFS) = 37.08

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.79 FLOW VELOCITY(FEET/SEC.) = 3.86

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.50 = 7897.64 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13505.50 TO NODE 13506.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 811.10 DOWNSTREAM(FEET) = 781.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1415.98 CHANNEL SLOPE = 0.0213  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.604

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	54.33	0.50	0.738	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.738

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.82

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.51

AVERAGE FLOW DEPTH(FEET) = 2.02 TRAVEL TIME(MIN.) = 6.73

Tc(MIN.) = 51.05

SUBAREA AREA(ACRES) = 54.33 SUBAREA RUNOFF(CFS) = 11.51

EFFECTIVE AREA(ACRES) = 278.26 AREA-AVERAGED Fm(INCH/HR) = 0.46

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.92  
TOTAL AREA(ACRES) = 278.3 PEAK FLOW RATE(CFS) = 37.08  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.91 FLOW VELOCITY(FEET/SEC.) = 3.38

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.00 = 9313.62 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13506.00 TO NODE 13506.50 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 781.00 DOWNSTREAM(FEET) = 743.17  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1542.62 CHANNEL SLOPE = 0.0245  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	61.33	0.50	0.783	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.69

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.68

AVERAGE FLOW DEPTH(FEET) = 1.94 TRAVEL TIME(MIN.) = 6.98

Tc(MIN.) = 58.03

SUBAREA AREA(ACRES) = 61.33 SUBAREA RUNOFF(CFS) = 9.23

EFFECTIVE AREA(ACRES) = 339.59 AREA-AVERAGED Fm(INCH/HR) = 0.45

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.90

TOTAL AREA(ACRES) = 339.6 PEAK FLOW RATE(CFS) = 37.08

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.86 FLOW VELOCITY(FEET/SEC.) = 3.58

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.50 = 10856.24 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13506.50 TO NODE 13520.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 743.17 DOWNSTREAM(FEET) = 717.04  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1370.93 CHANNEL SLOPE = 0.0191  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.528

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.86	0.50	0.848	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.848

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.95

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.29

AVERAGE FLOW DEPTH (FEET) = 1.99 TRAVEL TIME (MIN.) = 6.95  
 Tc (MIN.) = 64.97  
 SUBAREA AREA (ACRES) = 39.86 SUBAREA RUNOFF (CFS) = 3.74  
 EFFECTIVE AREA (ACRES) = 379.45 AREA-AVERAGED Fm (INCH/HR) = 0.45  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.89  
 TOTAL AREA (ACRES) = 379.5 PEAK FLOW RATE (CFS) = 37.08  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.95 FLOW VELOCITY (FEET/SEC.) = 3.25  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13520.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 -----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 64.97  
 RAINFALL INTENSITY (INCH/HR) = 0.53  
 AREA-AVERAGED Fm (INCH/HR) = 0.45  
 AREA-AVERAGED Fp (INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.89  
 EFFECTIVE STREAM AREA (ACRES) = 379.45  
 TOTAL STREAM AREA (ACRES) = 379.45  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 37.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13510.00 TO NODE 13511.00 IS CODE = 21

-----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 -----

INITIAL SUBAREA FLOW-LENGTH (FEET) = 903.68  
 ELEVATION DATA: UPSTREAM (FEET) = 1216.90 DOWNSTREAM (FEET) = 1022.78  
  
 $T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.615  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.226  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	6.66	0.50	1.000	0	14.62

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 4.35  
 TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 4.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13511.00 TO NODE 13512.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----

ELEVATION DATA: UPSTREAM (FEET) = 1022.78 DOWNSTREAM (FEET) = 954.27  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1027.63 CHANNEL SLOPE = 0.0667

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.054  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.76  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.80  
 AVERAGE FLOW DEPTH (FEET) = 0.97 TRAVEL TIME (MIN.) = 4.51  
 Tc (MIN.) = 19.12

SUBAREA AREA (ACRES) = 25.40 SUBAREA RUNOFF (CFS) = 12.67  
 EFFECTIVE AREA (ACRES) = 32.06 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 15.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.13 FLOW VELOCITY (FEET/SEC.) = 4.20  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13512.00 = 1931.31 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13512.00 TO NODE 13513.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----

ELEVATION DATA: UPSTREAM (FEET) = 954.27 DOWNSTREAM (FEET) = 872.45  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1926.42 CHANNEL SLOPE = 0.0425  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.876  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	90.23	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.46  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.22  
 AVERAGE FLOW DEPTH (FEET) = 1.58 TRAVEL TIME (MIN.) = 7.61  
 Tc (MIN.) = 26.73  
 SUBAREA AREA (ACRES) = 90.23 SUBAREA RUNOFF (CFS) = 30.51  
 EFFECTIVE AREA (ACRES) = 122.29 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 122.3 PEAK FLOW RATE (CFS) = 41.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.75 FLOW VELOCITY (FEET/SEC.) = 4.50  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13513.00 = 3857.73 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13513.00 TO NODE 13514.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----

ELEVATION DATA: UPSTREAM(FEET) = 872.45 DOWNSTREAM(FEET) = 813.12  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1895.66 CHANNEL SLOPE = 0.0313  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.774

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	135.65	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 58.18  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.39  
 AVERAGE FLOW DEPTH(FEET) = 2.10 TRAVEL TIME(MIN.) = 7.20  
 Tc(MIN.) = 33.94  
 SUBAREA AREA(ACRES) = 135.65 SUBAREA RUNOFF(CFS) = 33.38  
 EFFECTIVE AREA(ACRES) = 257.94 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 257.9 PEAK FLOW RATE(CFS) = 63.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.18 FLOW VELOCITY(FEET/SEC.) = 4.46  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13514.00 = 5753.39 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13514.00 TO NODE 13515.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 813.12 DOWNSTREAM(FEET) = 773.74  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.15 CHANNEL SLOPE = 0.0204  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.676

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	109.30	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 72.17  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.95  
 AVERAGE FLOW DEPTH(FEET) = 2.47 TRAVEL TIME(MIN.) = 8.13  
 Tc(MIN.) = 42.07  
 SUBAREA AREA(ACRES) = 109.30 SUBAREA RUNOFF(CFS) = 17.30  
 EFFECTIVE AREA(ACRES) = 367.24 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 367.2 PEAK FLOW RATE(CFS) = 63.48  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.35 FLOW VELOCITY(FEET/SEC.) = 3.82  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13515.00 = 7679.54 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 773.74 DOWNSTREAM(FEET) = 717.04  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2279.49 CHANNEL SLOPE = 0.0249  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.605

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	231.44	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 74.56  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.27  
 AVERAGE FLOW DEPTH(FEET) = 2.41 TRAVEL TIME(MIN.) = 8.91  
 Tc(MIN.) = 50.98  
 SUBAREA AREA(ACRES) = 231.44 SUBAREA RUNOFF(CFS) = 21.81  
 EFFECTIVE AREA(ACRES) = 598.68 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 598.7 PEAK FLOW RATE(CFS) = 63.48  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.27 FLOW VELOCITY(FEET/SEC.) = 4.10  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13520.00 = 9959.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 50.98  
 RAINFALL INTENSITY(INCH/HR) = 0.60  
 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 598.68  
 TOTAL STREAM AREA(ACRES) = 598.68  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 63.48

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	37.08	64.97	0.528	0.50( 0.45)	0.89	379.5	13500.00
2	63.48	50.98	0.605	0.50( 0.50)	1.00	598.7	13510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	100.55	50.98	0.605	0.50( 0.48)	0.96	896.4	13510.00

2 54.12 64.97 0.528 0.50( 0.48) 0.96 978.1 13500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 100.55 Tc(MIN.) = 50.98
EFFECTIVE AREA(ACRES) = 896.38 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 978.1
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13520.00 TO NODE 13520.50 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 717.04 DOWNSTREAM(FEET) = 700.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 2019.22 CHANNEL SLOPE = 0.0084
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.553

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 193.31 0.50 0.965 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 106.71
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.22
AVERAGE FLOW DEPTH(FEET) = 2.90 TRAVEL TIME(MIN.) = 7.97
Tc(MIN.) = 58.95
SUBAREA AREA(ACRES) = 193.31 SUBAREA RUNOFF(CFS) = 12.21
EFFECTIVE AREA(ACRES) = 1089.69 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 1171.4 PEAK FLOW RATE(CFS) = 100.55
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.84 FLOW VELOCITY(FEET/SEC.) = 4.15
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.50 = 14246.39 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13520.50 TO NODE 13521.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 661.95
CHANNEL LENGTH THRU SUBAREA(FEET) = 1622.36 CHANNEL SLOPE = 0.0235
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.534

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 129.79 0.50 0.897 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 105.55

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.18
AVERAGE FLOW DEPTH(FEET) = 2.39 TRAVEL TIME(MIN.) = 4.37
Tc(MIN.) = 63.32
SUBAREA AREA(ACRES) = 129.79 SUBAREA RUNOFF(CFS) = 9.99
EFFECTIVE AREA(ACRES) = 1219.48 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 1301.2 PEAK FLOW RATE(CFS) = 100.55
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.35 FLOW VELOCITY(FEET/SEC.) = 6.09
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13521.00 = 15868.75 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13521.00 TO NODE 13522.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 661.95 DOWNSTREAM(FEET) = 632.19
CHANNEL LENGTH THRU SUBAREA(FEET) = 2746.01 CHANNEL SLOPE = 0.0108
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.499

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 278.60 0.50 0.905 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 106.50
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.64
AVERAGE FLOW DEPTH(FEET) = 2.77 TRAVEL TIME(MIN.) = 9.87
Tc(MIN.) = 73.18
SUBAREA AREA(ACRES) = 278.60 SUBAREA RUNOFF(CFS) = 11.89
EFFECTIVE AREA(ACRES) = 1498.08 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 1579.8 PEAK FLOW RATE(CFS) = 100.55
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.71 FLOW VELOCITY(FEET/SEC.) = 4.58
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13522.00 = 18614.76 FEET.

\*\*\*\*\*

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1579.8 TC(MIN.) = 73.18
EFFECTIVE AREA(ACRES) = 1498.08 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.947
PEAK FLOW RATE(CFS) = 100.55

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 100.55 73.18 0.499 0.50( 0.47) 0.95 1498.1 13510.00

2 54.12 90.88 0.437 0.50( 0.47) 0.94 1579.8 13500.00

=====  
=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2011 Advanced Engineering Software (aes)  
Ver. 18.0 Release Date: 07/01/2011 License ID 1264

Analysis prepared by:

RBF Consulting

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 10-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P10EVAA.DAT  
TIME/DATE OF STUDY: 16:37 11/13/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.720
- 2) 10.00; 2.487
- 3) 15.00; 1.851
- 4) 20.00; 1.582
- 5) 25.00; 1.382
- 6) 30.00; 1.244
- 7) 40.00; 1.061
- 8) 50.00; 0.944
- 9) 60.00; 0.855
- 10) 90.00; 0.707
- 11) 120.00; 0.622
- 12) 180.00; 0.520
- 13) 360.00; 0.381
- 14) 1200.00; 0.166

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE/ WAY		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 571.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.305  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.151  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56	7.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 2.23  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 2.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.151  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.170  
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 9.21  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 11.43

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 7.31  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.151  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56



RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 2.60 0.30 0.200 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 7.23  
EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.06  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19  
TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 18.67

\*\*\*\*\*

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 571.00 DOWNSTREAM ELEVATION(FEET) = 530.50  
STREET LENGTH(FEET) = 1215.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.46

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.43  
HALFSTREET FLOOD WIDTH(FEET) = 15.20  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.98  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.16  
STREET FLOW TRAVEL TIME(MIN.) = 4.07 Tc(MIN.) = 11.37

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.312

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.20	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	2.40	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.135  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 7.57  
EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 21.17

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 14.80  
FLOW VELOCITY(FEET/SEC.) = 4.92 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.10  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1542.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.37  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.312  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.119  
SUBAREA AREA(ACRES) = 22.60 SUBAREA RUNOFF(CFS) = 46.31  
EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.04  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.13  
TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 67.48

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.37  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.312  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.198  
SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 12.77  
EFFECTIVE AREA(ACRES) = 39.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
TOTAL AREA(ACRES) = 39.3 PEAK FLOW RATE(CFS) = 80.25

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.50 DOWNSTREAM(FEET) = 522.00  
FLOW LENGTH(FEET) = 837.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.19  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 80.25  
PIPE TRAVEL TIME(MIN.) = 1.25 Tc(MIN.) = 12.62  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2379.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.62  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.154  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 15.30 0.30 0.100 56  
 PUBLIC PARK B 0.70 0.30 0.850 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.133  
 SUBAREA AREA(ACRES) = 16.00 SUBAREA RUNOFF(CFS) = 30.44  
 EFFECTIVE AREA(ACRES) = 55.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA(ACRES) = 55.3 PEAK FLOW RATE(CFS) = 105.09

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 522.00 DOWNSTREAM(FEET) = 473.00  
 FLOW LENGTH(FEET) = 568.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.41  
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 105.09  
 PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 12.98  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2947.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<<<

=====

MAINLINE Tc(MIN.) = 12.98  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.108  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	2.10	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
COMMERCIAL	B	0.50	0.30	0.100	56
PUBLIC PARK	B	13.00	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.820  
 SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 26.65  
 EFFECTIVE AREA(ACRES) = 71.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 71.2 PEAK FLOW RATE(CFS) = 129.47

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 127.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 435.00  
 FLOW LENGTH(FEET) = 588.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 25.31

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 129.47  
 PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 13.36  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<<<<

=====

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 100.00 TO NODE 121.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 574.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.872  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56	8.44

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 1.52  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.52

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 574.00 DOWNSTREAM ELEVATION(FEET) = 557.00  
 STREET LENGTH(FEET) = 221.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.62  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.37  
 HALFSTREET FLOOD WIDTH(FEET) = 11.68  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.59  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.45

STREET FLOW TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 9.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.735  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 7.90 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.10 0.30 0.400 56  
 APARTMENTS B 2.20 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.257  
 SUBAREA AREA(ACRES) = 14.30 SUBAREA RUNOFF(CFS) = 34.20  
 EFFECTIVE AREA(ACRES) = 14.90 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.26  
 TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 35.64

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 15.51  
 FLOW VELOCITY(FEET/SEC.) = 7.61 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.35  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 551.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 557.00 DOWNSTREAM ELEVATION(FEET) = 527.00  
 STREET LENGTH(FEET) = 317.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 46.03  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.46  
 HALFSTREET FLOOD WIDTH(FEET) = 16.52  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.74  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.00  
 STREET FLOW TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 9.60  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.586  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.50 0.30 0.400 56  
 APARTMENTS B 0.70 0.30 0.200 56

COMMERCIAL B 0.40 0.30 0.100 56  
 CONDOMINIUMS B 3.50 0.30 0.350 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.352  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 20.76  
 EFFECTIVE AREA(ACRES) = 24.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 24.2 PEAK FLOW RATE(CFS) = 54.40

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 17.70  
 FLOW VELOCITY(FEET/SEC.) = 9.10 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.35  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 123.00 = 868.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 527.00 DOWNSTREAM ELEVATION(FEET) = 496.00  
 STREET LENGTH(FEET) = 315.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 66.47

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.50  
 HALFSTREET FLOOD WIDTH(FEET) = 19.02  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.70  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.87  
 STREET FLOW TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 10.14  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.469

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 2.90 0.30 0.400 56  
 CONDOMINIUMS B 1.40 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.00 0.30 0.400 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 CONDOMINIUMS B 2.70 0.30 0.350 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387  
 SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 24.14  
 EFFECTIVE AREA(ACRES) = 35.60 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32

TOTAL AREA (ACRES) = 35.6 PEAK FLOW RATE (CFS) = 76.00

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.52 HALFSTREET FLOOD WIDTH (FEET) = 20.04  
FLOW VELOCITY (FEET/SEC.) = 10.05 DEPTH\*VELOCITY (FT\*FT/SEC.) = 5.23  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 124.00 = 1183.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 10.14

RAINFALL INTENSITY (INCH/HR) = 2.47

AREA-AVERAGED Fm (INCH/HR) = 0.10

AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.32

EFFECTIVE STREAM AREA (ACRES) = 35.60

TOTAL STREAM AREA (ACRES) = 35.60

PEAK FLOW RATE (CFS) AT CONFLUENCE = 76.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 317.00

ELEVATION DATA: UPSTREAM (FEET) = 699.00 DOWNSTREAM (FEET) = 610.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.111

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.706

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"OPEN BRUSH"	B	1.50	0.30	1.000	66	9.11

NATURAL FAIR COVER

"OPEN BRUSH" B 1.50 0.30 1.000 66 9.11

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 3.25

TOTAL AREA (ACRES) = 1.50 PEAK FLOW RATE (CFS) = 3.25

\*\*\*\*\*

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 610.00 DOWNSTREAM (FEET) = 575.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 206.00 CHANNEL SLOPE = 0.1699

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.573

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.50	0.30	1.000	66

NATURAL FAIR COVER

"OPEN BRUSH" B 1.50 0.30 1.000 66 9.11

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 3.25

TOTAL AREA (ACRES) = 1.50 PEAK FLOW RATE (CFS) = 3.25

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 2.80 0.30 1.000 66

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.12

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.33

AVERAGE FLOW DEPTH (FEET) = 0.57 TRAVEL TIME (MIN.) = 0.54

Tc (MIN.) = 9.65

SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 5.73

EFFECTIVE AREA (ACRES) = 4.30 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 4.3 PEAK FLOW RATE (CFS) = 8.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.65 FLOW VELOCITY (FEET/SEC.) = 7.03

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 523.00 FEET.

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FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 575.00 DOWNSTREAM (FEET) = 548.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.1350

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.470

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.30	0.30	1.000	66

NATURAL FAIR COVER

"OPEN BRUSH" B 3.30 0.30 1.000 66

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.02

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.93

AVERAGE FLOW DEPTH (FEET) = 0.76 TRAVEL TIME (MIN.) = 0.48

Tc (MIN.) = 10.13

SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 6.44

EFFECTIVE AREA (ACRES) = 7.60 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 7.6 PEAK FLOW RATE (CFS) = 14.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.82 FLOW VELOCITY (FEET/SEC.) = 7.34

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 723.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 548.00 DOWNSTREAM (FEET) = 524.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 318.00 CHANNEL SLOPE = 0.0755

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.359  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	2.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 16.97  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.06  
 AVERAGE FLOW DEPTH (FEET) = 0.97 TRAVEL TIME (MIN.) = 0.87  
 Tc (MIN.) = 11.01  
 SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 4.26  
 EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 18.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.99 FLOW VELOCITY (FEET/SEC.) = 6.18  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 1041.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 524.00 DOWNSTREAM (FEET) = 515.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 94.00 CHANNEL SLOPE = 0.0957  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.331  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	3.70	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 21.72  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.07  
 AVERAGE FLOW DEPTH (FEET) = 1.01 TRAVEL TIME (MIN.) = 0.22  
 Tc (MIN.) = 11.23  
 SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 6.76  
 EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 24.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.07 FLOW VELOCITY (FEET/SEC.) = 7.30  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 1135.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 507.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 207.00 CHANNEL SLOPE = 0.0386  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.251  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	8.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 32.14  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.53  
 AVERAGE FLOW DEPTH (FEET) = 1.39 TRAVEL TIME (MIN.) = 0.62  
 Tc (MIN.) = 11.85  
 SUBAREA AREA (ACRES) = 8.30 SUBAREA RUNOFF (CFS) = 14.58  
 EFFECTIVE AREA (ACRES) = 21.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 21.9 PEAK FLOW RATE (CFS) = 38.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.49 FLOW VELOCITY (FEET/SEC.) = 5.77  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 1342.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 507.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 338.00 CHANNEL SLOPE = 0.0207  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.105  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	0.60	0.30	1.000	66
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
NATURAL FAIR COVER "OPEN BRUSH"	B	13.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 49.94  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.90  
 AVERAGE FLOW DEPTH (FEET) = 1.84 TRAVEL TIME (MIN.) = 1.15  
 Tc (MIN.) = 13.00  
 SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 22.95  
 EFFECTIVE AREA (ACRES) = 36.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 36.0 PEAK FLOW RATE (CFS) = 58.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.96 FLOW VELOCITY(FEET/SEC.) = 5.09  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 1680.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 137.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 496.00  
FLOW LENGTH(FEET) = 726.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.23  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 58.53  
PIPE TRAVEL TIME(MIN.) = 1.47 Tc(MIN.) = 14.47  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.47  
RAINFALL INTENSITY(INCH/HR) = 1.92  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 36.00  
TOTAL STREAM AREA(ACRES) = 36.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 58.53

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	76.00	10.14	2.469	0.30( 0.10)	0.32	35.6	100.00
2	58.53	14.47	1.918	0.30( 0.30)	1.00	36.0	130.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	130.97	10.14	2.469	0.30( 0.18)	0.60	60.8	100.00
2	116.88	14.47	1.918	0.30( 0.20)	0.66	71.6	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 130.97 Tc(MIN.) = 10.14  
EFFECTIVE AREA(ACRES) = 60.82 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 71.6  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 444.00  
FLOW LENGTH(FEET) = 888.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.34  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 130.97  
PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 10.75  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 125.00 = 3294.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.75  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.392  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	1.00	0.30	0.400	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	7.50	0.30	0.400	56
NATURAL FAIR COVER "OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.407  
SUBAREA AREA(ACRES) = 8.60 SUBAREA RUNOFF(CFS) = 17.57  
EFFECTIVE AREA(ACRES) = 69.42 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 138.61

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 444.00 DOWNSTREAM(FEET) = 438.00  
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.20  
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 138.61  
PIPE TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 11.65  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.65

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.277  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	4.30	0.30	0.200	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.70	0.30	0.400	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.20	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 7.10 SUBAREA RUNOFF (CFS) = 14.12  
 EFFECTIVE AREA (ACRES) = 76.52 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54  
 TOTAL AREA (ACRES) = 87.3 PEAK FLOW RATE (CFS) = 145.56

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 11.65  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.277  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.40  
 EFFECTIVE AREA (ACRES) = 76.72 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54  
 TOTAL AREA (ACRES) = 87.5 PEAK FLOW RATE (CFS) = 145.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 11.65  
 RAINFALL INTENSITY (INCH/HR) = 2.28  
 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.54  
 EFFECTIVE STREAM AREA (ACRES) = 76.72  
 TOTAL STREAM AREA (ACRES) = 87.50  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 145.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 557.00 DOWNSTREAM (FEET) = 546.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.105  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.447  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.50	0.30	0.100	56	6.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 1.54  
 TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 1.54

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 546.00 DOWNSTREAM ELEVATION (FEET) = 488.00  
 STREET LENGTH (FEET) = 671.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.46

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.30  
 HALfstREET FLOOD WIDTH (FEET) = 7.72  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.82  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.75  
 STREET FLOW TRAVEL TIME (MIN.) = 1.92 Tc (MIN.) = 8.03  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.974

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.50	0.30	0.200	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	3.90	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293  
 SUBAREA AREA (ACRES) = 5.30 SUBAREA RUNOFF (CFS) = 13.77  
 EFFECTIVE AREA (ACRES) = 5.80 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA (ACRES) = 5.8 PEAK FLOW RATE (CFS) = 15.09

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.35  
 FLOW VELOCITY(FEET/SEC.) = 6.56 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.28  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1001.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 8.03  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.974  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	14.60	0.30	0.200	56
COMMERCIAL	B	1.10	0.30	0.100	56
CONDOMINIUMS	B	4.30	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.227  
 SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 52.31  
 EFFECTIVE AREA(ACRES) = 25.80 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 25.8 PEAK FLOW RATE(CFS) = 67.40

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

-----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 488.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
 STREET LENGTH(FEET) = 371.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 84.34  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.56  
 HALFSTREET FLOOD WIDTH(FEET) = 22.07  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.28  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 5.17  
 STREET FLOW TRAVEL TIME(MIN.) = 0.67 Tc(MIN.) = 8.69  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.810

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.50	0.30	0.200	56

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 10.00 0.30 0.200 56  
 APARTMENTS B 1.70 0.30 0.200 56  
 COMMERCIAL B 0.50 0.30 0.100 56  
 CONDOMINIUMS B 1.00 0.30 0.350 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.207  
 SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 33.88  
 EFFECTIVE AREA(ACRES) = 39.50 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA(ACRES) = 39.5 PEAK FLOW RATE(CFS) = 97.46

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 23.32  
 FLOW VELOCITY(FEET/SEC.) = 9.65 DEPTH\*VELOCITY(FT\*FT/SEC.) = 5.59  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1372.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 113.00 TO NODE 126.00 IS CODE = 31

-----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 438.00  
 FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.12  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 97.46  
 PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 9.11  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 1872.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 9.11  
 RAINFALL INTENSITY(INCH/HR) = 2.71  
 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.23  
 EFFECTIVE STREAM AREA(ACRES) = 39.50  
 TOTAL STREAM AREA(ACRES) = 39.50  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 97.46

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	145.96	11.65	2.277	0.30( 0.16)	0.54	76.7	100.00
1	127.17	16.05	1.795	0.30( 0.18)	0.60	87.5	130.00
2	97.46	9.11	2.708	0.30( 0.07)	0.23	39.5	110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.



\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	234.76	9.11	2.708	0.30 ( 0.13)	0.42	99.5	110.00
2	227.52	11.65	2.277	0.30 ( 0.13)	0.44	116.2	100.00
3	190.92	16.05	1.795	0.30 ( 0.15)	0.48	127.0	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 234.76 Tc(MIN.) = 9.11  
EFFECTIVE AREA(ACRES) = 99.46 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 127.0  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 435.00  
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 60.0 INCH PIPE IS 46.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.41  
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 234.76  
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 9.45  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.45  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.623  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	5.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.366  
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 17.64  
EFFECTIVE AREA(ACRES) = 107.26 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 134.8 PEAK FLOW RATE(CFS) = 241.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.45  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.623  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	1.50	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 10.88  
EFFECTIVE AREA(ACRES) = 112.16 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 139.7 PEAK FLOW RATE(CFS) = 252.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	252.10	9.45	2.623	0.30 ( 0.13)	0.42	112.2	110.00
2	243.98	12.00	2.233	0.30 ( 0.13)	0.44	128.9	100.00
3	205.18	16.40	1.775	0.30 ( 0.14)	0.48	139.7	130.00

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	129.47	13.36	2.059	0.30 ( 0.09)	0.29	71.2	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	369.81	9.45	2.623	0.30 ( 0.11)	0.38	162.5	110.00
2	370.44	12.00	2.233	0.30 ( 0.12)	0.39	192.8	100.00
3	361.39	13.36	2.059	0.30 ( 0.12)	0.39	203.5	100.00
4	316.02	16.40	1.775	0.30 ( 0.12)	0.42	210.9	130.00

TOTAL AREA(ACRES) = 210.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 370.44 Tc(MIN.) = 11.995  
EFFECTIVE AREA(ACRES) = 192.83 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
TOTAL AREA(ACRES) = 210.9  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.10 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 500.20 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 42.35
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 370.44
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 12.19
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.10 = 4750.20 FEET.

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FLOW PROCESS FROM NODE 127.10 TO NODE 127.20 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 353.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 595.30 CHANNEL SLOPE = 0.0218
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.031
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL         B         3.50   0.30  0.100  56
COMMERCIAL         B         0.10   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 373.68
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.11
AVERAGE FLOW DEPTH(FEET) = 1.01 TRAVEL TIME(MIN.) = 1.39
Tc(MIN.) = 13.59
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 6.48
EFFECTIVE AREA(ACRES) = 196.43 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 214.5 PEAK FLOW RATE(CFS) = 370.44
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.00 FLOW VELOCITY(FEET/SEC.) = 7.11
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.20 = 5345.50 FEET.

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FLOW PROCESS FROM NODE 127.20 TO NODE 127.30 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 340.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 476.00 CHANNEL SLOPE = 0.0273
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.899
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS

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LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL         B         3.10   0.30  0.100  56
COMMERCIAL         B         0.10   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 373.13
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.64
AVERAGE FLOW DEPTH(FEET) = 0.94 TRAVEL TIME(MIN.) = 1.04
Tc(MIN.) = 14.63
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 5.38
EFFECTIVE AREA(ACRES) = 199.63 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 217.7 PEAK FLOW RATE(CFS) = 370.44
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.94 FLOW VELOCITY(FEET/SEC.) = 7.63
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.30 = 5821.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.30 TO NODE 13569.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 338.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 506.00 CHANNEL SLOPE = 0.0040
CHANNEL BASE(FEET) = 150.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.710
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL         B         2.80   0.30  0.100  56
COMMERCIAL         B         0.60   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 373.01
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.82
AVERAGE FLOW DEPTH(FEET) = 0.87 TRAVEL TIME(MIN.) = 2.99
Tc(MIN.) = 17.62
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 5.14
EFFECTIVE AREA(ACRES) = 203.03 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 221.1 PEAK FLOW RATE(CFS) = 370.44
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.87 FLOW VELOCITY(FEET/SEC.) = 2.82
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 13569.00 = 6327.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 12
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>>>>CLEAR MEMORY BANK # 1 <<<<
=====
END OF STUDY SUMMARY:

```

TOTAL AREA (ACRES) = 221.1 TC (MIN.) = 17.62  
 EFFECTIVE AREA (ACRES) = 203.03 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.374  
 PEAK FLOW RATE (CFS) = 370.44

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	369.81	15.08	1.847	0.30 ( 0.11)	0.36	172.7	110.00
2	370.44	17.62	1.710	0.30 ( 0.11)	0.37	203.0	100.00
3	361.39	19.04	1.634	0.30 ( 0.11)	0.38	213.7	100.00
4	316.02	22.37	1.487	0.30 ( 0.12)	0.40	221.1	130.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2012 Advanced Engineering Software (aes)  
Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 10-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P10EVBB.DAT  
TIME/DATE OF STUDY: 16:37 12/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.757
- 2) 10.00; 2.507
- 3) 15.00; 1.859
- 4) 20.00; 1.590
- 5) 25.00; 1.388
- 6) 30.00; 1.248
- 7) 40.00; 1.066
- 8) 50.00; 0.948
- 9) 60.00; 0.860
- 10) 90.00; 0.712
- 11) 120.00; 0.627
- 12) 180.00; 0.525
- 13) 360.00; 0.386
- 14) 1200.00; 0.169

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00  
ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 543.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.596  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.108  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.80	0.30	0.100	56	7.60

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 2.22  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 2.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 543.00 DOWNSTREAM ELEVATION(FEET) = 523.00  
STREET LENGTH(FEET) = 502.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.24  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.28  
HALFSTREET FLOOD WIDTH(FEET) = 5.96  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.90  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.08  
STREET FLOW TRAVEL TIME(MIN.) = 2.15 Tc(MIN.) = 9.74  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.571

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.20	0.30	0.200	56
COMMERCIAL	B	1.30	0.30	0.100	56

NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.261  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.04  
 EFFECTIVE AREA(ACRES) = 2.60 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 5.87

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.24  
 FLOW VELOCITY(FEET/SEC.) = 4.11 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.25  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 810.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.74  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.571  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 1.40 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 3.20  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 9.07

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 523.00 DOWNSTREAM ELEVATION(FEET) = 468.00  
 STREET LENGTH(FEET) = 987.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.91  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.36  
 HALFSTREET FLOOD WIDTH(FEET) = 9.94  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.48  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.96  
 STREET FLOW TRAVEL TIME(MIN.) = 3.00 Tc(MIN.) = 12.74  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.152  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56  
 COMMERCIAL B 2.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.426  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 7.65  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 15.21

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.70  
 FLOW VELOCITY(FEET/SEC.) = 5.70 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.12  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 1797.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 468.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.67  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.38  
 HALFSTREET FLOOD WIDTH(FEET) = 12.15  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.84  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.22  
 STREET FLOW TRAVEL TIME(MIN.) = 2.79 Tc(MIN.) = 15.53  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.831  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.10 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 COMMERCIAL B 1.90 0.30 0.100 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 4.91  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 17.75

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.15  
 FLOW VELOCITY(FEET/SEC.) = 5.87 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.23  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2774.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.53  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.831  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.30	0.30	1.000	66

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 1.79  
 EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
 TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 19.54

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 204.00 TO NODE 218.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 343.00  
 STREET LENGTH(FEET) = 1228.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.26  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.41  
 HALFSTREET FLOOD WIDTH(FEET) = 13.63  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.01  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.44  
 STREET FLOW TRAVEL TIME(MIN.) = 3.41 Tc(MIN.) = 18.94  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.647

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
COMMERCIAL	B	0.50	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.40	0.30	1.000	66
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.70	0.30	0.500	56
COMMERCIAL	B	1.50	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.80	0.30	1.000	66

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 5.44  
 EFFECTIVE AREA(ACRES) = 16.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 16.6 PEAK FLOW RATE(CFS) = 22.91

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 13.79  
 FLOW VELOCITY(FEET/SEC.) = 6.05 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.48  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.94  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.647  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.20	0.30	0.500	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
COMMERCIAL	B	0.10	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450  
 SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 2.18  
 EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 25.09

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 18.94  
 RAINFALL INTENSITY(INCH/HR) = 1.65  
 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.39  
 EFFECTIVE STREAM AREA (ACRES) = 18.20  
 TOTAL STREAM AREA (ACRES) = 18.20  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 25.09

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 268.00  
 ELEVATION DATA: UPSTREAM (FEET) = 514.00 DOWNSTREAM (FEET) = 511.50

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.724  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.076

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	B	2.30	0.30	0.500	56	9.27
APARTMENTS	B	0.40	0.30	0.200	56	7.72

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456

SUBAREA RUNOFF (CFS) = 7.14

TOTAL AREA (ACRES) = 2.70 PEAK FLOW RATE (CFS) = 7.14

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION (FEET) = 511.50 DOWNSTREAM ELEVATION (FEET) = 503.00  
 STREET LENGTH (FEET) = 503.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 14.77  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.43  
 HALFSTREET FLOOD WIDTH (FEET) = 14.73  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.47  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.48  
 STREET FLOW TRAVEL TIME (MIN.) = 2.42 Tc (MIN.) = 10.14  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.489

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.20	0.30	0.500	56

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.20	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.475  
 SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 15.20  
 EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.14  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47  
 TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 20.92

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.47 HALFSTREET FLOOD WIDTH (FEET) = 16.99  
 FLOW VELOCITY (FEET/SEC.) = 3.77 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.76  
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 771.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.14

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.489

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.281

SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 2.81

EFFECTIVE AREA (ACRES) = 11.20 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45

TOTAL AREA (ACRES) = 11.2 PEAK FLOW RATE (CFS) = 23.73

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION (FEET) = 503.00 DOWNSTREAM ELEVATION (FEET) = 476.00  
 STREET LENGTH (FEET) = 423.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.93  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.41  
HALFSTREET FLOOD WIDTH(FEET) = 13.87  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.52  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.68  
STREET FLOW TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 11.22  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.348

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 1.00 0.30 0.500 56  
COMMERCIAL B 0.10 0.30 0.100 56  
CONDOMINIUMS B 0.10 0.30 0.350 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.454  
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 2.39  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 24.71

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 13.79  
FLOW VELOCITY(FEET/SEC.) = 6.53 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.67  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 11.22  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.348  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.50 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
COMMERCIAL B 0.30 0.30 0.100 56  
CONDOMINIUMS B 3.30 0.30 0.350 56  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.332  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 9.92  
EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 34.63

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 11.22  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.348  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 3.40 0.30 0.100 56  
CONDOMINIUMS B 8.10 0.30 0.350 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.276  
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 23.45  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 58.07

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 476.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
STREET LENGTH(FEET) = 789.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 58.07  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.60  
HALFSTREET FLOOD WIDTH(FEET) = 24.65  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.17  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.11  
STREET FLOW TRAVEL TIME(MIN.) = 2.54 Tc(MIN.) = 13.77  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.019  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 58.07  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.60 HALFSTREET FLOOD WIDTH(FEET) = 24.65  
FLOW VELOCITY(FEET/SEC.) = 5.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.11  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1983.00 FEET.

\*\*\*\*\*



FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.77  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.019  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	8.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.40	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 24.22  
 EFFECTIVE AREA(ACRES) = 43.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
 TOTAL AREA(ACRES) = 43.2 PEAK FLOW RATE(CFS) = 73.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 460.00 DOWNSTREAM ELEVATION(FEET) = 419.00  
STREET LENGTH(FEET) = 529.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 76.88  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.54  
 HALFSTREET FLOOD WIDTH(FEET) = 21.13  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.19  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.96  
 STREET FLOW TRAVEL TIME(MIN.) = 0.96 Tc(MIN.) = 14.73  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.894  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 6.28  
 EFFECTIVE AREA(ACRES) = 47.20 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 47.2 PEAK FLOW RATE(CFS) = 75.19

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 20.98  
FLOW VELOCITY(FEET/SEC.) = 9.12 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.90  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 2512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.73  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.894  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.70	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 8.79  
 EFFECTIVE AREA(ACRES) = 52.80 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
 TOTAL AREA(ACRES) = 52.8 PEAK FLOW RATE(CFS) = 83.98

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.73  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.894  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.90	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.50	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 11.77  
 EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 95.76

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 419.00 DOWNSTREAM ELEVATION(FEET) = 405.00  
STREET LENGTH(FEET) = 174.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 95.76  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.57  
HALFSTREET FLOOD WIDTH(FEET) = 22.85  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.86  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 5.63  
STREET FLOW TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 15.02  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.858  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 95.76  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.57 HALFSTREET FLOOD WIDTH(FEET) = 22.85  
FLOW VELOCITY(FEET/SEC.) = 9.86 DEPTH\*VELOCITY(FT\*FT/SEC.) = 5.63  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 2686.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 372.00  
FLOW LENGTH(FEET) = 395.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.73  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 95.76  
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 15.28  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 3081.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.28  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.844  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500					
SUBAREA AREA(ACRES) = 2.20		SUBAREA RUNOFF(CFS) = 3.35			
EFFECTIVE AREA(ACRES) = 62.50		AREA-AVERAGED Fm(INCH/HR) = 0.13			
AREA-AVERAGED Fp(INCH/HR) = 0.30		AREA-AVERAGED Ap = 0.44			
TOTAL AREA(ACRES) = 62.5		PEAK FLOW RATE(CFS) = 96.38			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.28  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.844  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	3.50	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.90	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500					
SUBAREA AREA(ACRES) = 10.60		SUBAREA RUNOFF(CFS) = 16.16			
EFFECTIVE AREA(ACRES) = 73.10		AREA-AVERAGED Fm(INCH/HR) = 0.13			
AREA-AVERAGED Fp(INCH/HR) = 0.30		AREA-AVERAGED Ap = 0.44			
TOTAL AREA(ACRES) = 73.1		PEAK FLOW RATE(CFS) = 112.54			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 343.00  
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.80  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 112.54  
PIPE TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 15.74  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 3688.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.74

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.819  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.443  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.06  
 EFFECTIVE AREA (ACRES) = 73.80 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 73.8 PEAK FLOW RATE (CFS) = 112.54  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
 -----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 15.74  
 RAINFALL INTENSITY (INCH/HR) = 1.82  
 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.44  
 EFFECTIVE STREAM AREA (ACRES) = 73.80  
 TOTAL STREAM AREA (ACRES) = 73.80  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 112.54

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	25.09	18.94	1.647	0.30 ( 0.12)	0.39	18.2	200.00
2	112.54	15.74	1.819	0.30 ( 0.13)	0.44	73.8	210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	135.74	15.74	1.819	0.30 ( 0.13)	0.43	88.9	210.00
2	126.15	18.94	1.647	0.30 ( 0.13)	0.43	92.0	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 135.74 Tc (MIN.) = 15.74  
 EFFECTIVE AREA (ACRES) = 88.93 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA (ACRES) = 92.0  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 343.00 DOWNSTREAM (FEET) = 326.50  
 FLOW LENGTH (FEET) = 734.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.6 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 16.92  
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 135.74  
 PIPE TRAVEL TIME (MIN.) = 0.72 Tc (MIN.) = 16.46  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 219.00 = 4736.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 16.46  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.780  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56  
 COMMERCIAL  
 B 0.60 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.70 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.90 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 4.22  
 EFFECTIVE AREA (ACRES) = 91.83 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 94.9 PEAK FLOW RATE (CFS) = 136.26

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 16.46  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.780  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL  
 B 0.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 0.90  
 EFFECTIVE AREA (ACRES) = 92.43 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44

TOTAL AREA (ACRES) = 95.5 PEAK FLOW RATE (CFS) = 137.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 326.50 DOWNSTREAM (FEET) = 325.00
FLOW LENGTH (FEET) = 161.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 37.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 12.31
ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 137.16
PIPE TRAVEL TIME (MIN.) = 0.22 Tc (MIN.) = 16.68
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 220.00 = 4897.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 16.68
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.769
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCs SOIL AREA Fp Ap SCs
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 4.90 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 3.60 0.30 0.400 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 18.40 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 4.30 0.30 0.400 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 6.90 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462
SUBAREA AREA (ACRES) = 38.60 SUBAREA RUNOFF (CFS) = 56.63
EFFECTIVE AREA (ACRES) = 131.03 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44
TOTAL AREA (ACRES) = 134.1 PEAK FLOW RATE (CFS) = 192.81

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 245.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 325.00 DOWNSTREAM (FEET) = 315.00
FLOW LENGTH (FEET) = 1019.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 42.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.64
ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 192.81

PIPE TRAVEL TIME (MIN.) = 1.25 Tc (MIN.) = 17.93
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.93
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.702
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCs SOIL AREA Fp Ap SCs
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56
COMMERCIAL B 0.40 0.30 0.100 56
NATURAL FAIR COVER
"OPEN BRUSH" B 0.30 0.30 1.000 66
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56
COMMERCIAL B 0.40 0.30 0.100 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379
SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 4.14
EFFECTIVE AREA (ACRES) = 133.93 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44
TOTAL AREA (ACRES) = 137.0 PEAK FLOW RATE (CFS) = 192.81
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.93
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.702
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCs SOIL AREA Fp Ap SCs
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.90 0.30 0.100 56
NATURAL FAIR COVER
"OPEN BRUSH" B 0.20 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.264
SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 1.61
EFFECTIVE AREA (ACRES) = 135.03 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44
TOTAL AREA (ACRES) = 138.1 PEAK FLOW RATE (CFS) = 192.81
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.93

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.702  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.40	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.434  
 SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 4.53  
 EFFECTIVE AREA (ACRES) = 138.23 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 141.3 PEAK FLOW RATE (CFS) = 195.18

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 220.50 TO NODE 221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 251.00  
 ELEVATION DATA: UPSTREAM (FEET) = 551.00 DOWNSTREAM (FEET) = 547.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.785  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.561  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"1 DWELLING/ACRE"	B	3.10	0.30	0.800	56	9.79
RESIDENTIAL						
"1 DWELLING/ACRE"	B	3.10	0.30	0.800	56	9.79

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA RUNOFF (CFS) = 12.95  
 TOTAL AREA (ACRES) = 6.20 PEAK FLOW RATE (CFS) = 12.95

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 547.00 DOWNSTREAM (FEET) = 542.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 386.00 CHANNEL SLOPE = 0.0130

CHANNEL BASE (FEET) = 10.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 5.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.370  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.163  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.86  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.06  
 AVERAGE FLOW DEPTH (FEET) = 0.33 TRAVEL TIME (MIN.) = 1.27  
 Tc (MIN.) = 11.06  
 SUBAREA AREA (ACRES) = 4.70 SUBAREA RUNOFF (CFS) = 9.82  
 EFFECTIVE AREA (ACRES) = 10.90 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA (ACRES) = 10.9 PEAK FLOW RATE (CFS) = 21.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.37 FLOW VELOCITY (FEET/SEC.) = 5.48  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 222.00 = 637.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION (FEET) = 542.00 DOWNSTREAM ELEVATION (FEET) = 531.00  
 STREET LENGTH (FEET) = 1146.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 35.20  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.58  
 HALFSTREET FLOOD WIDTH (FEET) = 23.48  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.44  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.00  
 STREET FLOW TRAVEL TIME (MIN.) = 5.55 Tc (MIN.) = 16.61  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.772

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	11.50	0.30	0.200	56

APARTMENTS B 2.90 0.30 0.200 56  
 COMMERCIAL B 0.70 0.30 0.100 56  
 PUBLIC PARK B 2.60 0.30 0.850 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.292  
 SUBAREA AREA (ACRES) = 17.70 SUBAREA RUNOFF (CFS) = 26.84  
 EFFECTIVE AREA (ACRES) = 28.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 28.6 PEAK FLOW RATE (CFS) = 42.68

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.61 HALFSTREET FLOOD WIDTH (FEET) = 25.27  
 FLOW VELOCITY (FEET/SEC.) = 3.62 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.22  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 223.00 = 1783.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION (FEET) = 531.00 DOWNSTREAM ELEVATION (FEET) = 520.00  
 STREET LENGTH (FEET) = 702.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 51.23  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.60  
 HALFSTREET FLOOD WIDTH (FEET) = 24.65  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.56  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.75  
 STREET FLOW TRAVEL TIME (MIN.) = 2.57 Tc (MIN.) = 19.18  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.634

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.40	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
CONDOMINIUMS	B	0.70	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.175  
 SUBAREA AREA (ACRES) = 12.00 SUBAREA RUNOFF (CFS) = 17.08  
 EFFECTIVE AREA (ACRES) = 40.60 AREA-AVERAGED Fm (INCH/HR) = 0.10  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32  
 TOTAL AREA (ACRES) = 40.6 PEAK FLOW RATE (CFS) = 56.21

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.62 HALFSTREET FLOOD WIDTH (FEET) = 25.59  
 FLOW VELOCITY (FEET/SEC.) = 4.65 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.88  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 224.00 = 2485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 520.00 DOWNSTREAM (FEET) = 463.00  
 FLOW LENGTH (FEET) = 1760.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.86  
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 56.21  
 PIPE TRAVEL TIME (MIN.) = 1.85 Tc (MIN.) = 21.02  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 225.00 = 4245.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 21.02  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.549  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.20	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	0.30	0.30	0.350	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	2.00	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.235  
 SUBAREA AREA (ACRES) = 11.50 SUBAREA RUNOFF (CFS) = 15.30  
 EFFECTIVE AREA (ACRES) = 52.10 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA (ACRES) = 52.1 PEAK FLOW RATE (CFS) = 68.38

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 21.02  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.549  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.40	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
CONDOMINIUMS	B	0.70	0.30	0.350	56

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RESIDENTIAL
"5-7 DWELLINGS/ACRE"      B      6.40    0.30    0.500   56
CONDOMINIUMS              B      0.90    0.30    0.350   56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"      B      5.20    0.30    0.500   56
CONDOMINIUMS              B      0.80    0.30    0.350   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.481
SUBAREA AREA (ACRES) = 13.30    SUBAREA RUNOFF (CFS) = 16.81
EFFECTIVE AREA (ACRES) = 65.40    AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.34
TOTAL AREA (ACRES) = 65.4    PEAK FLOW RATE (CFS) = 85.19

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FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 463.00    DOWNSTREAM(FEET) = 425.00
FLOW LENGTH(FEET) = 639.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 21.87
ESTIMATED PIPE DIAMETER (INCH) = 30.00    NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 85.19
PIPE TRAVEL TIME (MIN.) = 0.49    Tc (MIN.) = 21.51
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 226.00 = 4884.00 FEET.

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*****
FLOW PROCESS FROM NODE 226.00 TO NODE 226.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc (MIN.) = 21.51
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.529
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B      2.90    0.30    0.200   56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B      2.90    0.30    0.500   56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B      6.30    0.30    0.200   56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B      6.00    0.30    0.500   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348
SUBAREA AREA (ACRES) = 18.10    SUBAREA RUNOFF (CFS) = 23.21
EFFECTIVE AREA (ACRES) = 83.50    AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.34
TOTAL AREA (ACRES) = 83.5    PEAK FLOW RATE (CFS) = 107.24

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*****
FLOW PROCESS FROM NODE 226.00 TO NODE 243.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 425.00    DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 653.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 20.98
ESTIMATED PIPE DIAMETER (INCH) = 33.00    NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 107.24
PIPE TRAVEL TIME (MIN.) = 0.52    Tc (MIN.) = 22.03
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 243.00 = 5537.00 FEET.

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 22.03
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.508
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B      2.90    0.30    0.200   56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B      1.60    0.30    0.500   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307
SUBAREA AREA (ACRES) = 4.50    SUBAREA RUNOFF (CFS) = 5.73
EFFECTIVE AREA (ACRES) = 88.00    AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.34
TOTAL AREA (ACRES) = 88.0    PEAK FLOW RATE (CFS) = 111.40

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----

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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 22.03
RAINFALL INTENSITY (INCH/HR) = 1.51
AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.34
EFFECTIVE STREAM AREA (ACRES) = 88.00
TOTAL STREAM AREA (ACRES) = 88.00
PEAK FLOW RATE (CFS) AT CONFLUENCE = 111.40

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*****
FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----

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INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 550.00    DOWNSTREAM(FEET) = 547.50

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.751

```

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.819  
SUBAREA Tc AND LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
APARTMENTS B 0.60 0.30 0.200 56 8.75  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF (CFS) = 1.49  
TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 1.49

\*\*\*\*\*  
FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 547.50 DOWNSTREAM (FEET) = 541.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 802.00 CHANNEL SLOPE = 0.0081  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 3.00

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.312  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
APARTMENTS B 0.20 0.30 0.200 56  
COMMERCIAL B 5.90 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.79  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.85  
AVERAGE FLOW DEPTH (FEET) = 0.90 TRAVEL TIME (MIN.) = 2.75  
Tc (MIN.) = 11.50  
SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 12.52  
EFFECTIVE AREA (ACRES) = 6.70 AREA-AVERAGED Fm (INCH/HR) = 0.03  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
TOTAL AREA (ACRES) = 6.7 PEAK FLOW RATE (CFS) = 13.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.11 FLOW VELOCITY (FEET/SEC.) = 5.58  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1132.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 541.00 DOWNSTREAM (FEET) = 533.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 849.00 CHANNEL SLOPE = 0.0094  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 5.00

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.051  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 14.90 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.31  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.03  
AVERAGE FLOW DEPTH (FEET) = 1.39 TRAVEL TIME (MIN.) = 2.01  
Tc (MIN.) = 13.52  
SUBAREA AREA (ACRES) = 14.90 SUBAREA RUNOFF (CFS) = 27.11  
EFFECTIVE AREA (ACRES) = 21.60 AREA-AVERAGED Fm (INCH/HR) = 0.03  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA (ACRES) = 21.6 PEAK FLOW RATE (CFS) = 39.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.60 FLOW VELOCITY (FEET/SEC.) = 7.70  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1981.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 13.52  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.051  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
APARTMENTS B 0.20 0.30 0.200 56  
COMMERCIAL B 1.80 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 3.81  
EFFECTIVE AREA (ACRES) = 23.70 AREA-AVERAGED Fm (INCH/HR) = 0.03  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
TOTAL AREA (ACRES) = 23.7 PEAK FLOW RATE (CFS) = 43.08

\*\*\*\*\*  
FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 13.52  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.051  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.40 0.30 0.100 56  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
COMMERCIAL B 1.30 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.117  
SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 3.27  
EFFECTIVE AREA (ACRES) = 25.50 AREA-AVERAGED Fm (INCH/HR) = 0.03  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
TOTAL AREA (ACRES) = 25.5 PEAK FLOW RATE (CFS) = 46.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31  
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 537.00 DOWNSTREAM(FEET) = 510.00
FLOW LENGTH(FEET) = 513.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.82
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 46.35
PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 14.00
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2494.00 FEET.

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.989
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        1.70     0.30     0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B        1.60     0.30     0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 15.81
EFFECTIVE AREA(ACRES) = 34.90 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 34.9 PEAK FLOW RATE(CFS) = 60.73

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.989
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        0.70     0.30     0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B        2.50     0.30     0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 5.42
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 66.15

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 478.00
FLOW LENGTH(FEET) = 474.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.61
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 66.15
PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 14.36
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 2968.00 FEET.

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*****
FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.36
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.942
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        1.70     0.30     0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B        1.60     0.30     0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 5.50
EFFECTIVE AREA(ACRES) = 41.40 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21
TOTAL AREA(ACRES) = 41.4 PEAK FLOW RATE(CFS) = 70.03

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*****
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 478.00 DOWNSTREAM(FEET) = 471.00
FLOW LENGTH(FEET) = 473.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.34
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 70.03
PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 15.00
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 3441.00 FEET.

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*****
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.859
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        1.40     0.30     0.200    56
RESIDENTIAL

```

"8-10 DWELLINGS/ACRE"	B	7.10	0.30	0.400	56
APARTMENTS	B	2.70	0.30	0.200	56
COMMERCIAL	B	1.10	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
SUBAREA AREA (ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 19.56  
EFFECTIVE AREA(ACRES) = 53.70 AREA-AVERAGED Fm(INCH/HR) = 0.07  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
TOTAL AREA(ACRES) = 53.7 PEAK FLOW RATE(CFS) = 86.51

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.859  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	5.40	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.00	0.30	0.400	56
COMMERCIAL	B	0.60	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.378  
SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 15.55  
EFFECTIVE AREA(ACRES) = 63.60 AREA-AVERAGED Fm(INCH/HR) = 0.08  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
TOTAL AREA(ACRES) = 63.6 PEAK FLOW RATE(CFS) = 102.06

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 471.00 DOWNSTREAM(FEET) = 468.00  
FLOW LENGTH(FEET) = 283.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.04  
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 102.06  
PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 15.39  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 237.00 = 3724.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.39  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.838  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
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RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 6.10 0.30 0.200 56  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 0.60 0.30 0.400 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.218  
SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 10.69  
EFFECTIVE AREA(ACRES) = 70.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
TOTAL AREA(ACRES) = 70.3 PEAK FLOW RATE(CFS) = 111.54

\*\*\*\*\*  
FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 468.00 DOWNSTREAM(FEET) = 461.00  
FLOW LENGTH(FEET) = 698.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.85  
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 111.54  
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 16.37  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 238.00 = 4422.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.37  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.785  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	8.40	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.60	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.220  
SUBAREA AREA(ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 13.92  
EFFECTIVE AREA(ACRES) = 79.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
TOTAL AREA(ACRES) = 79.3 PEAK FLOW RATE(CFS) = 122.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.37  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.785  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"11+ DWELLINGS/ACRE" B 2.10 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 3.26
EFFECTIVE AREA(ACRES) = 81.40 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25
TOTAL AREA (ACRES) = 81.4 PEAK FLOW RATE (CFS) = 125.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 461.00 DOWNSTREAM(FEET) = 440.00
FLOW LENGTH(FEET) = 582.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.10
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 125.39
PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 16.86
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 5004.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.86
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.759
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 5.00 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 7.65
EFFECTIVE AREA(ACRES) = 86.40 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 86.4 PEAK FLOW RATE (CFS) = 131.13

\*\*\*\*\*

FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 418.00
FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.68
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 131.13
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 17.41
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 5654.00 FEET.

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FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.41
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.730
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 5.30 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 5.30 SUBAREA RUNOFF(CFS) = 7.96
EFFECTIVE AREA(ACRES) = 91.70 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 136.79

\*\*\*\*\*

FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.41
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.730
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.20 0.30 0.200 56
COMMERCIAL B 0.20 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186
SUBAREA AREA (ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.11
EFFECTIVE AREA(ACRES) = 93.10 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 93.1 PEAK FLOW RATE (CFS) = 138.90

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FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.41
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.730
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.20 0.30 0.200 56
SCHOOL B 0.70 0.30 0.600 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA (ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 2.78
EFFECTIVE AREA(ACRES) = 95.00 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 95.0 PEAK FLOW RATE (CFS) = 141.68

\*\*\*\*\*

FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 418.00 DOWNSTREAM(FEET) = 404.00
FLOW LENGTH(FEET) = 1279.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 39.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.93
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 141.68
PIPE TRAVEL TIME(MIN.) = 1.65 Tc(MIN.) = 19.05
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 241.00 = 6933.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.05

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.641

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Residential, Commercial, Public Park, School, and Residential with various values.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 18.80 SUBAREA RUNOFF(CFS) = 25.29
EFFECTIVE AREA(ACRES) = 113.80 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 113.8 PEAK FLOW RATE(CFS) = 159.38

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FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.05

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.641

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Public Park and School.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.666
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 19.06
EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33

TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 178.45

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 403.00
FLOW LENGTH(FEET) = 66.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.74
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 178.45
PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 19.12
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 6999.00 FEET.

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FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.12

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.637

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Residential, Commercial, Residential, and Residential.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.193
SUBAREA AREA(ACRES) = 19.10 SUBAREA RUNOFF(CFS) = 27.15
EFFECTIVE AREA(ACRES) = 147.60 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 147.6 PEAK FLOW RATE(CFS) = 205.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 1270.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 48.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.08
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 205.16
PIPE TRAVEL TIME(MIN.) = 1.75 Tc(MIN.) = 20.88
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

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FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 20.88
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.555
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B         1.00    0.30    0.200    56
PUBLIC PARK          B         2.00    0.30    0.850    56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B         2.80    0.30    0.200    56
COMMERCIAL           B         1.50    0.30    0.100    56
CONDOMINIUMS        B         0.10    0.30    0.350    56
PUBLIC PARK          B         1.10    0.30    0.850    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.421
SUBAREA AREA(ACRES) = 8.50      SUBAREA RUNOFF(CFS) = 10.93
EFFECTIVE AREA(ACRES) = 156.10  AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 156.1      PEAK FLOW RATE(CFS) = 205.16
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 20.88
RAINFALL INTENSITY(INCH/HR) = 1.55
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA(ACRES) = 156.10
TOTAL STREAM AREA(ACRES) = 156.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 205.16

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\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	111.40	22.03	1.508	0.30( 0.10)	0.34	88.0	220.50
2	205.16	20.88	1.555	0.30( 0.09)	0.32	156.1	230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	314.22	20.88	1.555	0.30( 0.10)	0.32	239.5	230.00
2	310.01	22.03	1.508	0.30( 0.10)	0.32	244.1	220.50

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

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PEAK FLOW RATE(CFS) = 314.22      Tc(MIN.) = 20.88
EFFECTIVE AREA(ACRES) = 239.49  AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.32

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TOTAL AREA(ACRES) = 244.1
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

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FLOW PROCESS FROM NODE 243.00 TO NODE 244.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 394.00  DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 849.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 31.01
ESTIMATED PIPE DIAMETER(INCH) = 48.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 314.22
PIPE TRAVEL TIME(MIN.) = 0.46  Tc(MIN.) = 21.33
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 244.00 = 9118.00 FEET.

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FLOW PROCESS FROM NODE 244.00 TO NODE 244.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 21.33
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.536
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B         0.10    0.30    0.200    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B         1.70    0.30    0.500    56
PUBLIC PARK          B         0.30    0.30    0.850    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B         0.80    0.30    0.500    56
PUBLIC PARK          B         0.10    0.30    0.850    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.537
SUBAREA AREA(ACRES) = 3.00      SUBAREA RUNOFF(CFS) = 3.71
EFFECTIVE AREA(ACRES) = 242.49  AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 247.1      PEAK FLOW RATE(CFS) = 314.22
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 244.00 TO NODE 245.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 340.00  DOWNSTREAM(FEET) = 315.00
FLOW LENGTH(FEET) = 777.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 41.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.92
ESTIMATED PIPE DIAMETER(INCH) = 54.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 314.22
PIPE TRAVEL TIME(MIN.) = 0.54  Tc(MIN.) = 21.88
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

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FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.88

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.514

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56

PUBLIC PARK B 0.20 0.30 0.850 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56

PUBLIC PARK B 0.10 0.30 0.850 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631

SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 0.95

EFFECTIVE AREA(ACRES) = 243.29 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33

TOTAL AREA(ACRES) = 247.9 PEAK FLOW RATE(CFS) = 314.22

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	314.22	21.88	1.514	0.30( 0.10)	0.33	243.3	230.00
2	310.01	23.03	1.468	0.30( 0.10)	0.33	247.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	195.18	17.93	1.702	0.30( 0.13)	0.44	138.2	210.00
2	179.35	21.17	1.543	0.30( 0.13)	0.44	141.3	200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	486.75	17.93	1.702	0.30( 0.11)	0.37	337.6	210.00
2	489.59	21.17	1.543	0.30( 0.11)	0.37	376.8	200.00
3	489.97	21.88	1.514	0.30( 0.11)	0.37	384.6	230.00
4	479.83	23.03	1.468	0.30( 0.11)	0.37	389.2	220.50

TOTAL AREA(ACRES) = 389.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 489.97 Tc(MIN.) = 21.875

EFFECTIVE AREA(ACRES) = 384.59 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 389.2

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

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FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 3 <<<<

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FLOW PROCESS FROM NODE 245.00 TO NODE 246.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 306.00

FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 75.0 INCH PIPE IS 56.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 19.94

ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 489.97

PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 22.39

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 246.00 = 10514.00 FEET.

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FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.39

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.493

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.90 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.50 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56

CONDOMINIUMS B 9.10 0.30 0.350 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.80 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.410

SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 20.10

EFFECTIVE AREA(ACRES) = 400.89 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 405.5 PEAK FLOW RATE(CFS) = 498.72

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	497.21	18.45	1.674	0.30( 0.11)	0.38	353.9	210.00
2	498.95	21.69	1.522	0.30( 0.11)	0.37	393.1	200.00
3	498.72	22.39	1.493	0.30( 0.11)	0.37	400.9	230.00

4 487.31 23.56 1.446 0.30( 0.11) 0.37 405.5 220.50  
NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 498.95 Tc(MIN.) = 21.69  
AREA-AVERAGED Fm(INCH/HR) = 0.11 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.37 EFFECTIVE AREA(ACRES) = 393.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 21.69  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.522  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.60	0.30	0.400	56
CONDOMINIUMS	B	7.40	0.30	0.350	56
PUBLIC PARK	B	0.30	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.375  
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 11.80  
EFFECTIVE AREA(ACRES) = 402.40 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 414.8 PEAK FLOW RATE(CFS) = 510.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 246.00 TO NODE 247.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 306.00 DOWNSTREAM(FEET) = 300.00  
FLOW LENGTH(FEET) = 185.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 66.0 INCH PIPE IS 48.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.29  
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 510.74  
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 21.80  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 247.00 = 10699.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 21.80  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.517  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
PUBLIC PARK	B	0.10	0.30	0.850	56

RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 1.30 0.30 0.400 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.413  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 2.51  
EFFECTIVE AREA(ACRES) = 404.40 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 416.8 PEAK FLOW RATE(CFS) = 511.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 21.80  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.517  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.40	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.80	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.365  
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 3.29  
EFFECTIVE AREA(ACRES) = 407.00 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 419.4 PEAK FLOW RATE(CFS) = 514.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 247.00 TO NODE 248.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 271.00  
FLOW LENGTH(FEET) = 859.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 63.0 INCH PIPE IS 51.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.23  
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 514.89  
PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 22.33  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 22.33  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.496

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.60	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.60	0.30	0.400	56
COMMERCIAL	B	1.00	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356  
SUBAREA AREA(ACRES) = 4.80 SUBAREA RUNOFF(CFS) = 6.00  
EFFECTIVE AREA(ACRES) = 411.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 424.2 PEAK FLOW RATE(CFS) = 514.89  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.33

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.496

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.50	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.12  
EFFECTIVE AREA(ACRES) = 412.70 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 425.1 PEAK FLOW RATE(CFS) = 514.89  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.33

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.496

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.70	0.30	0.400	56

RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.20	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.80	0.30	0.400	56
CONDOMINIUMS	B	0.20	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	3.20	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.466  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 10.01  
EFFECTIVE AREA(ACRES) = 420.90 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 433.3 PEAK FLOW RATE(CFS) = 524.24

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (INCH/HR)	Ae (ACRES)	HEADWATER NODE
1	524.27	19.08	1.639	0.30( 0.11)	0.38	381.7	210.00
2	524.24	22.33	1.496	0.30( 0.11)	0.37	420.9	200.00
3	523.12	23.03	1.468	0.30( 0.11)	0.37	428.7	230.00
4	510.38	24.20	1.420	0.30( 0.11)	0.37	433.3	220.50

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 524.27 Tc(MIN.) = 19.08

AREA-AVERAGED Fm(INCH/HR) = 0.11 AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.38 EFFECTIVE AREA(ACRES) = 381.71

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.08

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.639

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	5.70	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 7.79  
EFFECTIVE AREA(ACRES) = 387.41 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA(ACRES) = 439.0 PEAK FLOW RATE(CFS) = 532.07

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.08

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.639

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	6.40	0.30	1.000	66
NATURAL FAIR COVER					



"OPEN BRUSH" B 1.40 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.60 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 10.13  
 EFFECTIVE AREA (ACRES) = 395.81 AREA-AVERAGED Fm (INCH/HR) = 0.12  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA (ACRES) = 447.4 PEAK FLOW RATE (CFS) = 542.19

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 10  
 -----  
 >>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<<  
 =====

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21  
 -----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 413.04 DOWNSTREAM (FEET) = 405.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.928  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.275  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
CONDOMINIUMS	B	0.20	0.30	0.350	56	7.70
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56	6.93
CONDOMINIUMS	B	0.10	0.30	0.350	56	7.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.312  
 SUBAREA RUNOFF (CFS) = 1.15  
 TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 1.15

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62  
 -----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<<  
 =====

UPSTREAM ELEVATION (FEET) = 405.00 DOWNSTREAM ELEVATION (FEET) = 385.00  
 STREET LENGTH (FEET) = 587.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.22  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.28  
 HALFSTREET FLOOD WIDTH (FEET) = 6.72  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.54  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.00  
 STREET FLOW TRAVEL TIME (MIN.) = 2.77 Tc (MIN.) = 9.69  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.583

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.20	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.224  
 SUBAREA AREA (ACRES) = 2.70 SUBAREA RUNOFF (CFS) = 6.11  
 EFFECTIVE AREA (ACRES) = 3.10 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 3.1 PEAK FLOW RATE (CFS) = 7.01

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.32 HALFSTREET FLOOD WIDTH (FEET) = 8.91  
 FLOW VELOCITY (FEET/SEC.) = 3.89 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.25  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 917.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31  
 -----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 385.00 DOWNSTREAM (FEET) = 378.50  
 FLOW LENGTH (FEET) = 162.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.4 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.30  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 7.01  
 PIPE TRAVEL TIME (MIN.) = 0.26 Tc (MIN.) = 9.96  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1079.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81  
 -----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
 =====

MAINLINE Tc (MIN.) = 9.96  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.518  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56

COMMERCIAL B 1.30 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA (ACRES) = 2.40 SUBAREA RUNOFF (CFS) = 5.37  
 EFFECTIVE AREA (ACRES) = 5.50 AREA-AVERAGED Fm (INCH/HR) = 0.05  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
 TOTAL AREA (ACRES) = 5.5 PEAK FLOW RATE (CFS) = 12.20

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 378.50 DOWNSTREAM (FEET) = 348.50  
 FLOW LENGTH (FEET) = 637.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.61  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 12.20  
 PIPE TRAVEL TIME (MIN.) = 0.84 Tc (MIN.) = 10.80  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 1716.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 10.80  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.404  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.60	0.30	0.500	56
COMMERCIAL	B	1.70	0.30	0.100	56
CONDOMINIUMS	B	1.00	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
COMMERCIAL	B	0.70	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.240  
 SUBAREA AREA (ACRES) = 4.50 SUBAREA RUNOFF (CFS) = 9.44  
 EFFECTIVE AREA (ACRES) = 10.00 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA (ACRES) = 10.0 PEAK FLOW RATE (CFS) = 21.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 304.00 TO NODE 421.10 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 348.50 DOWNSTREAM (FEET) = 306.00  
 FLOW LENGTH (FEET) = 944.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.7 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 13.64  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 21.08  
 PIPE TRAVEL TIME (MIN.) = 1.15 Tc (MIN.) = 11.95  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 11.95  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.254  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.20	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.50	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.90	0.30	0.400	56
COMMERCIAL	B	2.00	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
 SUBAREA AREA (ACRES) = 7.30 SUBAREA RUNOFF (CFS) = 14.12  
 EFFECTIVE AREA (ACRES) = 17.30 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.27  
 TOTAL AREA (ACRES) = 17.3 PEAK FLOW RATE (CFS) = 33.86

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 11.95  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.254  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	4.40	0.30	0.200	56
COMMERCIAL	B	0.10	0.30	0.100	56
APARTMENTS	B	6.70	0.30	0.200	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.199  
 SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 22.12  
 EFFECTIVE AREA (ACRES) = 28.50 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 28.5 PEAK FLOW RATE (CFS) = 55.98

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 11.95  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.254  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 3.10 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 5.45  
 EFFECTIVE AREA(ACRES) = 31.60 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 61.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 11.95  
 RAINFALL INTENSITY(INCH/HR) = 2.25  
 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.31  
 EFFECTIVE STREAM AREA(ACRES) = 31.60  
 TOTAL STREAM AREA(ACRES) = 31.60  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 61.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 400.00 TO NODE 420.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 300.40  
 ELEVATION DATA: UPSTREAM(FEET) = 312.80 DOWNSTREAM(FEET) = 310.80

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.115  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.978  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 COMMERCIAL B 0.50 0.30 0.100 56 8.11  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF(CFS) = 1.33  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.33

\*\*\*\*\*

FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 307.00

STREET LENGTH(FEET) = 266.50 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 67.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 62.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.00

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.31  
 HALFSTREET FLOOD WIDTH(FEET) = 8.60  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.43  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.75  
 STREET FLOW TRAVEL TIME(MIN.) = 1.83 Tc(MIN.) = 9.95  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.520

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.60 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.34  
 EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 2.47

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 9.63  
 FLOW VELOCITY(FEET/SEC.) = 2.51 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.82  
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.00 = 566.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 307.00 DOWNSTREAM(FEET) = 305.50  
 FLOW LENGTH(FEET) = 105.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.31  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 2.47  
 PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 10.28  
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.10 = 671.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

\*\*\*\*\*

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 10.28  
 RAINFALL INTENSITY (INCH/HR) = 2.47  
 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.10  
 EFFECTIVE STREAM AREA (ACRES) = 1.10  
 TOTAL STREAM AREA (ACRES) = 1.10  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 2.47

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	61.43	11.95	2.254	0.30 (0.09)	0.31	31.6	300.00
2	2.47	10.28	2.471	0.30 (0.03)	0.10	1.1	400.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	60.59	10.28	2.471	0.30 (0.09)	0.31	28.3	400.00
2	63.67	11.95	2.254	0.30 (0.09)	0.31	32.7	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 63.67 Tc (MIN.) = 11.95  
 EFFECTIVE AREA (ACRES) = 32.70 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA (ACRES) = 32.7  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 426.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 305.50 DOWNSTREAM (FEET) = 301.00  
 FLOW LENGTH (FEET) = 261.40 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.1 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.63  
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 63.67  
 PIPE TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 12.30  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.10 = 2921.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc (MIN.) = 12.30  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.209  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.38  
 EFFECTIVE AREA (ACRES) = 32.90 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA (ACRES) = 32.9 PEAK FLOW RATE (CFS) = 63.67  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.20 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 301.00 DOWNSTREAM (FEET) = 289.00  
 FLOW LENGTH (FEET) = 448.56 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 21.8 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.26  
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 63.67  
 PIPE TRAVEL TIME (MIN.) = 0.49 Tc (MIN.) = 12.79  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.20 = 3369.96 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.20 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc (MIN.) = 12.79  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.146  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 0.50 SUBAREA RUNOFF (CFS) = 0.91  
 EFFECTIVE AREA (ACRES) = 33.40 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA (ACRES) = 33.4 PEAK FLOW RATE (CFS) = 63.67  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.30 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 289.00 DOWNSTREAM (FEET) = 282.00  
 FLOW LENGTH (FEET) = 260.45 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.5 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.81  
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 63.67  
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 13.08  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.30 = 3630.41 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.30 TO NODE 426.30 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.08  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.108  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 0.80 0.30 0.400 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 1.97  
EFFECTIVE AREA(ACRES) = 34.50 AREA-AVERAGED Fm(INCH/HR) = 0.09  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
TOTAL AREA(ACRES) = 34.5 PEAK FLOW RATE(CFS) = 63.67  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.30 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 271.00  
FLOW LENGTH(FEET) = 411.44 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 21.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.26  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 63.67  
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 13.53  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 13.53  
RAINFALL INTENSITY(INCH/HR) = 2.05  
AREA-AVERAGED Fm(INCH/HR) = 0.09  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.31  
EFFECTIVE STREAM AREA(ACRES) = 34.50  
TOTAL STREAM AREA(ACRES) = 34.50  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 63.67

\*\*\*\*\*

FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 233.60  
ELEVATION DATA: UPSTREAM(FEET) = 306.50 DOWNSTREAM(FEET) = 301.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.882  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.536  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL B 0.20 0.30 0.100 56 5.88  
COMMERCIAL B 0.20 0.30 0.100 56 5.88  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 1.26  
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.26

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.00 TO NODE 427.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<

UPSTREAM ELEVATION(FEET) = 301.80 DOWNSTREAM ELEVATION(FEET) = 294.00  
STREET LENGTH(FEET) = 478.70 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.13

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 8.64  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.56  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.80  
STREET FLOW TRAVEL TIME(MIN.) = 3.11 Tc(MIN.) = 8.99  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.759

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.20 0.30 0.100 56  
COMMERCIAL B 0.50 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.72  
EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10

TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 2.70

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.33 HALFSTREET FLOOD WIDTH (FEET) = 9.73
FLOW VELOCITY (FEET/SEC.) = 2.70 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.89
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 427.00 = 712.30 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 427.00 TO NODE 428.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<

UPSTREAM ELEVATION (FEET) = 294.00 DOWNSTREAM ELEVATION (FEET) = 286.00
STREET LENGTH (FEET) = 300.80 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 55.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.25
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.33
HALFSTREET FLOOD WIDTH (FEET) = 9.46
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.39
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.10
STREET FLOW TRAVEL TIME (MIN.) = 1.48 Tc (MIN.) = 10.47
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.446

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.10 0.30 0.100 56
COMMERCIAL B 0.40 0.30 0.100 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.50 SUBAREA RUNOFF (CFS) = 1.09
EFFECTIVE AREA (ACRES) = 1.60 AREA-AVERAGED Fm (INCH/HR) = 0.03
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 1.6 PEAK FLOW RATE (CFS) = 3.48

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.33 HALFSTREET FLOOD WIDTH (FEET) = 9.78
FLOW VELOCITY (FEET/SEC.) = 3.45 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.14
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 428.00 = 1013.10 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 428.00 TO NODE 429.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<

UPSTREAM ELEVATION (FEET) = 286.00 DOWNSTREAM ELEVATION (FEET) = 276.00

STREET LENGTH (FEET) = 242.40 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 55.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.89
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.32
HALFSTREET FLOOD WIDTH (FEET) = 9.24
AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.22
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.36
STREET FLOW TRAVEL TIME (MIN.) = 0.96 Tc (MIN.) = 11.43
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.322

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.40 0.30 0.100 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.83
EFFECTIVE AREA (ACRES) = 2.00 AREA-AVERAGED Fm (INCH/HR) = 0.03
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 4.13

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.33 HALFSTREET FLOOD WIDTH (FEET) = 9.57
FLOW VELOCITY (FEET/SEC.) = 4.24 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.39
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 429.00 = 1255.50 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 429.00 TO NODE 429.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.43
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.322

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL "8-10 DWELLINGS/ACRE" B 0.50 0.30 0.400 56
RESIDENTIAL "8-10 DWELLINGS/ACRE" B 1.50 0.30 0.400 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 3.96
EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.08
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25
TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 8.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 429.00 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 273.00
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.61
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.09
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 11.60
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 248.00 = 1355.50 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 11.60
RAINFALL INTENSITY(INCH/HR) = 2.30
AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.25
EFFECTIVE STREAM AREA(ACRES) = 4.00
TOTAL STREAM AREA(ACRES) = 4.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.09

\*\* CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 60.59 11.89 2.262 0.30( 0.09) 0.31 30.1 400.00
1 63.67 13.53 2.050 0.30( 0.09) 0.31 34.5 300.00
2 8.09 11.60 2.300 0.30( 0.08) 0.25 4.0 425.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 68.23 11.60 2.300 0.30( 0.09) 0.30 33.3 425.00
2 68.54 11.89 2.262 0.30( 0.09) 0.30 34.1 400.00
3 70.85 13.53 2.050 0.30( 0.09) 0.31 38.5 300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 70.85 Tc(MIN.) = 13.53
EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 38.5
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 68.23 11.60 2.300 0.30( 0.09) 0.30 33.3 425.00
2 68.54 11.89 2.262 0.30( 0.09) 0.30 34.1 400.00
3 70.85 13.53 2.050 0.30( 0.09) 0.31 38.5 300.00
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 542.19 19.08 1.639 0.30( 0.12) 0.39 395.8 210.00
2 540.34 22.33 1.496 0.30( 0.12) 0.39 435.0 200.00
3 538.86 23.03 1.468 0.30( 0.12) 0.38 442.8 230.00
4 525.52 24.20 1.420 0.30( 0.12) 0.38 447.4 220.50
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 540.80 11.60 2.300 0.30( 0.11) 0.38 273.9 425.00
2 544.54 11.89 2.262 0.30( 0.11) 0.38 280.6 400.00
3 558.86 13.53 2.050 0.30( 0.11) 0.38 319.1 300.00
4 598.20 19.08 1.639 0.30( 0.11) 0.38 434.3 210.00
5 591.15 22.33 1.496 0.30( 0.11) 0.38 473.5 200.00
6 588.65 23.03 1.468 0.30( 0.11) 0.38 481.3 230.00
7 573.61 24.20 1.420 0.30( 0.11) 0.38 485.9 220.50
TOTAL AREA(ACRES) = 485.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 598.20 Tc(MIN.) = 19.084
EFFECTIVE AREA(ACRES) = 434.31 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 485.9
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 249.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 261.00
FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 55.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.80
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 598.20

PIPE TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 19.30  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 10  
-----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 429.00 TO NODE 430.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 262.70

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.459  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.392  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.20	0.30	0.100	56	6.46
COMMERCIAL	B	0.40	0.30	0.100	56	6.46

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 1.82  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 262.70 DOWNSTREAM ELEVATION(FEET) = 258.98  
STREET LENGTH(FEET) = 345.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.55  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 10.43  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.28  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.78  
STREET FLOW TRAVEL TIME(MIN.) = 2.53 Tc(MIN.) = 8.99  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.761

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.50	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.47  
EFFECTIVE AREA(ACRES) = 1.20 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 2.95

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.23  
FLOW VELOCITY(FEET/SEC.) = 2.33 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.83  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.00 = 675.60 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.00 TO NODE 431.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 258.98 DOWNSTREAM(FEET) = 258.00  
FLOW LENGTH(FEET) = 91.03 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.05  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 2.95  
PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 9.29  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.10 = 766.63 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 9.29  
RAINFALL INTENSITY(INCH/HR) = 2.69  
AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 1.20  
TOTAL STREAM AREA(ACRES) = 1.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.95

\*\*\*\*\*  
FLOW PROCESS FROM NODE 410.00 TO NODE 440.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 299.70  
ELEVATION DATA: UPSTREAM(FEET) = 312.69 DOWNSTREAM(FEET) = 310.80



Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.196  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.958  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.40	0.30	0.100	56	8.20

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF(CFS) = 1.05  
 TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.05

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 61  
 \*\*\*\*\*

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 306.50  
 STREET LENGTH(FEET) = 299.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.49  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.29  
 HALFSTREET FLOOD WIDTH(FEET) = 7.31  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.30  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.66  
 STREET FLOW TRAVEL TIME(MIN.) = 2.17 Tc(MIN.) = 10.37  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.460

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.87  
 EFFECTIVE AREA(ACRES) = 0.80 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 1.75

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.95  
 FLOW VELOCITY(FEET/SEC.) = 2.39 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.71  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 441.00 = 598.70 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 61  
 \*\*\*\*\*

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 306.50 DOWNSTREAM ELEVATION(FEET) = 299.00  
 STREET LENGTH(FEET) = 341.60 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.34  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.31  
 HALFSTREET FLOOD WIDTH(FEET) = 8.34  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.97  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.91  
 STREET FLOW TRAVEL TIME(MIN.) = 1.91 Tc(MIN.) = 12.28  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.212

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.20	0.30	0.100	56
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.18  
 EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 2.75

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 9.13  
 FLOW VELOCITY(FEET/SEC.) = 3.04 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.97  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 442.00 = 940.30 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 61  
 \*\*\*\*\*

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 299.00 DOWNSTREAM ELEVATION(FEET) = 288.50  
 STREET LENGTH(FEET) = 390.10 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.27  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 9.43  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.44  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.12  
STREET FLOW TRAVEL TIME(MIN.) = 1.89 Tc(MIN.) = 14.17  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.967

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.30 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.05  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 3.49

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 9.73  
FLOW VELOCITY(FEET/SEC.) = 3.48 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.15  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 443.00 = 1330.40 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 443.00 TO NODE 444.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 288.50 DOWNSTREAM ELEVATION(FEET) = 281.00  
STREET LENGTH(FEET) = 272.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.81  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 10.13  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.57  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.20  
STREET FLOW TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 15.44  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.835

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

COMMERCIAL B 0.40 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.65  
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 3.90

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 10.23  
FLOW VELOCITY(FEET/SEC.) = 3.59 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.22  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 444.00 = 1603.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 444.00 TO NODE 445.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 281.00 DOWNSTREAM ELEVATION(FEET) = 268.10  
STREET LENGTH(FEET) = 462.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017  
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.43  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 10.83  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.72  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.30  
STREET FLOW TRAVEL TIME(MIN.) = 2.07 Tc(MIN.) = 17.52  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.724

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.70 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.07  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 4.72

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 11.13  
FLOW VELOCITY(FEET/SEC.) = 3.79 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.34  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 445.00 = 2065.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 445.00 TO NODE 446.00 IS CODE = 61  
-----

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 268.10 DOWNSTREAM ELEVATION(FEET) = 257.00  
STREET LENGTH(FEET) = 532.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.43  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 12.68  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.47  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.32  
STREET FLOW TRAVEL TIME(MIN.) = 2.56 Tc(MIN.) = 20.08  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.587

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.10 0.30 0.100 56  
COMMERCIAL B 0.60 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 1.40  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 5.75

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 13.00  
FLOW VELOCITY(FEET/SEC.) = 3.52 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.36  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 446.00 = 2598.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 446.00 TO NODE 431.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 257.00 DOWNSTREAM(FEET) = 256.50  
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.44  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 5.75  
PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 20.45  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 20.45  
RAINFALL INTENSITY(INCH/HR) = 1.57  
AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 4.10  
TOTAL STREAM AREA(ACRES) = 4.10  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.75

\*\* CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 2.95 9.29 2.685 0.30( 0.03) 0.10 1.2 429.00  
2 5.75 20.45 1.572 0.30( 0.03) 0.10 4.1 410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 7.44 9.29 2.685 0.30( 0.03) 0.10 3.1 429.00  
2 7.46 20.45 1.572 0.30( 0.03) 0.10 5.3 410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 7.46 Tc(MIN.) = 20.45  
EFFECTIVE AREA(ACRES) = 5.30 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 5.3  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 249.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 258.00 DOWNSTREAM(FEET) = 257.00  
FLOW LENGTH(FEET) = 230.42 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.52  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 7.46  
PIPE TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 21.30  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

=====  
\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	7.44	10.14	2.489	0.30( 0.03)	0.10	3.1	429.00
2	7.46	21.30	1.537	0.30( 0.03)	0.10	5.3	410.00

LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	540.80	11.82	2.271	0.30( 0.11)	0.38	273.9	425.00
2	544.54	12.10	2.234	0.30( 0.11)	0.38	280.6	400.00
3	558.86	13.74	2.022	0.30( 0.11)	0.38	319.1	300.00
4	598.20	19.30	1.628	0.30( 0.11)	0.38	434.3	210.00
5	591.15	22.55	1.487	0.30( 0.11)	0.38	473.5	200.00
6	588.65	23.25	1.459	0.30( 0.11)	0.38	481.3	230.00
7	573.61	24.41	1.412	0.30( 0.11)	0.38	485.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	518.09	10.14	2.489	0.30( 0.11)	0.38	237.9	429.00
2	548.24	11.82	2.271	0.30( 0.11)	0.38	277.3	425.00
3	551.99	12.10	2.234	0.30( 0.11)	0.38	284.1	400.00
4	566.31	13.74	2.022	0.30( 0.11)	0.38	322.9	300.00
5	605.65	19.30	1.628	0.30( 0.11)	0.38	439.2	210.00
6	601.31	21.30	1.537	0.30( 0.11)	0.38	463.8	410.00
7	598.36	22.55	1.487	0.30( 0.11)	0.38	478.8	200.00
8	595.72	23.25	1.459	0.30( 0.11)	0.38	486.6	230.00
9	580.44	24.41	1.412	0.30( 0.11)	0.37	491.2	220.50

TOTAL AREA (ACRES) = 491.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 605.65 Tc (MIN.) = 19.298  
EFFECTIVE AREA (ACRES) = 439.21 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA (ACRES) = 491.2  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<<

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 491.2 TC (MIN.) = 19.30  
EFFECTIVE AREA (ACRES) = 439.21 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.380  
PEAK FLOW RATE (CFS) = 605.65

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	518.09	10.14	2.489	0.30( 0.11)	0.38	237.9	429.00

2	548.24	11.82	2.271	0.30( 0.11)	0.38	277.3	425.00
3	551.99	12.10	2.234	0.30( 0.11)	0.38	284.1	400.00
4	566.31	13.74	2.022	0.30( 0.11)	0.38	322.9	300.00
5	605.65	19.30	1.628	0.30( 0.11)	0.38	439.2	210.00
6	601.31	21.30	1.537	0.30( 0.11)	0.38	463.8	410.00
7	598.36	22.55	1.487	0.30( 0.11)	0.38	478.8	200.00
8	595.72	23.25	1.459	0.30( 0.11)	0.38	486.6	230.00
9	580.44	24.41	1.412	0.30( 0.11)	0.37	491.2	220.50

=====  
END OF RATIONAL METHOD ANALYSIS  
=====



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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

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FILE NAME: 0506101E.DAT  
TIME/DATE OF STUDY: 12:42 04/15/2013  
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--\*TIME-OF-CONCENTRATION MODEL\*--  
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\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10100.00 TO NODE 10101.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.50 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.80 SUBAREA RUNOFF (CFS) = 1.32  
 EFFECTIVE AREA (ACRES) = 1.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.2 PEAK FLOW RATE (CFS) = 1.98

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10102.00 TO NODE 10103.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 762.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.1400  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.98  
 FLOW VELOCITY(FEET/SEC.) = 4.47 FLOW DEPTH(FEET) = 0.38  
 TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 10.99  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10103.00 = 679.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10103.00 TO NODE 10103.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 10.99  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.051  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 1.89  
 EFFECTIVE AREA (ACRES) = 2.40 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.4 PEAK FLOW RATE (CFS) = 3.78

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10103.00 TO NODE 10104.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 762.00 DOWNSTREAM(FEET) = 754.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 124.00 CHANNEL SLOPE = 0.0645  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 3.78  
 FLOW VELOCITY(FEET/SEC.) = 3.91 FLOW DEPTH(FEET) = 0.57  
 TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 11.52  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10104.00 = 803.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10104.00 TO NODE 10104.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 11.52  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.998  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.70 0.30 1.000 -  
 USER-DEFINED - 1.10 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 3.51  
 EFFECTIVE AREA (ACRES) = 4.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 4.7 PEAK FLOW RATE (CFS) = 7.18

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10104.00 TO NODE 10105.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 754.00 DOWNSTREAM(FEET) = 740.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00 CHANNEL SLOPE = 0.0255  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 7.18  
 FLOW VELOCITY(FEET/SEC.) = 3.26 FLOW DEPTH(FEET) = 0.86  
 TRAVEL TIME(MIN.) = 2.81 Tc(MIN.) = 14.34  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10105.00 = 1353.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10105.00 TO NODE 10105.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.34  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.766  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.40 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 6.00 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 10.60 SUBAREA RUNOFF (CFS) = 13.99  
 EFFECTIVE AREA (ACRES) = 15.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 15.3 PEAK FLOW RATE (CFS) = 20.19

```

*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10106.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 740.00 DOWNSTREAM(FEET) = 623.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 929.00 CHANNEL SLOPE = 0.1259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 20.19
FLOW VELOCITY(FEET/SEC.) = 7.69 FLOW DEPTH(FEET) = 0.94
TRAVEL TIME(MIN.) = 2.01 Tc(MIN.) = 16.35
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10106.00 = 2282.00 FEET.
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10106.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.35
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.650
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 10.40 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 4.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 18.83
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 37.42
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 592.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 417.00 CHANNEL SLOPE = 0.0743
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 37.42
FLOW VELOCITY(FEET/SEC.) = 7.36 FLOW DEPTH(FEET) = 1.30
TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 17.30
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10107.00 = 2699.00 FEET.
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10107.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.30

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* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.601
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 5.10 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 2.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 11.12
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 47.18
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 592.00 DOWNSTREAM(FEET) = 590.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0333
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.000
CHANNEL FLOW THRU SUBAREA(CFS) = 47.18
FLOW VELOCITY(FEET/SEC.) = 5.77 FLOW DEPTH(FEET) = 1.65
TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 17.47
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10108.00 = 2759.00 FEET.
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.47
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.592
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 7.00 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 7.50 0.30 1.000 -
USER-DEFINED - 1.80 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 21.04
EFFECTIVE AREA(ACRES) = 58.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.4 PEAK FLOW RATE(CFS) = 67.89
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 17.47
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.592
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -        0.20     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20     SUBAREA RUNOFF(CFS) = 0.23
EFFECTIVE AREA(ACRES) = 58.60   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.6     PEAK FLOW RATE(CFS) = 68.13

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*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10109.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 590.00  DOWNSTREAM(FEET) = 526.00
CHANNEL LENGTH THRU SUBAREA( FEET) = 973.00  CHANNEL SLOPE = 0.0658
CHANNEL BASE( FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH( FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 68.13
FLOW VELOCITY( FEET/SEC.) = 8.16  FLOW DEPTH( FEET) = 1.67
TRAVEL TIME(MIN.) = 1.99  Tc(MIN.) = 19.46
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10109.00 = 3732.00 FEET.

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*****
FLOW PROCESS FROM NODE 10109.00 TO NODE 10109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 19.46
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.488
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -        16.40   0.30     1.000     -
USER-DEFINED        -         0.60   0.30     1.000     -
USER-DEFINED        -         3.00   0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.00     SUBAREA RUNOFF(CFS) = 21.39
EFFECTIVE AREA(ACRES) = 78.60   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.6     PEAK FLOW RATE(CFS) = 84.07

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*****
FLOW PROCESS FROM NODE 10109.00 TO NODE 10110.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 526.00  DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA( FEET) = 1045.00  CHANNEL SLOPE = 0.0679

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CHANNEL BASE( FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH( FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 84.07
FLOW VELOCITY( FEET/SEC.) = 8.69  FLOW DEPTH( FEET) = 1.80
TRAVEL TIME(MIN.) = 2.00  Tc(MIN.) = 21.46
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10110.00 = 4777.00 FEET.

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*****
FLOW PROCESS FROM NODE 10110.00 TO NODE 10110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 21.46
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.410
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         1.00   0.30     1.000     -
USER-DEFINED        -         0.50   0.30     1.000     -
USER-DEFINED        -        31.60   0.30     1.000     -
USER-DEFINED        -         1.60   0.30     1.000     -
USER-DEFINED        -         0.40   0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.10     SUBAREA RUNOFF(CFS) = 35.08
EFFECTIVE AREA(ACRES) = 113.70  AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.7     PEAK FLOW RATE(CFS) = 113.63

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*****
FLOW PROCESS FROM NODE 10110.00 TO NODE 10111.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 455.00  DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA( FEET) = 675.00  CHANNEL SLOPE = 0.0667
CHANNEL BASE( FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH( FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 113.63
FLOW VELOCITY( FEET/SEC.) = 9.31  FLOW DEPTH( FEET) = 2.02
TRAVEL TIME(MIN.) = 1.21  Tc(MIN.) = 22.67
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10111.00 = 5452.00 FEET.

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*****
FLOW PROCESS FROM NODE 10111.00 TO NODE 10111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 22.67
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.369
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         7.40   0.30     1.000     -
USER-DEFINED        -         6.00   0.30     1.000     -
USER-DEFINED        -        24.80   0.30     1.000     -
USER-DEFINED        -         0.90   0.30     1.000     -

```

USER-DEFINED - 4.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 43.20 SUBAREA RUNOFF (CFS) = 41.58  
EFFECTIVE AREA (ACRES) = 156.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 156.9 PEAK FLOW RATE (CFS) = 151.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10111.00 TO NODE 10112.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	410.00	DOWNSTREAM (FEET) =	405.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	143.00	CHANNEL SLOPE =	0.0350
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	4.00
CHANNEL FLOW THRU SUBAREA (CFS) =	151.01		
FLOW VELOCITY (FEET/SEC.) =	7.86	FLOW DEPTH (FEET) =	2.53
TRAVEL TIME (MIN.) =	0.30	Tc (MIN.) =	22.97
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10112.00 =	5595.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 22.97

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.359

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	7.90	0.30	1.000	-
USER-DEFINED	-	25.90	0.30	1.000	-
USER-DEFINED	-	19.30	0.30	1.000	-
USER-DEFINED	-	2.10	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 56.20 SUBAREA RUNOFF (CFS) = 53.57

EFFECTIVE AREA (ACRES) = 213.10 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 213.1 PEAK FLOW RATE (CFS) = 203.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10113.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	405.00	DOWNSTREAM (FEET) =	363.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	1642.00	CHANNEL SLOPE =	0.0256
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	203.12		
FLOW VELOCITY (FEET/SEC.) =	7.52	FLOW DEPTH (FEET) =	3.00

TRAVEL TIME (MIN.) = 3.64 Tc (MIN.) = 26.61  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10113.00 = 7237.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 26.61

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.248

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	33.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 35.40 SUBAREA RUNOFF (CFS) = 30.21  
EFFECTIVE AREA (ACRES) = 248.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 248.5 PEAK FLOW RATE (CFS) = 212.06

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10114.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	363.00	DOWNSTREAM (FEET) =	340.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	918.00	CHANNEL SLOPE =	0.0251
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	212.06		
FLOW VELOCITY (FEET/SEC.) =	7.54	FLOW DEPTH (FEET) =	3.06
TRAVEL TIME (MIN.) =	2.03	Tc (MIN.) =	28.64
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10114.00 =	8155.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 28.64

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.195

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	10.10	0.30	1.000	-
USER-DEFINED	-	17.70	0.30	1.000	-
USER-DEFINED	-	52.90	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 83.10 SUBAREA RUNOFF (CFS) = 66.97

EFFECTIVE AREA(ACRES) = 331.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 331.6 PEAK FLOW RATE(CFS) = 267.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 28.64  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.195  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 1.21  
EFFECTIVE AREA(ACRES) = 333.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 333.1 PEAK FLOW RATE(CFS) = 268.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10114.00 TO NODE 10115.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 301.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1467.00 CHANNEL SLOPE = 0.0266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 268.43  
FLOW VELOCITY(FEET/SEC.) = 8.18 FLOW DEPTH(FEET) = 3.31  
TRAVEL TIME(MIN.) = 2.99 Tc(MIN.) = 31.63  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10115.00 = 9622.00 FEET.

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FLOW PROCESS FROM NODE 10115.00 TO NODE 10115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 31.63  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.132  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.60 0.30 1.000 -  
USER-DEFINED - 24.30 0.30 1.000 -  
USER-DEFINED - 47.70 0.30 1.000 -  
USER-DEFINED - 9.80 0.30 1.000 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 94.00 SUBAREA RUNOFF(CFS) = 70.41  
EFFECTIVE AREA(ACRES) = 427.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 427.1 PEAK FLOW RATE(CFS) = 319.94

\*\*\*\*\*

FLOW PROCESS FROM NODE 10115.00 TO NODE 10116.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 272.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1696.00 CHANNEL SLOPE = 0.0171  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 319.94  
FLOW VELOCITY(FEET/SEC.) = 7.25 FLOW DEPTH(FEET) = 3.83  
TRAVEL TIME(MIN.) = 3.90 Tc(MIN.) = 35.53  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10116.00 = 11318.00 FEET.

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FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 35.53  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.066  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.90 0.30 1.000 -  
USER-DEFINED - 4.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 32.00 0.30 1.000 -  
USER-DEFINED - 3.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 45.60 SUBAREA RUNOFF(CFS) = 31.44  
EFFECTIVE AREA(ACRES) = 472.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 472.7 PEAK FLOW RATE(CFS) = 325.91

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FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 35.53  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.066  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 1.000 -  
USER-DEFINED - 7.70 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.70 SUBAREA RUNOFF(CFS) = 6.69  
EFFECTIVE AREA(ACRES) = 482.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 482.4 PEAK FLOW RATE(CFS) = 332.59

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*****
FLOW PROCESS FROM NODE 10116.00 TO NODE 10117.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 272.00 DOWNSTREAM(FEET) = 252.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 878.00 CHANNEL SLOPE = 0.0228
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 332.59
FLOW VELOCITY(FEET/SEC.) = 8.14 FLOW DEPTH(FEET) = 3.69
TRAVEL TIME(MIN.) = 1.80 Tc(MIN.) = 37.33
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10117.00 = 12196.00 FEET.
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 37.33
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.035
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 8.20 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 8.17
EFFECTIVE AREA(ACRES) = 494.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 494.7 PEAK FLOW RATE(CFS) = 332.59
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 37.33
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.035
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 14.60 0.30 1.000 -
USER-DEFINED - 6.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 3.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996
SUBAREA AREA(ACRES) = 25.00 SUBAREA RUNOFF(CFS) = 16.57
EFFECTIVE AREA(ACRES) = 519.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

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AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 519.7 PEAK FLOW RATE(CFS) = 344.07
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10118.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 252.00 DOWNSTREAM(FEET) = 249.00
FLOW LENGTH(FEET) = 280.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 52.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.23
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 344.07
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 37.61
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10118.00 = 12476.00 FEET.
*****
FLOW PROCESS FROM NODE 10118.00 TO NODE 10119.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 249.00 DOWNSTREAM(FEET) = 240.00
FLOW LENGTH(FEET) = 892.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.79
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 344.07
PIPE TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 38.56
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10119.00 = 13368.00 FEET.
*****
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 38.56
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.015
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.100 -
USER-DEFINED - 1.00 0.30 0.600 -
USER-DEFINED - 0.80 0.30 0.850 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.706
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 2.60
EFFECTIVE AREA(ACRES) = 523.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 523.3 PEAK FLOW RATE(CFS) = 344.07
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****

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FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 38.56  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.015  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	9.60	0.30	0.600	-
USER-DEFINED	-	1.00	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.627  
 SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 10.12  
 EFFECTIVE AREA(ACRES) = 536.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 536.9 PEAK FLOW RATE(CFS) = 347.02

FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 38.56  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.015  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.06  
 EFFECTIVE AREA(ACRES) = 537.00 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 537.0 PEAK FLOW RATE(CFS) = 347.08

FLOW PROCESS FROM NODE 10119.00 TO NODE 10120.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 240.00 DOWNSTREAM(FEET) = 239.00  
 FLOW LENGTH(FEET) = 120.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 55.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.76  
 ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 347.08  
 PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 38.69  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10120.00 = 13488.00 FEET.

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 38.69  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.012  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.657  
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 4.11  
 EFFECTIVE AREA(ACRES) = 542.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 542.6 PEAK FLOW RATE(CFS) = 350.08

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 38.69  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.012  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.717  
 SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 3.66  
 EFFECTIVE AREA(ACRES) = 547.70 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 547.7 PEAK FLOW RATE(CFS) = 353.74

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 38.69  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.012  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	2.70	0.30	1.000	-
USER-DEFINED	-	11.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 10.13  
EFFECTIVE AREA(ACRES) = 563.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 563.5 PEAK FLOW RATE(CFS) = 363.87

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10121.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 239.00 DOWNSTREAM(FEET) = 213.00  
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 42.81  
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 363.87  
PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 38.77  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10121.00 = 13682.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10121.00 TO NODE 10122.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 213.00 DOWNSTREAM(FEET) = 176.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 995.00 CHANNEL SLOPE = 0.0372  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 363.87  
FLOW VELOCITY(FEET/SEC.) = 10.00 FLOW DEPTH(FEET) = 3.48  
TRAVEL TIME(MIN.) = 1.66 Tc(MIN.) = 40.42  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10122.00 = 14677.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 40.42  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.985  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.80 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 4.50  
EFFECTIVE AREA(ACRES) = 570.80 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98

TOTAL AREA(ACRES) = 570.8 PEAK FLOW RATE(CFS) = 363.87  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 40.42  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.985  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 3.30 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 3.00 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 6.47  
EFFECTIVE AREA(ACRES) = 581.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 581.3 PEAK FLOW RATE(CFS) = 363.87  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 40.42  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.985  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 3.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 3.50 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 4.87  
EFFECTIVE AREA(ACRES) = 589.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 589.2 PEAK FLOW RATE(CFS) = 365.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 40.42  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.985  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 1.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$  (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 1.11  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.98  
TOTAL AREA (ACRES) = 591.0 PEAK FLOW RATE (CFS) = 366.95

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 591.0 TC (MIN.) = 40.42  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.984  
PEAK FLOW RATE (CFS) = 366.95

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2007 Advanced Engineering Software (aes)  
Ver. 13.4 Release Date: 01/25/2007 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506102E.DAT  
TIME/DATE OF STUDY: 13:59 01/08/2009  
=====

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.120
- 2) 10.00; 2.158
- 3) 15.00; 1.718
- 4) 20.00; 1.461
- 5) 25.00; 1.289
- 6) 30.00; 1.180
- 7) 40.00; 0.990
- 8) 50.00; 0.873
- 9) 60.00; 0.780
- 10) 90.00; 0.628
- 11) 120.00; 0.534
- 12) 180.00; 0.437
- 13) 360.00; 0.302
- 14) 1440.00; 0.126

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10200.00 TO NODE 10201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 293.00  
ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 617.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.991

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.160

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------	--------------

RESIDENTIAL

"3-4 DWELLINGS/ACRE" - 0.73 0.30 0.600 0 9.99

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600

SUBAREA RUNOFF(CFS) = 1.30

TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 1.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10201.00 TO NODE 10202.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 617.00 DOWNSTREAM ELEVATION(FEET) = 613.00  
STREET LENGTH(FEET) = 323.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.01

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.32

HALFSTREET FLOOD WIDTH(FEET) = 8.10

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.38

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.76

STREET FLOW TRAVEL TIME(MIN.) = 2.26 Tc(MIN.) = 12.25

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.960

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

USER-DEFINED - 0.88 0.30 0.600 -



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 1.42  
EFFECTIVE AREA(ACRES) = 1.62 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 2.59

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 9.19  
FLOW VELOCITY(FEET/SEC.) = 2.50 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.86  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10202.00 = 616.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10202.00 TO NODE 10203.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 613.00 DOWNSTREAM ELEVATION(FEET) = 594.00  
STREET LENGTH(FEET) = 613.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.86

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 8.92  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.92  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.32  
STREET FLOW TRAVEL TIME(MIN.) = 2.61 Tc(MIN.) = 14.86

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.730

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.82	0.30	0.614	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.614

SUBAREA AREA(ACRES) = 1.82 SUBAREA RUNOFF(CFS) = 2.54  
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 4.79

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 9.90  
FLOW VELOCITY(FEET/SEC.) = 4.09 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.46  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10203.00 = 1229.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10203.00 TO NODE 10204.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 594.00 DOWNSTREAM ELEVATION(FEET) = 578.00  
STREET LENGTH(FEET) = 433.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.58

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 10.23  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.51  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.64  
STREET FLOW TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 16.46  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.643

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.21	0.30	0.655	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.655

SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 1.57  
EFFECTIVE AREA(ACRES) = 4.64 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 6.09

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.61

FLOW VELOCITY(FEET/SEC.) = 4.63 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.72

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10204.00 = 1662.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 578.00 DOWNSTREAM(FEET) = 575.00  
FLOW LENGTH(FEET) = 147.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.74  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 6.09

PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 16.78

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10205.00 = 1809.00 FEET.

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*****
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.78
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.627
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         3.61    0.30    0.917  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917
SUBAREA AREA(ACRES) = 3.61      SUBAREA RUNOFF(CFS) = 4.39
EFFECTIVE AREA(ACRES) = 8.25   AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75
TOTAL AREA(ACRES) = 8.3        PEAK FLOW RATE(CFS) = 10.41
*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 563.00
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.94
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.41
PIPE TRAVEL TIME(MIN.) = 1.05 Tc(MIN.) = 17.83
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10206.00 = 2374.00 FEET.
*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.83
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.573
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         4.75    0.30    0.669  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.669
SUBAREA AREA(ACRES) = 4.75      SUBAREA RUNOFF(CFS) = 5.86
EFFECTIVE AREA(ACRES) = 13.00   AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 13.0        PEAK FLOW RATE(CFS) = 15.87
*****
FLOW PROCESS FROM NODE 10206.00 TO NODE 10207.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 563.00 DOWNSTREAM(FEET) = 547.00

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FLOW LENGTH(FEET) = 599.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.50
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 15.87
PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 18.78
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10207.00 = 2973.00 FEET.
*****
FLOW PROCESS FROM NODE 10206.10 TO NODE 10207.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.78
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.524
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         4.59    0.30    0.664  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.664
SUBAREA AREA(ACRES) = 4.59      SUBAREA RUNOFF(CFS) = 5.47
EFFECTIVE AREA(ACRES) = 17.58   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 17.6        PEAK FLOW RATE(CFS) = 20.76
*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 516.00
FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.54
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.76
PIPE TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 19.47
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10208.00 = 3573.00 FEET.
*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.47
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.488
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         3.60    0.30    0.697  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.697
SUBAREA AREA(ACRES) = 3.60      SUBAREA RUNOFF(CFS) = 4.14
EFFECTIVE AREA(ACRES) = 21.18   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 21.2        PEAK FLOW RATE(CFS) = 24.35

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*****
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 516.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 604.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.32
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 24.35
PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 20.08
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10209.00 = 4177.00 FEET.

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*****
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.08
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.458
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      8.21  0.30  0.645 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645
SUBAREA AREA(ACRES) = 8.21 SUBAREA RUNOFF(CFS) = 9.35
EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 33.12

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*****
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 678.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.56
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 33.12
PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 20.73
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10210.00 = 4855.00 FEET.

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*****
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.73
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.436
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS

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LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      10.49  0.30  0.986 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 10.49 SUBAREA RUNOFF(CFS) = 10.77
EFFECTIVE AREA(ACRES) = 39.89 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 39.9 PEAK FLOW RATE(CFS) = 43.30

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*****
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 280.00
FLOW LENGTH(FEET) = 2662.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.60
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 43.30
PIPE TRAVEL TIME(MIN.) = 2.39 Tc(MIN.) = 23.11
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10211.00 = 7517.00 FEET.

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*****
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 23.11
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.354
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      10.00  0.30  1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 9.49
EFFECTIVE AREA(ACRES) = 49.89 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 49.9 PEAK FLOW RATE(CFS) = 49.85

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*****
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 280.00 DOWNSTREAM(FEET) = 176.00
FLOW LENGTH(FEET) = 935.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 17.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.76
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 49.85
PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 23.77
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10212.00 = 8452.00 FEET.

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FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.77
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.331
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 18.37 0.30 0.926 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.926
SUBAREA AREA(ACRES) = 18.37 SUBAREA RUNOFF(CFS) = 17.42
EFFECTIVE AREA(ACRES) = 68.26 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 68.3 PEAK FLOW RATE(CFS) = 66.25

\*\*\*\*\*
FLOW PROCESS FROM NODE 10212.00 TO NODE 10242.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 176.00 DOWNSTREAM(FEET) = 169.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00 CHANNEL SLOPE = 0.0211
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.295
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.97 0.30 0.970 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 67.14
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.30
AVERAGE FLOW DEPTH(FEET) = 2.06 TRAVEL TIME(MIN.) = 1.04
Tc(MIN.) = 24.81
SUBAREA AREA(ACRES) = 1.97 SUBAREA RUNOFF(CFS) = 1.78
EFFECTIVE AREA(ACRES) = 70.23 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 66.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.04 FLOW VELOCITY(FEET/SEC.) = 5.30
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<

\*\*\*\*\*
FLOW PROCESS FROM NODE 10220.00 TO NODE 10221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 308.00 DOWNSTREAM(FEET) = 300.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.111
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.712
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"GRASS" - 1.03 0.30 1.000 0 15.11
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.31
TOTAL AREA(ACRES) = 1.03 PEAK FLOW RATE(CFS) = 1.31

\*\*\*\*\*
FLOW PROCESS FROM NODE 10221.10 TO NODE 10222.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 300.00 DOWNSTREAM ELEVATION(FEET) = 261.00
STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.31
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.51
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.29
STREET FLOW TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 16.22
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.655

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.64 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 2.00
EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 3.25

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.22 HALFSTREET FLOOD WIDTH(FEET) = 3.04  
FLOW VELOCITY(FEET/SEC.) = 5.77 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.26  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10222.00 = 764.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10221.20 TO NODE 10222.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 16.22  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.655  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.12 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.12 SUBAREA RUNOFF(CFS) = 3.80  
EFFECTIVE AREA(ACRES) = 5.78 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 7.05

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.10 TO NODE 10223.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 261.00 DOWNSTREAM ELEVATION(FEET) = 208.00  
STREET LENGTH(FEET) = 622.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.05

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.30  
HALFSTREET FLOOD WIDTH(FEET) = 7.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.92  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.77

STREET FLOW TRAVEL TIME(MIN.) = 1.75 Tc(MIN.) = 17.97

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.565

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.75 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 2.00  
EFFECTIVE AREA(ACRES) = 7.54 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.5 PEAK FLOW RATE(CFS) = 8.58

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.26  
FLOW VELOCITY(FEET/SEC.) = 5.99 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.82  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10223.00 = 1386.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.20 TO NODE 10223.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 17.97  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.565  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.91 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.91 SUBAREA RUNOFF(CFS) = 9.01  
EFFECTIVE AREA(ACRES) = 15.45 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 17.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 10223.10 TO NODE 10224.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 208.00 DOWNSTREAM ELEVATION(FEET) = 204.00  
STREET LENGTH(FEET) = 758.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.82

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.55  
HALFSTREET FLOOD WIDTH(FEET) = 19.60  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.46  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.35  
STREET FLOW TRAVEL TIME(MIN.) = 5.14 Tc(MIN.) = 23.11  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.354

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.70 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 4.46  
EFFECTIVE AREA(ACRES) = 20.15 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.1 PEAK FLOW RATE(CFS) = 19.11

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 19.31  
FLOW VELOCITY(FEET/SEC.) = 2.44 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.33  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10224.00 = 2144.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.20 TO NODE 10224.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 23.11  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.354  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.21 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 1.15  
EFFECTIVE AREA(ACRES) = 21.35 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 20.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 204.00 DOWNSTREAM(FEET) = 201.00  
FLOW LENGTH(FEET) = 422.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.95  
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 20.26  
PIPE TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 24.12  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10225.00 = 2566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 24.12  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.319  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.81 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 4.81 SUBAREA RUNOFF(CFS) = 4.42  
EFFECTIVE AREA(ACRES) = 26.17 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 26.2 PEAK FLOW RATE(CFS) = 24.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 201.00 DOWNSTREAM(FEET) = 197.00  
FLOW LENGTH(FEET) = 799.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.32  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 24.01  
PIPE TRAVEL TIME(MIN.) = 2.11 Tc(MIN.) = 26.23  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10238.00 = 3365.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 26.23  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.262  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.24 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.24 SUBAREA RUNOFF(CFS) = 3.67  
EFFECTIVE AREA(ACRES) = 30.41 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.4 PEAK FLOW RATE(CFS) = 26.34

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 26.23  
RAINFALL INTENSITY(INCH/HR) = 1.26  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 30.41  
TOTAL STREAM AREA(ACRES) = 30.41  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 26.34

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10230.00 TO NODE 10231.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 276.00
ELEVATION DATA: UPSTREAM (FEET) = 503.00 DOWNSTREAM (FEET) = 390.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.944

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.938

SUBAREA Tc AND LOSS RATE DATA (AMC II):

Table with 7 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.)

AGRICULTURAL POOR COVER

"FALLOW" - 0.95 0.30 1.000 0 5.94

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 2.26

TOTAL AREA (ACRES) = 0.95 PEAK FLOW RATE (CFS) = 2.26

\*\*\*\*\* FLOW PROCESS FROM NODE 10231.10 TO NODE 10232.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 390.00 DOWNSTREAM (FEET) = 301.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 394.00 CHANNEL SLOPE = 0.2259

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.779

SUBAREA LOSS RATE DATA (AMC II):

Table with 7 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN

USER-DEFINED - 1.68 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.14

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.94

AVERAGE FLOW DEPTH (FEET) = 0.42 TRAVEL TIME (MIN.) = 0.83

Tc (MIN.) = 6.77

SUBAREA AREA (ACRES) = 1.68 SUBAREA RUNOFF (CFS) = 3.76

EFFECTIVE AREA (ACRES) = 2.63 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 2.6 PEAK FLOW RATE (CFS) = 5.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.48 FLOW VELOCITY (FEET/SEC.) = 8.65

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10232.00 = 670.00 FEET.

\*\*\*\*\* FLOW PROCESS FROM NODE 10231.20 TO NODE 10232.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 6.77

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.779

SUBAREA LOSS RATE DATA (AMC II):

Table with 7 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN

USER-DEFINED - 6.38 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 6.38 SUBAREA RUNOFF (CFS) = 14.23
EFFECTIVE AREA (ACRES) = 9.01 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 9.0 PEAK FLOW RATE (CFS) = 20.11

\*\*\*\*\* FLOW PROCESS FROM NODE 10232.00 TO NODE 10233.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION (FEET) = 301.00 DOWNSTREAM ELEVATION (FEET) = 277.00

STREET LENGTH (FEET) = 341.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.61

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.77

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.41

HALFSTREET FLOOD WIDTH (FEET) = 12.38

AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.90

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.80

STREET FLOW TRAVEL TIME (MIN.) = 0.82 Tc (MIN.) = 7.60

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.621

SUBAREA LOSS RATE DATA (AMC II):

Table with 7 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN

USER-DEFINED - 3.50 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 3.50 SUBAREA RUNOFF (CFS) = 7.32

EFFECTIVE AREA (ACRES) = 12.52 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 12.5 PEAK FLOW RATE (CFS) = 26.14

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 12.89

FLOW VELOCITY (FEET/SEC.) = 7.06 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.94

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10233.00 = 1011.00 FEET.

\*\*\*\*\* FLOW PROCESS FROM NODE 10233.10 TO NODE 10234.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 277.00 DOWNSTREAM ELEVATION(FEET) = 226.00  
STREET LENGTH(FEET) = 682.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.04

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.43  
HALFSTREET FLOOD WIDTH(FEET) = 13.50  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.46  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.20  
STREET FLOW TRAVEL TIME(MIN.) = 1.52 Tc(MIN.) = 9.12

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.328

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.27	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 4.27		SUBAREA RUNOFF(CFS) = 7.79			
EFFECTIVE AREA(ACRES) = 16.78		AREA-AVERAGED Fm(INCH/HR) = 0.30			
AREA-AVERAGED Fp(INCH/HR) = 0.30		AREA-AVERAGED Ap = 1.00			
TOTAL AREA(ACRES) = 16.8		PEAK FLOW RATE(CFS) = 30.63			

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 13.60  
FLOW VELOCITY(FEET/SEC.) = 7.51 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.23  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10234.00 = 1693.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10233.20 TO NODE 10234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.12

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.328

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.60	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 15.60		SUBAREA RUNOFF(CFS) = 28.47			
EFFECTIVE AREA(ACRES) = 32.38		AREA-AVERAGED Fm(INCH/HR) = 0.30			
AREA-AVERAGED Fp(INCH/HR) = 0.30		AREA-AVERAGED Ap = 1.00			
TOTAL AREA(ACRES) = 32.4		PEAK FLOW RATE(CFS) = 59.10			

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.10 TO NODE 10235.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 3 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 226.00 DOWNSTREAM ELEVATION(FEET) = 205.00  
STREET LENGTH(FEET) = 759.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 62.84

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.60  
HALFSTREET FLOOD WIDTH(FEET) = 22.30  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.08  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.68  
STREET FLOW TRAVEL TIME(MIN.) = 2.08 Tc(MIN.) = 11.20

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.053

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.74	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 4.74		SUBAREA RUNOFF(CFS) = 7.48			
EFFECTIVE AREA(ACRES) = 37.13		AREA-AVERAGED Fm(INCH/HR) = 0.30			
AREA-AVERAGED Fp(INCH/HR) = 0.30		AREA-AVERAGED Ap = 1.00			
TOTAL AREA(ACRES) = 37.1		PEAK FLOW RATE(CFS) = 59.10			

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 21.76  
FLOW VELOCITY(FEET/SEC.) = 6.00 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.56  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10235.00 = 2452.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.20 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.20

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.053

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.02	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 8.02		SUBAREA RUNOFF(CFS) = 12.65			
EFFECTIVE AREA(ACRES) = 45.15		AREA-AVERAGED Fm(INCH/HR) = 0.30			



AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.1 PEAK FLOW RATE (CFS) = 71.21

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.30 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.20  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.053  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.62 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.62 SUBAREA RUNOFF (CFS) = 4.12  
EFFECTIVE AREA (ACRES) = 47.76 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 75.34

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.00 TO NODE 10236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 205.00 DOWNSTREAM (FEET) = 201.00  
FLOW LENGTH (FEET) = 489.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.11  
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 75.34  
PIPE TRAVEL TIME (MIN.) = 0.81 Tc (MIN.) = 12.00  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10236.00 = 2941.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.10 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 12.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.982  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.89 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.89 SUBAREA RUNOFF (CFS) = 4.38  
EFFECTIVE AREA (ACRES) = 50.65 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 50.7 PEAK FLOW RATE (CFS) = 76.67

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.20 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 12.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.982  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.84 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.84 SUBAREA RUNOFF (CFS) = 7.32  
EFFECTIVE AREA (ACRES) = 55.49 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 83.99

\*\*\*\*\*

FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 201.00 DOWNSTREAM (FEET) = 199.00  
FLOW LENGTH (FEET) = 278.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.3 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.91  
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 83.99  
PIPE TRAVEL TIME (MIN.) = 0.47 Tc (MIN.) = 12.47  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10237.00 = 3219.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 12.47  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.941  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.62 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.62 SUBAREA RUNOFF (CFS) = 2.39  
EFFECTIVE AREA (ACRES) = 57.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 57.1 PEAK FLOW RATE (CFS) = 84.33

\*\*\*\*\*

FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 199.00 DOWNSTREAM (FEET) = 197.00  
FLOW LENGTH (FEET) = 345.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.6 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.01  
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 84.33  
 PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 13.11  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.11  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.884  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.38 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.38 SUBAREA RUNOFF(CFS) = 1.97  
 EFFECTIVE AREA(ACRES) = 58.49 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 84.33  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 13.11  
 RAINFALL INTENSITY(INCH/HR) = 1.88  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 58.49  
 TOTAL STREAM AREA(ACRES) = 58.49  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 84.33

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	26.34	26.23	1.262	0.30( 0.30)	1.00	30.4	10220.00
2	84.33	13.11	1.884	0.30( 0.30)	1.00	58.5	10230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	106.00	13.11	1.884	0.30( 0.30)	1.00	73.7	10230.00
2	77.55	26.23	1.262	0.30( 0.30)	1.00	88.9	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 106.00 Tc(MIN.) = 13.11  
 EFFECTIVE AREA(ACRES) = 73.69 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 88.9  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.00 TO NODE 10239.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 197.00 DOWNSTREAM(FEET) = 193.00  
 FLOW LENGTH(FEET) = 753.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.32  
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 106.00  
 PIPE TRAVEL TIME(MIN.) = 1.35 Tc(MIN.) = 14.46  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10239.00 = 4317.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.10 TO NODE 10239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.46  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.766  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.72 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.72 SUBAREA RUNOFF(CFS) = 3.59  
 EFFECTIVE AREA(ACRES) = 76.41 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 91.6 PEAK FLOW RATE(CFS) = 106.00  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.20 TO NODE 10239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.46  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.766  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 34.37 0.30 0.991 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.991  
 SUBAREA AREA(ACRES) = 34.37 SUBAREA RUNOFF(CFS) = 45.43  
 EFFECTIVE AREA(ACRES) = 110.78 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 126.0 PEAK FLOW RATE(CFS) = 146.24

\*\*\*\*\*

FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 193.00 DOWNSTREAM(FEET) = 191.00
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 42.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.89
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 146.24
PIPE TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 14.92
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10240.00 = 4618.00 FEET.

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*****
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.92
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.725
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -       2.22   0.30  0.916 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.916
SUBAREA AREA(ACRES) = 2.22 SUBAREA RUNOFF(CFS) = 2.90
EFFECTIVE AREA(ACRES) = 113.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 128.2 PEAK FLOW RATE(CFS) = 146.24
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10240.00 TO NODE 10241.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 191.00 DOWNSTREAM(FEET) = 180.00
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.23
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 146.24
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 15.01
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10241.00 = 4768.00 FEET.

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*****
FLOW PROCESS FROM NODE 10241.00 TO NODE 10242.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 169.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 267.00 CHANNEL SLOPE = 0.0412
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.695

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -       2.16   0.30  0.958 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.958
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 147.61
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.31
AVERAGE FLOW DEPTH(FEET) = 2.18 TRAVEL TIME(MIN.) = 0.43
Tc(MIN.) = 15.44
SUBAREA AREA(ACRES) = 2.16 SUBAREA RUNOFF(CFS) = 2.74
EFFECTIVE AREA(ACRES) = 115.16 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 130.4 PEAK FLOW RATE(CFS) = 146.24
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.18 FLOW VELOCITY(FEET/SEC.) = 10.28
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

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*****
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 11
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>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<
=====

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** MAIN STREAM CONFLUENCE DATA **
STREAM   Q   Tc Intensity Fp(Fm)   Ap   Ae   HEADWATER
NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1       146.24 15.44 1.695 0.30( 0.30) 0.99 115.2 10230.00
2       106.60 28.76 1.207 0.30( 0.30) 1.00 130.4 10220.00
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

```

```

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM   Q   Tc Intensity Fp(Fm)   Ap   Ae   HEADWATER
NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1       66.25 24.81 1.295 0.30( 0.25) 0.85 70.2 10200.00
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

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```

** PEAK FLOW RATE TABLE **
STREAM   Q   Tc Intensity Fp(Fm)   Ap   Ae   HEADWATER
NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1       203.30 15.44 1.695 0.30( 0.29) 0.95 158.9 10230.00
2       184.59 24.81 1.295 0.30( 0.28) 0.94 196.1 10200.00
3       167.24 28.76 1.207 0.30( 0.28) 0.94 200.6 10220.00
TOTAL AREA(ACRES) = 200.6

```

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 203.30 Tc(MIN.) = 15.440
EFFECTIVE AREA(ACRES) = 158.86 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 200.6
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

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*****
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 12
-----

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>>>>CLEAR MEMORY BANK # 1 <<<<

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*****
FLOW PROCESS FROM NODE 10242.00 TO NODE 10256.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 169.00 DOWNSTREAM(FEET) = 163.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 315.00 CHANNEL SLOPE = 0.0190
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.663
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 9.10 0.30 0.995 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 208.89
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.40
AVERAGE FLOW DEPTH(FEET) = 2.88 TRAVEL TIME(MIN.) = 0.63
Tc(MIN.) = 16.06
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 11.18
EFFECTIVE AREA(ACRES) = 167.97 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 209.7 PEAK FLOW RATE(CFS) = 208.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.87 FLOW VELOCITY(FEET/SEC.) = 8.40
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

*****
FLOW PROCESS FROM NODE 10243.00 TO NODE 10256.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 16.06
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.663
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.01 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.01 SUBAREA RUNOFF(CFS) = 8.60
EFFECTIVE AREA(ACRES) = 174.97 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 216.7 PEAK FLOW RATE(CFS) = 216.67

*****
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 16.06

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RAINFALL INTENSITY(INCH/HR) = 1.66
AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 174.97
TOTAL STREAM AREA(ACRES) = 216.71
PEAK FLOW RATE(CFS) AT CONFLUENCE = 216.67

*****
FLOW PROCESS FROM NODE 10250.00 TO NODE 10251.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----
INITIAL SUBAREA FLOW-LENGTH(FEET) = 284.00
ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 243.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.802
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.625
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"WOODLAND,GRASS" - 1.04 0.30 1.000 0 16.80
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.24
TOTAL AREA(ACRES) = 1.04 PEAK FLOW RATE(CFS) = 1.24

*****
FLOW PROCESS FROM NODE 10251.00 TO NODE 10252.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 243.00 DOWNSTREAM ELEVATION(FEET) = 240.00
STREET LENGTH(FEET) = 301.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.03
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.27
HALFSTREET FLOOD WIDTH(FEET) = 5.78
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.94
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.53
STREET FLOW TRAVEL TIME(MIN.) = 2.59 Tc(MIN.) = 19.39
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.492

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SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.47	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 1.58  
EFFECTIVE AREA(ACRES) = 2.51 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 2.69

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 6.91  
FLOW VELOCITY(FEET/SEC.) = 2.02 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.60  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10252.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10252.00 TO NODE 10253.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 240.00 DOWNSTREAM ELEVATION(FEET) = 234.00  
STREET LENGTH(FEET) = 544.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.87

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 9.16  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.37  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.81

STREET FLOW TRAVEL TIME(MIN.) = 3.83 Tc(MIN.) = 23.22  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.350

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.60 SUBAREA RUNOFF(CFS) = 4.35  
EFFECTIVE AREA(ACRES) = 7.12 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 6.73

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.66  
FLOW VELOCITY(FEET/SEC.) = 2.53 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.94

LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10253.00 = 1129.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 234.00 DOWNSTREAM(FEET) = 219.00  
FLOW LENGTH(FEET) = 362.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.31  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 6.73  
PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 23.80  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10254.00 = 1491.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.80  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.330  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.55	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 7.93  
EFFECTIVE AREA(ACRES) = 15.66 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.7 PEAK FLOW RATE(CFS) = 14.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 10254.00 TO NODE 10255.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 219.00 DOWNSTREAM(FEET) = 182.00  
FLOW LENGTH(FEET) = 716.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.60  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 14.52  
PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 24.68  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10255.00 = 2207.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10255.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 182.00 DOWNSTREAM(FEET) = 163.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 228.00 CHANNEL SLOPE = 0.0833  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.286  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	13.88	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 20.68  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.17  
 AVERAGE FLOW DEPTH (FEET) = 0.92 TRAVEL TIME (MIN.) = 0.46  
 Tc (MIN.) = 25.14  
 SUBAREA AREA (ACRES) = 13.88 SUBAREA RUNOFF (CFS) = 12.32  
 EFFECTIVE AREA (ACRES) = 29.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 29.5 PEAK FLOW RATE (CFS) = 26.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.00 FLOW VELOCITY (FEET/SEC.) = 8.70  
 LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10256.00 = 2435.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 25.14  
 RAINFALL INTENSITY (INCH/HR) = 1.29  
 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 29.54  
 TOTAL STREAM AREA (ACRES) = 29.54  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 26.21

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	216.67	16.06	1.663	0.30 ( 0.29)	0.96	175.0	10230.00
1	190.09	25.45	1.279	0.30 ( 0.28)	0.95	212.2	10200.00
1	177.22	29.41	1.193	0.30 ( 0.28)	0.95	216.7	10220.00
2	26.21	25.14	1.286	0.30 ( 0.30)	1.00	29.5	10250.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	239.83	16.06	1.663	0.30 ( 0.29)	0.96	193.8	10230.00
2	217.18	25.14	1.286	0.30 ( 0.29)	0.95	240.5	10250.00
3	216.13	25.45	1.279	0.30 ( 0.29)	0.95	241.8	10200.00
4	200.96	29.41	1.193	0.30 ( 0.29)	0.95	246.3	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 239.83 Tc (MIN.) = 16.06  
 EFFECTIVE AREA (ACRES) = 193.85 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 246.3  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 246.3 TC (MIN.) = 16.06  
 EFFECTIVE AREA (ACRES) = 193.85 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.962  
 PEAK FLOW RATE (CFS) = 239.83

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	239.83	16.06	1.663	0.30 ( 0.29)	0.96	193.8	10230.00
2	217.18	25.14	1.286	0.30 ( 0.29)	0.95	240.5	10250.00
3	216.13	25.45	1.279	0.30 ( 0.29)	0.95	241.8	10200.00
4	200.96	29.41	1.193	0.30 ( 0.29)	0.95	246.3	10220.00

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506103E.DAT  
TIME/DATE OF STUDY: 12:44 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 3.190
- 2) 6.00; 2.880
- 3) 7.00; 2.640
- 4) 8.00; 2.450
- 5) 9.00; 2.290
- 6) 10.00; 2.160
- 7) 11.00; 2.050
- 8) 12.00; 1.950
- 9) 13.00; 1.860
- 10) 14.00; 1.790
- 11) 15.00; 1.720
- 12) 20.00; 1.460
- 13) 25.00; 1.290
- 14) 30.00; 1.160
- 15) 40.00; 0.990
- 16) 50.00; 0.870
- 17) 60.00; 0.790
- 18) 90.00; 0.630
- 19) 120.00; 0.530
- 20) 180.00; 0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10300.00 TO NODE 10301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 627.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 5.147  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.144  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "5-7 DWELLINGS/ACRE"	-	1.20	0.30	0.500	95	5.15

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.500  
 SUBAREA RUNOFF(CFS) = 3.23  
 TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 3.23

\*\*\*\*\*

FLOW PROCESS FROM NODE 10301.00 TO NODE 10302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 510.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.2609  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 3.23  
 FLOW VELOCITY(FEET/SEC.) = 6.44 FLOW DEPTH(FEET) = 0.41  
 TRAVEL TIME(MIN.) = 0.30  $T_c$ (MIN.) = 5.44  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10302.00 = 443.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10302.00 TO NODE 10302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 5.44  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.052  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.500	-



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 3.92  
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 7.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10302.00 TO NODE 10303.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 467.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.2575  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.05  
FLOW VELOCITY(FEET/SEC.) = 7.71 FLOW DEPTH(FEET) = 0.55  
TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 5.81  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10303.00 = 610.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10303.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.81  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.940  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 5.52  
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 12.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10304.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 467.00 DOWNSTREAM(FEET) = 446.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 12.30  
FLOW VELOCITY(FEET/SEC.) = 7.75 FLOW DEPTH(FEET) = 0.73  
TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 6.05  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10304.00 = 725.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10304.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.05  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.867  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.500 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 5.82  
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 17.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10305.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 446.00 DOWNSTREAM(FEET) = 366.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 423.00 CHANNEL SLOPE = 0.1891  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 17.80  
FLOW VELOCITY(FEET/SEC.) = 8.68 FLOW DEPTH(FEET) = 0.83  
TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 6.87  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10305.00 = 1148.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10305.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.87  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.672  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.912  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 7.34  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.65  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 23.86

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10306.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 300.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 574.00 CHANNEL SLOPE = 0.1150  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 23.86  
 FLOW VELOCITY (FEET/SEC.) = 7.77 FLOW DEPTH (FEET) = 1.01  
 TRAVEL TIME (MIN.) = 1.23 Tc (MIN.) = 8.10  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10306.00 = 1722.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10306.00 TO NODE 10306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 8.10  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.434  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
 SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 6.93  
 EFFECTIVE AREA (ACRES) = 14.30 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 14.3 PEAK FLOW RATE (CFS) = 28.50

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10306.00 TO NODE 10307.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 300.00 DOWNSTREAM (FEET) = 293.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0350  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 28.50  
 FLOW VELOCITY (FEET/SEC.) = 5.17 FLOW DEPTH (FEET) = 1.36  
 TRAVEL TIME (MIN.) = 0.64 Tc (MIN.) = 8.74  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10307.00 = 1922.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10307.00 TO NODE 10307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 8.74  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.331  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.28  
 EFFECTIVE AREA (ACRES) = 15.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
 TOTAL AREA (ACRES) = 15.0 PEAK FLOW RATE (CFS) = 28.50  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10307.00 TO NODE 10308.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 293.00 DOWNSTREAM (FEET) = 276.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0850  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 28.50  
 FLOW VELOCITY (FEET/SEC.) = 9.00 FLOW DEPTH (FEET) = 1.03  
 TRAVEL TIME (MIN.) = 0.37 Tc (MIN.) = 9.11  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10308.00 = 2122.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10308.00 TO NODE 10308.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 9.11  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.275  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	8.50	0.30	0.500	-
USER-DEFINED	-	3.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.696  
 SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 26.04  
 EFFECTIVE AREA (ACRES) = 29.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 29.0 PEAK FLOW RATE (CFS) = 53.73

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10308.00 TO NODE 10309.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 250.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 600.00 CHANNEL SLOPE = 0.0433  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 53.73  
 FLOW VELOCITY (FEET/SEC.) = 8.14 FLOW DEPTH (FEET) = 1.48  
 TRAVEL TIME (MIN.) = 1.23 Tc (MIN.) = 10.34  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10309.00 = 2722.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.34
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.123
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         6.00     0.30     0.600    -
USER-DEFINED        -         1.80     0.30     0.850    -
USER-DEFINED        -         1.40     0.30     1.000    -
USER-DEFINED        -         0.70     0.30     1.000    -
USER-DEFINED        -         3.40     0.30     0.500    -
USER-DEFINED        -         2.10     0.30     0.600    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.662
SUBAREA AREA(ACRES) = 15.40   SUBAREA RUNOFF(CFS) = 26.67
EFFECTIVE AREA(ACRES) = 44.40   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 44.4     PEAK FLOW RATE(CFS) = 76.41

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*****
FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.34
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.123
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.50     0.30     0.850    -
USER-DEFINED        -         8.80     0.30     1.000    -
USER-DEFINED        -         3.50     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.967
SUBAREA AREA(ACRES) = 15.80   SUBAREA RUNOFF(CFS) = 26.06
EFFECTIVE AREA(ACRES) = 60.20   AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 60.2     PEAK FLOW RATE(CFS) = 102.47

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*****
FLOW PROCESS FROM NODE 10309.00 TO NODE 10310.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 250.00   DOWNSTREAM(FEET) = 208.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1021.00   CHANNEL SLOPE = 0.0411
CHANNEL BASE(FEET) = 0.00   "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 102.47
FLOW VELOCITY(FEET/SEC.) = 9.42   FLOW DEPTH(FEET) = 1.90
TRAVEL TIME(MIN.) = 1.81   Tc(MIN.) = 12.15
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10310.00 = 3743.00 FEET.

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*****
FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.15
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.937
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     0.100    -
USER-DEFINED        -         0.10     0.30     0.500    -
USER-DEFINED        -         4.00     0.30     0.600    -
USER-DEFINED        -         1.80     0.30     0.850    -
USER-DEFINED        -         0.40     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     0.100    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.668
SUBAREA AREA(ACRES) = 6.60   SUBAREA RUNOFF(CFS) = 10.31
EFFECTIVE AREA(ACRES) = 66.80   AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.76
TOTAL AREA(ACRES) = 66.8     PEAK FLOW RATE(CFS) = 102.72

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*****
FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.15
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.937
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     0.500    -
USER-DEFINED        -         8.00     0.30     0.600    -
USER-DEFINED        -         7.10     0.30     0.850    -
USER-DEFINED        -         8.20     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814
SUBAREA AREA(ACRES) = 23.50   SUBAREA RUNOFF(CFS) = 35.80
EFFECTIVE AREA(ACRES) = 90.30   AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 90.3     PEAK FLOW RATE(CFS) = 138.52

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*****
FLOW PROCESS FROM NODE 10310.00 TO NODE 10335.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 208.00   DOWNSTREAM(FEET) = 189.00
FLOW LENGTH(FEET) = 1595.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.45
ESTIMATED PIPE DIAMETER(INCH) = 48.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 138.52
PIPE TRAVEL TIME(MIN.) = 1.98   Tc(MIN.) = 14.12
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10335.00 = 5338.00 FEET.

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*****
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 14.12
RAINFALL INTENSITY(INCH/HR) = 1.78
AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.77
EFFECTIVE STREAM AREA(ACRES) = 90.30
TOTAL STREAM AREA(ACRES) = 90.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 138.52

*****
FLOW PROCESS FROM NODE 10320.00 TO NODE 10321.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----
INITIAL SUBAREA FLOW-LENGTH( FEET) = 330.00
ELEVATION DATA: UPSTREAM( FEET) = 671.00 DOWNSTREAM( FEET) = 622.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.795
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.944
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.00 0.30 0.500 95 5.79
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 2.51
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.51

*****
FLOW PROCESS FROM NODE 10321.00 TO NODE 10322.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM( FEET) = 622.00 DOWNSTREAM( FEET) = 599.00
CHANNEL LENGTH THRU SUBAREA( FEET) = 227.00 CHANNEL SLOPE = 0.1013
CHANNEL BASE( FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH( FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.51
FLOW VELOCITY( FEET/SEC.) = 5.20 FLOW DEPTH( FEET) = 0.40
TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 6.52
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10322.00 = 557.00 FEET.

*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10322.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 6.52
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.755
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.30 0.500 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 3.28
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 5.63

*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10323.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM( FEET) = 599.00 DOWNSTREAM( FEET) = 539.00
FLOW LENGTH( FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.7 INCHES
PIPE-FLOW VELOCITY( FEET/SEC.) = 21.46
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.63
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 6.65
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10323.00 = 719.00 FEET.

*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10323.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 6.65
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.724
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.30 0.500 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.16
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 6.72

*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10324.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM( FEET) = 539.00 DOWNSTREAM( FEET) = 530.00
CHANNEL LENGTH THRU SUBAREA( FEET) = 97.00 CHANNEL SLOPE = 0.0928
CHANNEL BASE( FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH( FEET) = 1.00

```

CHANNEL FLOW THRU SUBAREA(CFS) = 6.72  
FLOW VELOCITY(FEET/SEC.) = 5.16 FLOW DEPTH(FEET) = 0.66  
TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 6.96  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10324.00 = 816.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10324.00 TO NODE 10324.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 6.96  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.649  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.80 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.05  
EFFECTIVE AREA(ACRES) = 4.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.7 PEAK FLOW RATE(CFS) = 10.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10324.00 TO NODE 10325.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 530.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 210.00 CHANNEL SLOPE = 0.1429  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.57  
FLOW VELOCITY(FEET/SEC.) = 6.80 FLOW DEPTH(FEET) = 0.72  
TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 7.48  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10325.00 = 1026.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10325.00 TO NODE 10325.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 7.48  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.549  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 3.67  
EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 13.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10325.00 TO NODE 10326.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 460.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 345.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 13.82  
FLOW VELOCITY(FEET/SEC.) = 6.74 FLOW DEPTH(FEET) = 0.83  
TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 8.33  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10326.00 = 1371.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10326.00 TO NODE 10326.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 8.33  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.397  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.90 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 3.84  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 16.79

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10326.00 TO NODE 10327.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 430.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 263.00 CHANNEL SLOPE = 0.1141  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 16.79  
FLOW VELOCITY(FEET/SEC.) = 7.07 FLOW DEPTH(FEET) = 0.89  
TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 8.95  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10327.00 = 1634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10327.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 8.95  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.298  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 7.93  
EFFECTIVE AREA (ACRES) = 12.40 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 12.4 PEAK FLOW RATE (CFS) = 23.97

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10328.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 430.00 DOWNSTREAM (FEET) = 375.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 437.00 CHANNEL SLOPE = 0.1259  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 23.97  
FLOW VELOCITY (FEET/SEC.) = 9.92 FLOW DEPTH (FEET) = 0.90  
TRAVEL TIME (MIN.) = 0.73 Tc (MIN.) = 9.68  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10328.00 = 2071.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 9.68  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.201  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.500 -  
USER-DEFINED - 1.20 0.30 0.850 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.772  
SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 5.67  
EFFECTIVE AREA (ACRES) = 15.60 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 15.6 PEAK FLOW RATE (CFS) = 28.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10329.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 375.00 DOWNSTREAM (FEET) = 372.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 224.00 CHANNEL SLOPE = 0.0134  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 28.56  
FLOW VELOCITY (FEET/SEC.) = 4.47 FLOW DEPTH (FEET) = 1.46  
TRAVEL TIME (MIN.) = 0.84 Tc (MIN.) = 10.52  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10329.00 = 2295.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10329.00 TO NODE 10329.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 10.52  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.103  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.20 0.30 0.500 -  
USER-DEFINED - 1.40 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.571  
SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 19.47  
EFFECTIVE AREA (ACRES) = 26.80 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 26.8 PEAK FLOW RATE (CFS) = 46.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10329.00 TO NODE 10330.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 372.00 DOWNSTREAM (FEET) = 300.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 452.00 CHANNEL SLOPE = 0.1593  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 46.66  
FLOW VELOCITY (FEET/SEC.) = 12.82 FLOW DEPTH (FEET) = 1.10  
TRAVEL TIME (MIN.) = 0.59 Tc (MIN.) = 11.11  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10330.00 = 2747.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10330.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 11.11  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.039  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 4.20 0.30 0.500 -  
USER-DEFINED - 2.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.673  
SUBAREA AREA (ACRES) = 7.80 SUBAREA RUNOFF (CFS) = 12.90  
EFFECTIVE AREA (ACRES) = 34.60 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 34.6 PEAK FLOW RATE (CFS) = 58.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10331.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 295.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 182.00 CHANNEL SLOPE = 0.0275  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 58.02  
FLOW VELOCITY(FEET/SEC.) = 7.02 FLOW DEPTH(FEET) = 1.66  
TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 11.54  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10331.00 = 2929.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10331.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 11.54  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.996  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.850	-
USER-DEFINED	-	11.30	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	4.20	0.30	0.850	-
USER-DEFINED	-	1.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.652  
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 30.79  
EFFECTIVE AREA(ACRES) = 53.60 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 53.6 PEAK FLOW RATE(CFS) = 87.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10332.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 295.00 DOWNSTREAM(FEET) = 245.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.00 CHANNEL SLOPE = 0.0542  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 87.46  
FLOW VELOCITY(FEET/SEC.) = 10.02 FLOW DEPTH(FEET) = 1.71  
TRAVEL TIME(MIN.) = 1.53 Tc(MIN.) = 13.07  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10332.00 = 3851.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10332.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 13.07  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.855  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 1.40 0.30 0.500 -  
USER-DEFINED - 15.40 0.30 0.850 -  
USER-DEFINED - 8.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.881  
SUBAREA AREA(ACRES) = 25.60 SUBAREA RUNOFF(CFS) = 36.65  
EFFECTIVE AREA(ACRES) = 79.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 79.2 PEAK FLOW RATE(CFS) = 117.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10333.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 199.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 564.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 117.30  
FLOW VELOCITY(FEET/SEC.) = 12.55 FLOW DEPTH(FEET) = 1.77  
TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 13.82  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10333.00 = 4415.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10333.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 13.82  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.802  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.500	-
USER-DEFINED	-	0.50	0.30	0.850	-
USER-DEFINED	-	0.60	0.30	0.500	-
USER-DEFINED	-	5.70	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.761  
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 11.76  
EFFECTIVE AREA(ACRES) = 87.50 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 87.5 PEAK FLOW RATE(CFS) = 125.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10334.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 195.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 454.00 CHANNEL SLOPE = 0.0088  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 125.32

FLOW VELOCITY(FEET/SEC.) = 5.55 FLOW DEPTH(FEET) = 2.74  
TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 15.19  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10334.00 = 4869.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10334.00 TO NODE 10334.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.19  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.710  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.800 -  
USER-DEFINED - 2.60 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 4.86  
EFFECTIVE AREA(ACRES) = 91.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71  
TOTAL AREA(ACRES) = 91.2 PEAK FLOW RATE(CFS) = 125.32  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10334.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 195.00 DOWNSTREAM(FEET) = 189.00  
FLOW LENGTH(FEET) = 1291.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.12  
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 125.32  
PIPE TRAVEL TIME(MIN.) = 2.36 Tc(MIN.) = 17.55  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 17.55  
RAINFALL INTENSITY(INCH/HR) = 1.59  
AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.71  
EFFECTIVE STREAM AREA(ACRES) = 91.20  
TOTAL STREAM AREA(ACRES) = 91.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 125.32

\*\* CONFLUENCE DATA \*\*

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
--------	---	----	-----------	--------	----	----	-----------

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	138.52	14.12	1.781	0.30( 0.23)	0.77	90.3 10300.00
2	125.32	17.55	1.588	0.30( 0.21)	0.71	91.2 10320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	253.60	14.12	1.781	0.30( 0.22)	0.75	163.7	10300.00
2	246.50	17.55	1.588	0.30( 0.22)	0.74	181.5	10320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 253.60 Tc(MIN.) = 14.12  
EFFECTIVE AREA(ACRES) = 163.71 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA(ACRES) = 181.5  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10336.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 189.00 DOWNSTREAM(FEET) = 188.00  
FLOW LENGTH(FEET) = 103.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.52  
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 253.60  
PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 14.24  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10336.00 = 6263.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10336.00 TO NODE 10337.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.99  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 253.60  
PIPE TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 14.39  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10337.00 = 6475.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10337.00 TO NODE 10338.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 161.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0218



CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 253.60  
FLOW VELOCITY (FEET/SEC.) = 9.29 FLOW DEPTH (FEET) = 3.02  
TRAVEL TIME (MIN.) = 1.56 Tc (MIN.) = 15.95  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10338.00 = 7347.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 15.95  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.670  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.943  
SUBAREA AREA (ACRES) = 4.20 SUBAREA RUNOFF (CFS) = 5.25  
EFFECTIVE AREA (ACRES) = 167.91 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 185.7 PEAK FLOW RATE (CFS) = 253.60  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 15.95  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.670  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 6.17  
EFFECTIVE AREA (ACRES) = 172.91 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 190.7 PEAK FLOW RATE (CFS) = 253.60  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10339.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 161.00 DOWNSTREAM (FEET) = 159.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 328.00 CHANNEL SLOPE = 0.0061  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 253.60  
FLOW VELOCITY (FEET/SEC.) = 5.75 FLOW DEPTH (FEET) = 3.83  
TRAVEL TIME (MIN.) = 0.95 Tc (MIN.) = 16.90  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10339.00 = 7675.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 16.90  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.621  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.500	-
USER-DEFINED	-	2.30	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.767  
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 8.64  
EFFECTIVE AREA (ACRES) = 179.81 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 253.60  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 16.90  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.621  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.500	-
USER-DEFINED	-	6.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.876  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 11.25  
EFFECTIVE AREA (ACRES) = 189.01 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 206.8 PEAK FLOW RATE (CFS) = 253.60  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10390.00 IS CODE = 51

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 159.00 DOWNSTREAM(FEET) = 155.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 782.00 CHANNEL SLOPE = 0.0051
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 253.60
FLOW VELOCITY(FEET/SEC.) = 5.40 FLOW DEPTH(FEET) = 3.96
TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 19.32
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.32
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.495
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.30   0.30   0.800   -
USER-DEFINED        -         3.70   0.30   0.850   -
USER-DEFINED        -         0.10   0.30   1.000   -
USER-DEFINED        -         2.10   0.30   1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.901
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 6.84
EFFECTIVE AREA(ACRES) = 195.21 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 213.0 PEAK FLOW RATE(CFS) = 253.60
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
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*****
FLOW PROCESS FROM NODE 10340.00 TO NODE 10341.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 585.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.581
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.096
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE"   -         0.10   0.30   0.800   95   10.58
PUBLIC PARK         -         0.50   0.30   0.850   95   10.90

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AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW" - 0.40 0.30 1.000 95 21.09
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA RUNOFF(CFS) = 1.64
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 1.64

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*****
FLOW PROCESS FROM NODE 10341.00 TO NODE 10342.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====

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UPSTREAM ELEVATION(FEET) = 585.00 DOWNSTREAM ELEVATION(FEET) = 570.00
STREET LENGTH(FEET) = 250.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.27
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.24
HALFSTREET FLOOD WIDTH(FEET) = 4.11
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.56
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.10
STREET FLOW TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 11.49
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.001
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70   0.30   0.800   -
USER-DEFINED        -         1.40   0.30   1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 3.25
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 4.81

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 5.68
FLOW VELOCITY(FEET/SEC.) = 4.69 DEPTH*VELOCITY(FT*FT/SEC.) = 1.28
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10342.00 = 558.00 FEET.

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*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
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*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
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UPSTREAM ELEVATION(FEET) = 570.00 DOWNSTREAM ELEVATION(FEET) = 560.00  
STREET LENGTH(FEET) = 415.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.51

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.33  
HALFSTREET FLOOD WIDTH(FEET) = 8.73  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.42  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.14  
STREET FLOW TRAVEL TIME(MIN.) = 2.02 Tc(MIN.) = 13.51

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.824

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.800	-
USER-DEFINED	-	1.20	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.825

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 3.41  
EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 7.72

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 9.49  
FLOW VELOCITY(FEET/SEC.) = 3.54 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.23  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10343.00 = 973.00 FEET.

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FLOW PROCESS FROM NODE 10343.00 TO NODE 10344.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 560.00 DOWNSTREAM ELEVATION(FEET) = 550.00  
STREET LENGTH(FEET) = 616.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.53

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.47  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.17  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.23  
STREET FLOW TRAVEL TIME(MIN.) = 3.24 Tc(MIN.) = 16.76

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.629

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.30	0.800	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 3.61  
EFFECTIVE AREA(ACRES) = 8.40 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 10.37

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 11.88  
FLOW VELOCITY(FEET/SEC.) = 3.24 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.28  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10344.00 = 1589.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10344.00 TO NODE 10345.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 550.00 DOWNSTREAM ELEVATION(FEET) = 510.00  
STREET LENGTH(FEET) = 474.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.15

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.33  
HALFSTREET FLOOD WIDTH(FEET) = 8.73  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.39  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.13  
STREET FLOW TRAVEL TIME(MIN.) = 1.24 Tc(MIN.) = 18.00

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.564

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.80	0.30	0.800	-

USER-DEFINED - 0.20 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803  
SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 3.57  
EFFECTIVE AREA (ACRES) = 11.40 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA (ACRES) = 11.4 PEAK FLOW RATE (CFS) = 13.45

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.34 HALFSTREET FLOOD WIDTH (FEET) = 9.19  
FLOW VELOCITY (FEET/SEC.) = 6.51 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.23  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10345.00 = 2063.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10345.00 TO NODE 10346.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 510.00 DOWNSTREAM ELEVATION (FEET) = 484.00  
STREET LENGTH (FEET) = 231.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.54

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 14.86  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.34  
HALFSTREET FLOOD WIDTH (FEET) = 8.98  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.45  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.52  
STREET FLOW TRAVEL TIME (MIN.) = 0.52 Tc (MIN.) = 18.51  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.537

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.40 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 2.40 SUBAREA RUNOFF (CFS) = 2.80  
EFFECTIVE AREA (ACRES) = 13.80 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA (ACRES) = 13.8 PEAK FLOW RATE (CFS) = 15.98

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.34 HALFSTREET FLOOD WIDTH (FEET) = 9.29  
FLOW VELOCITY (FEET/SEC.) = 7.60 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.61  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10346.00 = 2294.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10346.00 TO NODE 10347.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 484.00 DOWNSTREAM ELEVATION (FEET) = 378.00  
STREET LENGTH (FEET) = 995.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.55

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.19  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.36  
HALFSTREET FLOOD WIDTH (FEET) = 10.00  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.65  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.74  
STREET FLOW TRAVEL TIME (MIN.) = 2.17 Tc (MIN.) = 20.68  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.437

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 4.42  
EFFECTIVE AREA (ACRES) = 17.90 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA (ACRES) = 17.9 PEAK FLOW RATE (CFS) = 19.15

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.36 HALFSTREET FLOOD WIDTH (FEET) = 10.25  
FLOW VELOCITY (FEET/SEC.) = 7.72 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.80  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10347.00 = 3289.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10347.00 TO NODE 10348.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 378.00 DOWNSTREAM ELEVATION (FEET) = 303.00  
STREET LENGTH (FEET) = 751.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.56

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.37

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.37  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.88  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.04

STREET FLOW TRAVEL TIME(MIN.) = 1.59 Tc(MIN.) = 22.27

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.383

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.20	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 8.43  
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 26.71

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 12.08  
FLOW VELOCITY(FEET/SEC.) = 8.10 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.24  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10348.00 = 4040.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10348.00 TO NODE 10349.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 303.00 DOWNSTREAM ELEVATION(FEET) = 252.00  
STREET LENGTH(FEET) = 607.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.79

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.43  
HALFSTREET FLOOD WIDTH(FEET) = 13.50  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.90  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.38

STREET FLOW TRAVEL TIME(MIN.) = 1.28 Tc(MIN.) = 23.55

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.339

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.30	0.30	0.800	-
USER-DEFINED	-	3.00	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.815  
SUBAREA AREA(ACRES) = 10.30 SUBAREA RUNOFF(CFS) = 10.15  
EFFECTIVE AREA(ACRES) = 36.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 36.4 PEAK FLOW RATE(CFS) = 35.84

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 14.21  
FLOW VELOCITY(FEET/SEC.) = 8.11 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.59  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10349.00 = 4647.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10349.00 TO NODE 10350.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 252.00 DOWNSTREAM ELEVATION(FEET) = 246.00  
STREET LENGTH(FEET) = 224.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.18

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.54  
HALFSTREET FLOOD WIDTH(FEET) = 19.19  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.45  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.95

STREET FLOW TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 24.23

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.316

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	12.60	0.30	0.800	-
USER-DEFINED	-	0.50	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.802  
SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 12.68  
EFFECTIVE AREA(ACRES) = 49.50 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 49.5 PEAK FLOW RATE(CFS) = 47.76

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.56 HALFSTREET FLOOD WIDTH(FEET) = 20.13

FLOW VELOCITY(FEET/SEC.) = 5.63 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.16  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10350.00 = 4871.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10350.00 TO NODE 10351.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 237.00  
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.86  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 47.76  
PIPE TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 24.96  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10351.00 = 5390.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10351.00 TO NODE 10351.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 24.96  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.291  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	5.60	0.30	0.800	-
USER-DEFINED	-	0.70	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.784  
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 6.18  
EFFECTIVE AREA(ACRES) = 56.00 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 56.0 PEAK FLOW RATE(CFS) = 52.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10351.00 TO NODE 10352.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 237.00 DOWNSTREAM(FEET) = 230.00  
FLOW LENGTH(FEET) = 675.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.17  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 52.83  
PIPE TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 26.07  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10352.00 = 6065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 26.07  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.262  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.300  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.48  
EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 52.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 26.07  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.262  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	0.100	-
USER-DEFINED	-	9.40	0.30	0.800	-
USER-DEFINED	-	1.10	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755  
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 10.53  
EFFECTIVE AREA(ACRES) = 68.70 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
TOTAL AREA(ACRES) = 68.7 PEAK FLOW RATE(CFS) = 63.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10352.00 TO NODE 10353.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 230.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 30.34  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 63.38  
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 26.23  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10353.00 = 6366.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10353.00 TO NODE 10353.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 26.23  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.258  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL	AREA	Fp	Ap	SCS
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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 6.00 0.30 0.800 -  
 USER-DEFINED - 1.30 0.30 0.850 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.799  
 SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 6.78  
 EFFECTIVE AREA(ACRES) = 76.10 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 76.1 PEAK FLOW RATE(CFS) = 69.89

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10353.00 TO NODE 10354.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 172.00  
 FLOW LENGTH(FEET) = 458.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.24  
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 69.89  
 PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 26.81  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10354.00 = 6824.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10354.00 TO NODE 10390.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----

ELEVATION DATA: UPSTREAM(FEET) = 172.00 DOWNSTREAM(FEET) = 155.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00 CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 69.89  
 FLOW VELOCITY(FEET/SEC.) = 8.53 FLOW DEPTH(FEET) = 1.65  
 TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 27.62  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----

MAINLINE Tc(MIN.) = 27.62  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.222  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 0.100 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.100 -  
 USER-DEFINED - 0.90 0.30 0.850 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 1.92  
 EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
 TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 69.89  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----

MAINLINE Tc(MIN.) = 27.62  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.222  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 2.10 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.964  
 SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 3.19  
 EFFECTIVE AREA(ACRES) = 81.90 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 81.9 PEAK FLOW RATE(CFS) = 72.53

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----

MAINLINE Tc(MIN.) = 27.62  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.222  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.50 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 2.07  
 EFFECTIVE AREA(ACRES) = 84.40 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 84.4 PEAK FLOW RATE(CFS) = 74.61

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
 -----

\*\* MAIN STREAM CONFLUENCE DATA \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 74.61 27.62 1.222 0.30( 0.24) 0.80 84.4 10340.00  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	253.60	19.32	1.495	0.30 ( 0.23)	0.77	195.2	10300.00
2	246.50	22.78	1.366	0.30 ( 0.23)	0.76	213.0	10320.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	320.32	19.32	1.495	0.30 ( 0.23)	0.78	254.2	10300.00
2	317.03	22.78	1.366	0.30 ( 0.23)	0.77	282.6	10320.00
3	289.96	27.62	1.222	0.30 ( 0.23)	0.77	297.4	10340.00

TOTAL AREA (ACRES) = 297.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 320.32 Tc (MIN.) = 19.317  
EFFECTIVE AREA (ACRES) = 254.24 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
TOTAL AREA (ACRES) = 297.4  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10360.00 TO NODE 10361.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
ELEVATION DATA: UPSTREAM (FEET) = 337.00 DOWNSTREAM (FEET) = 292.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.697

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.083

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.30	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"GRASS"	-	0.50	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.10	0.30	1.000	95	10.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 1.44  
TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 1.44

\*\*\*\*\*

FLOW PROCESS FROM NODE 10361.00 TO NODE 10362.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 292.00 DOWNSTREAM (FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 199.00 CHANNEL SLOPE = 0.0101  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 1.44  
FLOW VELOCITY (FEET/SEC.) = 1.92 FLOW DEPTH (FEET) = 0.50  
TRAVEL TIME (MIN.) = 1.73 Tc (MIN.) = 12.42  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10362.00 = 529.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.42

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.912

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986

SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 1.60

EFFECTIVE AREA (ACRES) = 2.00 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 2.91

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10363.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 290.00 DOWNSTREAM (FEET) = 288.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.91  
FLOW VELOCITY (FEET/SEC.) = 2.56 FLOW DEPTH (FEET) = 0.62  
TRAVEL TIME (MIN.) = 0.96 Tc (MIN.) = 13.38  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10363.00 = 676.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10363.00 TO NODE 10363.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<



MAINLINE Tc(MIN.) = 13.38  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.833  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 3.32  
 EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 6.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10363.00 TO NODE 10364.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 288.00 DOWNSTREAM(FEET) = 286.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 6.08  
 FLOW VELOCITY(FEET/SEC.) = 3.06 FLOW DEPTH(FEET) = 0.81  
 TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 14.18  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10364.00 = 823.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10364.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.18  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.777  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
 SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 2.53  
 EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 8.40

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10365.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 286.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.40  
 FLOW VELOCITY(FEET/SEC.) = 2.73 FLOW DEPTH(FEET) = 1.01  
 TRAVEL TIME(MIN.) = 1.51 Tc(MIN.) = 15.69  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10365.00 = 1071.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10365.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.69  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.684  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.50	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 4.37  
 EFFECTIVE AREA(ACRES) = 9.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 12.24

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10366.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 12.24  
 FLOW VELOCITY(FEET/SEC.) = 3.01 FLOW DEPTH(FEET) = 1.16  
 TRAVEL TIME(MIN.) = 1.37 Tc(MIN.) = 17.07  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10366.00 = 1319.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10366.00 TO NODE 10366.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.07  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.613  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	2.30	0.30	1.000	-

USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 2.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995  
SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 10.05  
EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 21.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 10366.00 TO NODE 10367.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 279.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 292.00 CHANNEL SLOPE = 0.0103  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 21.66  
FLOW VELOCITY (FEET/SEC.) = 3.77 FLOW DEPTH (FEET) = 1.38  
TRAVEL TIME (MIN.) = 1.29 Tc (MIN.) = 18.36  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10367.00 = 1611.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10367.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 18.36

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.545

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972

SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 1.81

EFFECTIVE AREA (ACRES) = 19.90 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 19.9 PEAK FLOW RATE (CFS) = 22.36

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10368.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 279.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 378.00 CHANNEL SLOPE = 0.0079  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 22.36  
FLOW VELOCITY (FEET/SEC.) = 3.46 FLOW DEPTH (FEET) = 1.47

TRAVEL TIME (MIN.) = 1.82 Tc (MIN.) = 20.18  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10368.00 = 1989.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10368.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 20.18

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.454

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.973  
SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 2.30  
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 23.03

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10369.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 247.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 229.00 CHANNEL SLOPE = 0.1266  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 23.03  
FLOW VELOCITY (FEET/SEC.) = 9.86 FLOW DEPTH (FEET) = 0.88  
TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 20.56  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10369.00 = 2218.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10369.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 20.56

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.441

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	9.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996  
SUBAREA AREA (ACRES) = 11.60 SUBAREA RUNOFF (CFS) = 11.92  
EFFECTIVE AREA (ACRES) = 33.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 33.7 PEAK FLOW RATE (CFS) = 34.69

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10370.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 247.00 DOWNSTREAM(FEET) = 226.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 179.00 CHANNEL SLOPE = 0.1173
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 34.69
FLOW VELOCITY(FEET/SEC.) = 10.64 FLOW DEPTH(FEET) = 1.04
TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 20.84
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10370.00 = 2397.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10370.00 TO NODE 10370.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.84

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.431

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 0.850 -
USER-DEFINED - 3.60 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 5.60 0.30 1.000 -
USER-DEFINED - 1.50 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997

SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 11.31

EFFECTIVE AREA(ACRES) = 44.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 44.8 PEAK FLOW RATE(CFS) = 45.71

\*\*\*\*\*

FLOW PROCESS FROM NODE 10370.00 TO NODE 10371.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 226.00 DOWNSTREAM(FEET) = 188.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 434.00 CHANNEL SLOPE = 0.0876
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 45.71
FLOW VELOCITY(FEET/SEC.) = 10.18 FLOW DEPTH(FEET) = 1.22
TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 21.55
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10371.00 = 2831.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10371.00 TO NODE 10371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.55

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.407

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 0.100 -
USER-DEFINED - 1.20 0.30 0.850 -
USER-DEFINED - 1.60 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 0.20 0.30 0.100 -
USER-DEFINED - 7.20 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958

SUBAREA AREA(ACRES) = 10.70 SUBAREA RUNOFF(CFS) = 10.78

EFFECTIVE AREA(ACRES) = 55.50 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 55.5 PEAK FLOW RATE(CFS) = 55.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 10371.00 TO NODE 10389.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 157.00
FLOW LENGTH(FEET) = 1918.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.10
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 55.52
PIPE TRAVEL TIME(MIN.) = 2.64 Tc(MIN.) = 24.20
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 24.20
RAINFALL INTENSITY(INCH/HR) = 1.32
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.99
EFFECTIVE STREAM AREA(ACRES) = 55.50
TOTAL STREAM AREA(ACRES) = 55.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 55.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 10380.00 TO NODE 10381.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 241.00
ELEVATION DATA: UPSTREAM(FEET) = 275.00 DOWNSTREAM(FEET) = 273.00

Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.110  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.619  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.30	0.100	95	7.11
PUBLIC PARK	-	1.10	0.30	0.850	95	11.30

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.735  
 SUBAREA RUNOFF(CFS) = 2.81  
 TOTAL AREA(ACRES) = 1.30 PEAK FLOW RATE(CFS) = 2.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10381.00 TO NODE 10382.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 273.00 DOWNSTREAM ELEVATION(FEET) = 271.00  
 STREET LENGTH(FEET) = 238.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.39  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.35  
 HALFSTREET FLOOD WIDTH(FEET) = 9.34  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.07  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.71  
 STREET FLOW TRAVEL TIME(MIN.) = 1.92 Tc(MIN.) = 9.03  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.286

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	1.40	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.718  
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 3.17  
 EFFECTIVE AREA(ACRES) = 3.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 5.59

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.43  
 FLOW VELOCITY(FEET/SEC.) = 2.19 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.80  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10382.00 = 479.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10382.00 TO NODE 10383.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 271.00 DOWNSTREAM ELEVATION(FEET) = 268.00  
 STREET LENGTH(FEET) = 357.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.10  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.40  
 HALFSTREET FLOOD WIDTH(FEET) = 12.30  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.38  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.96  
 STREET FLOW TRAVEL TIME(MIN.) = 2.50 Tc(MIN.) = 11.53  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.997

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	1.30	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.452  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.03  
 EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 9.83

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 13.40  
 FLOW VELOCITY(FEET/SEC.) = 2.48 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.06  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10383.00 = 836.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10383.00 TO NODE 10384.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 268.00 DOWNSTREAM ELEVATION(FEET) = 264.00  
 STREET LENGTH(FEET) = 473.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.91  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.46  
 HALFSTREET FLOOD WIDTH(FEET) = 14.96  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.66  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.22  
 STREET FLOW TRAVEL TIME(MIN.) = 2.96 Tc(MIN.) = 14.50  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.755

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.60	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 6.16  
 EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.57  
 TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 14.68

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 15.82  
 FLOW VELOCITY(FEET/SEC.) = 2.73 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.29  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10384.00 = 1309.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10384.00 TO NODE 10385.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 264.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
 STREET LENGTH(FEET) = 463.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.71  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.53  
 HALFSTREET FLOOD WIDTH(FEET) = 18.40  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.62  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.38  
 STREET FLOW TRAVEL TIME(MIN.) = 2.95 Tc(MIN.) = 17.44  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.593

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.600	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.650  
 SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 8.05  
 EFFECTIVE AREA(ACRES) = 16.70 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.7 PEAK FLOW RATE(CFS) = 21.23

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 19.34  
 FLOW VELOCITY(FEET/SEC.) = 2.70 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.47  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10385.00 = 1772.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10385.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 17.44  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.593  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.26  
 EFFECTIVE AREA(ACRES) = 16.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.9 PEAK FLOW RATE(CFS) = 21.49

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10386.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 261.00 DOWNSTREAM(FEET) = 200.00  
 FLOW LENGTH(FEET) = 712.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 18.05  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 21.49  
 PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 18.10

LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10386.00 = 2484.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.10

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.561

SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.75

EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60

TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 22.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.10

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	1.70	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.544

SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 5.15

EFFECTIVE AREA(ACRES) = 22.40 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59

TOTAL AREA(ACRES) = 22.4 PEAK FLOW RATE(CFS) = 27.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.10

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

USER-DEFINED	-	2.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223

SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 4.70

EFFECTIVE AREA(ACRES) = 25.90 AREA-AVERAGED Fm(INCH/HR) = 0.16

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54

TOTAL AREA(ACRES) = 25.9 PEAK FLOW RATE(CFS) = 32.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.10

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.228

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 2.68

EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52

TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 35.25

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.10

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	0.850	-
USER-DEFINED	-	2.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225

SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 4.03

EFFECTIVE AREA(ACRES) = 30.90 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49

TOTAL AREA(ACRES) = 30.9 PEAK FLOW RATE(CFS) = 39.28

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.10
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.559
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.00 0.30 0.100 -
USER-DEFINED - 1.50 0.30 0.600 -
USER-DEFINED - 1.70 0.30 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.204
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 9.70
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 48.98

\*\*\*\*\*
FLOW PROCESS FROM NODE 10386.00 TO NODE 10387.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 200.00 DOWNSTREAM(FEET) = 163.00
FLOW LENGTH(FEET) = 1145.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.08
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 48.98
PIPE TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 19.37
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10387.00 = 3629.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.37
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.493
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.30 0.100 -
USER-DEFINED - 23.80 0.30 0.850 -
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 0.80 0.30 1.000 -
USER-DEFINED - 0.60 0.30 0.100 -
USER-DEFINED - 6.90 0.30 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.830
SUBAREA AREA(ACRES) = 32.90 SUBAREA RUNOFF(CFS) = 36.83
EFFECTIVE AREA(ACRES) = 71.00 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62
TOTAL AREA(ACRES) = 71.0 PEAK FLOW RATE(CFS) = 83.56

\*\*\*\*\*
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.37
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.493
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 0.20 0.30 0.850 -
USER-DEFINED - 1.20 0.30 0.100 -
USER-DEFINED - 1.70 0.30 0.850 -
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.641
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 4.45
EFFECTIVE AREA(ACRES) = 74.80 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62
TOTAL AREA(ACRES) = 74.8 PEAK FLOW RATE(CFS) = 88.01

\*\*\*\*\*
FLOW PROCESS FROM NODE 10387.00 TO NODE 10388.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 163.00 DOWNSTREAM(FEET) = 158.00
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.56
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 88.01
PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 19.51
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10388.00 = 3779.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.51
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.486
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.80 0.30 0.100 -
USER-DEFINED - 0.40 0.30 0.400 -
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 7.79
EFFECTIVE AREA(ACRES) = 80.90 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59
TOTAL AREA(ACRES) = 80.9 PEAK FLOW RATE(CFS) = 95.30

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*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.51
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.486
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.30     0.100    -
USER-DEFINED        -        10.70     0.30     0.400    -
USER-DEFINED        -         2.30     0.30     0.850    -
USER-DEFINED        -         0.50     0.30     1.000    -
USER-DEFINED        -         0.30     0.30     1.000    -
USER-DEFINED        -         0.70     0.30     0.400    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.502
SUBAREA AREA(ACRES) = 14.60   SUBAREA RUNOFF(CFS) = 17.54
EFFECTIVE AREA(ACRES) = 95.50   AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 95.5     PEAK FLOW RATE(CFS) = 112.84

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.51
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.486
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70     0.30     0.850    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.70   SUBAREA RUNOFF(CFS) = 0.78
EFFECTIVE AREA(ACRES) = 96.20   AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 96.2     PEAK FLOW RATE(CFS) = 113.62

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10389.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 158.00   DOWNSTREAM(FEET) = 157.00
FLOW LENGTH(FEET) = 51.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.59
ESTIMATED PIPE DIAMETER(INCH) = 42.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 113.62
PIPE TRAVEL TIME(MIN.) = 0.05   Tc(MIN.) = 19.56
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10389.00 = 3830.00 FEET.

*****
FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1

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-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 19.56
RAINFALL INTENSITY(INCH/HR) = 1.48
AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.58
EFFECTIVE STREAM AREA(ACRES) = 96.20
TOTAL STREAM AREA(ACRES) = 96.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 113.62

** CONFLUENCE DATA **
STREAM   Q      Tc   Intensity   Fp(Fm)   Ap   Ae   HEADWATER
NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1        55.52 24.20 1.317 0.30( 0.30) 0.99 55.5 10360.00
2       113.62 19.56 1.483 0.30( 0.17) 0.58 96.2 10380.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM   Q      Tc   Intensity   Fp(Fm)   Ap   Ae   HEADWATER
NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1       165.77 19.56 1.483 0.30( 0.21) 0.71 141.1 10380.00
2       154.79 24.20 1.317 0.30( 0.22) 0.73 151.7 10360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 165.77   Tc(MIN.) = 19.56
EFFECTIVE AREA(ACRES) = 141.07   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 151.7
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

*****
FLOW PROCESS FROM NODE 10389.00 TO NODE 10390.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 157.00   DOWNSTREAM(FEET) = 155.00
FLOW LENGTH(FEET) = 312.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 44.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.09
ESTIMATED PIPE DIAMETER(INCH) = 57.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 165.77
PIPE TRAVEL TIME(MIN.) = 0.47   Tc(MIN.) = 20.03
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.03

```



\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.459  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 5.70 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.997  
 SUBAREA AREA (ACRES) = 9.50 SUBAREA RUNOFF (CFS) = 9.92  
 EFFECTIVE AREA (ACRES) = 150.57 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 161.2 PEAK FLOW RATE (CFS) = 168.21

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 20.03  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.459  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.20 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 2.29  
 EFFECTIVE AREA (ACRES) = 152.77 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 163.4 PEAK FLOW RATE (CFS) = 170.50

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	170.50	20.03	1.459	0.30 ( 0.22)	0.73	152.8	10380.00
2	158.45	24.67	1.301	0.30 ( 0.22)	0.75	163.4	10360.00

LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	320.32	19.32	1.495	0.30 ( 0.23)	0.78	254.2	10300.00
2	317.03	22.78	1.366	0.30 ( 0.23)	0.77	282.6	10320.00
3	289.96	27.62	1.222	0.30 ( 0.23)	0.77	297.4	10340.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM	Q	Tc	Intensity	Fp (Fm)	Ap	Ae	HEADWATER
--------	---	----	-----------	---------	----	----	-----------

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	489.59	19.32	1.495	0.30 ( 0.23)	0.76	401.6 10300.00
2	490.14	20.03	1.459	0.30 ( 0.23)	0.76	412.9 10380.00
3	480.40	22.78	1.366	0.30 ( 0.23)	0.76	441.7 10320.00
4	464.91	24.67	1.301	0.30 ( 0.23)	0.76	451.8 10360.00
5	436.74	27.62	1.222	0.30 ( 0.23)	0.76	460.8 10340.00
TOTAL AREA (ACRES) =			460.8			

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 490.14 Tc (MIN.) = 20.033  
 EFFECTIVE AREA (ACRES) = 412.87 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA (ACRES) = 460.8  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12  
 -----

>>>>CLEAR MEMORY BANK # 1<<<<

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 460.8 TC (MIN.) = 20.03  
 EFFECTIVE AREA (ACRES) = 412.87 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.758  
 PEAK FLOW RATE (CFS) = 490.14

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	489.59	19.32	1.495	0.30 ( 0.23)	0.76	401.6	10300.00
2	490.14	20.03	1.459	0.30 ( 0.23)	0.76	412.9	10380.00
3	480.40	22.78	1.366	0.30 ( 0.23)	0.76	441.7	10320.00
4	464.91	24.67	1.301	0.30 ( 0.23)	0.76	451.8	10360.00
5	436.74	27.62	1.222	0.30 ( 0.23)	0.76	460.8	10340.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506104E.DAT  
TIME/DATE OF STUDY: 12:47 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 3.190
- 2) 6.00; 2.880
- 3) 7.00; 2.640
- 4) 8.00; 2.450
- 5) 9.00; 2.290
- 6) 10.00; 2.160
- 7) 11.00; 2.050
- 8) 12.00; 1.950
- 9) 13.00; 1.860
- 10) 14.00; 1.790
- 11) 15.00; 1.720
- 12) 20.00; 1.460
- 13) 25.00; 1.290
- 14) 30.00; 1.160
- 15) 40.00; 0.990
- 16) 50.00; 0.870
- 17) 60.00; 0.790
- 18) 90.00; 0.630
- 19) 120.00; 0.530
- 20) 180.00; 0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10400.00 TO NODE 10401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00  
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.434  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.776  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
PUBLIC PARK	-	0.50	0.30	0.850	95	6.43

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.850  
 SUBAREA RUNOFF(CFS) = 1.13  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.13

\*\*\*\*\*

FLOW PROCESS FROM NODE 10401.00 TO NODE 10402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.3419  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.13  
 FLOW VELOCITY(FEET/SEC.) = 5.42 FLOW DEPTH(FEET) = 0.26  
 TRAVEL TIME(MIN.) = 0.36  $T_c$ (MIN.) = 6.79  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10402.00 = 424.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 6.79  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.690  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.940  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.08  
EFFECTIVE AREA(ACRES) = 1.00 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 2.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10402.00 TO NODE 10403.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.2439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.18  
FLOW VELOCITY(FEET/SEC.) = 5.56 FLOW DEPTH(FEET) = 0.36  
TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 7.16  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10403.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10403.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.16  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.609  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.89  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 4.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10404.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 420.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 266.00 CHANNEL SLOPE = 0.1880  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.00  
FLOW VELOCITY(FEET/SEC.) = 5.88 FLOW DEPTH(FEET) = 0.48  
TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 7.92  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10404.00 = 813.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.92  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.466  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.863  
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 4.57  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 8.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10405.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 370.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 289.00 CHANNEL SLOPE = 0.1730  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 8.32  
FLOW VELOCITY(FEET/SEC.) = 6.98 FLOW DEPTH(FEET) = 0.63  
TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 8.61  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10405.00 = 1102.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.61  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.353  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 7.55  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 15.45

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10406.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 367.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 23.00 CHANNEL SLOPE = 0.1304

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 15.45  
FLOW VELOCITY (FEET/SEC.) = 7.26 FLOW DEPTH (FEET) = 0.84  
TRAVEL TIME (MIN.) = 0.05 Tc (MIN.) = 8.66  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10406.00 = 1125.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.66  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.345  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 3.95  
EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 19.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 367.00 DOWNSTREAM (FEET) = 344.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 214.00 CHANNEL SLOPE = 0.1075  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 19.33  
FLOW VELOCITY (FEET/SEC.) = 7.16 FLOW DEPTH (FEET) = 0.95  
TRAVEL TIME (MIN.) = 0.50 Tc (MIN.) = 9.16  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10407.00 = 1339.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.16  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.270  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 3.63  
EFFECTIVE AREA (ACRES) = 12.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 22.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 344.00 DOWNSTREAM (FEET) = 327.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 919.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 22.27  
FLOW VELOCITY (FEET/SEC.) = 4.76 FLOW DEPTH (FEET) = 1.25  
TRAVEL TIME (MIN.) = 3.22 Tc (MIN.) = 12.37  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10408.00 = 2258.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10408.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 12.37  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.916  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.800 -  
USER-DEFINED - 7.90 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.849  
SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 11.96  
EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 30.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 327.00 DOWNSTREAM (FEET) = 314.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 807.00 CHANNEL SLOPE = 0.0161  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 30.32  
FLOW VELOCITY (FEET/SEC.) = 4.88 FLOW DEPTH (FEET) = 1.44  
TRAVEL TIME (MIN.) = 2.76 Tc (MIN.) = 15.13  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10409.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10409.00 TO NODE 10409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.13  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.713  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.90 0.30 0.800 -  
 USER-DEFINED - 5.70 0.30 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.823  
 SUBAREA AREA (ACRES) = 12.60 SUBAREA RUNOFF (CFS) = 16.63  
 EFFECTIVE AREA (ACRES) = 32.90 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA (ACRES) = 32.9 PEAK FLOW RATE (CFS) = 43.24

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10409.00 TO NODE 10410.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 314.00 DOWNSTREAM(FEET) = 266.00  
 FLOW LENGTH(FEET) = 213.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 30.35  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 43.24  
 PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 15.25  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10410.00 = 3278.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10410.00 TO NODE 10411.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 266.00 DOWNSTREAM(FEET) = 170.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1470.00 CHANNEL SLOPE = 0.0653  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 43.24  
 FLOW VELOCITY(FEET/SEC.) = 9.03 FLOW DEPTH(FEET) = 1.26  
 TRAVEL TIME(MIN.) = 2.71 Tc(MIN.) = 17.96  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10411.00 = 4748.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10411.00 TO NODE 10411.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.96  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.566  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	6.60	0.30	0.800	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.723  
 SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 10.32

EFFECTIVE AREA (ACRES) = 41.40 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 41.4 PEAK FLOW RATE (CFS) = 49.20

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10411.00 TO NODE 10412.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 170.00 DOWNSTREAM(FEET) = 161.00  
 FLOW LENGTH(FEET) = 1129.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.00  
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 49.20  
 PIPE TRAVEL TIME(MIN.) = 2.09 Tc(MIN.) = 20.05  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10412.00 = 5877.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10412.00 TO NODE 10413.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 161.00 DOWNSTREAM(FEET) = 141.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 360.00 CHANNEL SLOPE = 0.0556  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 49.20  
 FLOW VELOCITY(FEET/SEC.) = 8.76 FLOW DEPTH(FEET) = 1.37  
 TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 20.74  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10413.00 = 6237.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10413.00 TO NODE 10413.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 20.74  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.435  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.509  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 3.35  
 EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA (ACRES) = 44.3 PEAK FLOW RATE (CFS) = 49.20  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 44.3 TC (MIN.) = 20.74  
EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.798  
PEAK FLOW RATE (CFS) = 49.20

=====  
=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506105L.DAT  
TIME/DATE OF STUDY: 12:50 04/15/2013  
=====

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--\*TIME-OF-CONCENTRATION MODEL\*--  
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NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE (FT)	FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10500.00 TO NODE 10501.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

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FLOW PROCESS FROM NODE 10501.00 TO NODE 10502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

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\*\*\*\*\*

FLOW PROCESS FROM NODE 10502.00 TO NODE 10502.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.10     0.30      1.000     -
USER-DEFINED  -        0.80     0.30      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90    SUBAREA RUNOFF (CFS) = 1.36
EFFECTIVE AREA (ACRES) = 1.40   AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.4      PEAK FLOW RATE (CFS) = 2.11

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*****
FLOW PROCESS FROM NODE 10502.00 TO NODE 10503.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1025.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 193.00  CHANNEL SLOPE = 0.1295
CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040    MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.11
FLOW VELOCITY(FEET/SEC.) = 4.41  FLOW DEPTH(FEET) = 0.40
TRAVEL TIME(MIN.) = 0.73    Tc(MIN.) = 12.47
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10503.00 = 700.00 FEET.

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10503.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.47
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.908
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.50   0.30    1.000   -
USER-DEFINED        -        1.80   0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30    SUBAREA RUNOFF (CFS) = 3.33
EFFECTIVE AREA (ACRES) = 3.70   AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 3.7      PEAK FLOW RATE (CFS) = 5.35

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10504.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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```

ELEVATION DATA: UPSTREAM(FEET) = 1025.00  DOWNSTREAM(FEET) = 1020.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00  CHANNEL SLOPE = 0.0151
CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030    MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.35
FLOW VELOCITY(FEET/SEC.) = 3.09  FLOW DEPTH(FEET) = 0.76
TRAVEL TIME(MIN.) = 1.79    Tc(MIN.) = 14.26
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10504.00 = 1032.00 FEET.

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10504.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.26
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.772
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.10   0.30    1.000   -
USER-DEFINED        -        0.80   0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90    SUBAREA RUNOFF (CFS) = 1.19
EFFECTIVE AREA (ACRES) = 4.60   AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.6      PEAK FLOW RATE (CFS) = 6.09

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10505.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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ELEVATION DATA: UPSTREAM(FEET) = 1020.00  DOWNSTREAM(FEET) = 975.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 397.00  CHANNEL SLOPE = 0.1134
CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030    MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 6.09
FLOW VELOCITY(FEET/SEC.) = 6.80  FLOW DEPTH(FEET) = 0.55
TRAVEL TIME(MIN.) = 0.97    Tc(MIN.) = 15.23
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10505.00 = 1429.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10505.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.23
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.708
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.20   0.30    1.000   -
USER-DEFINED        -        1.20   0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.40    SUBAREA RUNOFF (CFS) = 1.77
EFFECTIVE AREA (ACRES) = 6.00   AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.0      PEAK FLOW RATE (CFS) = 7.60

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10506.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 905.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 334.00 CHANNEL SLOPE = 0.2096
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.60
FLOW VELOCITY(FEET/SEC.) = 9.05 FLOW DEPTH(FEET) = 0.53
TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 15.85
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10506.00 = 1763.00 FEET.

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10506.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.85
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.676
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        6.10   0.30   1.000  -
USER-DEFINED        -        3.70   0.30   1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 12.14
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 19.57

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10507.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 790.00 CHANNEL SLOPE = 0.0380
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 19.57
FLOW VELOCITY(FEET/SEC.) = 4.87 FLOW DEPTH(FEET) = 1.16
TRAVEL TIME(MIN.) = 2.70 Tc(MIN.) = 18.55
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10507.00 = 2553.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10507.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.55
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.535
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        2.70   0.30   1.000  -
USER-DEFINED        -        6.30   0.30   1.000  -
USER-DEFINED        -        0.30   0.30   1.000  -

```

```

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 10.34
EFFECTIVE AREA(ACRES) = 25.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 27.91

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```

*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10508.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 755.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 27.91
FLOW VELOCITY(FEET/SEC.) = 7.86 FLOW DEPTH(FEET) = 1.09
TRAVEL TIME(MIN.) = 2.38 Tc(MIN.) = 20.93
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10508.00 = 3673.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10508.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.93
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.428
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.80   0.30   1.000  -
USER-DEFINED        -       11.10   0.30   1.000  -
USER-DEFINED        -        3.10   0.30   1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 15.24
EFFECTIVE AREA(ACRES) = 40.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 40.73

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10509.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 755.00 DOWNSTREAM(FEET) = 533.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1578.00 CHANNEL SLOPE = 0.1407
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 40.73
FLOW VELOCITY(FEET/SEC.) = 9.54 FLOW DEPTH(FEET) = 1.19
TRAVEL TIME(MIN.) = 2.76 Tc(MIN.) = 23.68
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10509.00 = 5251.00 FEET.

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FLOW PROCESS FROM NODE 10509.00 TO NODE 10509.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.68

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.335

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.80	0.30	1.000	-
USER-DEFINED	-	11.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	8.30	0.30	1.000	-
USER-DEFINED	-	38.10	0.30	1.000	-
USER-DEFINED	-	8.70	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 77.40 SUBAREA RUNOFF (CFS) = 72.09

EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 109.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10509.00 TO NODE 10510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 415.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1236.00 CHANNEL SLOPE = 0.0955  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 109.43  
 FLOW VELOCITY (FEET/SEC.) = 10.56 FLOW DEPTH (FEET) = 1.86  
 TRAVEL TIME (MIN.) = 1.95 Tc (MIN.) = 25.63  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10510.00 = 6487.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 25.63

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.273

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	30.10	0.30	1.000	-
USER-DEFINED	-	15.30	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	11.30	0.30	1.000	-
USER-DEFINED	-	5.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 64.90 SUBAREA RUNOFF (CFS) = 56.87

EFFECTIVE AREA (ACRES) = 182.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 182.4 PEAK FLOW RATE (CFS) = 159.82

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10511.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1161.00 CHANNEL SLOPE = 0.0973  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 159.82  
 FLOW VELOCITY (FEET/SEC.) = 11.71 FLOW DEPTH (FEET) = 2.13  
 TRAVEL TIME (MIN.) = 1.65 Tc (MIN.) = 27.29  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10511.00 = 7648.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10511.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 27.29

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.231

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.50	0.30	1.000	-
USER-DEFINED	-	10.80	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	22.10	0.30	1.000	-
USER-DEFINED	-	4.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 54.80 SUBAREA RUNOFF (CFS) = 45.90

EFFECTIVE AREA (ACRES) = 237.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 237.2 PEAK FLOW RATE (CFS) = 198.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 302.00 DOWNSTREAM (FEET) = 190.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1644.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 198.66  
 FLOW VELOCITY (FEET/SEC.) = 10.80 FLOW DEPTH (FEET) = 2.48  
 TRAVEL TIME (MIN.) = 2.54 Tc (MIN.) = 29.83  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10512.00 = 9292.00 FEET.

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FLOW PROCESS FROM NODE 10512.00 TO NODE 10512.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 29.83
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.165
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.50     0.30     1.000     -
USER-DEFINED            -        0.20     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     1.000     -
USER-DEFINED            -        0.10     0.30     1.000     -
USER-DEFINED            -       14.20     0.30     1.000     -
USER-DEFINED            -        2.80     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 19.50      SUBAREA RUNOFF(CFS) = 15.17
EFFECTIVE AREA(ACRES) = 256.70   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 256.7        PEAK FLOW RATE(CFS) = 199.75

*****
FLOW PROCESS FROM NODE 10512.00 TO NODE 10513.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 190.00 DOWNSTREAM(FEET) = 183.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 86.00 CHANNEL SLOPE = 0.0814
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00
CHANNEL FLOW THRU SUBAREA(CFS) = 199.75
FLOW VELOCITY(FEET/SEC.) = 11.56 FLOW DEPTH(FEET) = 2.40
TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 29.95
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10513.00 = 9378.00 FEET.

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 29.95
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.161
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.10     0.30     0.100     -
USER-DEFINED            -        1.30     0.30     1.000     -
USER-DEFINED            -       29.90     0.30     1.000     -
USER-DEFINED            -       11.90     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     1.000     -
USER-DEFINED            -        0.60     0.30     0.100     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 45.50      SUBAREA RUNOFF(CFS) = 35.44
EFFECTIVE AREA(ACRES) = 302.20   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 302.2        PEAK FLOW RATE(CFS) = 234.45

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FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 29.95
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.161
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        9.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30      SUBAREA RUNOFF(CFS) = 7.21
EFFECTIVE AREA(ACRES) = 311.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 311.5        PEAK FLOW RATE(CFS) = 241.65

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10514.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 171.00
FLOW LENGTH(FEET) = 1209.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 48.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.29
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 241.65
PIPE TRAVEL TIME(MIN.) = 1.41 Tc(MIN.) = 31.36
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10514.00 = 10587.00 FEET.

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10514.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 31.36
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.137
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.20     0.30     0.100     -
USER-DEFINED            -        0.40     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     0.100     -
USER-DEFINED            -       31.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 33.60      SUBAREA RUNOFF(CFS) = 25.77
EFFECTIVE AREA(ACRES) = 345.10   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 345.1        PEAK FLOW RATE(CFS) = 260.58

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10515.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 171.00 DOWNSTREAM(FEET) = 165.00  
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 63.0 INCH PIPE IS 46.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.16  
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 260.58  
PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 31.98  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10515.00 = 11152.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10515.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 31.98  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.126  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 1.30 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 15.30 0.30 0.100 -  
USER-DEFINED - 1.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.202  
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 18.41  
EFFECTIVE AREA(ACRES) = 364.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 364.3 PEAK FLOW RATE(CFS) = 275.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10525.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 709.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 63.0 INCH PIPE IS 50.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.72  
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 275.71  
PIPE TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 32.78  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 32.78  
RAINFALL INTENSITY(INCH/HR) = 1.11  
AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.95  
EFFECTIVE STREAM AREA(ACRES) = 364.30  
TOTAL STREAM AREA(ACRES) = 364.30  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 275.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10520.00 TO NODE 10521.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 289.00  
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 180.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.311  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.581  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL - 0.30 0.30 0.100 95 7.31  
PUBLIC PARK - 1.20 0.30 0.850 95 11.62  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.700  
SUBAREA RUNOFF(CFS) = 3.20  
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 3.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10521.00 TO NODE 10522.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 180.00 DOWNSTREAM ELEVATION(FEET) = 176.00  
STREET LENGTH(FEET) = 408.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.43  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 9.97  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.29  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.82  
STREET FLOW TRAVEL TIME(MIN.) = 2.96 Tc(MIN.) = 10.27  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.130

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.60	0.30	0.100	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520  
 SUBAREA AREA (ACRES) = 2.50 SUBAREA RUNOFF (CFS) = 4.44  
 EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 7.03

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.38 HALFSTREET FLOOD WIDTH (FEET) = 11.21  
 FLOW VELOCITY (FEET/SEC.) = 2.43 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.93  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10522.00 = 697.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10522.00 TO NODE 10523.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 176.00 DOWNSTREAM ELEVATION (FEET) = 173.00  
 STREET LENGTH (FEET) = 333.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.61  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.44  
 HALFSTREET FLOOD WIDTH (FEET) = 14.18  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.64  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.17  
 STREET FLOW TRAVEL TIME (MIN.) = 2.10 Tc (MIN.) = 12.38  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.916

SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	4.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.109  
 SUBAREA AREA (ACRES) = 5.40 SUBAREA RUNOFF (CFS) = 9.15  
 EFFECTIVE AREA (ACRES) = 9.40 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA (ACRES) = 9.4 PEAK FLOW RATE (CFS) = 15.42

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.48 HALFSTREET FLOOD WIDTH (FEET) = 15.90  
 FLOW VELOCITY (FEET/SEC.) = 2.84 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.35  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10523.00 = 1030.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10523.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.38  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.916  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.90	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	0.100	-
USER-DEFINED	-	4.80	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	4.90	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.785  
 SUBAREA AREA (ACRES) = 12.70 SUBAREA RUNOFF (CFS) = 19.21  
 EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 34.62

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10524.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 173.00 DOWNSTREAM (FEET) = 165.00  
 FLOW LENGTH (FEET) = 736.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.28  
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 34.62  
 PIPE TRAVEL TIME (MIN.) = 1.32 Tc (MIN.) = 13.70  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10524.00 = 1766.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10524.00 TO NODE 10524.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.70  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.811  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.308  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 2.78  
EFFECTIVE AREA(ACRES) = 23.90 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 23.9 PEAK FLOW RATE(CFS) = 35.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10524.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 623.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.44  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 35.32  
PIPE TRAVEL TIME(MIN.) = 1.10 Tc(MIN.) = 14.80  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10525.00 = 2389.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.80  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.734  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	6.80	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 12.11  
EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64  
TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 45.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.80  
RAINFALL INTENSITY(INCH/HR) = 1.73  
AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.64  
EFFECTIVE STREAM AREA(ACRES) = 33.00

TOTAL STREAM AREA(ACRES) = 33.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 45.77

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	275.71	32.78	1.113	0.30( 0.29)	0.95	364.3	10500.00
2	45.77	14.80	1.734	0.30( 0.19)	0.64	33.0	10520.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	263.72	14.80	1.734	0.30( 0.27)	0.90	197.4	10520.00
2	303.03	32.78	1.113	0.30( 0.28)	0.93	397.3	10500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 303.03 Tc(MIN.) = 32.78  
EFFECTIVE AREA(ACRES) = 397.30 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
TOTAL AREA(ACRES) = 397.3  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10526.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 158.00 DOWNSTREAM(FEET) = 148.00  
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 57.78  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 303.03  
PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 32.79  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10526.00 = 11891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10526.00 TO NODE 10527.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 148.00 DOWNSTREAM(FEET) = 135.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 296.00 CHANNEL SLOPE = 0.0439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 303.03  
FLOW VELOCITY(FEET/SEC.) = 12.63 FLOW DEPTH(FEET) = 2.83  
TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 33.18  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10527.00 = 12187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 33.18  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.106  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.02  
 EFFECTIVE AREA(ACRES) = 398.70 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 398.7 PEAK FLOW RATE(CFS) = 303.03  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 33.18  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.106  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
 SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 3.58  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 403.6 PEAK FLOW RATE(CFS) = 303.03  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 403.6 TC(MIN.) = 33.18  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.927  
 PEAK FLOW RATE(CFS) = 303.03

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	263.73	15.21	1.709	0.30( 0.27)	0.90	203.7	10520.00
2	303.03	33.18	1.106	0.30( 0.28)	0.93	403.6	10500.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

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FILE NAME: 0506106E.DAT  
TIME/DATE OF STUDY: 12:52 04/15/2013  
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--\*TIME-OF-CONCENTRATION MODEL\*--  
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5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET

as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10600.00 TO NODE 10601.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

=====

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.602

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.094

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

RESIDENTIAL

"5-7 DWELLINGS/ACRE" - 0.50 0.30 0.500 95 10.60

PUBLIC PARK - 0.60 0.30 0.850 95 13.16

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.691

SUBAREA RUNOFF(CFS) = 1.87

TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 1.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 10601.00 TO NODE 10602.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

=====

UPSTREAM ELEVATION(FEET) = 164.00 DOWNSTREAM ELEVATION(FEET) = 162.00

STREET LENGTH(FEET) = 220.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.53

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.32

HALFSTREET FLOOD WIDTH(FEET) = 8.22

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.04

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.66  
 STREET FLOW TRAVEL TIME (MIN.) = 1.80 Tc (MIN.) = 12.40  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.914  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.517  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 3.32  
 EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.17  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 5.01

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.35 HALFSTREET FLOOD WIDTH (FEET) = 9.72  
 FLOW VELOCITY (FEET/SEC.) = 2.21 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.78  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10602.00 = 531.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10602.00 TO NODE 10603.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 162.00 DOWNSTREAM ELEVATION (FEET) = 159.00  
 STREET LENGTH (FEET) = 328.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.80  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.40  
 HALFSTREET FLOOD WIDTH (FEET) = 11.91  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.42  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.96  
 STREET FLOW TRAVEL TIME (MIN.) = 2.25 Tc (MIN.) = 14.65  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.744

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.500	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	2.40	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.527  
 SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 5.57

EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 10.09

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 13.32  
 FLOW VELOCITY (FEET/SEC.) = 2.57 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.09  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10603.00 = 859.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10603.00 TO NODE 10604.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 159.00 DOWNSTREAM ELEVATION (FEET) = 155.00  
 STREET LENGTH (FEET) = 465.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 14.95  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.47  
 HALFSTREET FLOOD WIDTH (FEET) = 15.82  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.78  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.32  
 STREET FLOW TRAVEL TIME (MIN.) = 2.79 Tc (MIN.) = 17.44  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.593

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.30	0.500	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.513  
 SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 9.71  
 EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 18.84

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.51 HALFSTREET FLOOD WIDTH (FEET) = 17.38  
 FLOW VELOCITY (FEET/SEC.) = 2.93 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.48  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10604.00 = 1324.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10604.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.44
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.593
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.30    0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.10    SUBAREA RUNOFF(CFS) = 0.12
EFFECTIVE AREA(ACRES) = 14.70  AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 14.7    PEAK FLOW RATE(CFS) = 18.96

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10605.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 155.00  DOWNSTREAM(FEET) = 140.00
FLOW LENGTH(FEET) = 214.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.24
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 18.96
PIPE TRAVEL TIME(MIN.) = 0.22  Tc(MIN.) = 17.66
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10605.00 = 1538.00 FEET.

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10605.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.66
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.581
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20    0.30    0.100  -
USER-DEFINED        -         1.70    0.30    0.100  -
USER-DEFINED        -        10.20    0.30    0.800  -
USER-DEFINED        -         2.90    0.30    0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.682
SUBAREA AREA(ACRES) = 16.00  SUBAREA RUNOFF(CFS) = 19.83
EFFECTIVE AREA(ACRES) = 30.70  AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 30.7    PEAK FLOW RATE(CFS) = 38.64

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10606.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

```

```

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 140.00  DOWNSTREAM(FEET) = 133.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00  CHANNEL SLOPE = 0.0400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 38.64
FLOW VELOCITY(FEET/SEC.) = 7.28  FLOW DEPTH(FEET) = 1.33
TRAVEL TIME(MIN.) = 0.40  Tc(MIN.) = 18.06
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10606.00 = 1713.00 FEET.

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.06
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.561
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.30    0.500  -
USER-DEFINED        -         0.30    0.30    0.850  -
USER-DEFINED        -         0.10    0.30    1.000  -
USER-DEFINED        -         1.10    0.30    1.000  -
USER-DEFINED        -         0.10    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 1.80    SUBAREA RUNOFF(CFS) = 2.08
EFFECTIVE AREA(ACRES) = 32.50  AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 32.5    PEAK FLOW RATE(CFS) = 40.14

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.06
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.561
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.30    0.850  -
USER-DEFINED        -         1.20    0.30    1.000  -
USER-DEFINED        -         0.10    0.30    1.000  -
USER-DEFINED        -         1.80    0.30    1.000  -
USER-DEFINED        -         0.10    0.30    0.850  -
USER-DEFINED        -         0.20    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 4.33
EFFECTIVE AREA(ACRES) = 36.30  AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.66
TOTAL AREA(ACRES) = 36.3    PEAK FLOW RATE(CFS) = 44.47

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81

```

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 18.06

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.561

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.68

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.67

TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 45.15  
=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 36.9 TC(MIN.) = 18.06

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.670

PEAK FLOW RATE(CFS) = 45.15  
=====

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
 RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
 (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
 \* Rancho Mission Viejo ROMP Study \*  
 \* Storm Event: 10 Yr \*  
 \* From Node: 40300 To Node: 40313 \*  
 \*\*\*\*\*

FILE NAME: 0610403V.DAT  
 TIME/DATE OF STUDY: 10:00 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
 \*USER-DEFINED TABLED RAINFALL USED\*  
 NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.911
- 2) 10.00; 2.592
- 3) 15.00; 1.893
- 4) 20.00; 1.621
- 5) 25.00; 1.412
- 6) 30.00; 1.265
- 7) 40.00; 1.084
- 8) 50.00; 0.966
- 9) 60.00; 0.879
- 10) 90.00; 0.732
- 11) 120.00; 0.650
- 12) 180.00; 0.546
- 13) 360.00; 0.406
- 14) 1440.00; 0.179

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
 1. Relative Flow-Depth = 0.00 FEET  
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
 \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
 \*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40300.00 TO NODE 40301.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 316.00  
 ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 720.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.541  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.713  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.39	0.30	1.000	0	9.54

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 0.86  
 TOTAL AREA(ACRES) = 0.39 PEAK FLOW RATE(CFS) = 0.86

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40301.00 TO NODE 40302.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 675.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 191.00 CHANNEL SLOPE = 0.2356  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.572  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.88	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.76  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.29  
 AVERAGE FLOW DEPTH(FEET) = 0.33 TRAVEL TIME(MIN.) = 0.60  
 Tc(MIN.) = 10.14  
 SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 1.81  
 EFFECTIVE AREA(ACRES) = 1.28 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 1.3 PEAK FLOW RATE(CFS) = 2.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 FLOW VELOCITY(FEET/SEC.) = 5.84  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40302.00 = 507.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40302.00 TO NODE 40303.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	675.00	DOWNSTREAM(FEET) =	625.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	179.00	CHANNEL SLOPE =	0.2793
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.509		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.84	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.45

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.67

AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 0.45

Tc(MIN.) = 10.59

SUBAREA AREA(ACRES) = 0.84 SUBAREA RUNOFF(CFS) = 1.66

EFFECTIVE AREA(ACRES) = 2.12 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.1 PEAK FLOW RATE(CFS) = 4.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 7.01

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40303.00 = 686.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40303.00 TO NODE 40304.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	625.00	DOWNSTREAM(FEET) =	557.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	161.00	CHANNEL SLOPE =	0.4224
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.469		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.94	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.08

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.20

AVERAGE FLOW DEPTH(FEET) = 0.51 TRAVEL TIME(MIN.) = 0.29

Tc(MIN.) = 10.88

SUBAREA AREA(ACRES) = 2.94 SUBAREA RUNOFF(CFS) = 5.74

EFFECTIVE AREA(ACRES) = 5.06 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.1 PEAK FLOW RATE(CFS) = 9.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.57 FLOW VELOCITY(FEET/SEC.) = 10.15

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40304.00 = 847.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40304.00 TO NODE 40305.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	557.00	DOWNSTREAM(FEET) =	548.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	42.00	CHANNEL SLOPE =	0.2143
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.457		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.68	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.50

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.20

AVERAGE FLOW DEPTH(FEET) = 0.68 TRAVEL TIME(MIN.) = 0.09

Tc(MIN.) = 10.97

SUBAREA AREA(ACRES) = 1.68 SUBAREA RUNOFF(CFS) = 3.26

EFFECTIVE AREA(ACRES) = 6.73 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 13.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.72 FLOW VELOCITY(FEET/SEC.) = 8.40

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40305.00 = 889.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40305.00 TO NODE 40306.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	548.00	DOWNSTREAM(FEET) =	515.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	217.00	CHANNEL SLOPE =	0.1521
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.393		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.67	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.47

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.92

AVERAGE FLOW DEPTH(FEET) = 0.86 TRAVEL TIME(MIN.) = 0.46

Tc(MIN.) = 11.42

SUBAREA AREA(ACRES) = 4.67 SUBAREA RUNOFF(CFS) = 8.80

EFFECTIVE AREA(ACRES) = 11.41 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.4 PEAK FLOW RATE (CFS) = 21.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.93 FLOW VELOCITY (FEET/SEC.) = 8.35  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40306.00 = 1106.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40306.00 TO NODE 40307.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 502.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 180.00 CHANNEL SLOPE = 0.0722  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.331

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.44	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 29.20

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.84

AVERAGE FLOW DEPTH (FEET) = 1.19 TRAVEL TIME (MIN.) = 0.44

Tc (MIN.) = 11.86

SUBAREA AREA (ACRES) = 8.44 SUBAREA RUNOFF (CFS) = 15.43

EFFECTIVE AREA (ACRES) = 19.84 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 19.8 PEAK FLOW RATE (CFS) = 36.28

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.29 FLOW VELOCITY (FEET/SEC.) = 7.22

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40307.00 = 1286.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40307.00 TO NODE 40308.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 502.00 DOWNSTREAM (FEET) = 469.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 553.00 CHANNEL SLOPE = 0.0597  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.149

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.07	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 44.67

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.06

AVERAGE FLOW DEPTH (FEET) = 1.45 TRAVEL TIME (MIN.) = 1.31

Tc (MIN.) = 13.17

SUBAREA AREA (ACRES) = 10.07 SUBAREA RUNOFF (CFS) = 16.76  
EFFECTIVE AREA (ACRES) = 29.92 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 29.9 PEAK FLOW RATE (CFS) = 49.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.51 FLOW VELOCITY (FEET/SEC.) = 7.25

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40308.00 = 1839.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40308.00 TO NODE 40309.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 469.00 DOWNSTREAM (FEET) = 433.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 631.00 CHANNEL SLOPE = 0.0571  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.950

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.09	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 56.54

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.39

AVERAGE FLOW DEPTH (FEET) = 1.60 TRAVEL TIME (MIN.) = 1.42

Tc (MIN.) = 14.59

SUBAREA AREA (ACRES) = 9.09 SUBAREA RUNOFF (CFS) = 13.50

EFFECTIVE AREA (ACRES) = 39.01 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 39.0 PEAK FLOW RATE (CFS) = 57.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.61 FLOW VELOCITY (FEET/SEC.) = 7.43

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40309.00 = 2470.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40309.00 TO NODE 40310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 433.00 DOWNSTREAM (FEET) = 406.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 595.00 CHANNEL SLOPE = 0.0454  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.839

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.61	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 65.97

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.04

AVERAGE FLOW DEPTH(FEET) = 1.77 TRAVEL TIME(MIN.) = 1.41  
Tc(MIN.) = 16.00  
SUBAREA AREA(ACRES) = 11.61 SUBAREA RUNOFF(CFS) = 16.08  
EFFECTIVE AREA(ACRES) = 50.62 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 50.6 PEAK FLOW RATE(CFS) = 70.10

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.81 FLOW VELOCITY(FEET/SEC.) = 7.12  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40310.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40310.00 TO NODE 40311.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 406.00 DOWNSTREAM(FEET) = 353.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1122.00 CHANNEL SLOPE = 0.0472  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.729

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 15.32 0.30 0.897 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 80.16  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.28  
AVERAGE FLOW DEPTH(FEET) = 1.70 TRAVEL TIME(MIN.) = 2.01  
Tc(MIN.) = 18.01  
SUBAREA AREA(ACRES) = 15.32 SUBAREA RUNOFF(CFS) = 20.13  
EFFECTIVE AREA(ACRES) = 65.94 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 65.9 PEAK FLOW RATE(CFS) = 85.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.73 FLOW VELOCITY(FEET/SEC.) = 9.44  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40311.00 = 4187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40311.00 TO NODE 40312.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 843.00 CHANNEL SLOPE = 0.0451  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.650

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 26.00 0.30 0.886 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.886

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 101.43  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.71  
AVERAGE FLOW DEPTH(FEET) = 1.87 TRAVEL TIME(MIN.) = 1.45  
Tc(MIN.) = 19.46  
SUBAREA AREA(ACRES) = 26.00 SUBAREA RUNOFF(CFS) = 32.40  
EFFECTIVE AREA(ACRES) = 91.94 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 91.9 PEAK FLOW RATE(CFS) = 112.95

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.94 FLOW VELOCITY(FEET/SEC.) = 9.98  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40312.00 = 5030.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40312.00 TO NODE 40313.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 310.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 226.00 CHANNEL SLOPE = 0.0221  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.623

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.53 0.30 0.896 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.896  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 114.49  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.66  
AVERAGE FLOW DEPTH(FEET) = 2.23 TRAVEL TIME(MIN.) = 0.49  
Tc(MIN.) = 19.95  
SUBAREA AREA(ACRES) = 2.53 SUBAREA RUNOFF(CFS) = 3.09  
EFFECTIVE AREA(ACRES) = 94.47 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 94.5 PEAK FLOW RATE(CFS) = 113.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.23 FLOW VELOCITY(FEET/SEC.) = 7.62  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40313.00 = 5256.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40313.00 TO NODE 40313.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 19.95  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.623  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 80.58 0.30 0.984 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
SUBAREA AREA(ACRES) = 80.58 SUBAREA RUNOFF(CFS) = 96.32  
EFFECTIVE AREA(ACRES) = 175.05 AREA-AVERAGED Fm(INCH/HR) = 0.29



AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30    AREA-AVERAGED  $A_p$  = 0.97  
TOTAL AREA (ACRES) = 175.0            PEAK FLOW RATE (CFS) = 210.14

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES)        =        175.0    TC (MIN.) =        19.95  
EFFECTIVE AREA (ACRES) =        175.05    AREA-AVERAGED  $F_m$  (INCH/HR) = 0.29  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30    AREA-AVERAGED  $A_p$  = 0.965  
PEAK FLOW RATE (CFS)     =        210.14

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*

\* Rancho Mission Viejo ROMP Study
\* Storm Event: 10 Yr
\* From Node: 40400 To Node: 40453

FILE NAME: 0610404V.DAT
TIME/DATE OF STUDY: 10:00 01/21/2013

=====
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
\*USER-DEFINED TABLED RAINFALL USED\*
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.911
2) 10.00; 2.592
3) 15.00; 1.893
4) 20.00; 1.621
5) 25.00; 1.412
6) 30.00; 1.265
7) 40.00; 1.084
8) 50.00; 0.966
9) 60.00; 0.879
10) 90.00; 0.732
11) 120.00; 0.650
12) 180.00; 0.546
13) 360.00; 0.406
14) 1440.00; 0.179

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

Table with columns: NO., HALF-WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-/PARK-SIDE / SIDE/ WAY, CURB HEIGHT (FT), GUTTER GEOMETRIES (FT), MANNING FACTOR (n). Rows 1-5.

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 40400.00 TO NODE 40401.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00
ELEVATION DATA: UPSTREAM(FEET) = 928.00 DOWNSTREAM(FEET) = 750.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.081
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.098
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" - 0.75 0.30 1.000 0 8.08
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.89
TOTAL AREA(ACRES) = 0.75 PEAK FLOW RATE(CFS) = 1.89

\*\*\*\*\*

FLOW PROCESS FROM NODE 40401.00 TO NODE 40402.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 710.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 107.00 CHANNEL SLOPE = 0.3738
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.035
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS
USER-DEFINED - 1.17 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.34
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.46
AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 0.24
Tc(MIN.) = 8.32
SUBAREA AREA(ACRES) = 1.17 SUBAREA RUNOFF(CFS) = 2.89
EFFECTIVE AREA(ACRES) = 1.93 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 4.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 7.97  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40402.00 = 434.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40402.00 TO NODE 40403.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 710.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.2756  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.961

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.05	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.00

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.57

AVERAGE FLOW DEPTH(FEET) = 0.51 TRAVEL TIME(MIN.) = 0.28

Tc(MIN.) = 8.60

SUBAREA AREA(ACRES) = 1.05 SUBAREA RUNOFF(CFS) = 2.51

EFFECTIVE AREA(ACRES) = 2.97 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 7.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.55 FLOW VELOCITY(FEET/SEC.) = 7.95

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40403.00 = 561.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40403.00 TO NODE 40404.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 113.00 CHANNEL SLOPE = 0.2212  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.898

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.95	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.40

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.89

AVERAGE FLOW DEPTH(FEET) = 0.63 TRAVEL TIME(MIN.) = 0.24

Tc(MIN.) = 8.84

SUBAREA AREA(ACRES) = 1.95 SUBAREA RUNOFF(CFS) = 4.56

EFFECTIVE AREA(ACRES) = 4.92 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 11.51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.68 FLOW VELOCITY(FEET/SEC.) = 8.25

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40404.00 = 674.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40404.00 TO NODE 40405.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 650.00 DOWNSTREAM(FEET) = 610.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 219.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.778

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.15	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.91

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.02

AVERAGE FLOW DEPTH(FEET) = 0.76 TRAVEL TIME(MIN.) = 0.45

Tc(MIN.) = 9.29

SUBAREA AREA(ACRES) = 2.15 SUBAREA RUNOFF(CFS) = 4.79

EFFECTIVE AREA(ACRES) = 7.07 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 15.77

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.80 FLOW VELOCITY(FEET/SEC.) = 8.29

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40405.00 = 893.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40405.00 TO NODE 40406.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 605.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 43.00 CHANNEL SLOPE = 0.1163  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.752

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.97

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.34

AVERAGE FLOW DEPTH(FEET) = 0.93 TRAVEL TIME(MIN.) = 0.10

Tc(MIN.) = 9.39

SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 6.40

EFFECTIVE AREA(ACRES) = 9.97 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 10.0 PEAK FLOW RATE (CFS) = 22.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.98 FLOW VELOCITY (FEET/SEC.) = 7.62  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40406.00 = 936.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40406.00 TO NODE 40407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 605.00 DOWNSTREAM (FEET) = 602.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 52.00 CHANNEL SLOPE = 0.0577  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.715

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 26.91  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.14  
AVERAGE FLOW DEPTH (FEET) = 1.21 TRAVEL TIME (MIN.) = 0.14  
Tc (MIN.) = 9.53  
SUBAREA AREA (ACRES) = 4.51 SUBAREA RUNOFF (CFS) = 9.80  
EFFECTIVE AREA (ACRES) = 14.48 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 14.5 PEAK FLOW RATE (CFS) = 31.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.28 FLOW VELOCITY (FEET/SEC.) = 6.41  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40407.00 = 988.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40407.00 TO NODE 40408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 602.00 DOWNSTREAM (FEET) = 559.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 533.00 CHANNEL SLOPE = 0.0807  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.493

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.99	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 37.38  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.55  
AVERAGE FLOW DEPTH (FEET) = 1.28 TRAVEL TIME (MIN.) = 1.18  
Tc (MIN.) = 10.71

SUBAREA AREA (ACRES) = 5.99 SUBAREA RUNOFF (CFS) = 11.81  
EFFECTIVE AREA (ACRES) = 20.47 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.5 PEAK FLOW RATE (CFS) = 40.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.32 FLOW VELOCITY (FEET/SEC.) = 7.69  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40408.00 = 1521.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40408.00 TO NODE 40409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 559.00 DOWNSTREAM (FEET) = 509.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 702.00 CHANNEL SLOPE = 0.0712  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.278

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.05	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 45.77  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.61  
AVERAGE FLOW DEPTH (FEET) = 1.42 TRAVEL TIME (MIN.) = 1.54  
Tc (MIN.) = 12.25  
SUBAREA AREA (ACRES) = 6.05 SUBAREA RUNOFF (CFS) = 10.77  
EFFECTIVE AREA (ACRES) = 26.51 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.5 PEAK FLOW RATE (CFS) = 47.20

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.43 FLOW VELOCITY (FEET/SEC.) = 7.68  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40409.00 = 2223.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40409.00 TO NODE 40447.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 509.00 DOWNSTREAM (FEET) = 482.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 440.00 CHANNEL SLOPE = 0.0614  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.140

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.09	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 52.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.43

AVERAGE FLOW DEPTH (FEET) = 1.53 TRAVEL TIME (MIN.) = 0.99  
Tc (MIN.) = 13.23  
SUBAREA AREA (ACRES) = 6.09 SUBAREA RUNOFF (CFS) = 10.08  
EFFECTIVE AREA (ACRES) = 32.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 32.6 PEAK FLOW RATE (CFS) = 53.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.55 FLOW VELOCITY (FEET/SEC.) = 7.47  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 13.23  
RAINFALL INTENSITY (INCH/HR) = 2.14  
AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA (ACRES) = 32.60  
TOTAL STREAM AREA (ACRES) = 32.60  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 53.98

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40410.00 TO NODE 40411.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 329.00  
ELEVATION DATA: UPSTREAM (FEET) = 878.00 DOWNSTREAM (FEET) = 726.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.371  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.021  
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL, BROADLEAF"	-	0.69	0.30	1.000	0	8.37

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF (CFS) = 1.68  
TOTAL AREA (ACRES) = 0.69 PEAK FLOW RATE (CFS) = 1.68

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40411.00 TO NODE 40412.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 726.00 DOWNSTREAM (FEET) = 687.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 101.00 CHANNEL SLOPE = 0.3861  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.959

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.91	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.77  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.07  
AVERAGE FLOW DEPTH (FEET) = 0.36 TRAVEL TIME (MIN.) = 0.24  
Tc (MIN.) = 8.61  
SUBAREA AREA (ACRES) = 0.91 SUBAREA RUNOFF (CFS) = 2.18  
EFFECTIVE AREA (ACRES) = 1.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 1.6 PEAK FLOW RATE (CFS) = 3.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.41 FLOW VELOCITY (FEET/SEC.) = 7.68  
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40412.00 = 430.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40412.00 TO NODE 40413.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 687.00 DOWNSTREAM (FEET) = 658.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 153.00 CHANNEL SLOPE = 0.1895  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.853  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.96	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.92  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.34  
AVERAGE FLOW DEPTH (FEET) = 0.51 TRAVEL TIME (MIN.) = 0.40  
Tc (MIN.) = 9.01  
SUBAREA AREA (ACRES) = 0.96 SUBAREA RUNOFF (CFS) = 2.20  
EFFECTIVE AREA (ACRES) = 2.55 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 2.6 PEAK FLOW RATE (CFS) = 5.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.55 FLOW VELOCITY (FEET/SEC.) = 6.54  
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40413.00 = 583.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40413.00 TO NODE 40414.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 658.00 DOWNSTREAM (FEET) = 615.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 247.00 CHANNEL SLOPE = 0.1741  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.698  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.57  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.02  
 AVERAGE FLOW DEPTH (FEET) = 0.64 TRAVEL TIME (MIN.) = 0.59  
 Tc (MIN.) = 9.60  
 SUBAREA AREA (ACRES) = 2.51 SUBAREA RUNOFF (CFS) = 5.41  
 EFFECTIVE AREA (ACRES) = 5.06 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.1 PEAK FLOW RATE (CFS) = 10.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.70 FLOW VELOCITY (FEET/SEC.) = 7.45  
 LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40414.00 = 830.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40414.00 TO NODE 40415.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 615.00 DOWNSTREAM (FEET) = 567.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 414.00 CHANNEL SLOPE = 0.1159  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.509  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.38	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.28  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.93  
 AVERAGE FLOW DEPTH (FEET) = 0.86 TRAVEL TIME (MIN.) = 1.00  
 Tc (MIN.) = 10.59  
 SUBAREA AREA (ACRES) = 4.38 SUBAREA RUNOFF (CFS) = 8.70  
 EFFECTIVE AREA (ACRES) = 9.44 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.4 PEAK FLOW RATE (CFS) = 18.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.93 FLOW VELOCITY (FEET/SEC.) = 7.29  
 LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40415.00 = 1244.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40415.00 TO NODE 40416.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 567.00 DOWNSTREAM (FEET) = 538.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 301.00 CHANNEL SLOPE = 0.0963  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.414  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.77	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 26.16  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.39  
 AVERAGE FLOW DEPTH (FEET) = 1.09 TRAVEL TIME (MIN.) = 0.68  
 Tc (MIN.) = 11.27  
 SUBAREA AREA (ACRES) = 7.77 SUBAREA RUNOFF (CFS) = 14.78  
 EFFECTIVE AREA (ACRES) = 17.21 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 17.2 PEAK FLOW RATE (CFS) = 32.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.18 FLOW VELOCITY (FEET/SEC.) = 7.84  
 LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40416.00 = 1545.00 FEET.

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FLOW PROCESS FROM NODE 40416.00 TO NODE 40417.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 538.00 DOWNSTREAM (FEET) = 529.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 116.00 CHANNEL SLOPE = 0.0776  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.380  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 47.90  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.96  
 AVERAGE FLOW DEPTH (FEET) = 1.42 TRAVEL TIME (MIN.) = 0.24  
 Tc (MIN.) = 11.52  
 SUBAREA AREA (ACRES) = 16.20 SUBAREA RUNOFF (CFS) = 30.33  
 EFFECTIVE AREA (ACRES) = 33.41 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 33.4 PEAK FLOW RATE (CFS) = 62.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.57 FLOW VELOCITY (FEET/SEC.) = 8.49  
 LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40417.00 = 1661.00 FEET.

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FLOW PROCESS FROM NODE 40417.00 TO NODE 40447.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 529.00 DOWNSTREAM(FEET) = 482.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 891.00 CHANNEL SLOPE = 0.0527
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.110
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 14.55 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 74.40
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.67
AVERAGE FLOW DEPTH(FEET) = 1.80 TRAVEL TIME(MIN.) = 1.94
Tc(MIN.) = 13.45
SUBAREA AREA(ACRES) = 14.55 SUBAREA RUNOFF(CFS) = 23.69
EFFECTIVE AREA(ACRES) = 47.96 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 48.0 PEAK FLOW RATE(CFS) = 78.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.83 FLOW VELOCITY(FEET/SEC.) = 7.79
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40447.00 = 2552.00 FEET.

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FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 13.45
RAINFALL INTENSITY(INCH/HR) = 2.11
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 47.96
TOTAL STREAM AREA(ACRES) = 47.96
PEAK FLOW RATE(CFS) AT CONFLUENCE = 78.11

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\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	53.98	13.23	2.140	0.30( 0.30)	1.00	32.6	40400.00
2	78.11	13.45	2.110	0.30( 0.30)	1.00	48.0	40410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	132.09	13.23	2.140	0.30( 0.30)	1.00	79.8	40400.00
2	131.20	13.45	2.110	0.30( 0.30)	1.00	80.6	40410.00

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COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 132.09 Tc(MIN.) = 13.23
EFFECTIVE AREA(ACRES) = 79.78 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 80.6
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

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*****
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
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*****
FLOW PROCESS FROM NODE 40420.00 TO NODE 40421.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00
ELEVATION DATA: UPSTREAM(FEET) = 925.00 DOWNSTREAM(FEET) = 815.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.799
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.908
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" - 0.31 0.30 1.000 0 8.80
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.72
TOTAL AREA(ACRES) = 0.31 PEAK FLOW RATE(CFS) = 0.72

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*****
FLOW PROCESS FROM NODE 40421.00 TO NODE 40422.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 815.00 DOWNSTREAM(FEET) = 743.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.5854
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.826
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.06
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.58
AVERAGE FLOW DEPTH(FEET) = 0.23 TRAVEL TIME(MIN.) = 0.31
Tc(MIN.) = 9.11
SUBAREA AREA(ACRES) = 0.30 SUBAREA RUNOFF(CFS) = 0.67

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EFFECTIVE AREA(ACRES) = 0.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 1.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.26 FLOW VELOCITY(FEET/SEC.) = 6.96  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40422.00 = 444.00 FEET.

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FLOW PROCESS FROM NODE 40422.00 TO NODE 40423.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 743.00 DOWNSTREAM(FEET) = 665.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 142.00 CHANNEL SLOPE = 0.5493  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.746

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.25

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.82

AVERAGE FLOW DEPTH(FEET) = 0.31 TRAVEL TIME(MIN.) = 0.30

Tc(MIN.) = 9.41

SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 1.76

EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 3.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 FLOW VELOCITY(FEET/SEC.) = 8.24  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40423.00 = 586.00 FEET.

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FLOW PROCESS FROM NODE 40423.00 TO NODE 40424.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 665.00 DOWNSTREAM(FEET) = 630.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 99.00 CHANNEL SLOPE = 0.3535  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.686

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.32	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.44

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.17

AVERAGE FLOW DEPTH(FEET) = 0.40 TRAVEL TIME(MIN.) = 0.23

Tc(MIN.) = 9.64  
SUBAREA AREA(ACRES) = 0.32 SUBAREA RUNOFF(CFS) = 0.68  
EFFECTIVE AREA(ACRES) = 1.72 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 3.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 FLOW VELOCITY(FEET/SEC.) = 7.37  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40424.00 = 685.00 FEET.

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FLOW PROCESS FROM NODE 40424.00 TO NODE 40425.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 615.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 35.00 CHANNEL SLOPE = 0.4286  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.668

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.87	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.69

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.87

AVERAGE FLOW DEPTH(FEET) = 0.46 TRAVEL TIME(MIN.) = 0.07

Tc(MIN.) = 9.71

SUBAREA AREA(ACRES) = 1.87 SUBAREA RUNOFF(CFS) = 3.98

EFFECTIVE AREA(ACRES) = 3.59 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.6 PEAK FLOW RATE(CFS) = 7.65

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.52 FLOW VELOCITY(FEET/SEC.) = 9.59  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40425.00 = 720.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40425.00 TO NODE 40426.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 615.00 DOWNSTREAM(FEET) = 574.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 260.00 CHANNEL SLOPE = 0.1577  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.543

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.19	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.86



TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.80  
AVERAGE FLOW DEPTH (FEET) = 0.66 TRAVEL TIME (MIN.) = 0.64  
Tc (MIN.) = 10.35  
SUBAREA AREA (ACRES) = 1.19 SUBAREA RUNOFF (CFS) = 2.40  
EFFECTIVE AREA (ACRES) = 4.78 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 4.8 PEAK FLOW RATE (CFS) = 9.65

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.68 FLOW VELOCITY (FEET/SEC.) = 6.92  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40426.00 = 980.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40426.00 TO NODE 40427.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 574.00 DOWNSTREAM (FEET) = 533.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 322.00 CHANNEL SLOPE = 0.1273  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.431  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.82 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.40  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.71  
AVERAGE FLOW DEPTH (FEET) = 0.75 TRAVEL TIME (MIN.) = 0.80  
Tc (MIN.) = 11.15  
SUBAREA AREA (ACRES) = 1.82 SUBAREA RUNOFF (CFS) = 3.49  
EFFECTIVE AREA (ACRES) = 6.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 6.6 PEAK FLOW RATE (CFS) = 12.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.78 FLOW VELOCITY (FEET/SEC.) = 6.88  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40427.00 = 1302.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40427.00 TO NODE 40428.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 521.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 160.00 CHANNEL SLOPE = 0.0750  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.371  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 6.79 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.99  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.21  
AVERAGE FLOW DEPTH (FEET) = 1.01 TRAVEL TIME (MIN.) = 0.43  
Tc (MIN.) = 11.58  
SUBAREA AREA (ACRES) = 6.79 SUBAREA RUNOFF (CFS) = 12.66  
EFFECTIVE AREA (ACRES) = 13.39 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 13.4 PEAK FLOW RATE (CFS) = 24.96

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.12 FLOW VELOCITY (FEET/SEC.) = 6.67  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40428.00 = 1462.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40428.00 TO NODE 40429.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 521.00 DOWNSTREAM (FEET) = 508.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 221.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.290  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.74 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 28.31  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.28  
AVERAGE FLOW DEPTH (FEET) = 1.23 TRAVEL TIME (MIN.) = 0.59  
Tc (MIN.) = 12.16  
SUBAREA AREA (ACRES) = 3.74 SUBAREA RUNOFF (CFS) = 6.70  
EFFECTIVE AREA (ACRES) = 17.13 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.1 PEAK FLOW RATE (CFS) = 30.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.26 FLOW VELOCITY (FEET/SEC.) = 6.40  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40429.00 = 1683.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40429.00 TO NODE 40446.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 508.00 DOWNSTREAM (FEET) = 489.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 306.00 CHANNEL SLOPE = 0.0621  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.181  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 0.99 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.51  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.58  
AVERAGE FLOW DEPTH (FEET) = 1.26 TRAVEL TIME (MIN.) = 0.78  
Tc (MIN.) = 12.94  
SUBAREA AREA (ACRES) = 0.99 SUBAREA RUNOFF (CFS) = 1.67  
EFFECTIVE AREA (ACRES) = 18.12 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 18.1 PEAK FLOW RATE (CFS) = 30.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.25 FLOW VELOCITY (FEET/SEC.) = 6.56  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40446.00 = 1989.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40446.00 TO NODE 40446.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40430.00 TO NODE 40431.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 302.00  
ELEVATION DATA: UPSTREAM (FEET) = 1035.00 DOWNSTREAM (FEET) = 875.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.870  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.153  
SUBAREA Tc AND LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"CHAPARRAL, BROADLEAF" - 0.40 0.30 1.000 0 7.87  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF (CFS) = 1.04  
TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 1.04

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40431.00 TO NODE 40432.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 875.00 DOWNSTREAM (FEET) = 800.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 160.00 CHANNEL SLOPE = 0.4688  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.050  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 0.65 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.84  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.80  
AVERAGE FLOW DEPTH (FEET) = 0.30 TRAVEL TIME (MIN.) = 0.39  
Tc (MIN.) = 8.26  
SUBAREA AREA (ACRES) = 0.65 SUBAREA RUNOFF (CFS) = 1.60  
EFFECTIVE AREA (ACRES) = 1.05 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 2.60

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.34 FLOW VELOCITY (FEET/SEC.) = 7.49  
LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40432.00 = 462.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40432.00 TO NODE 40433.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 800.00 DOWNSTREAM (FEET) = 712.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 150.00 CHANNEL SLOPE = 0.5867  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.977  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.08 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.91  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.09  
AVERAGE FLOW DEPTH (FEET) = 0.38 TRAVEL TIME (MIN.) = 0.28  
Tc (MIN.) = 8.54  
SUBAREA AREA (ACRES) = 1.08 SUBAREA RUNOFF (CFS) = 2.61  
EFFECTIVE AREA (ACRES) = 2.13 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 2.1 PEAK FLOW RATE (CFS) = 5.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.42 FLOW VELOCITY (FEET/SEC.) = 9.60  
LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40433.00 = 612.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40433.00 TO NODE 40434.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 657.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 120.00 CHANNEL SLOPE = 0.4583  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.923  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.98	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.48					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.72					
AVERAGE FLOW DEPTH(FEET) = 0.51 TRAVEL TIME(MIN.) = 0.21					
Tc(MIN.) = 8.74					
SUBAREA AREA(ACRES) = 1.98 SUBAREA RUNOFF(CFS) = 4.68					
EFFECTIVE AREA(ACRES) = 4.11 AREA-AVERAGED Fm(INCH/HR) = 0.30					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 9.71					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.56 FLOW VELOCITY(FEET/SEC.) = 10.33  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40434.00 = 732.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40434.00 TO NODE 40435.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.34	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.39					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.50					
AVERAGE FLOW DEPTH(FEET) = 0.70 TRAVEL TIME(MIN.) = 0.32					
Tc(MIN.) = 9.06					
SUBAREA AREA(ACRES) = 2.34 SUBAREA RUNOFF(CFS) = 5.35					
EFFECTIVE AREA(ACRES) = 6.46 AREA-AVERAGED Fm(INCH/HR) = 0.30					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 6.5 PEAK FLOW RATE(CFS) = 14.76					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.74 FLOW VELOCITY(FEET/SEC.) = 8.91  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40435.00 = 893.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40435.00 TO NODE 40445.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER	-	0.75	0.30	1.000	0
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA RUNOFF(CFS) = 1.80					
TOTAL AREA(ACRES) = 0.75 PEAK FLOW RATE(CFS) = 1.80					

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.75	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.59					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.01					
AVERAGE FLOW DEPTH(FEET) = 0.89 TRAVEL TIME(MIN.) = 0.85					
Tc(MIN.) = 9.91					
SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 3.66					
EFFECTIVE AREA(ACRES) = 8.21 AREA-AVERAGED Fm(INCH/HR) = 0.30					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 17.11					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.90 FLOW VELOCITY(FEET/SEC.) = 7.11  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40445.00 = 1251.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40445.00 TO NODE 40445.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.34	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.39					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.50					
AVERAGE FLOW DEPTH(FEET) = 0.70 TRAVEL TIME(MIN.) = 0.32					
Tc(MIN.) = 9.06					
SUBAREA AREA(ACRES) = 2.34 SUBAREA RUNOFF(CFS) = 5.35					
EFFECTIVE AREA(ACRES) = 6.46 AREA-AVERAGED Fm(INCH/HR) = 0.30					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 6.5 PEAK FLOW RATE(CFS) = 14.76					

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40440.00 TO NODE 40441.00 IS CODE = 21

-----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER	-	0.75	0.30	1.000	0	8.59
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000						
SUBAREA RUNOFF(CFS) = 1.80						
TOTAL AREA(ACRES) = 0.75 PEAK FLOW RATE(CFS) = 1.80						

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.586  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.965

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER	-	0.75	0.30	1.000	0	8.59
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000						
SUBAREA RUNOFF(CFS) = 1.80						
TOTAL AREA(ACRES) = 0.75 PEAK FLOW RATE(CFS) = 1.80						

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FLOW PROCESS FROM NODE 40441.00 TO NODE 40442.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 898.00 DOWNSTREAM(FEET) = 760.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 253.00 CHANNEL SLOPE = 0.5455
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.827
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.89 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.81
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.08
AVERAGE FLOW DEPTH(FEET) = 0.34 TRAVEL TIME(MIN.) = 0.52
Tc(MIN.) = 9.11
SUBAREA AREA(ACRES) = 0.89 SUBAREA RUNOFF(CFS) = 2.02
EFFECTIVE AREA(ACRES) = 1.64 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 3.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.38 FLOW VELOCITY(FEET/SEC.) = 8.75
LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40442.00 = 572.00 FEET.

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*****
FLOW PROCESS FROM NODE 40442.00 TO NODE 40443.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 760.00 DOWNSTREAM(FEET) = 653.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 188.00 CHANNEL SLOPE = 0.5691
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.743
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.80 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.71
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.85
AVERAGE FLOW DEPTH(FEET) = 0.44 TRAVEL TIME(MIN.) = 0.32
Tc(MIN.) = 9.43
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 3.97
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 7.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.49 FLOW VELOCITY(FEET/SEC.) = 10.46

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LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40443.00 = 760.00 FEET.
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FLOW PROCESS FROM NODE 40443.00 TO NODE 40444.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 653.00 DOWNSTREAM(FEET) = 605.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 198.00 CHANNEL SLOPE = 0.2424
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.639
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.16 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.89
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.36
AVERAGE FLOW DEPTH(FEET) = 0.66 TRAVEL TIME(MIN.) = 0.39
Tc(MIN.) = 9.82
SUBAREA AREA(ACRES) = 3.16 SUBAREA RUNOFF(CFS) = 6.65
EFFECTIVE AREA(ACRES) = 6.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.6 PEAK FLOW RATE(CFS) = 13.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.72 FLOW VELOCITY(FEET/SEC.) = 8.93
LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40444.00 = 958.00 FEET.

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FLOW PROCESS FROM NODE 40444.00 TO NODE 40445.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 605.00 DOWNSTREAM(FEET) = 579.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 243.00 CHANNEL SLOPE = 0.1070
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.533
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.67 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.57
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.79
AVERAGE FLOW DEPTH(FEET) = 0.87 TRAVEL TIME(MIN.) = 0.60
Tc(MIN.) = 10.42
SUBAREA AREA(ACRES) = 1.67 SUBAREA RUNOFF(CFS) = 3.37
EFFECTIVE AREA(ACRES) = 8.27 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 16.63

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.90 FLOW VELOCITY(FEET/SEC.) = 6.88  
 LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40445.00 = 1201.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40445.00 TO NODE 40445.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 10.42  
 RAINFALL INTENSITY(INCH/HR) = 2.53  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 8.27  
 TOTAL STREAM AREA(ACRES) = 8.27  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 16.63

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	17.11	9.91	2.615	0.30( 0.30)	1.00	8.2	40430.00
2	16.63	10.42	2.533	0.30( 0.30)	1.00	8.3	40440.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	33.51	9.91	2.615	0.30( 0.30)	1.00	16.1	40430.00
2	33.13	10.42	2.533	0.30( 0.30)	1.00	16.5	40440.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 33.51 Tc(MIN.) = 9.91  
 EFFECTIVE AREA(ACRES) = 16.08 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 16.5  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40445.00 = 1251.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40445.00 TO NODE 40446.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 579.00 DOWNSTREAM(FEET) = 489.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 636.00 CHANNEL SLOPE = 0.1415  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.446

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE USER-DEFINED	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
		3.79	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.17  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.38  
 AVERAGE FLOW DEPTH(FEET) = 1.15 TRAVEL TIME(MIN.) = 1.13  
 Tc(MIN.) = 11.04  
 SUBAREA AREA(ACRES) = 3.79 SUBAREA RUNOFF(CFS) = 7.31  
 EFFECTIVE AREA(ACRES) = 19.87 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 20.3 PEAK FLOW RATE(CFS) = 38.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.16 FLOW VELOCITY(FEET/SEC.) = 9.43  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40446.00 = 1887.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	38.38	11.04	2.446	0.30( 0.30)	1.00	19.9	40430.00
2	37.83	11.56	2.374	0.30( 0.30)	1.00	20.3	40440.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 38.38 Tc(MIN.) = 11.04  
 AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 19.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 40446.00 TO NODE 40446.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	38.38	11.04	2.446	0.30( 0.30)	1.00	19.9	40430.00
2	37.83	11.56	2.374	0.30( 0.30)	1.00	20.3	40440.00

LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40446.00 = 1887.00 FEET.

\*\* MEMORY BANK # 2 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	30.68	12.94	2.181	0.30( 0.30)	1.00	18.1	40420.00

LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40446.00 = 1989.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	68.25	11.04	2.446	0.30( 0.30)	1.00	35.3	40430.00
2	68.05	11.56	2.374	0.30( 0.30)	1.00	36.5	40440.00
3	65.00	12.94	2.181	0.30( 0.30)	1.00	38.4	40420.00

TOTAL AREA(ACRES) = 38.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 68.25 Tc(MIN.) = 11.04  
 EFFECTIVE AREA(ACRES) = 35.33 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 38.4  
 LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40446.00 = 1989.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40446.00 TO NODE 40446.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40446.00 TO NODE 40447.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 489.00 DOWNSTREAM(FEET) = 482.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.0419  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.390

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 68.80

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.92

AVERAGE FLOW DEPTH(FEET) = 1.82 TRAVEL TIME(MIN.) = 0.40

Tc(MIN.) = 11.44

SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 1.11

EFFECTIVE AREA(ACRES) = 35.92 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 39.0 PEAK FLOW RATE(CFS) = 68.25

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.82 FLOW VELOCITY(FEET/SEC.) = 6.88

LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40447.00 = 2156.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	68.25	11.44	2.390	0.30( 0.30)	1.00	35.9	40430.00
2	68.05	11.96	2.317	0.30( 0.30)	1.00	37.1	40440.00
3	65.00	13.35	2.124	0.30( 0.30)	1.00	39.0	40420.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 68.25 Tc(MIN.) = 11.44

AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 35.92

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	68.25	11.44	2.390	0.30( 0.30)	1.00	35.9	40430.00
2	68.05	11.96	2.317	0.30( 0.30)	1.00	37.1	40440.00
3	65.00	13.35	2.124	0.30( 0.30)	1.00	39.0	40420.00

LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40447.00 = 2156.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	132.09	13.23	2.140	0.30( 0.30)	1.00	79.8	40400.00
2	131.20	13.45	2.110	0.30( 0.30)	1.00	80.6	40410.00

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	197.99	11.44	2.390	0.30( 0.30)	1.00	104.9	40430.00
2	198.98	11.96	2.317	0.30( 0.30)	1.00	109.2	40440.00
3	197.34	13.23	2.140	0.30( 0.30)	1.00	118.6	40400.00
4	196.63	13.35	2.124	0.30( 0.30)	1.00	119.2	40420.00
5	195.68	13.45	2.110	0.30( 0.30)	1.00	119.5	40410.00
TOTAL AREA(ACRES) =		119.5					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 198.98 Tc(MIN.) = 11.963

EFFECTIVE AREA(ACRES) = 109.17 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 119.5

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40448.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 482.00 DOWNSTREAM(FEET) = 447.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 926.00 CHANNEL SLOPE = 0.0378  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.074

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	24.32	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 218.40

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.86

AVERAGE FLOW DEPTH(FEET) = 2.87 TRAVEL TIME(MIN.) = 1.74

Tc(MIN.) = 13.70

SUBAREA AREA(ACRES) = 24.32 SUBAREA RUNOFF(CFS) = 38.83

EFFECTIVE AREA(ACRES) = 133.49 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 143.9 PEAK FLOW RATE (CFS) = 213.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.84 FLOW VELOCITY (FEET/SEC.) = 8.80  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40448.00 = 3589.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	214.77	13.18	2.147	0.30 ( 0.30)	1.00	129.2	40430.00
2	213.15	13.70	2.074	0.30 ( 0.30)	1.00	133.5	40440.00
3	205.24	14.98	1.896	0.30 ( 0.30)	1.00	142.9	40400.00
4	205.06	15.09	1.888	0.30 ( 0.30)	1.00	143.5	40420.00
5	204.81	15.20	1.882	0.30 ( 0.30)	1.00	143.9	40410.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 214.77 Tc (MIN.) = 13.18  
AREA-AVERAGED Fm (INCH/HR) = 0.30 AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA (ACRES) = 129.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40448.00 TO NODE 40449.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 447.00 DOWNSTREAM (FEET) = 433.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 443.00 CHANNEL SLOPE = 0.0316  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.032

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	108.49	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 299.34

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.96

AVERAGE FLOW DEPTH (FEET) = 3.34 TRAVEL TIME (MIN.) = 0.82

Tc (MIN.) = 14.01

SUBAREA AREA (ACRES) = 108.49 SUBAREA RUNOFF (CFS) = 169.08

EFFECTIVE AREA (ACRES) = 237.71 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 252.3 PEAK FLOW RATE (CFS) = 370.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 3.61 FLOW VELOCITY (FEET/SEC.) = 9.46  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40449.00 = 4032.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	370.46	14.01	2.032	0.30 ( 0.30)	1.00	237.7	40430.00
2	361.22	14.53	1.959	0.30 ( 0.30)	1.00	242.0	40440.00
3	350.39	15.82	1.848	0.30 ( 0.30)	1.00	251.4	40400.00
4	349.77	15.93	1.842	0.30 ( 0.30)	1.00	252.0	40420.00
5	348.92	16.04	1.836	0.30 ( 0.30)	1.00	252.3	40410.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 370.46 Tc (MIN.) = 14.01  
AREA-AVERAGED Fm (INCH/HR) = 0.30 AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA (ACRES) = 237.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40449.00 TO NODE 40450.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 433.00 DOWNSTREAM (FEET) = 398.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1065.00 CHANNEL SLOPE = 0.0329  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.848

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	36.85	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 396.13

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.75

AVERAGE FLOW DEPTH (FEET) = 3.68 TRAVEL TIME (MIN.) = 1.82

Tc (MIN.) = 15.83

SUBAREA AREA (ACRES) = 36.85 SUBAREA RUNOFF (CFS) = 51.33

EFFECTIVE AREA (ACRES) = 274.56 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 289.2 PEAK FLOW RATE (CFS) = 382.50

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 3.63 FLOW VELOCITY (FEET/SEC.) = 9.68  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40450.00 = 5097.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	382.50	15.83	1.848	0.30 ( 0.30)	1.00	274.6	40430.00
2	381.18	16.36	1.819	0.30 ( 0.30)	1.00	278.8	40440.00
3	375.65	17.67	1.748	0.30 ( 0.30)	1.00	288.3	40400.00
4	374.81	17.78	1.742	0.30 ( 0.30)	1.00	288.8	40420.00
5	373.68	17.89	1.736	0.30 ( 0.30)	1.00	289.2	40410.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 382.50 Tc (MIN.) = 15.83  
AREA-AVERAGED Fm (INCH/HR) = 0.30 AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA (ACRES) = 274.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40450.00 TO NODE 40451.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 398.00 DOWNSTREAM (FEET) = 386.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 401.00 CHANNEL SLOPE = 0.0299  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.810  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 71.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 431.29  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.62  
 AVERAGE FLOW DEPTH(FEET) = 3.87 TRAVEL TIME(MIN.) = 0.69  
 Tc(MIN.) = 16.52  
 SUBAREA AREA(ACRES) = 71.80 SUBAREA RUNOFF(CFS) = 97.59  
 EFFECTIVE AREA(ACRES) = 346.36 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 361.0 PEAK FLOW RATE(CFS) = 470.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.99 FLOW VELOCITY(FEET/SEC.) = 9.84  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40451.00 = 5498.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 470.74 16.52 1.810 0.30( 0.30) 1.00 346.4 40430.00  
 2 467.39 17.06 1.781 0.30( 0.30) 1.00 350.6 40440.00  
 3 456.89 18.36 1.710 0.30( 0.30) 1.00 360.1 40400.00  
 4 455.63 18.48 1.704 0.30( 0.30) 1.00 360.6 40420.00  
 5 454.07 18.59 1.698 0.30( 0.30) 1.00 361.0 40410.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 470.74 Tc(MIN.) = 16.52  
 AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 346.36

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40451.00 TO NODE 40452.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 386.00 DOWNSTREAM(FEET) = 358.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 957.00 CHANNEL SLOPE = 0.0293  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.739

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 12.07 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 478.55  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.17  
 AVERAGE FLOW DEPTH(FEET) = 3.62 TRAVEL TIME(MIN.) = 1.31  
 Tc(MIN.) = 17.83  
 SUBAREA AREA(ACRES) = 12.07 SUBAREA RUNOFF(CFS) = 15.63  
 EFFECTIVE AREA(ACRES) = 358.43 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 373.1 PEAK FLOW RATE(CFS) = 470.74

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.60 FLOW VELOCITY(FEET/SEC.) = 12.12  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40452.00 = 6455.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 470.74 17.83 1.739 0.30( 0.30) 1.00 358.4 40430.00  
 2 467.39 18.37 1.709 0.30( 0.30) 1.00 362.7 40440.00  
 3 456.89 19.69 1.638 0.30( 0.30) 1.00 372.1 40400.00  
 4 455.63 19.80 1.632 0.30( 0.30) 1.00 372.7 40420.00  
 5 454.07 19.92 1.625 0.30( 0.30) 1.00 373.1 40410.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 470.74 Tc(MIN.) = 17.83  
 AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 358.43

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40452.00 TO NODE 40453.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 358.00 DOWNSTREAM(FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 973.00 CHANNEL SLOPE = 0.0576  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.682

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 9.14 0.30 0.970 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 476.46  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 15.64  
 AVERAGE FLOW DEPTH(FEET) = 3.19 TRAVEL TIME(MIN.) = 1.04  
 Tc(MIN.) = 18.87  
 SUBAREA AREA(ACRES) = 9.14 SUBAREA RUNOFF(CFS) = 11.44  
 EFFECTIVE AREA(ACRES) = 367.57 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 382.2 PEAK FLOW RATE(CFS) = 470.74

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.17 FLOW VELOCITY(FEET/SEC.) = 15.61  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40453.00 = 7428.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 470.74 18.87 1.682 0.30( 0.30) 1.00 367.6 40430.00  
 2 467.39 19.41 1.653 0.30( 0.30) 1.00 371.8 40440.00  
 3 456.89 20.73 1.590 0.30( 0.30) 1.00 381.3 40400.00  
 4 455.63 20.84 1.586 0.30( 0.30) 1.00 381.8 40420.00  
 5 454.07 20.96 1.581 0.30( 0.30) 1.00 382.2 40410.00



NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 470.74 Tc(MIN.) = 18.87  
AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 367.57

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FLOW PROCESS FROM NODE 40453.00 TO NODE 40453.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.87

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.682

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	28.26	0.30	0.882	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.882

SUBAREA AREA(ACRES) = 28.26 SUBAREA RUNOFF(CFS) = 36.06

EFFECTIVE AREA(ACRES) = 395.83 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 410.5 PEAK FLOW RATE(CFS) = 493.41

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 410.5 TC(MIN.) = 18.87

EFFECTIVE AREA(ACRES) = 395.83 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.991

PEAK FLOW RATE(CFS) = 493.41

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	493.41	18.87	1.682	0.30( 0.30)	0.99	395.8	40430.00
2	488.18	19.41	1.653	0.30( 0.30)	0.99	400.1	40440.00
3	476.58	20.73	1.590	0.30( 0.30)	0.99	409.5	40400.00
4	475.50	20.84	1.586	0.30( 0.30)	0.99	410.1	40420.00
5	474.11	20.96	1.581	0.30( 0.30)	0.99	410.5	40410.00

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 10 Yr \*  
\* From Node: 40500 To Node: 40519 \*  
\*\*\*\*\*

FILE NAME: 0610405V.DAT  
TIME/DATE OF STUDY: 10:00 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.911
- 2) 10.00; 2.592
- 3) 15.00; 1.893
- 4) 20.00; 1.621
- 5) 25.00; 1.412
- 6) 30.00; 1.265
- 7) 40.00; 1.084
- 8) 50.00; 0.966
- 9) 60.00; 0.879
- 10) 90.00; 0.732
- 11) 120.00; 0.650
- 12) 180.00; 0.546
- 13) 360.00; 0.406
- 14) 1440.00; 0.179

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40500.00 TO NODE 40501.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 961.00 DOWNSTREAM(FEET) = 845.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.819  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.903  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.63	0.30	1.000	0	8.82

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.48  
TOTAL AREA(ACRES) = 0.63 PEAK FLOW RATE(CFS) = 1.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40501.00 TO NODE 40502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 845.00 DOWNSTREAM(FEET) = 788.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 141.00 CHANNEL SLOPE = 0.4043  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.817  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.11	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.74  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.20  
AVERAGE FLOW DEPTH(FEET) = 0.36 TRAVEL TIME(MIN.) = 0.33  
Tc(MIN.) = 9.15  
SUBAREA AREA(ACRES) = 1.11 SUBAREA RUNOFF(CFS) = 2.52  
EFFECTIVE AREA(ACRES) = 1.74 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 3.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 FLOW VELOCITY(FEET/SEC.) = 7.93  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40502.00 = 469.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40502.00 TO NODE 40503.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 788.00 DOWNSTREAM(FEET) = 719.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 187.00 CHANNEL SLOPE = 0.3690  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.718

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.44	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.51

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.31

AVERAGE FLOW DEPTH(FEET) = 0.47 TRAVEL TIME(MIN.) = 0.38

Tc(MIN.) = 9.52

SUBAREA AREA(ACRES) = 1.44 SUBAREA RUNOFF(CFS) = 3.13

EFFECTIVE AREA(ACRES) = 3.18 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 6.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.51 FLOW VELOCITY(FEET/SEC.) = 8.73

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40503.00 = 656.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40503.00 TO NODE 40504.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 719.00 DOWNSTREAM(FEET) = 545.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 302.00 CHANNEL SLOPE = 0.5762  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.604

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.36	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.40

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.61

AVERAGE FLOW DEPTH(FEET) = 0.55 TRAVEL TIME(MIN.) = 0.43

Tc(MIN.) = 9.95

SUBAREA AREA(ACRES) = 3.36 SUBAREA RUNOFF(CFS) = 6.97

EFFECTIVE AREA(ACRES) = 6.54 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 6.5 PEAK FLOW RATE(CFS) = 13.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.61 FLOW VELOCITY(FEET/SEC.) = 12.33

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40504.00 = 958.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40504.00 TO NODE 40505.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 545.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 328.00 CHANNEL SLOPE = 0.2287  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.521

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.58	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.14

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.91

AVERAGE FLOW DEPTH(FEET) = 0.88 TRAVEL TIME(MIN.) = 0.55

Tc(MIN.) = 10.51

SUBAREA AREA(ACRES) = 9.58 SUBAREA RUNOFF(CFS) = 19.15

EFFECTIVE AREA(ACRES) = 16.12 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 32.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.00 FLOW VELOCITY(FEET/SEC.) = 10.81

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40505.00 = 1286.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40505.00 TO NODE 40506.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 410.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 507.00 CHANNEL SLOPE = 0.1183  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.390

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.98	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.56

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.02

AVERAGE FLOW DEPTH(FEET) = 1.25 TRAVEL TIME(MIN.) = 0.94

Tc(MIN.) = 11.44

SUBAREA AREA(ACRES) = 10.98 SUBAREA RUNOFF(CFS) = 20.66

EFFECTIVE AREA(ACRES) = 27.10 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 27.1 PEAK FLOW RATE (CFS) = 50.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.34 FLOW VELOCITY (FEET/SEC.) = 9.47  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40506.00 = 1793.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40506.00 TO NODE 40507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 410.00 DOWNSTREAM (FEET) = 355.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 698.00 CHANNEL SLOPE = 0.0788  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.194  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.53	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 54.85  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.29  
AVERAGE FLOW DEPTH (FEET) = 1.48 TRAVEL TIME (MIN.) = 1.40  
Tc (MIN.) = 12.85  
SUBAREA AREA (ACRES) = 4.53 SUBAREA RUNOFF (CFS) = 7.72  
EFFECTIVE AREA (ACRES) = 31.63 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 31.6 PEAK FLOW RATE (CFS) = 53.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.48 FLOW VELOCITY (FEET/SEC.) = 8.24  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40507.00 = 2491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40507.00 TO NODE 40518.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 355.00 DOWNSTREAM (FEET) = 341.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 604.00 CHANNEL SLOPE = 0.0232  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.983  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 60.77  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.66  
AVERAGE FLOW DEPTH (FEET) = 1.74 TRAVEL TIME (MIN.) = 1.51  
Tc (MIN.) = 14.36

SUBAREA AREA (ACRES) = 9.02 SUBAREA RUNOFF (CFS) = 13.67  
EFFECTIVE AREA (ACRES) = 40.66 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 40.7 PEAK FLOW RATE (CFS) = 61.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.75 FLOW VELOCITY (FEET/SEC.) = 6.69  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40518.00 = 3095.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40518.00 TO NODE 40518.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 14.36  
RAINFALL INTENSITY (INCH/HR) = 1.98  
AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA (ACRES) = 40.66  
TOTAL STREAM AREA (ACRES) = 40.66  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 61.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40510.00 TO NODE 40511.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 329.00  
ELEVATION DATA: UPSTREAM (FEET) = 851.00 DOWNSTREAM (FEET) = 735.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.835  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.899  
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	-	0.48	0.30	1.000	0	8.84

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF (CFS) = 1.12  
TOTAL AREA (ACRES) = 0.48 PEAK FLOW RATE (CFS) = 1.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40511.00 TO NODE 40512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 735.00 DOWNSTREAM (FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 116.00 CHANNEL SLOPE = 0.7328  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.837

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.73	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.94  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.30  
AVERAGE FLOW DEPTH(FEET) = 0.28 TRAVEL TIME(MIN.) = 0.23  
Tc(MIN.) = 9.07  
SUBAREA AREA(ACRES) = 0.73 SUBAREA RUNOFF(CFS) = 1.66  
EFFECTIVE AREA(ACRES) = 1.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 2.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 9.07  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40512.00 = 445.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40512.00 TO NODE 40513.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 650.00 DOWNSTREAM(FEET) = 581.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 152.00 CHANNEL SLOPE = 0.4539  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.758

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.36	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.25  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.46  
AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 0.30  
Tc(MIN.) = 9.37  
SUBAREA AREA(ACRES) = 1.36 SUBAREA RUNOFF(CFS) = 3.00  
EFFECTIVE AREA(ACRES) = 2.56 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 5.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 9.12  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40513.00 = 597.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40513.00 TO NODE 40514.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 581.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00 CHANNEL SLOPE = 0.4629  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.681

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.32	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.15  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.98  
AVERAGE FLOW DEPTH(FEET) = 0.52 TRAVEL TIME(MIN.) = 0.29  
Tc(MIN.) = 9.66  
SUBAREA AREA(ACRES) = 2.32 SUBAREA RUNOFF(CFS) = 4.97  
EFFECTIVE AREA(ACRES) = 4.88 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 10.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.58 FLOW VELOCITY(FEET/SEC.) = 10.54  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40514.00 = 772.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40514.00 TO NODE 40515.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 440.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 206.00 CHANNEL SLOPE = 0.2913  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.587

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.15	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.67  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.29  
AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 0.37  
Tc(MIN.) = 10.03  
SUBAREA AREA(ACRES) = 2.15 SUBAREA RUNOFF(CFS) = 4.43  
EFFECTIVE AREA(ACRES) = 7.03 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.0 PEAK FLOW RATE(CFS) = 14.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.71 FLOW VELOCITY(FEET/SEC.) = 9.66  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40515.00 = 978.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40515.00 TO NODE 40516.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 390.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 269.00 CHANNEL SLOPE = 0.1859  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.516  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.24	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.70  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.78  
 AVERAGE FLOW DEPTH(FEET) = 0.86 TRAVEL TIME(MIN.) = 0.51  
 Tc(MIN.) = 10.54  
 SUBAREA AREA(ACRES) = 5.24 SUBAREA RUNOFF(CFS) = 10.46  
 EFFECTIVE AREA(ACRES) = 12.27 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 24.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.94 FLOW VELOCITY(FEET/SEC.) = 9.32  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40516.00 = 1247.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40516.00 TO NODE 40517.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 390.00 DOWNSTREAM(FEET) = 355.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 384.00 CHANNEL SLOPE = 0.0911  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.396  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.01	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 28.26  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.43  
 AVERAGE FLOW DEPTH(FEET) = 1.13 TRAVEL TIME(MIN.) = 0.86  
 Tc(MIN.) = 11.40  
 SUBAREA AREA(ACRES) = 4.01 SUBAREA RUNOFF(CFS) = 7.57  
 EFFECTIVE AREA(ACRES) = 16.28 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 16.3 PEAK FLOW RATE(CFS) = 30.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.16 FLOW VELOCITY(FEET/SEC.) = 7.55  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40517.00 = 1631.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40517.00 TO NODE 40518.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 355.00 DOWNSTREAM(FEET) = 341.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 512.00 CHANNEL SLOPE = 0.0273  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.207  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.89	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.34  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.30  
 AVERAGE FLOW DEPTH(FEET) = 1.42 TRAVEL TIME(MIN.) = 1.35  
 Tc(MIN.) = 12.76  
 SUBAREA AREA(ACRES) = 8.89 SUBAREA RUNOFF(CFS) = 15.26  
 EFFECTIVE AREA(ACRES) = 25.17 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 25.2 PEAK FLOW RATE(CFS) = 43.20

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.49 FLOW VELOCITY(FEET/SEC.) = 6.48  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40518.00 = 2143.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40518.00 TO NODE 40518.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 12.76  
 RAINFALL INTENSITY(INCH/HR) = 2.21  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 25.17  
 TOTAL STREAM AREA(ACRES) = 25.17  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 43.20

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	61.58	14.36	1.983	0.30( 0.30)	1.00	40.7	40500.00
2	43.20	12.76	2.207	0.30( 0.30)	1.00	25.2	40510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	104.78	12.76	2.207	0.30( 0.30)	1.00	61.3	40510.00
2	99.71	14.36	1.983	0.30( 0.30)	1.00	65.8	40500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 104.78 Tc(MIN.) = 12.76  
 EFFECTIVE AREA(ACRES) = 61.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 65.8  
 LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40518.00 = 3095.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40518.00 TO NODE 40519.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 341.00 DOWNSTREAM(FEET) = 295.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 996.00 CHANNEL SLOPE = 0.0462  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.974  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.05 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 109.33  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.97  
 AVERAGE FLOW DEPTH(FEET) = 1.91 TRAVEL TIME(MIN.) = 1.67  
 Tc(MIN.) = 14.42  
 SUBAREA AREA(ACRES) = 6.05 SUBAREA RUNOFF(CFS) = 9.11  
 EFFECTIVE AREA(ACRES) = 67.34 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 71.9 PEAK FLOW RATE(CFS) = 104.78  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.88 FLOW VELOCITY(FEET/SEC.) = 9.86  
 LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40519.00 = 4091.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	104.78	14.42	1.974	0.30( 0.30)	1.00	67.3	40510.00
2	99.71	16.04	1.836	0.30( 0.30)	1.00	71.9	40500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 104.78 Tc(MIN.) = 14.42  
 AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 67.34

\*\*\*\*\*

FLOW PROCESS FROM NODE 40519.00 TO NODE 40519.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.42  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.974  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 9.50 0.30 0.982 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 14.36  
 EFFECTIVE AREA(ACRES) = 76.84 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 81.4 PEAK FLOW RATE(CFS) = 115.81

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 81.4 Tc(MIN.) = 14.42  
 EFFECTIVE AREA(ACRES) = 76.84 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.998  
 PEAK FLOW RATE(CFS) = 115.81

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	115.81	14.42	1.974	0.30( 0.30)	1.00	76.8	40510.00
2	112.57	16.04	1.836	0.30( 0.30)	1.00	81.4	40500.00

END OF RATIONAL METHOD ANALYSIS





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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 10 Yr \*  
\* From Node: 40600 To Node: 40615 \*  
\*\*\*\*\*

FILE NAME: 0610406V.DAT  
TIME/DATE OF STUDY: 10:00 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.911
- 2) 10.00; 2.592
- 3) 15.00; 1.893
- 4) 20.00; 1.621
- 5) 25.00; 1.412
- 6) 30.00; 1.265
- 7) 40.00; 1.084
- 8) 50.00; 0.966
- 9) 60.00; 0.879
- 10) 90.00; 0.732
- 11) 120.00; 0.650
- 12) 180.00; 0.546
- 13) 360.00; 0.406
- 14) 1440.00; 0.179

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

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FLOW PROCESS FROM NODE 40600.00 TO NODE 40601.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 279.00  
ELEVATION DATA: UPSTREAM(FEET) = 1054.00 DOWNSTREAM(FEET) = 1000.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.326  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.769  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.54	0.30	1.000	0	9.33

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.21  
TOTAL AREA(ACRES) = 0.54 PEAK FLOW RATE(CFS) = 1.21

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FLOW PROCESS FROM NODE 40601.00 TO NODE 40602.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 985.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 199.00 CHANNEL SLOPE = 0.0754  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.555  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.76	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.98  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.53  
AVERAGE FLOW DEPTH(FEET) = 0.43 TRAVEL TIME(MIN.) = 0.94  
 $T_c$ (MIN.) = 10.26  
SUBAREA AREA(ACRES) = 0.76 SUBAREA RUNOFF(CFS) = 1.54  
EFFECTIVE AREA(ACRES) = 1.30 AREA-AVERAGED  $F_m$ (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$ (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 1.00  
TOTAL AREA(ACRES) = 1.3 PEAK FLOW RATE(CFS) = 2.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.48 FLOW VELOCITY(FEET/SEC.) = 3.77  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40602.00 = 478.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40602.00 TO NODE 40603.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	985.00	DOWNSTREAM(FEET) =	958.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	282.00	CHANNEL SLOPE =	0.0957
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.410		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.11	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.70

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.53

AVERAGE FLOW DEPTH(FEET) = 0.52 TRAVEL TIME(MIN.) = 1.04

Tc(MIN.) = 11.30

SUBAREA AREA(ACRES) = 1.11 SUBAREA RUNOFF(CFS) = 2.11

EFFECTIVE AREA(ACRES) = 2.41 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 4.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.57 FLOW VELOCITY(FEET/SEC.) = 4.74

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40603.00 = 760.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40603.00 TO NODE 40604.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	958.00	DOWNSTREAM(FEET) =	940.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	219.00	CHANNEL SLOPE =	0.0822
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.298		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.36	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.90

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.57

AVERAGE FLOW DEPTH(FEET) = 0.60 TRAVEL TIME(MIN.) = 0.80

Tc(MIN.) = 12.10

SUBAREA AREA(ACRES) = 0.36 SUBAREA RUNOFF(CFS) = 0.64

EFFECTIVE AREA(ACRES) = 2.77 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.8 PEAK FLOW RATE(CFS) = 4.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.60 FLOW VELOCITY(FEET/SEC.) = 4.61

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40604.00 = 979.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40604.00 TO NODE 40605.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	940.00	DOWNSTREAM(FEET) =	800.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	547.00	CHANNEL SLOPE =	0.2559
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.136		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.46

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.88

AVERAGE FLOW DEPTH(FEET) = 0.56 TRAVEL TIME(MIN.) = 1.16

Tc(MIN.) = 13.26

SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 4.96

EFFECTIVE AREA(ACRES) = 5.77 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 9.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 8.24

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40605.00 = 1526.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40605.00 TO NODE 40606.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	800.00	DOWNSTREAM(FEET) =	680.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	277.00	CHANNEL SLOPE =	0.4332
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.075		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.22	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.31

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.54

AVERAGE FLOW DEPTH(FEET) = 0.60 TRAVEL TIME(MIN.) = 0.44

Tc(MIN.) = 13.70

SUBAREA AREA(ACRES) = 2.22 SUBAREA RUNOFF(CFS) = 3.55

EFFECTIVE AREA(ACRES) = 7.99 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.0 PEAK FLOW RATE (CFS) = 12.77

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.62 FLOW VELOCITY (FEET/SEC.) = 10.97  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40606.00 = 1803.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40606.00 TO NODE 40607.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 680.00 DOWNSTREAM (FEET) = 670.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 59.00 CHANNEL SLOPE = 0.1695  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.059  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.34	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 20.16  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.52  
AVERAGE FLOW DEPTH (FEET) = 0.89 TRAVEL TIME (MIN.) = 0.12  
Tc (MIN.) = 13.81  
SUBAREA AREA (ACRES) = 9.34 SUBAREA RUNOFF (CFS) = 14.78  
EFFECTIVE AREA (ACRES) = 17.33 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.3 PEAK FLOW RATE (CFS) = 27.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.99 FLOW VELOCITY (FEET/SEC.) = 9.24  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40607.00 = 1862.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40607.00 TO NODE 40608.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 670.00 DOWNSTREAM (FEET) = 585.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 246.00 CHANNEL SLOPE = 0.3455  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.013  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.64	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.01  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.46  
AVERAGE FLOW DEPTH (FEET) = 0.91 TRAVEL TIME (MIN.) = 0.33  
Tc (MIN.) = 14.14

SUBAREA AREA (ACRES) = 4.64 SUBAREA RUNOFF (CFS) = 7.15  
EFFECTIVE AREA (ACRES) = 21.96 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 33.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.94 FLOW VELOCITY (FEET/SEC.) = 12.74  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40608.00 = 2108.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40608.00 TO NODE 40609.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 585.00 DOWNSTREAM (FEET) = 494.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 482.00 CHANNEL SLOPE = 0.1888  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.907  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.61	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 40.09  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.57  
AVERAGE FLOW DEPTH (FEET) = 1.12 TRAVEL TIME (MIN.) = 0.76  
Tc (MIN.) = 14.90  
SUBAREA AREA (ACRES) = 8.61 SUBAREA RUNOFF (CFS) = 12.46  
EFFECTIVE AREA (ACRES) = 30.57 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 30.6 PEAK FLOW RATE (CFS) = 44.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.16 FLOW VELOCITY (FEET/SEC.) = 10.87  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40609.00 = 2590.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40609.00 TO NODE 40610.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 494.00 DOWNSTREAM (FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 236.00 CHANNEL SLOPE = 0.1017  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.875  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	18.33	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 57.21  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.21

AVERAGE FLOW DEPTH (FEET) = 1.44 TRAVEL TIME (MIN.) = 0.43  
Tc (MIN.) = 15.33  
SUBAREA AREA (ACRES) = 18.33 SUBAREA RUNOFF (CFS) = 25.99  
EFFECTIVE AREA (ACRES) = 48.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 48.9 PEAK FLOW RATE (CFS) = 69.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.55 FLOW VELOCITY (FEET/SEC.) = 9.67  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40610.00 = 2826.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40610.00 TO NODE 40611.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 425.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 560.00 CHANNEL SLOPE = 0.0804  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.819  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.11 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 76.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.05  
AVERAGE FLOW DEPTH (FEET) = 1.68 TRAVEL TIME (MIN.) = 1.03  
Tc (MIN.) = 16.36  
SUBAREA AREA (ACRES) = 10.11 SUBAREA RUNOFF (CFS) = 13.82  
EFFECTIVE AREA (ACRES) = 59.01 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 59.0 PEAK FLOW RATE (CFS) = 80.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.71 FLOW VELOCITY (FEET/SEC.) = 9.18  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40611.00 = 3386.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40611.00 TO NODE 40612.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 425.00 DOWNSTREAM (FEET) = 373.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 906.00 CHANNEL SLOPE = 0.0574  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.721  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 20.87 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 94.03  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.39  
AVERAGE FLOW DEPTH (FEET) = 1.93 TRAVEL TIME (MIN.) = 1.80  
Tc (MIN.) = 18.16  
SUBAREA AREA (ACRES) = 20.87 SUBAREA RUNOFF (CFS) = 26.70  
EFFECTIVE AREA (ACRES) = 79.89 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 79.9 PEAK FLOW RATE (CFS) = 102.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.99 FLOW VELOCITY (FEET/SEC.) = 8.56  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40612.00 = 4292.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40612.00 TO NODE 40613.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 373.00 DOWNSTREAM (FEET) = 326.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1220.00 CHANNEL SLOPE = 0.0385  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.607  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 13.07 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 109.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.33  
AVERAGE FLOW DEPTH (FEET) = 1.98 TRAVEL TIME (MIN.) = 2.18  
Tc (MIN.) = 20.34  
SUBAREA AREA (ACRES) = 13.07 SUBAREA RUNOFF (CFS) = 15.37  
EFFECTIVE AREA (ACRES) = 92.95 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 93.0 PEAK FLOW RATE (CFS) = 109.32

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.98 FLOW VELOCITY (FEET/SEC.) = 9.31  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40613.00 = 5512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40613.00 TO NODE 40614.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 326.00 DOWNSTREAM (FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 209.00 CHANNEL SLOPE = 0.1722  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.598  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 14.71 0.30 0.999 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 117.92  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 16.65  
AVERAGE FLOW DEPTH(FEET) = 1.54 TRAVEL TIME(MIN.) = 0.21  
Tc(MIN.) = 20.55  
SUBAREA AREA(ACRES) = 14.71 SUBAREA RUNOFF(CFS) = 17.19  
EFFECTIVE AREA(ACRES) = 107.67 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 107.7 PEAK FLOW RATE(CFS) = 125.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.57 FLOW VELOCITY(FEET/SEC.) = 16.91  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40614.00 = 5721.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40614.00 TO NODE 40615.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 290.00 DOWNSTREAM(FEET) = 286.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0104  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.554

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	23.56	0.30	0.971	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.971

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 139.16

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.06

AVERAGE FLOW DEPTH(FEET) = 2.77 TRAVEL TIME(MIN.) = 1.06

Tc(MIN.) = 21.61

SUBAREA AREA(ACRES) = 23.56 SUBAREA RUNOFF(CFS) = 26.77

EFFECTIVE AREA(ACRES) = 131.23 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 131.2 PEAK FLOW RATE(CFS) = 148.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.84 FLOW VELOCITY(FEET/SEC.) = 6.15  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40615.00 = 6107.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40615.00 TO NODE 40615.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 21.61

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.554

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.74	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 3.74 SUBAREA RUNOFF(CFS) = 4.23  
EFFECTIVE AREA(ACRES) = 134.97 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 135.0 PEAK FLOW RATE(CFS) = 152.48

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 135.0 TC(MIN.) = 21.61

EFFECTIVE AREA(ACRES) = 134.97 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.995

PEAK FLOW RATE(CFS) = 152.48

END OF RATIONAL METHOD ANALYSIS



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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 10 Yr \*  
\* From Node: 50100 To Node: 50167 \*  
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FILE NAME: 0610501V.DAT  
TIME/DATE OF STUDY: 10:00 01/21/2013

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.886
- 2) 10.00; 2.578
- 3) 15.00; 1.888
- 4) 20.00; 1.616
- 5) 25.00; 1.408
- 6) 30.00; 1.262
- 7) 40.00; 1.081
- 8) 50.00; 0.963
- 9) 60.00; 0.876
- 10) 90.00; 0.729
- 11) 120.00; 0.646
- 12) 180.00; 0.543
- 13) 360.00; 0.403
- 14) 1440.00; 0.177

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

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FLOW PROCESS FROM NODE 50100.00 TO NODE 50101.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00  
ELEVATION DATA: UPSTREAM(FEET) = 1072.00 DOWNSTREAM(FEET) = 1063.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.598  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.943  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.30	1.000	0	14.60

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.89  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.89

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FLOW PROCESS FROM NODE 50101.00 TO NODE 50102.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 1063.00 DOWNSTREAM(FEET) = 975.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 273.00 CHANNEL SLOPE = 0.3223  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.862  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.29	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.10  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.26  
AVERAGE FLOW DEPTH(FEET) = 0.26 TRAVEL TIME(MIN.) = 0.87  
Tc(MIN.) = 15.46  
SUBAREA AREA(ACRES) = 0.29 SUBAREA RUNOFF(CFS) = 0.41  
EFFECTIVE AREA(ACRES) = 0.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 1.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.28 FLOW VELOCITY(FEET/SEC.) = 5.47  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50102.00 = 597.00 FEET.

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FLOW PROCESS FROM NODE 50102.00 TO NODE 50103.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) =	975.00	DOWNSTREAM(FEET) =	948.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	111.00	CHANNEL SLOPE =	0.2432
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	1.842		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.22	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.42

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.98

AVERAGE FLOW DEPTH(FEET) = 0.31 TRAVEL TIME(MIN.) = 0.37

Tc(MIN.) = 15.83

SUBAREA AREA(ACRES) = 0.22 SUBAREA RUNOFF(CFS) = 0.31

EFFECTIVE AREA(ACRES) = 1.12 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 1.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 5.20

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50103.00 = 708.00 FEET.

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FLOW PROCESS FROM NODE 50103.00 TO NODE 50104.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) =	948.00	DOWNSTREAM(FEET) =	914.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	136.00	CHANNEL SLOPE =	0.2500
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	1.820		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.96

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.45

AVERAGE FLOW DEPTH(FEET) = 0.35 TRAVEL TIME(MIN.) = 0.42

Tc(MIN.) = 16.25

SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 0.81

EFFECTIVE AREA(ACRES) = 1.71 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 2.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 FLOW VELOCITY(FEET/SEC.) = 5.73

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50104.00 = 844.00 FEET.

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FLOW PROCESS FROM NODE 50104.00 TO NODE 50105.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) =	914.00	DOWNSTREAM(FEET) =	895.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	52.00	CHANNEL SLOPE =	0.3654
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	1.813		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.73	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.52

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.34

AVERAGE FLOW DEPTH(FEET) = 0.40 TRAVEL TIME(MIN.) = 0.12

Tc(MIN.) = 16.37

SUBAREA AREA(ACRES) = 1.73 SUBAREA RUNOFF(CFS) = 2.35

EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 4.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 7.87

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50105.00 = 896.00 FEET.

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FLOW PROCESS FROM NODE 50105.00 TO NODE 50106.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) =	895.00	DOWNSTREAM(FEET) =	835.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	280.00	CHANNEL SLOPE =	0.2143
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	1.778		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.22

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.23

AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 0.65

Tc(MIN.) = 17.01

SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 5.06

EFFECTIVE AREA(ACRES) = 7.24 AREA-AVERAGED Fm(INCH/HR) = 0.30



AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 7.2 PEAK FLOW RATE (CFS) = 9.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.64 FLOW VELOCITY (FEET/SEC.) = 7.75  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50106.00 = 1176.00 FEET.

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FLOW PROCESS FROM NODE 50106.00 TO NODE 50107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 835.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 413.00 CHANNEL SLOPE = 0.2179  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.733

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.53	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.56  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.38  
AVERAGE FLOW DEPTH (FEET) = 0.71 TRAVEL TIME (MIN.) = 0.82  
Tc (MIN.) = 17.84  
SUBAREA AREA (ACRES) = 4.53 SUBAREA RUNOFF (CFS) = 5.84  
EFFECTIVE AREA (ACRES) = 11.77 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.8 PEAK FLOW RATE (CFS) = 15.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.76 FLOW VELOCITY (FEET/SEC.) = 8.77  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50107.00 = 1589.00 FEET.

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FLOW PROCESS FROM NODE 50107.00 TO NODE 50108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 302.00 CHANNEL SLOPE = 0.2318  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.705

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.76	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.84  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.49  
AVERAGE FLOW DEPTH (FEET) = 0.81 TRAVEL TIME (MIN.) = 0.53  
Tc (MIN.) = 18.37

SUBAREA AREA (ACRES) = 5.76 SUBAREA RUNOFF (CFS) = 7.29  
EFFECTIVE AREA (ACRES) = 17.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.5 PEAK FLOW RATE (CFS) = 22.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.86 FLOW VELOCITY (FEET/SEC.) = 9.88  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50108.00 = 1891.00 FEET.

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FLOW PROCESS FROM NODE 50108.00 TO NODE 50109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 655.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 81.00 CHANNEL SLOPE = 0.2469  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.698

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.77	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 32.09  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.11  
AVERAGE FLOW DEPTH (FEET) = 0.98 TRAVEL TIME (MIN.) = 0.12  
Tc (MIN.) = 18.49  
SUBAREA AREA (ACRES) = 15.77 SUBAREA RUNOFF (CFS) = 19.84  
EFFECTIVE AREA (ACRES) = 33.31 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 33.3 PEAK FLOW RATE (CFS) = 41.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.09 FLOW VELOCITY (FEET/SEC.) = 11.84  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50109.00 = 1972.00 FEET.

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FLOW PROCESS FROM NODE 50109.00 TO NODE 50110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 655.00 DOWNSTREAM (FEET) = 590.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 379.00 CHANNEL SLOPE = 0.1715  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.666

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.53	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 49.00  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.74

AVERAGE FLOW DEPTH(FEET) = 1.23 TRAVEL TIME(MIN.) = 0.59  
Tc(MIN.) = 19.08  
SUBAREA AREA(ACRES) = 11.53 SUBAREA RUNOFF(CFS) = 14.18  
EFFECTIVE AREA(ACRES) = 44.84 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 44.8 PEAK FLOW RATE(CFS) = 55.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.29 FLOW VELOCITY(FEET/SEC.) = 11.10  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50110.00 = 2351.00 FEET.

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FLOW PROCESS FROM NODE 50110.00 TO NODE 50111.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 570.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 340.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.627

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 27.15 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 71.35  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.90  
AVERAGE FLOW DEPTH(FEET) = 1.73 TRAVEL TIME(MIN.) = 0.72  
Tc(MIN.) = 19.79  
SUBAREA AREA(ACRES) = 27.15 SUBAREA RUNOFF(CFS) = 32.43  
EFFECTIVE AREA(ACRES) = 71.99 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 72.0 PEAK FLOW RATE(CFS) = 85.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.86 FLOW VELOCITY(FEET/SEC.) = 8.30  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50111.00 = 2691.00 FEET.

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FLOW PROCESS FROM NODE 50111.00 TO NODE 50112.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 567.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 403.00 CHANNEL SLOPE = 0.0074  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.558

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 66.68 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 123.74  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.18  
AVERAGE FLOW DEPTH(FEET) = 3.14 TRAVEL TIME(MIN.) = 1.61  
Tc(MIN.) = 21.40  
SUBAREA AREA(ACRES) = 66.68 SUBAREA RUNOFF(CFS) = 75.49  
EFFECTIVE AREA(ACRES) = 138.68 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 138.7 PEAK FLOW RATE(CFS) = 156.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.44 FLOW VELOCITY(FEET/SEC.) = 4.43  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50112.00 = 3094.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50112.00 TO NODE 50140.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 21.40  
RAINFALL INTENSITY(INCH/HR) = 1.56  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 138.68  
TOTAL STREAM AREA(ACRES) = 138.68  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 156.98

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50120.00 TO NODE 50121.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00  
ELEVATION DATA: UPSTREAM(FEET) = 1068.00 DOWNSTREAM(FEET) = 968.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.018  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.835

SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER  
"CHAPARRAL, BROADLEAF" - 0.29 0.30 1.000 0 9.02  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.66  
TOTAL AREA(ACRES) = 0.29 PEAK FLOW RATE(CFS) = 0.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50121.00 TO NODE 50122.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 968.00 DOWNSTREAM(FEET) = 916.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 242.00 CHANNEL SLOPE = 0.2149  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.611  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.55 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.23  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.71  
AVERAGE FLOW DEPTH (FEET) = 0.29 TRAVEL TIME (MIN.) = 0.86  
Tc (MIN.) = 9.88  
SUBAREA AREA (ACRES) = 0.55 SUBAREA RUNOFF (CFS) = 1.14  
EFFECTIVE AREA (ACRES) = 0.83 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 0.8 PEAK FLOW RATE (CFS) = 1.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.34 FLOW VELOCITY (FEET/SEC.) = 5.05  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50122.00 = 566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50122.00 TO NODE 50123.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 916.00 DOWNSTREAM (FEET) = 906.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 111.00 CHANNEL SLOPE = 0.0901  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.532  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.68 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.42  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.03  
AVERAGE FLOW DEPTH (FEET) = 0.45 TRAVEL TIME (MIN.) = 0.46  
Tc (MIN.) = 10.33  
SUBAREA AREA (ACRES) = 0.68 SUBAREA RUNOFF (CFS) = 1.36  
EFFECTIVE AREA (ACRES) = 1.51 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 1.5 PEAK FLOW RATE (CFS) = 3.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.49 FLOW VELOCITY (FEET/SEC.) = 4.20  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50123.00 = 677.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50123.00 TO NODE 50124.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 906.00 DOWNSTREAM (FEET) = 903.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 60.00 CHANNEL SLOPE = 0.0500  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.493  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.59 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.62  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.53  
AVERAGE FLOW DEPTH (FEET) = 0.58 TRAVEL TIME (MIN.) = 0.28  
Tc (MIN.) = 10.62  
SUBAREA AREA (ACRES) = 0.59 SUBAREA RUNOFF (CFS) = 1.16  
EFFECTIVE AREA (ACRES) = 2.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 2.1 PEAK FLOW RATE (CFS) = 4.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.62 FLOW VELOCITY (FEET/SEC.) = 3.65  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50124.00 = 737.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50124.00 TO NODE 50125.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 903.00 DOWNSTREAM (FEET) = 901.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 29.00 CHANNEL SLOPE = 0.0690  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.478  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.44 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.56  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.44  
AVERAGE FLOW DEPTH (FEET) = 0.65 TRAVEL TIME (MIN.) = 0.11  
Tc (MIN.) = 10.73  
SUBAREA AREA (ACRES) = 1.44 SUBAREA RUNOFF (CFS) = 2.82  
EFFECTIVE AREA (ACRES) = 3.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 3.5 PEAK FLOW RATE (CFS) = 6.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.70 FLOW VELOCITY (FEET/SEC.) = 4.66  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50125.00 = 766.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50125.00 TO NODE 50126.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 901.00 DOWNSTREAM(FEET) = 889.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 130.00 CHANNEL SLOPE = 0.0923
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.424
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.69 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.52
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.63
AVERAGE FLOW DEPTH(FEET) = 0.75 TRAVEL TIME(MIN.) = 0.38
Tc(MIN.) = 11.11
SUBAREA AREA(ACRES) = 2.69 SUBAREA RUNOFF(CFS) = 5.15
EFFECTIVE AREA(ACRES) = 6.23 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.2 PEAK FLOW RATE(CFS) = 11.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.81 FLOW VELOCITY(FEET/SEC.) = 6.00
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50126.00 = 896.00 FEET.

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FLOW PROCESS FROM NODE 50126.00 TO NODE 50127.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 889.00 DOWNSTREAM(FEET) = 855.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 231.00 CHANNEL SLOPE = 0.1472
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.353
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.18 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.94
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.43
AVERAGE FLOW DEPTH(FEET) = 0.79 TRAVEL TIME(MIN.) = 0.52
Tc(MIN.) = 11.63
SUBAREA AREA(ACRES) = 2.18 SUBAREA RUNOFF(CFS) = 4.03
EFFECTIVE AREA(ACRES) = 8.41 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 15.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.83 FLOW VELOCITY(FEET/SEC.) = 7.58
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50127.00 = 1127.00 FEET.

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FLOW PROCESS FROM NODE 50127.00 TO NODE 50128.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 855.00 DOWNSTREAM(FEET) = 793.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 211.00 CHANNEL SLOPE = 0.2938
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.307
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 5.70 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.69
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.62
AVERAGE FLOW DEPTH(FEET) = 0.81 TRAVEL TIME(MIN.) = 0.33
Tc(MIN.) = 11.96
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 10.29
EFFECTIVE AREA(ACRES) = 14.11 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.1 PEAK FLOW RATE(CFS) = 25.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.87 FLOW VELOCITY(FEET/SEC.) = 11.16
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50128.00 = 1338.00 FEET.

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FLOW PROCESS FROM NODE 50128.00 TO NODE 50129.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 793.00 DOWNSTREAM(FEET) = 708.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 353.00 CHANNEL SLOPE = 0.2408
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.234
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 9.99 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.19
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.17
AVERAGE FLOW DEPTH(FEET) = 1.01 TRAVEL TIME(MIN.) = 0.53
Tc(MIN.) = 12.49
SUBAREA AREA(ACRES) = 9.99 SUBAREA RUNOFF(CFS) = 17.40
EFFECTIVE AREA(ACRES) = 24.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 41.96

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.09 FLOW VELOCITY(FEET/SEC.) = 11.69
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50129.00 = 1691.00 FEET.

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FLOW PROCESS FROM NODE 50129.00 TO NODE 50130.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 708.00 DOWNSTREAM(FEET) = 571.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 735.00 CHANNEL SLOPE = 0.1864
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.085
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 13.71 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 52.99
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.33
AVERAGE FLOW DEPTH(FEET) = 1.25 TRAVEL TIME(MIN.) = 1.08
Tc(MIN.) = 13.57
SUBAREA AREA(ACRES) = 13.71 SUBAREA RUNOFF(CFS) = 22.03
EFFECTIVE AREA(ACRES) = 37.82 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 60.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.32 FLOW VELOCITY(FEET/SEC.) = 11.71
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50130.00 = 2426.00 FEET.

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FLOW PROCESS FROM NODE 50130.00 TO NODE 50131.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 571.00 DOWNSTREAM(FEET) = 566.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 709.00 CHANNEL SLOPE = 0.0071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.787
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.71 0.30 0.986 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 74.68
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.61
AVERAGE FLOW DEPTH(FEET) = 2.63 TRAVEL TIME(MIN.) = 3.28
Tc(MIN.) = 16.85
SUBAREA AREA(ACRES) = 20.71 SUBAREA RUNOFF(CFS) = 27.79
EFFECTIVE AREA(ACRES) = 58.52 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 78.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.67 FLOW VELOCITY(FEET/SEC.) = 3.66
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50131.00 = 3135.00 FEET.

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FLOW PROCESS FROM NODE 50132.00 TO NODE 50131.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.85
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.787
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 154.02 0.30 0.949 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 154.02 SUBAREA RUNOFF(CFS) = 208.29
EFFECTIVE AREA(ACRES) = 212.54 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 212.5 PEAK FLOW RATE(CFS) = 286.70

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FLOW PROCESS FROM NODE 50131.00 TO NODE 50140.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 16.85
RAINFALL INTENSITY(INCH/HR) = 1.79
AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 212.54
TOTAL STREAM AREA(ACRES) = 212.54
PEAK FLOW RATE(CFS) AT CONFLUENCE = 286.70

\*\* CONFLUENCE DATA \*\*
Table with 7 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*
Table with 7 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 432.84 Tc(MIN.) = 16.85
EFFECTIVE AREA(ACRES) = 321.72 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 351.2

LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50140.00 = 3135.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 566.00 DOWNSTREAM(FEET) = 416.00
FLOW LENGTH(FEET) = 376.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 67.23
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 432.84
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 16.94
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50141.00 = 3511.00 FEET.

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FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.94
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.782
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 48.73 0.30 0.922 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.922
SUBAREA AREA(ACRES) = 48.73 SUBAREA RUNOFF(CFS) = 66.03
EFFECTIVE AREA(ACRES) = 370.45 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 400.0 PEAK FLOW RATE(CFS) = 497.40

\*\*\*\*\*

FLOW PROCESS FROM NODE 50141.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 416.00 DOWNSTREAM(FEET) = 404.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 972.00 CHANNEL SLOPE = 0.0123
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.659
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.56 0.30 0.610 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.610
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 502.43
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.17
AVERAGE FLOW DEPTH(FEET) = 4.83 TRAVEL TIME(MIN.) = 2.26
Tc(MIN.) = 19.20
SUBAREA AREA(ACRES) = 7.56 SUBAREA RUNOFF(CFS) = 10.05
EFFECTIVE AREA(ACRES) = 378.01 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 407.5 PEAK FLOW RATE(CFS) = 497.40
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.81 FLOW VELOCITY(FEET/SEC.) = 7.16
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50162.00 = 4483.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 497.40 19.20 1.659 0.30( 0.29) 0.96 378.0 50120.00
2 454.56 23.80 1.458 0.30( 0.29) 0.96 407.5 50100.00
NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 497.40 Tc(MIN.) = 19.20
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 378.01

\*\*\*\*\*

FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 19.20
RAINFALL INTENSITY(INCH/HR) = 1.66
AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 378.01
TOTAL STREAM AREA(ACRES) = 407.52
PEAK FLOW RATE(CFS) AT CONFLUENCE = 497.40

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FLOW PROCESS FROM NODE 50150.00 TO NODE 50151.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00
ELEVATION DATA: UPSTREAM(FEET) = 1076.00 DOWNSTREAM(FEET) = 988.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.235
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.778
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" - 0.46 0.30 1.000 0 9.23
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.02
TOTAL AREA(ACRES) = 0.46 PEAK FLOW RATE(CFS) = 1.02

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FLOW PROCESS FROM NODE 50151.00 TO NODE 50152.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	988.00	DOWNSTREAM(FEET) =	938.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	220.00	CHANNEL SLOPE =	0.2273
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.591		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.62  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.12  
AVERAGE FLOW DEPTH(FEET) = 0.33 TRAVEL TIME(MIN.) = 0.72  
Tc(MIN.) = 9.95  
SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 1.21  
EFFECTIVE AREA(ACRES) = 1.04 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 2.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 FLOW VELOCITY(FEET/SEC.) = 5.49  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50152.00 = 543.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50152.00 TO NODE 50153.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	938.00	DOWNSTREAM(FEET) =	904.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	218.00	CHANNEL SLOPE =	0.1560
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.489		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.13	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.27  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.27  
AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.69  
Tc(MIN.) = 10.64  
SUBAREA AREA(ACRES) = 1.13 SUBAREA RUNOFF(CFS) = 2.23  
EFFECTIVE AREA(ACRES) = 2.18 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.2 PEAK FLOW RATE(CFS) = 4.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.50 FLOW VELOCITY(FEET/SEC.) = 5.70  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50153.00 = 761.00 FEET.

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FLOW PROCESS FROM NODE 50153.00 TO NODE 50154.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) =	904.00	DOWNSTREAM(FEET) =	881.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	212.00	CHANNEL SLOPE =	0.1085
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.402		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.13  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.60  
AVERAGE FLOW DEPTH(FEET) = 0.65 TRAVEL TIME(MIN.) = 0.63  
Tc(MIN.) = 11.27  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.67  
EFFECTIVE AREA(ACRES) = 5.18 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.2 PEAK FLOW RATE(CFS) = 9.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.74 FLOW VELOCITY(FEET/SEC.) = 6.04  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50154.00 = 973.00 FEET.

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FLOW PROCESS FROM NODE 50154.00 TO NODE 50155.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	881.00	DOWNSTREAM(FEET) =	877.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	158.00	CHANNEL SLOPE =	0.0253
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.306		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.78  
AVERAGE FLOW DEPTH(FEET) = 1.08 TRAVEL TIME(MIN.) = 0.70  
Tc(MIN.) = 11.97  
SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 6.89  
EFFECTIVE AREA(ACRES) = 8.99 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 9.0 PEAK FLOW RATE(CFS) = 16.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.16 FLOW VELOCITY(FEET/SEC.) = 3.99

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50155.00 = 1131.00 FEET.

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FLOW PROCESS FROM NODE 50155.00 TO NODE 50156.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 877.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 195.00 CHANNEL SLOPE = 0.0103
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.153

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.32 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.00
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.94
AVERAGE FLOW DEPTH(FEET) = 1.47 TRAVEL TIME(MIN.) = 1.11
Tc(MIN.) = 13.07
SUBAREA AREA(ACRES) = 3.32 SUBAREA RUNOFF(CFS) = 5.54
EFFECTIVE AREA(ACRES) = 12.31 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 20.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.51 FLOW VELOCITY(FEET/SEC.) = 3.01
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50156.00 = 1326.00 FEET.

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FLOW PROCESS FROM NODE 50156.00 TO NODE 50157.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 850.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 424.00 CHANNEL SLOPE = 0.0590
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.990

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.78 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.41
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.99
AVERAGE FLOW DEPTH(FEET) = 1.14 TRAVEL TIME(MIN.) = 1.18
Tc(MIN.) = 14.25
SUBAREA AREA(ACRES) = 3.78 SUBAREA RUNOFF(CFS) = 5.75
EFFECTIVE AREA(ACRES) = 16.09 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 24.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.16 FLOW VELOCITY(FEET/SEC.) = 6.04
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50157.00 = 1750.00 FEET.

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FLOW PROCESS FROM NODE 50157.00 TO NODE 50158.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 835.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0949
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.944

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 11.22 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 32.78
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.78
AVERAGE FLOW DEPTH(FEET) = 1.19 TRAVEL TIME(MIN.) = 0.34
Tc(MIN.) = 14.59
SUBAREA AREA(ACRES) = 11.22 SUBAREA RUNOFF(CFS) = 16.59
EFFECTIVE AREA(ACRES) = 27.31 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 27.3 PEAK FLOW RATE(CFS) = 40.40

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.28 FLOW VELOCITY(FEET/SEC.) = 8.23
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50158.00 = 1908.00 FEET.

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FLOW PROCESS FROM NODE 50158.00 TO NODE 50159.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 835.00 DOWNSTREAM(FEET) = 680.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 721.00 CHANNEL SLOPE = 0.2150
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.855

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.87 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 55.01
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.06
AVERAGE FLOW DEPTH(FEET) = 1.23 TRAVEL TIME(MIN.) = 1.00
Tc(MIN.) = 15.59
SUBAREA AREA(ACRES) = 20.87 SUBAREA RUNOFF(CFS) = 29.22
EFFECTIVE AREA(ACRES) = 48.18 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00



TOTAL AREA (ACRES) = 48.2 PEAK FLOW RATE (CFS) = 67.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.33 FLOW VELOCITY (FEET/SEC.) = 12.67  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50159.00 = 2629.00 FEET.

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FLOW PROCESS FROM NODE 50159.00 TO NODE 50160.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 680.00 DOWNSTREAM (FEET) = 558.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 874.00 CHANNEL SLOPE = 0.1396

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.787

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	32.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 88.88

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.58

AVERAGE FLOW DEPTH (FEET) = 1.60 TRAVEL TIME (MIN.) = 1.26

Tc (MIN.) = 16.85

SUBAREA AREA (ACRES) = 32.02 SUBAREA RUNOFF (CFS) = 42.86

EFFECTIVE AREA (ACRES) = 80.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 80.2 PEAK FLOW RATE (CFS) = 107.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.72 FLOW VELOCITY (FEET/SEC.) = 12.10  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50160.00 = 3503.00 FEET.

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FLOW PROCESS FROM NODE 50160.00 TO NODE 50161.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 558.00 DOWNSTREAM (FEET) = 463.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 1013.00 CHANNEL SLOPE = 0.0938

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.701

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	13.52	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 115.86

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.65

AVERAGE FLOW DEPTH (FEET) = 1.90 TRAVEL TIME (MIN.) = 1.59

Tc (MIN.) = 18.43

SUBAREA AREA (ACRES) = 13.52 SUBAREA RUNOFF (CFS) = 17.05

EFFECTIVE AREA (ACRES) = 93.72 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 93.7 PEAK FLOW RATE (CFS) = 118.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.92 FLOW VELOCITY (FEET/SEC.) = 10.69

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50161.00 = 4516.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50161.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 463.00 DOWNSTREAM (FEET) = 404.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 1126.00 CHANNEL SLOPE = 0.0524

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.592

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	19.35	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 129.42

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.79

AVERAGE FLOW DEPTH (FEET) = 2.22 TRAVEL TIME (MIN.) = 2.13

Tc (MIN.) = 20.57

SUBAREA AREA (ACRES) = 19.35 SUBAREA RUNOFF (CFS) = 22.50

EFFECTIVE AREA (ACRES) = 113.07 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 113.1 PEAK FLOW RATE (CFS) = 131.50

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.23 FLOW VELOCITY (FEET/SEC.) = 8.81

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

\*\*\*\*\*

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION (MIN.) = 20.57

RAINFALL INTENSITY (INCH/HR) = 1.59

AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00

EFFECTIVE STREAM AREA (ACRES) = 113.07

TOTAL STREAM AREA (ACRES) = 113.07

PEAK FLOW RATE (CFS) AT CONFLUENCE = 131.50

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	497.40	19.20	1.659	0.30( 0.29)	0.96	378.0	50120.00
1	454.56	23.80	1.458	0.30( 0.29)	0.96	407.5	50100.00
2	131.50	20.57	1.592	0.30( 0.30)	1.00	113.1	50150.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	626.52	19.20	1.659	0.30( 0.29)	0.97	483.5	50120.00
2	616.16	20.57	1.592	0.30( 0.29)	0.97	499.9	50150.00
3	572.37	23.80	1.458	0.30( 0.29)	0.97	520.6	50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 626.52 Tc(MIN.) = 19.20  
EFFECTIVE AREA(ACRES) = 483.54 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 520.6  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50162.00 TO NODE 50163.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 378.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1158.00 CHANNEL SLOPE = 0.0225  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.567

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	151.93	0.30	0.990	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 713.40  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.80  
AVERAGE FLOW DEPTH(FEET) = 4.93 TRAVEL TIME(MIN.) = 1.97  
Tc(MIN.) = 21.17  
SUBAREA AREA(ACRES) = 151.93 SUBAREA RUNOFF(CFS) = 173.70  
EFFECTIVE AREA(ACRES) = 635.47 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 672.5 PEAK FLOW RATE(CFS) = 729.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 4.96 FLOW VELOCITY(FEET/SEC.) = 9.87  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50163.00 = 6800.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	729.27	21.17	1.567	0.30( 0.29)	0.97	635.5	50120.00
2	714.27	22.55	1.510	0.30( 0.29)	0.97	651.8	50150.00
3	660.60	25.82	1.384	0.30( 0.29)	0.98	672.5	50100.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 729.27 Tc(MIN.) = 21.17  
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.97 EFFECTIVE AREA(ACRES) = 635.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50163.00 TO NODE 50164.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 378.00 DOWNSTREAM(FEET) = 356.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 886.00 CHANNEL SLOPE = 0.0248  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.509

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	177.01	0.30	0.989	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.989  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 825.87  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.56  
AVERAGE FLOW DEPTH(FEET) = 5.11 TRAVEL TIME(MIN.) = 1.40  
Tc(MIN.) = 22.57  
SUBAREA AREA(ACRES) = 177.01 SUBAREA RUNOFF(CFS) = 193.17  
EFFECTIVE AREA(ACRES) = 812.48 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 849.5 PEAK FLOW RATE(CFS) = 889.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 5.25 FLOW VELOCITY(FEET/SEC.) = 10.75  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50164.00 = 7686.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	889.21	22.57	1.509	0.30( 0.29)	0.98	812.5	50120.00
2	863.96	23.95	1.452	0.30( 0.29)	0.98	828.8	50150.00
3	801.76	27.26	1.342	0.30( 0.29)	0.98	849.5	50100.00

NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 889.21 Tc(MIN.) = 22.57  
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 812.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50164.00 TO NODE 50165.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 356.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1762.00 CHANNEL SLOPE = 0.0233  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.399

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	177.01	0.30	0.989	-

LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -       155.27     0.30       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 966.03  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.71  
 AVERAGE FLOW DEPTH(FEET) = 5.48    TRAVEL TIME(MIN.) = 2.74  
 Tc(MIN.) = 25.31  
 SUBAREA AREA(ACRES) = 155.27        SUBAREA RUNOFF(CFS) = 153.61  
 EFFECTIVE AREA(ACRES) = 967.75        AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1004.8        PEAK FLOW RATE(CFS) = 962.32

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 5.47    FLOW VELOCITY(FEET/SEC.) = 10.71  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50165.00 = 9448.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	962.32	25.31	1.399	0.30( 0.29)	0.98	967.8	50120.00
2	942.04	26.71	1.358	0.30( 0.29)	0.98	984.1	50150.00
3	873.79	30.07	1.261	0.30( 0.29)	0.98	1004.8	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 962.32    Tc(MIN.) = 25.31  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.98    EFFECTIVE AREA(ACRES) = 967.75

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50165.00 TO NODE 50166.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00    DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 893.00    CHANNEL SLOPE = 0.0347  
 CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040    MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.364

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	50.24	0.30	0.997	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 986.40  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.52  
 AVERAGE FLOW DEPTH(FEET) = 5.12    TRAVEL TIME(MIN.) = 1.19  
 Tc(MIN.) = 26.50  
 SUBAREA AREA(ACRES) = 50.24        SUBAREA RUNOFF(CFS) = 48.17  
 EFFECTIVE AREA(ACRES) = 1017.99        AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1055.0        PEAK FLOW RATE(CFS) = 980.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 5.11    FLOW VELOCITY(FEET/SEC.) = 12.49  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50166.00 = 10341.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	980.25	26.50	1.364	0.30( 0.29)	0.98	1018.0	50120.00
2	957.41	27.91	1.323	0.30( 0.29)	0.98	1034.3	50150.00
3	896.35	31.29	1.239	0.30( 0.29)	0.98	1055.0	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 980.25    Tc(MIN.) = 26.50  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.98    EFFECTIVE AREA(ACRES) = 1017.99

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50166.00 TO NODE 50167.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 284.00    DOWNSTREAM(FEET) = 240.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00    CHANNEL SLOPE = 0.0437  
 CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040    MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.328

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.36	0.30	0.892	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.892  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 984.24  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.62  
 AVERAGE FLOW DEPTH(FEET) = 4.91    TRAVEL TIME(MIN.) = 1.23  
 Tc(MIN.) = 27.73  
 SUBAREA AREA(ACRES) = 8.36        SUBAREA RUNOFF(CFS) = 7.98  
 EFFECTIVE AREA(ACRES) = 1026.35        AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1063.4        PEAK FLOW RATE(CFS) = 980.25  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 4.90    FLOW VELOCITY(FEET/SEC.) = 13.60  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50167.00 = 11349.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	980.25	27.73	1.328	0.30( 0.29)	0.98	1026.3	50120.00
2	957.41	29.15	1.287	0.30( 0.29)	0.98	1042.7	50150.00
3	896.35	32.55	1.216	0.30( 0.29)	0.98	1063.4	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 980.25    Tc(MIN.) = 27.73  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.98    EFFECTIVE AREA(ACRES) = 1026.35

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1063.4    TC(MIN.) = 27.73  
 EFFECTIVE AREA(ACRES) = 1026.35    AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.981  
 PEAK FLOW RATE(CFS) = 980.25

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	980.25	27.73	1.328	0.30 ( 0.29)	0.98	1026.3	50120.00
2	957.41	29.15	1.287	0.30 ( 0.29)	0.98	1042.7	50150.00
3	896.35	32.55	1.216	0.30 ( 0.29)	0.98	1063.4	50100.00

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=====  
END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 10 Yr \*  
\* From Node: 50400 To Node: 50412 \*  
\*\*\*\*\*

FILE NAME: 0610504V.DAT  
TIME/DATE OF STUDY: 10:01 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.855
- 2) 10.00; 2.561
- 3) 15.00; 1.881
- 4) 20.00; 1.610
- 5) 25.00; 1.403
- 6) 30.00; 1.259
- 7) 40.00; 1.077
- 8) 50.00; 0.959
- 9) 60.00; 0.872
- 10) 90.00; 0.725
- 11) 120.00; 0.642
- 12) 180.00; 0.539
- 13) 360.00; 0.399
- 14) 1440.00; 0.175

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.482  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.496  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.49	0.30	1.000	0	10.48

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.96  
TOTAL AREA(ACRES) = 0.49 PEAK FLOW RATE(CFS) = 0.96

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.379  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.33  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.10  
AVERAGE FLOW DEPTH(FEET) = 0.29 TRAVEL TIME(MIN.) = 0.86  
Tc(MIN.) = 11.34  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.74  
EFFECTIVE AREA(ACRES) = 0.88 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 1.65

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 5.26  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	700.00	DOWNSTREAM(FEET) =	600.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	239.00	CHANNEL SLOPE =	0.4184
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.299		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.43	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.03

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.80

AVERAGE FLOW DEPTH(FEET) = 0.32 TRAVEL TIME(MIN.) = 0.59

Tc(MIN.) = 11.92

SUBAREA AREA(ACRES) = 0.43 SUBAREA RUNOFF(CFS) = 0.77

EFFECTIVE AREA(ACRES) = 1.31 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.3 PEAK FLOW RATE(CFS) = 2.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.33 FLOW VELOCITY(FEET/SEC.) = 7.08

LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	600.00	DOWNSTREAM(FEET) =	550.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	71.00	CHANNEL SLOPE =	0.7042
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.283		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.26	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.47

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.56

AVERAGE FLOW DEPTH(FEET) = 0.35 TRAVEL TIME(MIN.) = 0.12

Tc(MIN.) = 12.05

SUBAREA AREA(ACRES) = 1.26 SUBAREA RUNOFF(CFS) = 2.24

EFFECTIVE AREA(ACRES) = 2.57 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 4.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 FLOW VELOCITY(FEET/SEC.) = 10.23

LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	550.00	DOWNSTREAM(FEET) =	500.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	145.00	CHANNEL SLOPE =	0.3448
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.242		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.11	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.55

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.10

AVERAGE FLOW DEPTH(FEET) = 0.48 TRAVEL TIME(MIN.) = 0.30

Tc(MIN.) = 12.35

SUBAREA AREA(ACRES) = 1.11 SUBAREA RUNOFF(CFS) = 1.94

EFFECTIVE AREA(ACRES) = 3.68 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.7 PEAK FLOW RATE(CFS) = 6.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.51 FLOW VELOCITY(FEET/SEC.) = 8.35

LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	500.00	DOWNSTREAM(FEET) =	450.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	158.00	CHANNEL SLOPE =	0.3165
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.199		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.45

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.37

AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 0.31

Tc(MIN.) = 12.66

SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 2.05

EFFECTIVE AREA(ACRES) = 4.88 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 4.9 PEAK FLOW RATE (CFS) = 8.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.57 FLOW VELOCITY (FEET/SEC.) = 8.63  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 450.00 DOWNSTREAM (FEET) = 400.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 228.00 CHANNEL SLOPE = 0.2193  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.139

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.33	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 13.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.54  
AVERAGE FLOW DEPTH (FEET) = 0.73 TRAVEL TIME (MIN.) = 0.44  
Tc (MIN.) = 13.11

SUBAREA AREA (ACRES) = 6.33 SUBAREA RUNOFF (CFS) = 10.47  
EFFECTIVE AREA (ACRES) = 11.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.2 PEAK FLOW RATE (CFS) = 18.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.82 FLOW VELOCITY (FEET/SEC.) = 9.21  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 400.00 DOWNSTREAM (FEET) = 325.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 490.00 CHANNEL SLOPE = 0.1531  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.007

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.78	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 22.22  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.46  
AVERAGE FLOW DEPTH (FEET) = 0.94 TRAVEL TIME (MIN.) = 0.97  
Tc (MIN.) = 14.07

SUBAREA AREA (ACRES) = 4.78 SUBAREA RUNOFF (CFS) = 7.35  
EFFECTIVE AREA (ACRES) = 15.99 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 16.0 PEAK FLOW RATE (CFS) = 24.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.97 FLOW VELOCITY (FEET/SEC.) = 8.67  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 325.00 DOWNSTREAM (FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.984

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 36.32  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.08  
AVERAGE FLOW DEPTH (FEET) = 1.31 TRAVEL TIME (MIN.) = 0.17  
Tc (MIN.) = 14.24

SUBAREA AREA (ACRES) = 15.51 SUBAREA RUNOFF (CFS) = 23.50  
EFFECTIVE AREA (ACRES) = 31.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 31.5 PEAK FLOW RATE (CFS) = 47.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.45 FLOW VELOCITY (FEET/SEC.) = 7.60  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 320.00 DOWNSTREAM (FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.956

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.01	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 52.95  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.17

AVERAGE FLOW DEPTH (FEET) = 1.47 TRAVEL TIME (MIN.) = 0.21  
Tc (MIN.) = 14.45  
SUBAREA AREA (ACRES) = 7.01 SUBAREA RUNOFF (CFS) = 10.44  
EFFECTIVE AREA (ACRES) = 38.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.5 PEAK FLOW RATE (CFS) = 57.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.51 FLOW VELOCITY (FEET/SEC.) = 8.35  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 312.00 DOWNSTREAM (FEET) = 282.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 566.00 CHANNEL SLOPE = 0.0530  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.843  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 15.49 0.30 0.921 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.921  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 68.29  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.55  
AVERAGE FLOW DEPTH (FEET) = 1.74 TRAVEL TIME (MIN.) = 1.25  
Tc (MIN.) = 15.70  
SUBAREA AREA (ACRES) = 15.49 SUBAREA RUNOFF (CFS) = 21.85  
EFFECTIVE AREA (ACRES) = 54.00 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 54.0 PEAK FLOW RATE (CFS) = 75.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.81 FLOW VELOCITY (FEET/SEC.) = 7.70  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 216.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 954.00 CHANNEL SLOPE = 0.0692  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.763  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 14.29 0.30 0.971 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.971

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 84.78  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.87  
AVERAGE FLOW DEPTH (FEET) = 1.61 TRAVEL TIME (MIN.) = 1.46  
Tc (MIN.) = 17.16  
SUBAREA AREA (ACRES) = 14.29 SUBAREA RUNOFF (CFS) = 18.93  
EFFECTIVE AREA (ACRES) = 68.28 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 68.3 PEAK FLOW RATE (CFS) = 90.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.65 FLOW VELOCITY (FEET/SEC.) = 11.06  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 17.16  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.763  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.39 0.30 0.933 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.933  
SUBAREA AREA (ACRES) = 2.39 SUBAREA RUNOFF (CFS) = 3.20  
EFFECTIVE AREA (ACRES) = 70.68 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA (ACRES) = 70.7 PEAK FLOW RATE (CFS) = 93.58

-----  
END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 70.7 TC (MIN.) = 17.16  
EFFECTIVE AREA (ACRES) = 70.68 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.975  
PEAK FLOW RATE (CFS) = 93.58

-----  
END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 10 Yr \*  
\* From Node: 50500 To Node: 50513 \*  
\*\*\*\*\*

FILE NAME: 0610505V.DAT  
TIME/DATE OF STUDY: 10:01 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.759
- 2) 10.00; 2.509
- 3) 15.00; 1.860
- 4) 20.00; 1.590
- 5) 25.00; 1.388
- 6) 30.00; 1.248
- 7) 40.00; 1.066
- 8) 50.00; 0.948
- 9) 60.00; 0.860
- 10) 90.00; 0.712
- 11) 120.00; 0.628
- 12) 180.00; 0.525
- 13) 360.00; 0.386
- 14) 1440.00; 0.169

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50500.00 TO NODE 50501.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 1122.00 DOWNSTREAM(FEET) = 980.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.501  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.884  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.67	0.30	1.000	0	8.50

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.55  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 1.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50501.00 TO NODE 50502.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 832.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 500.00 CHANNEL SLOPE = 0.2960  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.543  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.83	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.40  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.13  
AVERAGE FLOW DEPTH(FEET) = 0.36 TRAVEL TIME(MIN.) = 1.36  
Tc(MIN.) = 9.86  
SUBAREA AREA(ACRES) = 0.83 SUBAREA RUNOFF(CFS) = 1.69  
EFFECTIVE AREA(ACRES) = 1.50 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.5 PEAK FLOW RATE(CFS) = 3.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 FLOW VELOCITY(FEET/SEC.) = 6.58  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50502.00 = 830.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50502.00 TO NODE 50503.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	832.00	DOWNSTREAM(FEET) =	779.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	255.00	CHANNEL SLOPE =	0.2078
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.448		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.76	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.67

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.04

AVERAGE FLOW DEPTH(FEET) = 0.56 TRAVEL TIME(MIN.) = 0.60

Tc(MIN.) = 10.46

SUBAREA AREA(ACRES) = 3.76 SUBAREA RUNOFF(CFS) = 7.26

EFFECTIVE AREA(ACRES) = 5.26 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.3 PEAK FLOW RATE(CFS) = 10.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.66 FLOW VELOCITY(FEET/SEC.) = 7.81

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50503.00 = 1085.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50503.00 TO NODE 50504.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	779.00	DOWNSTREAM(FEET) =	765.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	382.00	CHANNEL SLOPE =	0.0366
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.261		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.56	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.20

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.42

AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 1.44

Tc(MIN.) = 11.90

SUBAREA AREA(ACRES) = 4.56 SUBAREA RUNOFF(CFS) = 8.05

EFFECTIVE AREA(ACRES) = 9.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 17.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.12 FLOW VELOCITY(FEET/SEC.) = 4.63

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50504.00 = 1467.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50504.00 TO NODE 50505.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	765.00	DOWNSTREAM(FEET) =	750.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	355.00	CHANNEL SLOPE =	0.0423
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.111		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.79	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.42

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.10

AVERAGE FLOW DEPTH(FEET) = 1.15 TRAVEL TIME(MIN.) = 1.16

Tc(MIN.) = 13.06

SUBAREA AREA(ACRES) = 3.79 SUBAREA RUNOFF(CFS) = 6.18

EFFECTIVE AREA(ACRES) = 13.61 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 13.6 PEAK FLOW RATE(CFS) = 22.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.19 FLOW VELOCITY(FEET/SEC.) = 5.19

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50505.00 = 1822.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50505.00 TO NODE 50506.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	750.00	DOWNSTREAM(FEET) =	712.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	261.00	CHANNEL SLOPE =	0.1456
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.046		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.43	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.23

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.73

AVERAGE FLOW DEPTH(FEET) = 1.02 TRAVEL TIME(MIN.) = 0.50

Tc(MIN.) = 13.56

SUBAREA AREA(ACRES) = 6.43 SUBAREA RUNOFF(CFS) = 10.10

EFFECTIVE AREA(ACRES) = 20.03 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.0 PEAK FLOW RATE (CFS) = 31.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.08 FLOW VELOCITY (FEET/SEC.) = 9.02  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50506.00 = 2083.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50506.00 TO NODE 50507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 464.00 CHANNEL SLOPE = 0.2414  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.956

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.57	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 33.40  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.08  
AVERAGE FLOW DEPTH (FEET) = 1.00 TRAVEL TIME (MIN.) = 0.70  
Tc (MIN.) = 14.26

SUBAREA AREA (ACRES) = 2.57 SUBAREA RUNOFF (CFS) = 3.83  
EFFECTIVE AREA (ACRES) = 22.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.6 PEAK FLOW RATE (CFS) = 33.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.00 FLOW VELOCITY (FEET/SEC.) = 11.13  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50507.00 = 2547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50507.00 TO NODE 50508.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 535.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 310.00 CHANNEL SLOPE = 0.2097  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.894

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.09	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 38.05  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.90  
AVERAGE FLOW DEPTH (FEET) = 1.08 TRAVEL TIME (MIN.) = 0.47  
Tc (MIN.) = 14.73

SUBAREA AREA (ACRES) = 6.09 SUBAREA RUNOFF (CFS) = 8.74  
EFFECTIVE AREA (ACRES) = 28.69 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 28.7 PEAK FLOW RATE (CFS) = 41.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.11 FLOW VELOCITY (FEET/SEC.) = 11.12  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50508.00 = 2857.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50508.00 TO NODE 50509.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 405.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.2658  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.839

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 48.11  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.64  
AVERAGE FLOW DEPTH (FEET) = 1.13 TRAVEL TIME (MIN.) = 0.64  
Tc (MIN.) = 15.38

SUBAREA AREA (ACRES) = 10.02 SUBAREA RUNOFF (CFS) = 13.89  
EFFECTIVE AREA (ACRES) = 38.72 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.7 PEAK FLOW RATE (CFS) = 53.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.17 FLOW VELOCITY (FEET/SEC.) = 13.02  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50509.00 = 3346.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50509.00 TO NODE 50510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 285.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 706.00 CHANNEL SLOPE = 0.1700  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.782

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 58.04  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.19

AVERAGE FLOW DEPTH(FEET) = 1.32 TRAVEL TIME(MIN.) = 1.05  
Tc(MIN.) = 16.43  
SUBAREA AREA(ACRES) = 6.60 SUBAREA RUNOFF(CFS) = 8.80  
EFFECTIVE AREA(ACRES) = 45.32 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 45.3 PEAK FLOW RATE(CFS) = 60.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.34 FLOW VELOCITY(FEET/SEC.) = 11.26  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50510.00 = 4052.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50510.00 TO NODE 50511.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 238.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1169.00 CHANNEL SLOPE = 0.0402  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.660  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 22.45 0.30 0.991 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 74.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.60  
AVERAGE FLOW DEPTH(FEET) = 1.70 TRAVEL TIME(MIN.) = 2.27  
Tc(MIN.) = 18.70  
SUBAREA AREA(ACRES) = 22.45 SUBAREA RUNOFF(CFS) = 27.55  
EFFECTIVE AREA(ACRES) = 67.77 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 67.8 PEAK FLOW RATE(CFS) = 83.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.77 FLOW VELOCITY(FEET/SEC.) = 8.86  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50511.00 = 5221.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50511.00 TO NODE 50512.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 238.00 DOWNSTREAM(FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 489.00 CHANNEL SLOPE = 0.0102  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.584  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 39.83 0.30 0.990 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 106.11  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.63  
AVERAGE FLOW DEPTH(FEET) = 2.51 TRAVEL TIME(MIN.) = 1.45  
Tc(MIN.) = 20.15  
SUBAREA AREA(ACRES) = 39.83 SUBAREA RUNOFF(CFS) = 46.15  
EFFECTIVE AREA(ACRES) = 107.59 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 107.6 PEAK FLOW RATE(CFS) = 124.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.67 FLOW VELOCITY(FEET/SEC.) = 5.84  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50512.00 = 5710.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50512.00 TO NODE 50513.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 233.00 DOWNSTREAM(FEET) = 209.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 537.00 CHANNEL SLOPE = 0.0447  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.549  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 128.70  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.23  
AVERAGE FLOW DEPTH(FEET) = 2.05 TRAVEL TIME(MIN.) = 0.87  
Tc(MIN.) = 21.02  
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 8.32  
EFFECTIVE AREA(ACRES) = 114.99 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 115.0 PEAK FLOW RATE(CFS) = 129.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.05 FLOW VELOCITY(FEET/SEC.) = 10.27  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50513.00 = 6247.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50513.00 TO NODE 50513.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 21.02  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.549  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.19 0.30 0.961 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.961  
SUBAREA AREA(ACRES) = 38.19 SUBAREA RUNOFF(CFS) = 43.34  
EFFECTIVE AREA(ACRES) = 153.18 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30    AREA-AVERAGED  $A_p$  = 0.99  
TOTAL AREA (ACRES) = 153.2    PEAK FLOW RATE (CFS) = 172.78

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 153.2    TC (MIN.) = 21.02  
EFFECTIVE AREA (ACRES) = 153.18    AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30    AREA-AVERAGED  $A_p$  = 0.986  
PEAK FLOW RATE (CFS) = 172.78

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 10 Yr \*  
\* From Node: 50600 To Node: 50610 \*  
\*\*\*\*\*

FILE NAME: 0610506V.DAT  
TIME/DATE OF STUDY: 10:01 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.759
- 2) 10.00; 2.509
- 3) 15.00; 1.860
- 4) 20.00; 1.590
- 5) 25.00; 1.388
- 6) 30.00; 1.248
- 7) 40.00; 1.066
- 8) 50.00; 0.948
- 9) 60.00; 0.860
- 10) 90.00; 0.712
- 11) 120.00; 0.628
- 12) 180.00; 0.525
- 13) 360.00; 0.386
- 14) 1440.00; 0.169

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50600.00 TO NODE 50601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00  
ELEVATION DATA: UPSTREAM(FEET) = 780.00 DOWNSTREAM(FEET) = 730.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.166  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.487  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	1.44	0.30	1.000	0	10.17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.83  
TOTAL AREA(ACRES) = 1.44 PEAK FLOW RATE(CFS) = 2.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50601.00 TO NODE 50602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.1541  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.347  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.27	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.00  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.53  
AVERAGE FLOW DEPTH(FEET) = 0.49 TRAVEL TIME(MIN.) = 1.08  
Tc(MIN.) = 11.24  
SUBAREA AREA(ACRES) = 1.27 SUBAREA RUNOFF(CFS) = 2.34  
EFFECTIVE AREA(ACRES) = 2.71 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 4.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.53 FLOW VELOCITY(FEET/SEC.) = 5.89  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50602.00 = 671.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50602.00 TO NODE 50603.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	675.00	DOWNSTREAM(FEET) =	600.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	258.00	CHANNEL SLOPE =	0.2907
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.275		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.31	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.16

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.77

AVERAGE FLOW DEPTH(FEET) = 0.51 TRAVEL TIME(MIN.) = 0.55

Tc(MIN.) = 11.80

SUBAREA AREA(ACRES) = 1.31 SUBAREA RUNOFF(CFS) = 2.33

EFFECTIVE AREA(ACRES) = 4.02 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 7.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.54 FLOW VELOCITY(FEET/SEC.) = 8.03

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50603.00 = 929.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50603.00 TO NODE 50604.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	600.00	DOWNSTREAM(FEET) =	585.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	116.00	CHANNEL SLOPE =	0.1293
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.235		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.58	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.52

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.25

AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 0.31

Tc(MIN.) = 12.11

SUBAREA AREA(ACRES) = 1.58 SUBAREA RUNOFF(CFS) = 2.76

EFFECTIVE AREA(ACRES) = 5.60 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.6 PEAK FLOW RATE(CFS) = 9.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.71 FLOW VELOCITY(FEET/SEC.) = 6.51

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50604.00 = 1045.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50604.00 TO NODE 50605.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	585.00	DOWNSTREAM(FEET) =	584.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	16.00	CHANNEL SLOPE =	0.0625
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.229		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.98	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.08

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.38

AVERAGE FLOW DEPTH(FEET) = 0.93 TRAVEL TIME(MIN.) = 0.05

Tc(MIN.) = 12.16

SUBAREA AREA(ACRES) = 4.98 SUBAREA RUNOFF(CFS) = 8.65

EFFECTIVE AREA(ACRES) = 10.58 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 10.6 PEAK FLOW RATE(CFS) = 18.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.03 FLOW VELOCITY(FEET/SEC.) = 5.74

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50605.00 = 1061.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50605.00 TO NODE 50606.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	584.00	DOWNSTREAM(FEET) =	579.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	122.00	CHANNEL SLOPE =	0.0410
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.178		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.18	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.75

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.19

AVERAGE FLOW DEPTH(FEET) = 1.21 TRAVEL TIME(MIN.) = 0.39

Tc(MIN.) = 12.55

SUBAREA AREA(ACRES) = 5.18 SUBAREA RUNOFF(CFS) = 8.76

EFFECTIVE AREA(ACRES) = 15.76 AREA-AVERAGED Fm(INCH/HR) = 0.30



AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 15.8 PEAK FLOW RATE (CFS) = 26.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.28 FLOW VELOCITY (FEET/SEC.) = 5.38  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50606.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50606.00 TO NODE 50607.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 579.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 637.00 CHANNEL SLOPE = 0.0801  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.988

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.34	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 32.23  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.27  
AVERAGE FLOW DEPTH (FEET) = 1.22 TRAVEL TIME (MIN.) = 1.46  
Tc (MIN.) = 14.01

SUBAREA AREA (ACRES) = 7.34 SUBAREA RUNOFF (CFS) = 11.16  
EFFECTIVE AREA (ACRES) = 23.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 23.1 PEAK FLOW RATE (CFS) = 35.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.25 FLOW VELOCITY (FEET/SEC.) = 7.44  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50607.00 = 1820.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50607.00 TO NODE 50608.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 422.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 529.00 CHANNEL SLOPE = 0.2004  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.881

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.99	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 37.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.63  
AVERAGE FLOW DEPTH (FEET) = 1.08 TRAVEL TIME (MIN.) = 0.83  
Tc (MIN.) = 14.84

SUBAREA AREA (ACRES) = 2.99 SUBAREA RUNOFF (CFS) = 4.26  
EFFECTIVE AREA (ACRES) = 26.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.1 PEAK FLOW RATE (CFS) = 37.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.08 FLOW VELOCITY (FEET/SEC.) = 10.64  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50608.00 = 2349.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50608.00 TO NODE 50609.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 422.00 DOWNSTREAM (FEET) = 297.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 708.00 CHANNEL SLOPE = 0.1766  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.809

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.94	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 45.23  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.70  
AVERAGE FLOW DEPTH (FEET) = 1.19 TRAVEL TIME (MIN.) = 1.10  
Tc (MIN.) = 15.94

SUBAREA AREA (ACRES) = 11.94 SUBAREA RUNOFF (CFS) = 16.22  
EFFECTIVE AREA (ACRES) = 38.04 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.0 PEAK FLOW RATE (CFS) = 51.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.25 FLOW VELOCITY (FEET/SEC.) = 11.05  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50609.00 = 3057.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50609.00 TO NODE 50610.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 297.00 DOWNSTREAM (FEET) = 207.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1321.00 CHANNEL SLOPE = 0.0681  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.689

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.38	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 58.15  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.88

AVERAGE FLOW DEPTH (FEET) = 1.40 TRAVEL TIME (MIN.) = 2.23  
Tc (MIN.) = 18.17  
SUBAREA AREA (ACRES) = 10.38 SUBAREA RUNOFF (CFS) = 12.98  
EFFECTIVE AREA (ACRES) = 48.42 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 60.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.42 FLOW VELOCITY (FEET/SEC.) = 9.95  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50610.00 = 4378.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 18.17  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.689  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.17 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.17 SUBAREA RUNOFF (CFS) = 1.46  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 49.6 PEAK FLOW RATE (CFS) = 61.99

=====

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 49.6 TC (MIN.) = 18.17  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.000  
PEAK FLOW RATE (CFS) = 61.99

=====

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END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 10 Yr \*  
\* From Node: 50700 To Node: 50716 \*  
\*\*\*\*\*

FILE NAME: 0610507V.DAT  
TIME/DATE OF STUDY: 10:01 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.759
- 2) 10.00; 2.509
- 3) 15.00; 1.860
- 4) 20.00; 1.590
- 5) 25.00; 1.388
- 6) 30.00; 1.248
- 7) 40.00; 1.066
- 8) 50.00; 0.948
- 9) 60.00; 0.860
- 10) 90.00; 0.712
- 11) 120.00; 0.628
- 12) 180.00; 0.525
- 13) 360.00; 0.386
- 14) 1440.00; 0.169

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50700.00 TO NODE 50701.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00  
ELEVATION DATA: UPSTREAM(FEET) = 1121.00 DOWNSTREAM(FEET) = 870.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.572  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.116  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.18	0.30	1.000	0	7.57

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.47  
TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 0.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50701.00 TO NODE 50702.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 827.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.3386  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.016  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.98  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.28  
AVERAGE FLOW DEPTH(FEET) = 0.25 TRAVEL TIME(MIN.) = 0.40  
Tc(MIN.) = 7.97  
SUBAREA AREA(ACRES) = 0.42 SUBAREA RUNOFF(CFS) = 1.03  
EFFECTIVE AREA(ACRES) = 0.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 1.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.29 FLOW VELOCITY(FEET/SEC.) = 5.76  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50702.00 = 456.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50702.00 TO NODE 50703.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 827.00 DOWNSTREAM(FEET) = 815.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 94.00 CHANNEL SLOPE = 0.1277  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.923

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.34	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.88

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.25

AVERAGE FLOW DEPTH(FEET) = 0.38 TRAVEL TIME(MIN.) = 0.37

Tc(MIN.) = 8.34

SUBAREA AREA(ACRES) = 0.34 SUBAREA RUNOFF(CFS) = 0.80

EFFECTIVE AREA(ACRES) = 0.94 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 2.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 FLOW VELOCITY(FEET/SEC.) = 4.44

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50703.00 = 550.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50703.00 TO NODE 50704.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 815.00 DOWNSTREAM(FEET) = 800.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 169.00 CHANNEL SLOPE = 0.0888  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.768

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.72	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.14

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.53

AVERAGE FLOW DEPTH(FEET) = 0.55 TRAVEL TIME(MIN.) = 0.62

Tc(MIN.) = 8.96

SUBAREA AREA(ACRES) = 1.72 SUBAREA RUNOFF(CFS) = 3.82

EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 5.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.63 FLOW VELOCITY(FEET/SEC.) = 4.97

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50704.00 = 719.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50704.00 TO NODE 50705.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 800.00 DOWNSTREAM(FEET) = 785.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 128.00 CHANNEL SLOPE = 0.1172  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.679

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.12	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.19

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.97

AVERAGE FLOW DEPTH(FEET) = 0.68 TRAVEL TIME(MIN.) = 0.36

Tc(MIN.) = 9.32

SUBAREA AREA(ACRES) = 2.12 SUBAREA RUNOFF(CFS) = 4.54

EFFECTIVE AREA(ACRES) = 4.79 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 10.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.74 FLOW VELOCITY(FEET/SEC.) = 6.32

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50705.00 = 847.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50705.00 TO NODE 50706.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 775.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.543

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.64	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.92

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.24

AVERAGE FLOW DEPTH(FEET) = 0.94 TRAVEL TIME(MIN.) = 0.54

Tc(MIN.) = 9.86

SUBAREA AREA(ACRES) = 3.64 SUBAREA RUNOFF(CFS) = 7.34

EFFECTIVE AREA(ACRES) = 8.42 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.4 PEAK FLOW RATE (CFS) = 17.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.01 FLOW VELOCITY (FEET/SEC.) = 5.54  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50706.00 = 1017.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50706.00 TO NODE 50707.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 775.00 DOWNSTREAM (FEET) = 772.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 162.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.435

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.65	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 21.47  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.81  
AVERAGE FLOW DEPTH (FEET) = 1.37 TRAVEL TIME (MIN.) = 0.71  
Tc (MIN.) = 10.57

SUBAREA AREA (ACRES) = 4.65 SUBAREA RUNOFF (CFS) = 8.93  
EFFECTIVE AREA (ACRES) = 13.07 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 13.1 PEAK FLOW RATE (CFS) = 25.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.45 FLOW VELOCITY (FEET/SEC.) = 3.96  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50707.00 = 1179.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50707.00 TO NODE 50708.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 772.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 357.00 CHANNEL SLOPE = 0.0756  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.323

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.55	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 28.35  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.90  
AVERAGE FLOW DEPTH (FEET) = 1.17 TRAVEL TIME (MIN.) = 0.86  
Tc (MIN.) = 11.43

SUBAREA AREA (ACRES) = 3.55 SUBAREA RUNOFF (CFS) = 6.46  
EFFECTIVE AREA (ACRES) = 16.62 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 16.6 PEAK FLOW RATE (CFS) = 30.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.20 FLOW VELOCITY (FEET/SEC.) = 7.00  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50708.00 = 1536.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50708.00 TO NODE 50709.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 733.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 444.00 CHANNEL SLOPE = 0.0270  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.128

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.58	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 34.85  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.92  
AVERAGE FLOW DEPTH (FEET) = 1.54 TRAVEL TIME (MIN.) = 1.50  
Tc (MIN.) = 12.94

SUBAREA AREA (ACRES) = 5.58 SUBAREA RUNOFF (CFS) = 9.18  
EFFECTIVE AREA (ACRES) = 22.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.2 PEAK FLOW RATE (CFS) = 36.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.56 FLOW VELOCITY (FEET/SEC.) = 4.99  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50709.00 = 1980.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50709.00 TO NODE 50710.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 733.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 467.00 CHANNEL SLOPE = 0.1242  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.016

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.17	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 39.74  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.05

AVERAGE FLOW DEPTH (FEET) = 1.21 TRAVEL TIME (MIN.) = 0.86  
Tc (MIN.) = 13.80  
SUBAREA AREA (ACRES) = 4.17 SUBAREA RUNOFF (CFS) = 6.44  
EFFECTIVE AREA (ACRES) = 26.38 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.4 PEAK FLOW RATE (CFS) = 40.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.22 FLOW VELOCITY (FEET/SEC.) = 9.07  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50710.00 = 2447.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50710.00 TO NODE 50711.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 619.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 516.00 CHANNEL SLOPE = 0.1085  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.896  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 21.41 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 56.12  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.35  
AVERAGE FLOW DEPTH (FEET) = 1.41 TRAVEL TIME (MIN.) = 0.92  
Tc (MIN.) = 14.72  
SUBAREA AREA (ACRES) = 21.41 SUBAREA RUNOFF (CFS) = 30.76  
EFFECTIVE AREA (ACRES) = 47.78 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 68.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.52 FLOW VELOCITY (FEET/SEC.) = 9.87  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50711.00 = 2963.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50711.00 TO NODE 50712.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 619.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 650.00 CHANNEL SLOPE = 0.0292  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.798  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.43 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 73.67  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.61  
AVERAGE FLOW DEPTH (FEET) = 1.80 TRAVEL TIME (MIN.) = 1.42  
Tc (MIN.) = 16.14  
SUBAREA AREA (ACRES) = 7.43 SUBAREA RUNOFF (CFS) = 10.01  
EFFECTIVE AREA (ACRES) = 55.21 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.2 PEAK FLOW RATE (CFS) = 74.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.80 FLOW VELOCITY (FEET/SEC.) = 7.63  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50712.00 = 3613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50713.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 794.00 CHANNEL SLOPE = 0.0907  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.741  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 36.47 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 98.11  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.46  
AVERAGE FLOW DEPTH (FEET) = 1.62 TRAVEL TIME (MIN.) = 1.06  
Tc (MIN.) = 17.20  
SUBAREA AREA (ACRES) = 36.47 SUBAREA RUNOFF (CFS) = 47.31  
EFFECTIVE AREA (ACRES) = 91.68 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 118.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.74 FLOW VELOCITY (FEET/SEC.) = 13.14  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50713.00 = 4407.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50713.00 TO NODE 50714.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 423.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1215.00 CHANNEL SLOPE = 0.0864  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.658  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.52 0.30 0.998 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.998  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 130.24  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.21  
 AVERAGE FLOW DEPTH(FEET) = 1.81 TRAVEL TIME(MIN.) = 1.53  
 Tc(MIN.) = 18.73  
 SUBAREA AREA(ACRES) = 18.52 SUBAREA RUNOFF(CFS) = 22.66  
 EFFECTIVE AREA(ACRES) = 110.22 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 110.2 PEAK FLOW RATE(CFS) = 134.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.84 FLOW VELOCITY(FEET/SEC.) = 13.33  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50714.00 = 5622.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50714.00 TO NODE 50715.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 319.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 768.00 CHANNEL SLOPE = 0.1354  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.615  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.31	0.30	0.993	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 137.91  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 15.83  
 AVERAGE FLOW DEPTH(FEET) = 1.70 TRAVEL TIME(MIN.) = 0.81  
 Tc(MIN.) = 19.54  
 SUBAREA AREA(ACRES) = 5.31 SUBAREA RUNOFF(CFS) = 6.30  
 EFFECTIVE AREA(ACRES) = 115.52 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 115.5 PEAK FLOW RATE(CFS) = 136.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.70 FLOW VELOCITY(FEET/SEC.) = 15.80  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50715.00 = 6390.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50715.00 TO NODE 50716.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 319.00 DOWNSTREAM(FEET) = 182.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1513.00 CHANNEL SLOPE = 0.0905  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.539  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.31	0.30	0.993	-

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	79.09	0.30	0.979	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 181.06  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 14.59  
 AVERAGE FLOW DEPTH(FEET) = 2.03 TRAVEL TIME(MIN.) = 1.73  
 Tc(MIN.) = 21.27  
 SUBAREA AREA(ACRES) = 79.09 SUBAREA RUNOFF(CFS) = 88.64  
 EFFECTIVE AREA(ACRES) = 194.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 194.6 PEAK FLOW RATE(CFS) = 217.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.18 FLOW VELOCITY(FEET/SEC.) = 15.27  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50716.00 = 7903.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50716.00 TO NODE 50716.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 21.27  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.539  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	42.18	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 42.18 SUBAREA RUNOFF(CFS) = 47.04  
 EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 236.8 PEAK FLOW RATE(CFS) = 264.52

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 236.8 TC(MIN.) = 21.27  
 EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.993  
 PEAK FLOW RATE(CFS) = 264.52

=====

END OF RATIONAL METHOD ANALYSIS





Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 10 Yr \*  
\* From Node: 50800 To Node: 50811 \*  
\*\*\*\*\*

FILE NAME: 0610508V.DAT  
TIME/DATE OF STUDY: 10:02 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.759
- 2) 10.00; 2.509
- 3) 15.00; 1.860
- 4) 20.00; 1.590
- 5) 25.00; 1.388
- 6) 30.00; 1.248
- 7) 40.00; 1.066
- 8) 50.00; 0.948
- 9) 60.00; 0.860
- 10) 90.00; 0.712
- 11) 120.00; 0.628
- 12) 180.00; 0.525
- 13) 360.00; 0.386
- 14) 1440.00; 0.169

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50800.00 TO NODE 50801.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00  
ELEVATION DATA: UPSTREAM(FEET) = 795.00 DOWNSTREAM(FEET) = 745.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.302  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.469  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.60	0.30	1.000	0	10.30

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.16  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50801.00 TO NODE 50802.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 725.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 245.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.349  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.35	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.25  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.40  
AVERAGE FLOW DEPTH(FEET) = 0.57 TRAVEL TIME(MIN.) = 0.93  
Tc(MIN.) = 11.23  
SUBAREA AREA(ACRES) = 3.35 SUBAREA RUNOFF(CFS) = 6.18  
EFFECTIVE AREA(ACRES) = 3.94 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 3.9 PEAK FLOW RATE(CFS) = 7.28

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.69 FLOW VELOCITY(FEET/SEC.) = 5.07  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50802.00 = 566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50802.00 TO NODE 50803.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	725.00	DOWNSTREAM(FEET) =	700.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	325.00	CHANNEL SLOPE =	0.0769
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.213		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.52	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.59

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.16

AVERAGE FLOW DEPTH(FEET) = 0.74 TRAVEL TIME(MIN.) = 1.05

Tc(MIN.) = 12.28

SUBAREA AREA(ACRES) = 1.52 SUBAREA RUNOFF(CFS) = 2.62

EFFECTIVE AREA(ACRES) = 5.47 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 9.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.77 FLOW VELOCITY(FEET/SEC.) = 5.25

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50803.00 = 891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50803.00 TO NODE 50804.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	700.00	DOWNSTREAM(FEET) =	652.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	594.00	CHANNEL SLOPE =	0.0808
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	1.996		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.12	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.10

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.93

AVERAGE FLOW DEPTH(FEET) = 0.89 TRAVEL TIME(MIN.) = 1.67

Tc(MIN.) = 13.95

SUBAREA AREA(ACRES) = 6.12 SUBAREA RUNOFF(CFS) = 9.35

EFFECTIVE AREA(ACRES) = 11.59 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 11.6 PEAK FLOW RATE(CFS) = 17.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.97 FLOW VELOCITY(FEET/SEC.) = 6.32

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50804.00 = 1485.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50804.00 TO NODE 50805.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	652.00	DOWNSTREAM(FEET) =	542.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	499.00	CHANNEL SLOPE =	0.2204
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	1.884		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.17	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.38

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.65

AVERAGE FLOW DEPTH(FEET) = 0.86 TRAVEL TIME(MIN.) = 0.86

Tc(MIN.) = 14.81

SUBAREA AREA(ACRES) = 5.17 SUBAREA RUNOFF(CFS) = 7.38

EFFECTIVE AREA(ACRES) = 16.76 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 23.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.90 FLOW VELOCITY(FEET/SEC.) = 9.89

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50805.00 = 1984.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50805.00 TO NODE 50806.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	542.00	DOWNSTREAM(FEET) =	450.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	650.00	CHANNEL SLOPE =	0.1415
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	1.803		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.22	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.44

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.67

AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 1.25

Tc(MIN.) = 16.06

SUBAREA AREA(ACRES) = 5.22 SUBAREA RUNOFF(CFS) = 7.06

EFFECTIVE AREA(ACRES) = 21.99 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 29.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.06 FLOW VELOCITY (FEET/SEC.) = 8.86  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50806.00 = 2634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50806.00 TO NODE 50807.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 450.00 DOWNSTREAM (FEET) = 400.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 639.00 CHANNEL SLOPE = 0.0782  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.727

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.83	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 39.90  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.60  
AVERAGE FLOW DEPTH (FEET) = 1.32 TRAVEL TIME (MIN.) = 1.40  
Tc (MIN.) = 17.46  
SUBAREA AREA (ACRES) = 15.83 SUBAREA RUNOFF (CFS) = 20.34  
EFFECTIVE AREA (ACRES) = 37.82 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 37.8 PEAK FLOW RATE (CFS) = 48.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.42 FLOW VELOCITY (FEET/SEC.) = 7.99  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50807.00 = 3273.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50807.00 TO NODE 50808.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 400.00 DOWNSTREAM (FEET) = 350.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 448.00 CHANNEL SLOPE = 0.1116  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.684

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 53.22  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.34  
AVERAGE FLOW DEPTH (FEET) = 1.38 TRAVEL TIME (MIN.) = 0.80  
Tc (MIN.) = 18.26

SUBAREA AREA (ACRES) = 7.46 SUBAREA RUNOFF (CFS) = 9.29  
EFFECTIVE AREA (ACRES) = 45.28 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 56.40

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.41 FLOW VELOCITY (FEET/SEC.) = 9.48  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50808.00 = 3721.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50808.00 TO NODE 50809.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 350.00 DOWNSTREAM (FEET) = 283.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 438.00 CHANNEL SLOPE = 0.1530  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.648

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.20	0.30	0.972	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 60.80  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.91  
AVERAGE FLOW DEPTH (FEET) = 1.36 TRAVEL TIME (MIN.) = 0.67  
Tc (MIN.) = 18.93  
SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 8.79  
EFFECTIVE AREA (ACRES) = 52.48 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 52.5 PEAK FLOW RATE (CFS) = 63.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.39 FLOW VELOCITY (FEET/SEC.) = 10.97  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50809.00 = 4159.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50809.00 TO NODE 50810.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 283.00 DOWNSTREAM (FEET) = 243.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 665.00 CHANNEL SLOPE = 0.0602  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.593

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	63.52	0.30	0.983	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.983  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 100.83  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.79

AVERAGE FLOW DEPTH (FEET) = 1.77 TRAVEL TIME (MIN.) = 1.03  
Tc (MIN.) = 19.95  
SUBAREA AREA (ACRES) = 63.52 SUBAREA RUNOFF (CFS) = 74.20  
EFFECTIVE AREA (ACRES) = 116.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 116.0 PEAK FLOW RATE (CFS) = 135.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.97 FLOW VELOCITY (FEET/SEC.) = 11.61  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50810.00 = 4824.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50810.00 TO NODE 50811.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 243.00 DOWNSTREAM (FEET) = 173.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1122.00 CHANNEL SLOPE = 0.0624  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.514

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.57	0.30	0.980	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 141.66  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.60  
AVERAGE FLOW DEPTH (FEET) = 2.22 TRAVEL TIME (MIN.) = 1.95  
Tc (MIN.) = 21.90  
SUBAREA AREA (ACRES) = 11.57 SUBAREA RUNOFF (CFS) = 12.70  
EFFECTIVE AREA (ACRES) = 127.57 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 127.6 PEAK FLOW RATE (CFS) = 139.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.21 FLOW VELOCITY (FEET/SEC.) = 9.56  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50811.00 = 5946.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 21.90  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.514  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 4.04  
EFFECTIVE AREA (ACRES) = 131.27 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 131.3 PEAK FLOW RATE (CFS) = 143.78

=====

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 131.3 TC (MIN.) = 21.90  
EFFECTIVE AREA (ACRES) = 131.27 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.988  
PEAK FLOW RATE (CFS) = 143.78

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2006 Advanced Engineering Software (aes)  
Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 2 \*  
\* HYDROLOGIC ANALYSIS - 10-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E502XX10.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.000; 3.190  
2) 6.000; 2.880  
3) 7.000; 2.640  
4) 8.000; 2.450  
5) 9.000; 2.290  
6) 10.000; 2.160  
7) 11.000; 2.050  
8) 12.000; 1.950  
9) 13.000; 1.860  
10) 14.000; 1.790  
11) 15.000; 1.720  
12) 20.000; 1.460  
13) 25.000; 1.290  
14) 30.000; 1.160  
15) 40.000; 0.990  
16) 50.000; 0.870  
17) 60.000; 0.790  
18) 90.000; 0.630  
19) 120.000; 0.530  
20) 180.000; 0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50200.00 TO NODE 50201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 497.00 DOWNSTREAM(FEET) = 365.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.563  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.30	1.000	95	8.56
NATURAL FAIR COVER "OPEN BRUSH"	-	0.60	0.30	1.000	95	8.56
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.20	0.30	1.000	95	8.56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.60  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 2.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50201.00 TO NODE 50202.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 365.00 DOWNSTREAM(FEET) = 335.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 259.00 CHANNEL SLOPE = 0.1158  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.60  
FLOW VELOCITY(FEET/SEC.) = 4.48 FLOW DEPTH(FEET) = 0.44  
TRAVEL TIME(MIN.) = 0.96  $T_c$ (MIN.) = 9.53  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50202.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50202.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc (MIN) = 9.53  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.221  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.70 SUBAREA RUNOFF (CFS) = 4.67  
EFFECTIVE AREA (ACRES) = 4.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 4.1 PEAK FLOW RATE (CFS) = 7.09

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50203.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 335.00 DOWNSTREAM (FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 196.00 CHANNEL SLOPE = 0.1020  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 7.09  
FLOW VELOCITY (FEET/SEC.) = 5.44 FLOW DEPTH (FEET) = 0.66  
TRAVEL TIME (MIN.) = 0.60 Tc (MIN.) = 10.13  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50203.00 = 781.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50203.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc (MIN) = 10.13  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.146  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.20 SUBAREA RUNOFF (CFS) = 6.98  
EFFECTIVE AREA (ACRES) = 8.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.3 PEAK FLOW RATE (CFS) = 13.79

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50204.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 315.00 DOWNSTREAM (FEET) = 304.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 158.00 CHANNEL SLOPE = 0.0696  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 13.79  
FLOW VELOCITY (FEET/SEC.) = 5.61 FLOW DEPTH (FEET) = 0.91  
TRAVEL TIME (MIN.) = 0.47 Tc (MIN.) = 10.60  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50204.00 = 939.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50204.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc (MIN) = 10.60  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.094  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA (ACRES) = 4.30 SUBAREA RUNOFF (CFS) = 7.11  
EFFECTIVE AREA (ACRES) = 12.60 AREA-AVERAGED Fm (INCH/HR) = 0.28  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA (ACRES) = 12.6 PEAK FLOW RATE (CFS) = 20.52

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50205.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 304.00 DOWNSTREAM (FEET) = 234.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 487.00 CHANNEL SLOPE = 0.1437  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 20.52  
FLOW VELOCITY (FEET/SEC.) = 10.00 FLOW DEPTH (FEET) = 0.83  
TRAVEL TIME (MIN.) = 0.81 Tc (MIN.) = 11.41  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50205.00 = 1426.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc (MIN) = 11.41  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.009  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.100 -

USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.90 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 5.51  
 EFFECTIVE AREA(ACRES) = 16.10 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 25.06

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN) = 11.41  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.009  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	4.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.850	-
USER-DEFINED	-	3.70	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.882  
 SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 19.78  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
 TOTAL AREA(ACRES) = 28.7 PEAK FLOW RATE(CFS) = 44.85

=====  
 END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 28.7 TC(MIN.) = 11.41  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.910  
 PEAK FLOW RATE(CFS) = 44.85  
 =====

-----  
 END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 3 \*  
\* HYDROLOGIC ANALYSIS - 10-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E503XX10.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	3.190
2)	6.000;	2.880
3)	7.000;	2.640
4)	8.000;	2.450
5)	9.000;	2.290
6)	10.000;	2.160
7)	11.000;	2.050
8)	12.000;	1.950
9)	13.000;	1.860
10)	14.000;	1.790
11)	15.000;	1.720
12)	20.000;	1.460
13)	25.000;	1.290
14)	30.000;	1.160
15)	40.000;	0.990
16)	50.000;	0.870
17)	60.000;	0.790
18)	90.000;	0.630
19)	120.000;	0.530
20)	180.000;	0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	(FT)	(FT)	SIDE / SIDE/ WAY	(FT)	(FT)	(FT)	(FT)	(n)

HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50300.00 TO NODE 50301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00  
ELEVATION DATA: UPSTREAM(FEET) = 1110.00 DOWNSTREAM(FEET) = 1035.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.517  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.223  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.60	0.30	1.000	95	9.52
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.52

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.56  
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 1.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50301.00 TO NODE 50302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 960.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 225.00 CHANNEL SLOPE = 0.3333  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.56  
FLOW VELOCITY(FEET/SEC.) = 5.75 FLOW DEPTH(FEET) = 0.30  
TRAVEL TIME(MIN.) = 0.65  $T_c$ (MIN.) = 10.17  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50302.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50302.00 TO NODE 50302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN) = 10.17
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.141
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.30    1.000   -
USER-DEFINED        -         1.00    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.10    SUBAREA RUNOFF(CFS) = 1.82
EFFECTIVE AREA(ACRES) = 2.00    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.0        PEAK FLOW RATE(CFS) = 3.31

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*****
FLOW PROCESS FROM NODE 50302.00 TO NODE 50303.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 84.00 CHANNEL SLOPE = 0.1190
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.31
FLOW VELOCITY(FEET/SEC.) = 4.84 FLOW DEPTH(FEET) = 0.48
TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 10.46
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50303.00 = 631.00 FEET.

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*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50303.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 10.46
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.110
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.30    1.000   -
USER-DEFINED        -         0.30    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.70    SUBAREA RUNOFF(CFS) = 1.14
EFFECTIVE AREA(ACRES) = 2.70    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.7        PEAK FLOW RATE(CFS) = 4.40

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```

*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50304.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 940.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 72.00 CHANNEL SLOPE = 0.1389
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

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MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.40
FLOW VELOCITY(FEET/SEC.) = 5.39 FLOW DEPTH(FEET) = 0.52
TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 10.68
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50304.00 = 703.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50304.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 10.68
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.085
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.30    0.30    1.000   -
USER-DEFINED        -         0.90    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.20    SUBAREA RUNOFF(CFS) = 3.53
EFFECTIVE AREA(ACRES) = 4.90    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.9        PEAK FLOW RATE(CFS) = 7.87

```

```

*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50305.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 940.00 DOWNSTREAM(FEET) = 890.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.2941
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.87
FLOW VELOCITY(FEET/SEC.) = 8.32 FLOW DEPTH(FEET) = 0.56
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 11.02
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50305.00 = 873.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 11.02
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.048
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00    0.30    1.000   -
USER-DEFINED        -         0.80    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.80    SUBAREA RUNOFF(CFS) = 4.40
EFFECTIVE AREA(ACRES) = 7.70    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 7.7        PEAK FLOW RATE(CFS) = 12.11

```

```

*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50306.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 890.00 DOWNSTREAM(FEET) = 785.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 439.00 CHANNEL SLOPE = 0.2392
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 12.11
FLOW VELOCITY(FEET/SEC.) = 8.64 FLOW DEPTH(FEET) = 0.68
TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 11.87
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50306.00 = 1312.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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```

MAINLINE Tc(MIN) = 11.87
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.963
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.80   0.30  1.000 -
USER-DEFINED        -         3.30   0.30  1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 10.63
EFFECTIVE AREA(ACRES) = 14.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.8 PEAK FLOW RATE(CFS) = 22.15

```

```

*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50307.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

```

```

ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 737.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 213.00 CHANNEL SLOPE = 0.2254
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 22.15
FLOW VELOCITY(FEET/SEC.) = 9.83 FLOW DEPTH(FEET) = 0.87
TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 12.23
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50307.00 = 1525.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

```

MAINLINE Tc(MIN) = 12.23
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.929
SUBAREA LOSS RATE DATA(AMC II):

```

```

DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00   0.30  1.000 -
USER-DEFINED        -         0.90   0.30  1.000 -
USER-DEFINED        -         0.20   0.30  1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 4.55
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 26.25

```

```

*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50308.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

```

```

ELEVATION DATA: UPSTREAM(FEET) = 737.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 527.00 CHANNEL SLOPE = 0.2600
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 26.25
FLOW VELOCITY(FEET/SEC.) = 10.73 FLOW DEPTH(FEET) = 0.90
TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 13.05
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50308.00 = 2052.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

```

MAINLINE Tc(MIN) = 13.05
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.857
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         5.70   0.30  1.000 -
USER-DEFINED        -         1.00   0.30  1.000 -
USER-DEFINED        -         3.30   0.30  1.000 -
USER-DEFINED        -         0.40   0.30  1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 14.57
EFFECTIVE AREA(ACRES) = 28.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 28.3 PEAK FLOW RATE(CFS) = 39.65

```

```

*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50309.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

```

```

ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 555.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 561.00 CHANNEL SLOPE = 0.0802
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00

```

CHANNEL FLOW THRU SUBAREA(CFS) = 39.65  
FLOW VELOCITY(FEET/SEC.) = 7.64 FLOW DEPTH(FEET) = 1.32  
TRAVEL TIME(MIN.) = 1.22 Tc(MIN.) = 14.27  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 2613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 14.27  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.771  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 4.10  
EFFECTIVE AREA(ACRES) = 31.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.4 PEAK FLOW RATE(CFS) = 41.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50310.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 555.00 DOWNSTREAM(FEET) = 509.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 401.00 CHANNEL SLOPE = 0.1147  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 41.57  
FLOW VELOCITY(FEET/SEC.) = 8.89 FLOW DEPTH(FEET) = 1.25  
TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 15.02  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50310.00 = 3014.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN) = 15.02  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.719  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	7.60	0.30	1.000	-
USER-DEFINED	-	6.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 22.09

EFFECTIVE AREA(ACRES) = 48.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 48.7 PEAK FLOW RATE(CFS) = 62.19

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50311.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 509.00 DOWNSTREAM(FEET) = 395.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 685.00 CHANNEL SLOPE = 0.1664  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 62.19  
FLOW VELOCITY(FEET/SEC.) = 11.29 FLOW DEPTH(FEET) = 1.36  
TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 16.04  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50311.00 = 3699.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50311.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 16.04  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.666  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 11.56  
EFFECTIVE AREA(ACRES) = 58.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 58.1 PEAK FLOW RATE(CFS) = 71.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50312.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 383.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 216.00 CHANNEL SLOPE = 0.0556  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 71.44  
FLOW VELOCITY(FEET/SEC.) = 7.76 FLOW DEPTH(FEET) = 1.75  
TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 16.50  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50312.00 = 3915.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.50

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.642

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	18.40	0.30	1.000	-
USER-DEFINED	-	11.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 37.70 SUBAREA RUNOFF (CFS) = 45.54

EFFECTIVE AREA (ACRES) = 95.80 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 95.8 PEAK FLOW RATE (CFS) = 115.71

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.50

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.642

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 3.40 SUBAREA RUNOFF (CFS) = 4.11

EFFECTIVE AREA (ACRES) = 99.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 99.2 PEAK FLOW RATE (CFS) = 119.82

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50313.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 383.00 DOWNSTREAM (FEET) = 350.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 762.00 CHANNEL SLOPE = 0.0433

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00

CHANNEL FLOW THRU SUBAREA (CFS) = 119.82

FLOW VELOCITY (FEET/SEC.) = 8.03 FLOW DEPTH (FEET) = 2.23

TRAVEL TIME (MIN.) = 1.58 Tc (MIN.) = 18.08

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50313.00 = 4677.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 18.08

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.560

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 7.14

EFFECTIVE AREA (ACRES) = 105.50 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 105.5 PEAK FLOW RATE (CFS) = 119.82

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 18.08

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.560

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 10.90 SUBAREA RUNOFF (CFS) = 12.36

EFFECTIVE AREA (ACRES) = 116.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 116.4 PEAK FLOW RATE (CFS) = 131.98

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50314.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 350.00 DOWNSTREAM (FEET) = 318.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 957.00 CHANNEL SLOPE = 0.0334

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00

CHANNEL FLOW THRU SUBAREA (CFS) = 131.98

FLOW VELOCITY (FEET/SEC.) = 7.46 FLOW DEPTH (FEET) = 2.43

TRAVEL TIME (MIN.) = 2.14 Tc (MIN.) = 20.22

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50314.00 = 5634.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 20.22  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.452  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 3.70 0.30 1.000 -  
USER-DEFINED - 3.40 0.30 1.000 -  
USER-DEFINED - 2.00 0.30 1.000 -  
USER-DEFINED - 10.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 21.80 SUBAREA RUNOFF(CFS) = 22.61  
EFFECTIVE AREA(ACRES) = 138.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 138.2 PEAK FLOW RATE(CFS) = 143.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 20.22  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.452  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.80 0.30 1.000 -  
USER-DEFINED - 15.20 0.30 1.000 -  
USER-DEFINED - 5.90 0.30 1.000 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 34.70 SUBAREA RUNOFF(CFS) = 35.99  
EFFECTIVE AREA(ACRES) = 172.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 172.9 PEAK FLOW RATE(CFS) = 179.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 20.22  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.452  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 0.83

EFFECTIVE AREA(ACRES) = 173.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 173.7 PEAK FLOW RATE(CFS) = 180.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50314.00 TO NODE 50315.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 318.00 DOWNSTREAM(FEET) = 313.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00 CHANNEL SLOPE = 0.0179  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 180.18  
FLOW VELOCITY(FEET/SEC.) = 6.37 FLOW DEPTH(FEET) = 3.07  
TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 20.95  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50315.00 = 5914.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50315.00 TO NODE 50315.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 20.95  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.428  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 0.50 0.30 1.000 -  
USER-DEFINED - 2.40 0.30 1.000 -  
USER-DEFINED - 2.00 0.30 1.000 -  
USER-DEFINED - 0.50 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 6.80  
EFFECTIVE AREA(ACRES) = 180.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 180.4 PEAK FLOW RATE(CFS) = 183.09

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50315.00 TO NODE 50316.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 313.00 DOWNSTREAM(FEET) = 285.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 642.00 CHANNEL SLOPE = 0.0436  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 183.09  
FLOW VELOCITY(FEET/SEC.) = 8.94 FLOW DEPTH(FEET) = 2.61  
TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 22.15  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50316.00 = 6556.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.15

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.387

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 7.14

EFFECTIVE AREA(ACRES) = 187.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 187.7 PEAK FLOW RATE(CFS) = 183.62

\*\*\*\*\*

FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.15

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.387

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 2.15

EFFECTIVE AREA(ACRES) = 189.90 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 189.9 PEAK FLOW RATE(CFS) = 185.78

\*\*\*\*\*

FLOW PROCESS FROM NODE 50316.00 TO NODE 50317.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 282.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 448.00 CHANNEL SLOPE = 0.0067

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00

CHANNEL FLOW THRU SUBAREA(CFS) = 185.78

FLOW VELOCITY(FEET/SEC.) = 4.44 FLOW DEPTH(FEET) = 3.73

TRAVEL TIME(MIN.) = 1.68 Tc(MIN.) = 23.83

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50317.00 = 7004.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 23.83

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.330

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	2.60	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	10.20	0.30	1.000	-
USER-DEFINED	-	42.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.997

SUBAREA AREA(ACRES) = 59.70 SUBAREA RUNOFF(CFS) = 55.38

EFFECTIVE AREA(ACRES) = 249.60 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 249.6 PEAK FLOW RATE(CFS) = 231.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 23.83

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.330

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.30	1.000	-
USER-DEFINED	-	17.50	0.30	1.000	-
USER-DEFINED	-	22.00	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 65.80 SUBAREA RUNOFF(CFS) = 60.99

EFFECTIVE AREA(ACRES) = 315.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 315.4 PEAK FLOW RATE(CFS) = 292.38

\*\*\*\*\*

FLOW PROCESS FROM NODE 50317.00 TO NODE 50318.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 233.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 600.00 CHANNEL SLOPE = 0.0817

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00

CHANNEL FLOW THRU SUBAREA(CFS) = 292.38

FLOW VELOCITY(FEET/SEC.) = 12.73 FLOW DEPTH(FEET) = 2.77

TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 24.62

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50318.00 = 7604.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 24.62

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.303

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	0.100	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.839

SUBAREA AREA (ACRES) = 6.70 SUBAREA RUNOFF (CFS) = 6.34

EFFECTIVE AREA (ACRES) = 322.10 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 322.1 PEAK FLOW RATE (CFS) = 292.38

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 24.62

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.303

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	5.00	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.935

SUBAREA AREA (ACRES) = 7.60 SUBAREA RUNOFF (CFS) = 7.00

EFFECTIVE AREA (ACRES) = 329.70 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 329.7 PEAK FLOW RATE (CFS) = 298.13

\*\*\*\*\*

FLOW PROCESS FROM NODE 50318.00 TO NODE 50319.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 233.00 DOWNSTREAM (FEET) = 228.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 201.00 CHANNEL SLOPE = 0.0249

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00

CHANNEL FLOW THRU SUBAREA (CFS) = 298.13

FLOW VELOCITY (FEET/SEC.) = 10.18 FLOW DEPTH (FEET) = 3.13

TRAVEL TIME (MIN.) = 0.33 Tc (MIN.) = 24.94

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50319.00 = 7805.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 24.94

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.292

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 5.94

EFFECTIVE AREA (ACRES) = 336.00 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 336.0 PEAK FLOW RATE (CFS) = 300.75

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 24.94

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.292

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.994

SUBAREA AREA (ACRES) = 7.80 SUBAREA RUNOFF (CFS) = 6.98

EFFECTIVE AREA (ACRES) = 343.80 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 343.8 PEAK FLOW RATE (CFS) = 307.73

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50320.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 228.00 DOWNSTREAM (FEET) = 214.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 809.00 CHANNEL SLOPE = 0.0173

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00



CHANNEL FLOW THRU SUBAREA(CFS) = 307.73  
FLOW VELOCITY(FEET/SEC.) = 8.95 FLOW DEPTH(FEET) = 3.38  
TRAVEL TIME(MIN.) = 1.51 Tc(MIN.) = 26.45  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50320.00 = 8614.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 26.45

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.252

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	4.80	0.30	0.850	-
USER-DEFINED	-	5.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.929

SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 9.99

EFFECTIVE AREA(ACRES) = 355.20 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 355.2 PEAK FLOW RATE(CFS) = 307.73

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 26.45

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.252

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.90	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.854

SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 10.04

EFFECTIVE AREA(ACRES) = 366.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 366.4 PEAK FLOW RATE(CFS) = 315.51

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 366.4 TC(MIN.) = 26.45

EFFECTIVE AREA(ACRES) = 366.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.985

PEAK FLOW RATE(CFS) = 315.51

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 4 \*  
\* HYDROLOGIC ANALYSIS - 10-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E504XX10.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.000; 3.190
- 2) 6.000; 2.880
- 3) 7.000; 2.640
- 4) 8.000; 2.450
- 5) 9.000; 2.290
- 6) 10.000; 2.160
- 7) 11.000; 2.050
- 8) 12.000; 1.950
- 9) 13.000; 1.860
- 10) 14.000; 1.790
- 11) 15.000; 1.720
- 12) 20.000; 1.460
- 13) 25.000; 1.290
- 14) 30.000; 1.160
- 15) 40.000; 0.990
- 16) 50.000; 0.870
- 17) 60.000; 0.790
- 18) 90.000; 0.630
- 19) 120.000; 0.530
- 20) 180.000; 0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.482  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.107  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.50	0.30	1.000	95	10.48

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.81  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.81

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.81  
FLOW VELOCITY(FEET/SEC.) = 4.44 FLOW DEPTH(FEET) = 0.25  
TRAVEL TIME(MIN.) = 0.98  $T_c$ (MIN.) = 11.46  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.46

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.004  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.61  
 EFFECTIVE AREA (ACRES) = 0.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 1.38

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 239.00 CHANNEL SLOPE = 0.4184  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1.38  
 FLOW VELOCITY (FEET/SEC.) = 6.23 FLOW DEPTH (FEET) = 0.27  
 TRAVEL TIME (MIN.) = 0.64 Tc (MIN.) = 12.10  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50403.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.10  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.941  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.59  
 EFFECTIVE AREA (ACRES) = 1.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.3 PEAK FLOW RATE (CFS) = 1.92

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00 CHANNEL SLOPE = 0.7042  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1.92

FLOW VELOCITY (FEET/SEC.) = 8.20 FLOW DEPTH (FEET) = 0.28  
 TRAVEL TIME (MIN.) = 0.14 Tc (MIN.) = 12.25  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50404.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.25  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.928  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 1.76  
 EFFECTIVE AREA (ACRES) = 2.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.5 PEAK FLOW RATE (CFS) = 3.66

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 145.00 CHANNEL SLOPE = 0.3448  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 3.66  
 FLOW VELOCITY (FEET/SEC.) = 7.29 FLOW DEPTH (FEET) = 0.41  
 TRAVEL TIME (MIN.) = 0.33 Tc (MIN.) = 12.58  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50405.00 TO NODE 50405.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.58  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.898  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 1.58  
 EFFECTIVE AREA (ACRES) = 3.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.6 PEAK FLOW RATE (CFS) = 5.18

```

*****
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.18
FLOW VELOCITY(FEET/SEC.) = 7.81 FLOW DEPTH(FEET) = 0.47
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 12.92
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50406.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.92
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.867
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.80 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 1.69
EFFECTIVE AREA(ACRES) = 4.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 6.77

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.2193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 6.77
FLOW VELOCITY(FEET/SEC.) = 7.20 FLOW DEPTH(FEET) = 0.56
TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 13.45
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50407.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 13.45
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.829
SUBAREA LOSS RATE DATA(AMC II):

```

```

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.30 1.000 -
USER-DEFINED - 1.20 0.30 1.000 -
USER-DEFINED - 1.70 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 8.81
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 15.41

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 325.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 490.00 CHANNEL SLOPE = 0.1531
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 15.41
FLOW VELOCITY(FEET/SEC.) = 7.76 FLOW DEPTH(FEET) = 0.81
TRAVEL TIME(MIN.) = 1.05 Tc(MIN.) = 14.50
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.50
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.755
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 1.30 0.30 1.000 -
USER-DEFINED - 0.50 0.30 1.000 -
USER-DEFINED - 1.20 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 4.98
EFFECTIVE AREA(ACRES) = 15.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.0 PEAK FLOW RATE(CFS) = 19.65

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.50
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.755
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.18  
EFFECTIVE AREA(ACRES) = 15.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.9 PEAK FLOW RATE(CFS) = 20.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 20.82  
FLOW VELOCITY(FEET/SEC.) = 6.14 FLOW DEPTH(FEET) = 1.06  
TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 14.70  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.70  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.741  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	6.40	0.30	1.000	-
USER-DEFINED	-	6.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 14.80 SUBAREA RUNOFF(CFS) = 19.20  
EFFECTIVE AREA(ACRES) = 30.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.7 PEAK FLOW RATE(CFS) = 39.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.70  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.741  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.78  
EFFECTIVE AREA(ACRES) = 31.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.3 PEAK FLOW RATE(CFS) = 40.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 40.60  
FLOW VELOCITY(FEET/SEC.) = 7.65 FLOW DEPTH(FEET) = 1.33  
TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 14.92  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.92  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.726  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 8.21  
EFFECTIVE AREA(ACRES) = 37.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 37.7 PEAK FLOW RATE(CFS) = 48.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.92  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.726  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.77  
 EFFECTIVE AREA(ACRES) = 38.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 38.3 PEAK FLOW RATE(CFS) = 49.15

\*\*\*\*\*

FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 312.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 566.00 CHANNEL SLOPE = 0.0530  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 49.15  
 FLOW VELOCITY(FEET/SEC.) = 6.92 FLOW DEPTH(FEET) = 1.54  
 TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 16.28  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 16.28  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.653  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658  
 SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 6.55  
 EFFECTIVE AREA(ACRES) = 43.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 43.3 PEAK FLOW RATE(CFS) = 53.21

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 16.28  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.653  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

USER-DEFINED - 5.80 0.30 1.000 -  
 USER-DEFINED - 0.50 0.30 1.000 -  
 USER-DEFINED - 3.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 12.79  
 EFFECTIVE AREA(ACRES) = 53.80 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 53.8 PEAK FLOW RATE(CFS) = 66.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 216.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 954.00 CHANNEL SLOPE = 0.0692  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 66.00  
 FLOW VELOCITY(FEET/SEC.) = 10.21 FLOW DEPTH(FEET) = 1.47  
 TRAVEL TIME(MIN.) = 1.56 Tc(MIN.) = 17.84  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.84  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.572  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875  
 SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 4.24  
 EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 66.32

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.84  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.572  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.30 0.30 1.000 -  
 USER-DEFINED - 9.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 12.14  
 EFFECTIVE AREA(ACRES) = 68.00 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 68.0 PEAK FLOW RATE(CFS) = 78.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.84  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.572  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.934  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 2.91  
 EFFECTIVE AREA(ACRES) = 70.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 70.5 PEAK FLOW RATE(CFS) = 81.37

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 70.5 TC(MIN.) = 17.84  
 EFFECTIVE AREA(ACRES) = 70.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.967  
 PEAK FLOW RATE(CFS) = 81.37

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 2 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 10-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P201XX10.DAT  
TIME/DATE OF STUDY: 10:20 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	3.190
2)	6.000;	2.880
3)	7.000;	2.640
4)	8.000;	2.450
5)	9.000;	2.290
6)	10.000;	2.160
7)	11.000;	2.050
8)	12.000;	1.950
9)	13.000;	1.860
10)	14.000;	1.790
11)	15.000;	1.720
12)	20.000;	1.460
13)	25.000;	1.290
14)	30.000;	1.160
15)	40.000;	0.990
16)	50.000;	0.870
17)	60.000;	0.790
18)	90.000;	0.630
19)	120.000;	0.530
20)	180.000;	0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20100.00 TO NODE 20101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 830.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.230  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.260  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.30	1.000	95	9.23
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.23

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.06  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.06

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20101.00 TO NODE 20102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 276.00 CHANNEL SLOPE = 0.2899  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.06  
FLOW VELOCITY(FEET/SEC.) = 5.06 FLOW DEPTH(FEET) = 0.26  
TRAVEL TIME(MIN.) = 0.91  $T_c$ (MIN.) = 10.14  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20102.00 = 595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20102.00 TO NODE 20102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<



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=====
MAINLINE Tc(MIN) = 10.14
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.145
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.80    0.30    1.000   -
USER-DEFINED        -         0.20    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.00    SUBAREA RUNOFF(CFS) = 1.66
EFFECTIVE AREA(ACRES) = 1.60    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6        PEAK FLOW RATE(CFS) = 2.66

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*****
FLOW PROCESS FROM NODE 20102.00 TO NODE 20103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

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=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.1863
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.66
FLOW VELOCITY(FEET/SEC.) = 5.34 FLOW DEPTH(FEET) = 0.41
TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 10.64
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20103.00 = 756.00 FEET.

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.64
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.089
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50    0.30    1.000   -
USER-DEFINED        -         0.10    0.30    1.000   -
USER-DEFINED        -         0.30    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90    SUBAREA RUNOFF(CFS) = 1.45
EFFECTIVE AREA(ACRES) = 2.50    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.5        PEAK FLOW RATE(CFS) = 4.03

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 690.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 64.00 CHANNEL SLOPE = 0.4688

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CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.03
FLOW VELOCITY(FEET/SEC.) = 8.41 FLOW DEPTH(FEET) = 0.40
TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 10.77
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20104.00 = 820.00 FEET.

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.77
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.075
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.30    1.000   -
USER-DEFINED        -         3.30    0.30    1.000   -
USER-DEFINED        -         0.10    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 6.07
EFFECTIVE AREA(ACRES) = 6.30    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.3        PEAK FLOW RATE(CFS) = 10.07

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 690.00 DOWNSTREAM(FEET) = 670.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 159.00 CHANNEL SLOPE = 0.1258
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.07
FLOW VELOCITY(FEET/SEC.) = 6.44 FLOW DEPTH(FEET) = 0.72
TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 11.18
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20105.00 = 979.00 FEET.

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*****
FLOW PROCESS FROM NODE 20105.00 TO NODE 20105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.18
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.032
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.30    1.000   -
USER-DEFINED        -         1.50    0.30    1.000   -
USER-DEFINED        -         2.20    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90    SUBAREA RUNOFF(CFS) = 6.08

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EFFECTIVE AREA (ACRES) = 10.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 10.2 PEAK FLOW RATE (CFS) = 15.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 20105.00 TO NODE 20106.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 670.00 DOWNSTREAM (FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 192.00 CHANNEL SLOPE = 0.1042  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 15.90  
FLOW VELOCITY (FEET/SEC.) = 6.72 FLOW DEPTH (FEET) = 0.89  
TRAVEL TIME (MIN.) = 0.48 Tc (MIN.) = 11.66  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20106.00 = 1171.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20106.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN) = 11.66  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.984  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.10 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 3.80 SUBAREA RUNOFF (CFS) = 5.76  
EFFECTIVE AREA (ACRES) = 14.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 14.0 PEAK FLOW RATE (CFS) = 21.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20107.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 650.00 DOWNSTREAM (FEET) = 640.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 156.00 CHANNEL SLOPE = 0.0641  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 21.22  
FLOW VELOCITY (FEET/SEC.) = 6.06 FLOW DEPTH (FEET) = 1.08  
TRAVEL TIME (MIN.) = 0.43 Tc (MIN.) = 12.09  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20107.00 = 1327.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20107.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 12.09  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.942

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.20 0.30 1.000 -  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 5.91  
EFFECTIVE AREA (ACRES) = 18.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 18.0 PEAK FLOW RATE (CFS) = 26.61

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20108.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 640.00 DOWNSTREAM (FEET) = 609.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 512.00 CHANNEL SLOPE = 0.0605  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 26.61  
FLOW VELOCITY (FEET/SEC.) = 6.23 FLOW DEPTH (FEET) = 1.19  
TRAVEL TIME (MIN.) = 1.37 Tc (MIN.) = 13.46  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20108.00 = 1839.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20108.00 TO NODE 20108.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN) = 13.46  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.828  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.200 -  
USER-DEFINED - 1.50 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970  
SUBAREA AREA (ACRES) = 2.70 SUBAREA RUNOFF (CFS) = 3.74  
EFFECTIVE AREA (ACRES) = 20.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.7 PEAK FLOW RATE (CFS) = 28.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 600.00  
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.19  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 28.49  
PIPE TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 13.67  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20109.00 = 2033.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20109.00 TO NODE 20109.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN) = 13.67  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.813  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.200 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.10  
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 29.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20109.00 TO NODE 20110.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 594.00  
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.53  
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 29.32  
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 14.24  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20110.00 = 2393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20110.00 TO NODE 20110.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN) = 14.24  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.773  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 0.100 -  
USER-DEFINED - 3.50 0.30 0.200 -  
USER-DEFINED - 2.70 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.20 0.30 1.000 -

USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 11.70  
EFFECTIVE AREA(ACRES) = 29.60 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 29.6 PEAK FLOW RATE(CFS) = 40.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20110.00 TO NODE 20111.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 594.00 DOWNSTREAM(FEET) = 590.00  
FLOW LENGTH(FEET) = 246.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.26  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 40.25  
PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 14.60  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20111.00 = 2639.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20111.00 TO NODE 20111.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN) = 14.60  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.748  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 2.10 0.30 0.200 -  
USER-DEFINED - 2.10 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 4.70 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.792  
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 15.09  
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 54.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20111.00 TO NODE 20112.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 580.00  
FLOW LENGTH(FEET) = 628.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.99  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 54.66

PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 15.47  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20112.00 = 3267.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.47

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.695

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.200	-
USER-DEFINED	-	4.40	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	7.50	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.797

SUBAREA AREA(ACRES) = 15.20 SUBAREA RUNOFF(CFS) = 19.92

EFFECTIVE AREA(ACRES) = 55.90 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 55.9 PEAK FLOW RATE(CFS) = 72.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.47

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.695

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.950

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 3.05

EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 75.71

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20113.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 580.00 DOWNSTREAM(FEET) = 570.00

FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 13.98

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 75.71  
PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 16.09  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20113.00 = 3786.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.09

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.663

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.100	-
USER-DEFINED	-	4.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.877

SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 15.88

EFFECTIVE AREA(ACRES) = 70.90 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 89.89

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.09

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.663

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	1.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.787

SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 4.62

EFFECTIVE AREA(ACRES) = 74.50 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 74.5 PEAK FLOW RATE(CFS) = 94.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20114.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00

FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.68

ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 94.52  
PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 17.04  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20114.00 = 4393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.04  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.614  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.30 0.100 -  
USER-DEFINED - 4.00 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 0.50 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.747  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 9.88  
EFFECTIVE AREA(ACRES) = 82.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 82.4 PEAK FLOW RATE(CFS) = 101.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.04  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.614  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 1.000 -  
USER-DEFINED - 8.20 0.30 1.000 -  
USER-DEFINED - 3.20 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 3.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.932  
SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 21.01  
EFFECTIVE AREA(ACRES) = 99.90 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 99.9 PEAK FLOW RATE(CFS) = 122.11

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20115.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 560.00  
FLOW LENGTH(FEET) = 461.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.70  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 122.11  
PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 17.65  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20115.00 = 4854.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.65  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.582  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.60 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 0.100 -  
USER-DEFINED - 6.20 0.30 0.850 -  
USER-DEFINED - 2.20 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798  
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 15.47  
EFFECTIVE AREA(ACRES) = 112.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 112.7 PEAK FLOW RATE(CFS) = 134.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.65  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.582  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.81  
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 135.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20116.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 560.00 DOWNSTREAM(FEET) = 528.00  
FLOW LENGTH(FEET) = 219.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 34.34

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 135.56  
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 17.75  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20116.00 = 5073.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20116.00 TO NODE 20117.00 IS CODE = 51

=====  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====  
ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 489.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 174.00 CHANNEL SLOPE = 0.2241  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 135.56  
FLOW VELOCITY(FEET/SEC.) = 19.10 FLOW DEPTH(FEET) = 1.54  
TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 17.90  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20117.00 = 5247.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====  
MAINLINE Tc(MIN) = 17.90  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.569  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.40 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.910  
SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 2.92  
EFFECTIVE AREA(ACRES) = 115.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 115.9 PEAK FLOW RATE(CFS) = 137.11

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====  
MAINLINE Tc(MIN) = 17.90  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.569  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 0.200 -  
USER-DEFINED - 3.30 0.30 0.850 -  
USER-DEFINED - 0.90 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 6.50 0.30 1.000 -

USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.855  
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 15.12  
EFFECTIVE AREA(ACRES) = 128.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 128.7 PEAK FLOW RATE(CFS) = 152.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====  
MAINLINE Tc(MIN) = 17.90  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.569  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 5.85  
EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 133.8 PEAK FLOW RATE(CFS) = 158.08

=====  
END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 133.8 TC(MIN.) = 17.90  
EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.854  
PEAK FLOW RATE(CFS) = 158.08

=====  
END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S31 \*  
\* Rational Method Hydrology Analysis - 10-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S31.DAT  
TIME/DATE OF STUDY: 16:17 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.120
- 2) 10.00; 2.158
- 3) 15.00; 1.718
- 4) 20.00; 1.461
- 5) 25.00; 1.289
- 6) 30.00; 1.180
- 7) 40.00; 0.990
- 8) 50.00; 0.873
- 9) 60.00; 0.780
- 10) 90.00; 0.628
- 11) 120.00; 0.534
- 12) 180.00; 0.437
- 13) 360.00; 0.302
- 14) 1440.00; 0.126

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13100.00 TO NODE 13101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.58  
ELEVATION DATA: UPSTREAM(FEET) = 1069.66 DOWNSTREAM(FEET) = 969.92

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.312  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.482  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.94	0.30	1.000	0	8.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.85  
TOTAL AREA(ACRES) = 0.94 PEAK FLOW RATE(CFS) = 1.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13101.00 TO NODE 13102.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 969.92 DOWNSTREAM(FEET) = 807.20  
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.89 CHANNEL SLOPE = 0.2444  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.21  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.060  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.67	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.98  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.97  
AVERAGE FLOW DEPTH(FEET) = 0.19 TRAVEL TIME(MIN.) = 2.80  
Tc(MIN.) = 11.11  
SUBAREA AREA(ACRES) = 7.67 SUBAREA RUNOFF(CFS) = 12.15  
EFFECTIVE AREA(ACRES) = 8.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 13.64  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:



DEPTH(FEET) = 0.26 FLOW VELOCITY(FEET/SEC.) = 4.90  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13102.00 = 948.47 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13102.00 TO NODE 13103.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 807.20 DOWNSTREAM(FEET) = 769.94  
CHANNEL LENGTH THRU SUBAREA(FEET) = 691.01 CHANNEL SLOPE = 0.0539  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.66

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.800

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	20.65	0.30	0.999	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.999

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.65

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.90

AVERAGE FLOW DEPTH(FEET) = 0.63 TRAVEL TIME(MIN.) = 2.96

Tc(MIN.) = 14.06

SUBAREA AREA(ACRES) = 20.65 SUBAREA RUNOFF(CFS) = 27.89

EFFECTIVE AREA(ACRES) = 29.26 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 29.3 PEAK FLOW RATE(CFS) = 39.51

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.78 FLOW VELOCITY(FEET/SEC.) = 4.38

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13103.00 = 1639.48 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 769.94 DOWNSTREAM(FEET) = 693.88

FLOW LENGTH(FEET) = 1563.10 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000

DEPTH OF FLOW IN 36.0 INCH PIPE IS 13.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 16.99

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 39.51

PIPE TRAVEL TIME(MIN.) = 1.53 Tc(MIN.) = 15.60

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13104.00 = 3202.58 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.60

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.687

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	28.00	0.30	0.750	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.750

SUBAREA AREA(ACRES) = 28.00 SUBAREA RUNOFF(CFS) = 36.85

EFFECTIVE AREA(ACRES) = 57.26 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88

TOTAL AREA(ACRES) = 57.3 PEAK FLOW RATE(CFS) = 73.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 693.88 DOWNSTREAM(FEET) = 645.69

FLOW LENGTH(FEET) = 1068.98 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000

DEPTH OF FLOW IN 36.0 INCH PIPE IS 19.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 19.43

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 73.39

PIPE TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 16.52

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13105.00 = 4271.56 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.52

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.640

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	35.28	0.30	0.867	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.867

SUBAREA AREA(ACRES) = 35.28 SUBAREA RUNOFF(CFS) = 43.82

EFFECTIVE AREA(ACRES) = 92.54 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87

TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 114.79

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 645.69 DOWNSTREAM(FEET) = 608.48

FLOW LENGTH(FEET) = 1127.55 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 29.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 18.54

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 114.79  
 PIPE TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 17.53  
 LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.53  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.588  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 37.68 0.30 0.889 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.889  
 SUBAREA AREA(ACRES) = 37.68 SUBAREA RUNOFF(CFS) = 44.82  
 EFFECTIVE AREA(ACRES) = 130.22 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
 TOTAL AREA(ACRES) = 130.2 PEAK FLOW RATE(CFS) = 155.28

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 15.1

>>>>DEFINE MEMORY BANK # 2 <<<<<

PEAK FLOWRATE TABLE FILE NAME: S30.DNA  
 MEMORY BANK # 2 DEFINED AS FOLLOWS:  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1311.19	41.63	0.30( 0.24)	0.81	1997.4	13000.00
2	1279.41	43.72	0.30( 0.24)	0.81	2016.1	13010.00
TOTAL AREA(ACRES) =						2016.1

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 14.0

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<<

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1311.19	41.63	0.30( 0.24)	0.81	1997.4	13000.00
2	1279.41	43.72	0.30( 0.24)	0.81	2016.1	13010.00
TOTAL AREA(ACRES) =						2016.1

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13026.00 TO NODE 13106.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 662.66 DOWNSTREAM(FEET) = 608.48  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 3098.88 CHANNEL SLOPE = 0.0175  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.26  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.913

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	75.28	0.30	0.755	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1334.45  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.39  
 AVERAGE FLOW DEPTH(FEET) = 2.26 TRAVEL TIME(MIN.) = 4.97  
 Tc(MIN.) = 46.60  
 SUBAREA AREA(ACRES) = 75.28 SUBAREA RUNOFF(CFS) = 46.51  
 EFFECTIVE AREA(ACRES) = 2072.73 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 2091.4 PEAK FLOW RATE(CFS) = 1311.19

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.24 FLOW VELOCITY(FEET/SEC.) = 10.33  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1311.19	46.60	0.913	0.30( 0.24)	0.80	2072.7	13000.00
2	1279.41	48.74	0.888	0.30( 0.24)	0.80	2091.4	13010.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1311.19 Tc(MIN.) = 46.60  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA(ACRES) = 2072.73

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1311.19	46.60	0.913	0.30( 0.24)	0.80	2072.7	13000.00
2	1279.41	48.74	0.888	0.30( 0.24)	0.80	2091.4	13010.00
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.							

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	155.28	17.53	1.588	0.30( 0.26)	0.88	130.2	13100.00

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1144.18	17.53	1.588	0.30 ( 0.24)	0.81	909.9	13100.00
2	1387.33	46.60	0.913	0.30 ( 0.24)	0.81	2202.9	13000.00
3	1352.62	48.74	0.888	0.30 ( 0.24)	0.81	2221.6	13010.00
TOTAL AREA (ACRES) =		2221.6					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1387.33 Tc (MIN.) = 46.599  
EFFECTIVE AREA (ACRES) = 2202.95 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA (ACRES) = 2221.6  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13106.00 TO NODE 13107.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 608.48 DOWNSTREAM (FEET) = 584.29  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1650.20 CHANNEL SLOPE = 0.0147  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT (FEET) = 2.50  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.881  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 190.45 0.30 0.755 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1443.44  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.08  
AVERAGE FLOW DEPTH (FEET) = 2.49 TRAVEL TIME (MIN.) = 2.73  
Tc (MIN.) = 49.33

SUBAREA AREA (ACRES) = 190.45 SUBAREA RUNOFF (CFS) = 112.21  
EFFECTIVE AREA (ACRES) = 2393.40 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA (ACRES) = 2412.1 PEAK FLOW RATE (CFS) = 1387.33  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT (FEET) = 2.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.44 FLOW VELOCITY (FEET/SEC.) = 9.93  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13107.00 = 20924.84 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1194.92	20.40	1.448	0.30 ( 0.24)	0.80	1100.4	13100.00
2	1387.33	49.33	0.881	0.30 ( 0.24)	0.80	2393.4	13000.00
3	1352.62	51.49	0.859	0.30 ( 0.24)	0.80	2412.1	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1387.33 Tc (MIN.) = 49.33  
AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA (ACRES) = 2393.40

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13107.00 TO NODE 13108.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 584.29 DOWNSTREAM (FEET) = 563.78  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1061.67 CHANNEL SLOPE = 0.0193  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT (FEET) = 2.33  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.865  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 314.12 0.30 0.939 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.939  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1469.75  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.10  
AVERAGE FLOW DEPTH (FEET) = 2.32 TRAVEL TIME (MIN.) = 1.59  
Tc (MIN.) = 50.92  
SUBAREA AREA (ACRES) = 314.12 SUBAREA RUNOFF (CFS) = 164.83  
EFFECTIVE AREA (ACRES) = 2707.52 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA (ACRES) = 2726.2 PEAK FLOW RATE (CFS) = 1508.10  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT (FEET) = 2.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.36 FLOW VELOCITY (FEET/SEC.) = 11.19  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13108.00 = 21986.51 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1452.54	22.04	1.391	0.30 ( 0.25)	0.83	1414.5	13100.00
2	1508.10	50.92	0.865	0.30 ( 0.25)	0.82	2707.5	13000.00
3	1468.97	53.10	0.844	0.30 ( 0.25)	0.82	2726.2	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1508.10 Tc (MIN.) = 50.92  
AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2707.52

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13108.00 TO NODE 13109.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 563.78 DOWNSTREAM (FEET) = 541.61  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1657.28 CHANNEL SLOPE = 0.0134

GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.68  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.839  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	203.63	0.30	0.785	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1563.41  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.05  
 AVERAGE FLOW DEPTH (FEET) = 2.68 TRAVEL TIME (MIN.) = 2.75  
 Tc (MIN.) = 53.67  
 SUBAREA AREA (ACRES) = 203.63 SUBAREA RUNOFF (CFS) = 110.62  
 EFFECTIVE AREA (ACRES) = 2911.15 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 2929.8 PEAK FLOW RATE (CFS) = 1556.24  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.67

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.67 FLOW VELOCITY (FEET/SEC.) = 10.03  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13109.00 = 23643.79 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap (INCH/HR)	Ae (ACRES)	HEADWATER NODE
1	1525.99	24.80	1.296	0.30 ( 0.25)	0.83	1618.1	13100.00
2	1556.24	53.67	0.839	0.30 ( 0.25)	0.82	2911.1	13000.00
3	1512.41	55.87	0.819	0.30 ( 0.24)	0.82	2929.8	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1556.24 Tc (MIN.) = 53.67  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2911.15

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13109.00 TO NODE 13110.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 541.61 DOWNSTREAM (FEET) = 509.94  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 2016.96 CHANNEL SLOPE = 0.0157  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.62  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.810  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	283.06	0.30	0.791	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.791  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1629.18  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.75  
 AVERAGE FLOW DEPTH (FEET) = 2.62 TRAVEL TIME (MIN.) = 3.13

Tc (MIN.) = 56.80  
 SUBAREA AREA (ACRES) = 283.06 SUBAREA RUNOFF (CFS) = 145.88  
 EFFECTIVE AREA (ACRES) = 3194.21 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3212.9 PEAK FLOW RATE (CFS) = 1625.67  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.62 FLOW VELOCITY (FEET/SEC.) = 10.73  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13110.00 = 25660.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap (INCH/HR)	Ae (ACRES)	HEADWATER NODE
1	1674.98	27.91	1.226	0.30 ( 0.25)	0.82	1901.2	13100.00
2	1625.67	56.80	0.810	0.30 ( 0.24)	0.81	3194.2	13000.00
3	1575.31	59.03	0.789	0.30 ( 0.24)	0.81	3212.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1674.98 Tc (MIN.) = 27.91  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 1901.17

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13110.00 TO NODE 13111.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 509.94 DOWNSTREAM (FEET) = 461.07  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 3058.95 CHANNEL SLOPE = 0.0160  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 2.75  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.132  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	248.05	0.30	0.783	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1775.19  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.12  
 AVERAGE FLOW DEPTH (FEET) = 2.74 TRAVEL TIME (MIN.) = 4.58  
 Tc (MIN.) = 32.50

SUBAREA AREA (ACRES) = 248.05 SUBAREA RUNOFF (CFS) = 200.40  
 EFFECTIVE AREA (ACRES) = 2149.22 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 3460.9 PEAK FLOW RATE (CFS) = 1716.14  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.69

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.69 FLOW VELOCITY (FEET/SEC.) = 10.99  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13111.00 = 28719.70 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1716.14	32.50	1.132	0.30 ( 0.25)	0.82	2149.2	13100.00
2	1638.51	61.46	0.773	0.30 ( 0.24)	0.81	3442.3	13000.00
3	1611.59	63.74	0.761	0.30 ( 0.24)	0.81	3460.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1716.14 Tc(MIN.) = 32.50  
 AREA-AVERAGED Fm(INCH/HR) = 0.25 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA(ACRES) = 2149.22

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13111.00 TO NODE 13112.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 461.07 DOWNSTREAM(FEET) = 452.77  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1781.78 CHANNEL SLOPE = 0.0047  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.92  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.056

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	179.91	0.30	0.694	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.694  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1784.80  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.39  
 AVERAGE FLOW DEPTH(FEET) = 3.91 TRAVEL TIME(MIN.) = 4.02  
 Tc(MIN.) = 36.52

SUBAREA AREA(ACRES) = 179.91 SUBAREA RUNOFF(CFS) = 137.31  
 EFFECTIVE AREA(ACRES) = 2329.13 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3640.9 PEAK FLOW RATE(CFS) = 1716.14

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.83 FLOW VELOCITY(FEET/SEC.) = 7.30  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13112.00 = 30501.48 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1716.14	36.52	1.056	0.30 ( 0.24)	0.81	2329.1	13100.00
2	1662.11	65.56	0.752	0.30 ( 0.24)	0.81	3622.2	13000.00
3	1632.52	67.86	0.740	0.30 ( 0.24)	0.81	3640.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1716.14 Tc(MIN.) = 36.52  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 2329.13

\*\*\*\*\*

FLOW PROCESS FROM NODE 13112.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 452.77 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1625.01 CHANNEL SLOPE = 0.0155  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.76  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.009

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	155.96	0.30	0.836	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.836  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1769.39  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.01  
 AVERAGE FLOW DEPTH(FEET) = 2.76 TRAVEL TIME(MIN.) = 2.46  
 Tc(MIN.) = 38.98

SUBAREA AREA(ACRES) = 155.96 SUBAREA RUNOFF(CFS) = 106.49  
 EFFECTIVE AREA(ACRES) = 2485.09 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3796.8 PEAK FLOW RATE(CFS) = 1716.14

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.71 FLOW VELOCITY(FEET/SEC.) = 10.91  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13222.00 = 32126.49 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1716.14	38.98	1.009	0.30 ( 0.24)	0.81	2485.1	13100.00
2	1689.35	68.05	0.739	0.30 ( 0.24)	0.81	3778.1	13000.00
3	1657.69	70.37	0.727	0.30 ( 0.24)	0.81	3796.8	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1716.14 Tc(MIN.) = 38.98  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 2485.09

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 3796.8 TC(MIN.) = 38.98  
 EFFECTIVE AREA(ACRES) = 2485.09 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 PEAK FLOW RATE(CFS) = 1716.14

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1716.14	38.98	1.009	0.30 ( 0.24)	0.81	2485.1	13100.00
2	1689.35	68.05	0.739	0.30 ( 0.24)	0.81	3778.1	13000.00
3	1657.69	70.37	0.727	0.30 ( 0.24)	0.81	3796.8	13010.00

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S32 \*  
\* Rational Method Hydrology Analysis - 10-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S32.DAT  
TIME/DATE OF STUDY: 16:17 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.120
- 2) 10.00; 2.158
- 3) 15.00; 1.718
- 4) 20.00; 1.461
- 5) 25.00; 1.289
- 6) 30.00; 1.180
- 7) 40.00; 0.990
- 8) 50.00; 0.873
- 9) 60.00; 0.780
- 10) 90.00; 0.628
- 11) 120.00; 0.534
- 12) 180.00; 0.437
- 13) 360.00; 0.302
- 14) 1440.00; 0.126

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13200.00 TO NODE 13201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 298.57  
ELEVATION DATA: UPSTREAM(FEET) = 1069.04 DOWNSTREAM(FEET) = 1005.76

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.271  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.67	0.30	1.000	0	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.19  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 1.19

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13201.00 TO NODE 13202.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.76 DOWNSTREAM(FEET) = 896.98  
CHANNEL LENGTH THRU SUBAREA(FEET) = 747.55 CHANNEL SLOPE = 0.1455  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.22  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.855  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.46  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.09  
AVERAGE FLOW DEPTH(FEET) = 0.20 TRAVEL TIME(MIN.) = 4.04  
Tc(MIN.) = 13.45  
SUBAREA AREA(ACRES) = 7.42 SUBAREA RUNOFF(CFS) = 10.38  
EFFECTIVE AREA(ACRES) = 8.09 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.1 PEAK FLOW RATE(CFS) = 11.32  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.28

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.28 FLOW VELOCITY(FEET/SEC.) = 3.86  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13202.00 = 1046.12 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 896.98 DOWNSTREAM(FEET) = 840.27  
FLOW LENGTH(FEET) = 1789.59 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 7.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.20  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 11.32  
PIPE TRAVEL TIME(MIN.) = 2.92 Tc(MIN.) = 16.37  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13203.00 = 2835.71 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.37  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.648  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.89 0.30 0.731 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.731  
SUBAREA AREA(ACRES) = 38.89 SUBAREA RUNOFF(CFS) = 50.00  
EFFECTIVE AREA(ACRES) = 46.98 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
TOTAL AREA(ACRES) = 47.0 PEAK FLOW RATE(CFS) = 59.81

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 840.27 DOWNSTREAM(FEET) = 782.97  
FLOW LENGTH(FEET) = 992.54 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 15.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.22  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 59.81  
PIPE TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 17.19  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13204.00 = 3828.25 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.19  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.606  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 83.09 0.30 0.645 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645  
SUBAREA AREA(ACRES) = 83.09 SUBAREA RUNOFF(CFS) = 105.62  
EFFECTIVE AREA(ACRES) = 130.07 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 130.1 PEAK FLOW RATE(CFS) = 163.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 782.97 DOWNSTREAM(FEET) = 692.52  
FLOW LENGTH(FEET) = 2046.57 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.63  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 163.65  
PIPE TRAVEL TIME(MIN.) = 1.51 Tc(MIN.) = 18.69  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13205.00 = 5874.82 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.69  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.528  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 88.51 0.30 0.679 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.679  
SUBAREA AREA(ACRES) = 88.51 SUBAREA RUNOFF(CFS) = 105.53  
EFFECTIVE AREA(ACRES) = 218.58 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 218.6 PEAK FLOW RATE(CFS) = 260.14

\*\*\*\*\*

FLOW PROCESS FROM NODE 13205.00 TO NODE 13206.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 692.52 DOWNSTREAM(FEET) = 605.24  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2704.69 CHANNEL SLOPE = 0.0323  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.47  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.344



SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	163.73	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 340.38  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.55  
AVERAGE FLOW DEPTH(FEET) = 2.41 TRAVEL TIME(MIN.) = 4.72  
Tc(MIN.) = 23.41  
SUBAREA AREA(ACRES) = 163.73 SUBAREA RUNOFF(CFS) = 160.11  
EFFECTIVE AREA(ACRES) = 382.31 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 382.3 PEAK FLOW RATE(CFS) = 383.93  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.57 FLOW VELOCITY(FEET/SEC.) = 9.89  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13206.00 = 8579.51 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13206.00 TO NODE 13207.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 605.24 DOWNSTREAM(FEET) = 555.41  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2479.15 CHANNEL SLOPE = 0.0201  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.18  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.220

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 445.54  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.71  
AVERAGE FLOW DEPTH(FEET) = 3.14 TRAVEL TIME(MIN.) = 4.74  
Tc(MIN.) = 28.16  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 123.13  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 464.53  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.21 FLOW VELOCITY(FEET/SEC.) = 8.82  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13207.00 = 11058.66 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 555.41 DOWNSTREAM(FEET) = 505.65  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1734.55 CHANNEL SLOPE = 0.0287  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.10  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.162

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 514.83  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.31  
AVERAGE FLOW DEPTH(FEET) = 3.09 TRAVEL TIME(MIN.) = 2.80  
Tc(MIN.) = 30.96  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 100.58  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 537.42  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.16 FLOW VELOCITY(FEET/SEC.) = 10.44  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 30.96  
RAINFALL INTENSITY(INCH/HR) = 1.16  
AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.81  
EFFECTIVE STREAM AREA(ACRES) = 649.28  
TOTAL STREAM AREA(ACRES) = 649.28  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 537.42

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13210.00 TO NODE 13211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.51  
ELEVATION DATA: UPSTREAM(FEET) = 949.80 DOWNSTREAM(FEET) = 828.64

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.525  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.441  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"OPEN BRUSH" - 1.96 0.30 1.000 0 8.53  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 3.78  
TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 3.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13211.00 TO NODE 13212.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 828.64 DOWNSTREAM(FEET) = 767.94  
CHANNEL LENGTH THRU SUBAREA(FEET) = 652.49 CHANNEL SLOPE = 0.0930  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.38  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.017

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 11.95 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.10  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.54  
AVERAGE FLOW DEPTH(FEET) = 0.35 TRAVEL TIME(MIN.) = 3.07  
Tc(MIN.) = 11.60

SUBAREA AREA(ACRES) = 11.95 SUBAREA RUNOFF(CFS) = 18.47  
EFFECTIVE AREA(ACRES) = 13.91 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 21.50  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.46 FLOW VELOCITY(FEET/SEC.) = 4.25  
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13212.00 = 967.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13212.00 TO NODE 13213.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 767.94 DOWNSTREAM(FEET) = 706.43  
CHANNEL LENGTH THRU SUBAREA(FEET) = 967.91 CHANNEL SLOPE = 0.0635  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.77  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.712

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 27.07 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.77  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.60  
AVERAGE FLOW DEPTH(FEET) = 0.74 TRAVEL TIME(MIN.) = 3.51  
Tc(MIN.) = 15.11  
SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 34.41  
EFFECTIVE AREA(ACRES) = 40.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 41.0 PEAK FLOW RATE(CFS) = 52.09  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.87 FLOW VELOCITY(FEET/SEC.) = 5.08  
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13213.00 = 1934.91 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13213.00 TO NODE 13214.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 706.43 DOWNSTREAM(FEET) = 659.31  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.11 CHANNEL SLOPE = 0.0497  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.05  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.550

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.09 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 62.27  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.99  
AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 3.17  
Tc(MIN.) = 18.28

SUBAREA AREA(ACRES) = 18.09 SUBAREA RUNOFF(CFS) = 20.35  
EFFECTIVE AREA(ACRES) = 59.07 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 66.45  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.08 FLOW VELOCITY(FEET/SEC.) = 5.07  
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13214.00 = 2883.02 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13214.00 TO NODE 13215.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 659.31 DOWNSTREAM(FEET) = 628.91  
CHANNEL LENGTH THRU SUBAREA(FEET) = 970.24 CHANNEL SLOPE = 0.0313  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.61

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.409

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	71.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 102.13

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.96

AVERAGE FLOW DEPTH(FEET) = 1.57 TRAVEL TIME(MIN.) = 3.26

Tc(MIN.) = 21.54

SUBAREA AREA(ACRES) = 71.42 SUBAREA RUNOFF(CFS) = 71.26

EFFECTIVE AREA(ACRES) = 130.49 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 130.5 PEAK FLOW RATE(CFS) = 130.20

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.79 FLOW VELOCITY(FEET/SEC.) = 5.36

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13215.00 = 3853.26 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13215.00 TO NODE 13216.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 628.91 DOWNSTREAM(FEET) = 598.39  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.63 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.89

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.315

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	36.33	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 146.80

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.67

AVERAGE FLOW DEPTH(FEET) = 1.88 TRAVEL TIME(MIN.) = 2.71

Tc(MIN.) = 24.25

SUBAREA AREA(ACRES) = 36.33 SUBAREA RUNOFF(CFS) = 33.19

EFFECTIVE AREA(ACRES) = 166.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 166.8 PEAK FLOW RATE(CFS) = 152.42

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.93 FLOW VELOCITY(FEET/SEC.) = 5.72

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13216.00 = 4775.89 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13216.00 TO NODE 13217.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 598.39 DOWNSTREAM(FEET) = 568.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.40 CHANNEL SLOPE = 0.0470  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.87

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.271

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	42.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 171.00

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.71

AVERAGE FLOW DEPTH(FEET) = 1.86 TRAVEL TIME(MIN.) = 1.58

Tc(MIN.) = 25.83

SUBAREA AREA(ACRES) = 42.51 SUBAREA RUNOFF(CFS) = 37.16

EFFECTIVE AREA(ACRES) = 209.33 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 209.3 PEAK FLOW RATE(CFS) = 182.97

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.93 FLOW VELOCITY(FEET/SEC.) = 6.83

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13217.00 = 5412.29 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 568.48 DOWNSTREAM(FEET) = 505.65  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1896.50 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.32

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.164

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	73.24	0.30	0.951	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.951  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 211.95  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 6.31  
 AVERAGE FLOW DEPTH( FEET) = 2.30 TRAVEL TIME( MIN.) = 5.01  
 Tc( MIN.) = 30.84  
 SUBAREA AREA( ACRES) = 73.24 SUBAREA RUNOFF( CFS) = 57.93  
 EFFECTIVE AREA( ACRES) = 282.57 AREA-AVERAGED Fm( INCH/HR) = 0.30  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA( ACRES) = 282.6 PEAK FLOW RATE( CFS) = 220.72  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 2.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 2.35 FLOW VELOCITY( FEET/SEC.) = 6.38  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13220.00 = 7308.79 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION( MIN.) = 30.84  
 RAINFALL INTENSITY( INCH/HR) = 1.16  
 AREA-AVERAGED Fm( INCH/HR) = 0.30  
 AREA-AVERAGED Fp( INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.99  
 EFFECTIVE STREAM AREA( ACRES) = 282.57  
 TOTAL STREAM AREA( ACRES) = 282.57  
 PEAK FLOW RATE( CFS) AT CONFLUENCE = 220.72

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	537.42	30.96	1.162	0.30( 0.24)	0.81	649.3	13200.00
2	220.72	30.84	1.164	0.30( 0.30)	0.99	282.6	13210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	757.39	30.84	1.164	0.30( 0.26)	0.86	929.4	13210.00
2	757.56	30.96	1.162	0.30( 0.26)	0.86	931.8	13200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE( CFS) = 757.56 Tc( MIN.) = 30.96  
 EFFECTIVE AREA( ACRES) = 931.85 AREA-AVERAGED Fm( INCH/HR) = 0.26  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA( ACRES) = 931.8  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13220.00 TO NODE 13221.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

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ELEVATION DATA: UPSTREAM( FEET) = 505.65 DOWNSTREAM( FEET) = 478.94  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 1949.14 CHANNEL SLOPE = 0.0137  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 4.04  
 \* 10 YEAR RAINFALL INTENSITY( INCH/HR) = 1.106

SUBAREA LOSS RATE DATA( AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	108.50	0.30	0.637	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp( INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.637  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW( CFS) = 802.21  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 10.98  
 AVERAGE FLOW DEPTH( FEET) = 4.04 TRAVEL TIME( MIN.) = 2.96  
 Tc( MIN.) = 33.92

SUBAREA AREA( ACRES) = 108.50 SUBAREA RUNOFF( CFS) = 89.30  
 EFFECTIVE AREA( ACRES) = 1040.35 AREA-AVERAGED Fm( INCH/HR) = 0.25  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA( ACRES) = 1040.3 PEAK FLOW RATE( CFS) = 799.71  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 4.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH( FEET) = 4.03 FLOW VELOCITY( FEET/SEC.) = 10.98  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13221.00 = 14742.35 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	799.87	33.80	1.108	0.30( 0.25)	0.84	1037.9	13210.00
2	799.71	33.92	1.106	0.30( 0.25)	0.84	1040.3	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE( CFS) = 799.87 Tc( MIN.) = 33.80  
 AREA-AVERAGED Fm( INCH/HR) = 0.25 AREA-AVERAGED Fp( INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.84 EFFECTIVE AREA( ACRES) = 1037.87

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13221.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM( FEET) = 478.94 DOWNSTREAM( FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 2078.70 CHANNEL SLOPE = 0.0247  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 3.54  
 \* 10 YEAR RAINFALL INTENSITY( INCH/HR) = 1.060

SUBAREA LOSS RATE DATA( AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED - 87.26 0.30 0.699 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.699  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 833.26  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.75  
 AVERAGE FLOW DEPTH (FEET) = 3.54 TRAVEL TIME (MIN.) = 2.52  
 Tc (MIN.) = 36.32  
 SUBAREA AREA (ACRES) = 87.26 SUBAREA RUNOFF (CFS) = 66.77  
 EFFECTIVE AREA (ACRES) = 1125.13 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA (ACRES) = 1127.6 PEAK FLOW RATE (CFS) = 821.94  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.52 FLOW VELOCITY (FEET/SEC.) = 13.69  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13222.00 = 16821.05 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	821.94	36.32	1.060	0.30 (0.25)	0.83	1125.1	13210.00
2	821.47	36.44	1.058	0.30 (0.25)	0.83	1127.6	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 821.94 Tc (MIN.) = 36.32  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.83 EFFECTIVE AREA (ACRES) = 1125.13

=====  
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1127.6 TC (MIN.) = 36.32  
 EFFECTIVE AREA (ACRES) = 1125.13 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.828  
 PEAK FLOW RATE (CFS) = 821.94

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	821.94	36.32	1.060	0.30 (0.25)	0.83	1125.1	13210.00
2	821.47	36.44	1.058	0.30 (0.25)	0.83	1127.6	13200.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S35 \*  
\* Rational Method Hydrology Analysis - 10-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S35.DAT  
TIME/DATE OF STUDY: 16:17 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.120
- 2) 10.00; 2.158
- 3) 15.00; 1.718
- 4) 20.00; 1.461
- 5) 25.00; 1.289
- 6) 30.00; 1.180
- 7) 40.00; 0.990
- 8) 50.00; 0.873
- 9) 60.00; 0.780
- 10) 90.00; 0.628
- 11) 120.00; 0.534
- 12) 180.00; 0.437
- 13) 360.00; 0.302
- 14) 1440.00; 0.126

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.00 TO NODE 13500.50 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 548.43  
ELEVATION DATA: UPSTREAM(FEET) = 1183.47 DOWNSTREAM(FEET) = 1065.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.986  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	5.11	0.30	1.000	0	11.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 7.75  
TOTAL AREA(ACRES) = 5.11 PEAK FLOW RATE(CFS) = 7.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.50 TO NODE 13501.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1033.15  
CHANNEL LENGTH THRU SUBAREA(FEET) = 431.71 CHANNEL SLOPE = 0.0738  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.39  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.795  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.87	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.74  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.32  
AVERAGE FLOW DEPTH(FEET) = 0.38 TRAVEL TIME(MIN.) = 2.17  
Tc(MIN.) = 14.12  
SUBAREA AREA(ACRES) = 8.87 SUBAREA RUNOFF(CFS) = 11.94  
EFFECTIVE AREA(ACRES) = 13.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 18.81  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.46 FLOW VELOCITY(FEET/SEC.) = 3.74  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13501.00 = 980.14 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13501.00 TO NODE 13502.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1033.15 DOWNSTREAM(FEET) = 990.26  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.63 CHANNEL SLOPE = 0.0452  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.70

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.543

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.82	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 28.26  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.69

AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 4.28  
Tc(MIN.) = 18.40

SUBAREA AREA(ACRES) = 16.82 SUBAREA RUNOFF(CFS) = 18.82  
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 34.47

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.76 FLOW VELOCITY(FEET/SEC.) = 3.95

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13502.00 = 1928.77 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13502.00 TO NODE 13503.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.26 DOWNSTREAM(FEET) = 956.06  
CHANNEL LENGTH THRU SUBAREA(FEET) = 940.98 CHANNEL SLOPE = 0.0363  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.11

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.393

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	46.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 57.14  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.36

AVERAGE FLOW DEPTH(FEET) = 1.08 TRAVEL TIME(MIN.) = 3.60

Tc(MIN.) = 22.00

SUBAREA AREA(ACRES) = 46.02 SUBAREA RUNOFF(CFS) = 45.25

EFFECTIVE AREA(ACRES) = 76.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 76.8 PEAK FLOW RATE(CFS) = 75.54

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.26 FLOW VELOCITY(FEET/SEC.) = 4.77

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13503.00 = 2869.75 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13503.00 TO NODE 13504.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 956.06 DOWNSTREAM(FEET) = 889.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2131.31 CHANNEL SLOPE = 0.0312  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.58

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.197

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	58.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 99.21

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.93

AVERAGE FLOW DEPTH(FEET) = 1.54 TRAVEL TIME(MIN.) = 7.20

Tc(MIN.) = 29.20

SUBAREA AREA(ACRES) = 58.46 SUBAREA RUNOFF(CFS) = 47.22

EFFECTIVE AREA(ACRES) = 135.28 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 135.3 PEAK FLOW RATE(CFS) = 109.27

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.63 FLOW VELOCITY(FEET/SEC.) = 5.06

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13504.00 = 5001.06 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13504.00 TO NODE 13505.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 889.48 DOWNSTREAM(FEET) = 848.10  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1661.97 CHANNEL SLOPE = 0.0249  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.90

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.088  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	49.30	0.30	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 126.76  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.90  
 AVERAGE FLOW DEPTH (FEET) = 1.88 TRAVEL TIME (MIN.) = 5.65  
 Tc (MIN.) = 34.86  
 SUBAREA AREA (ACRES) = 49.30 SUBAREA RUNOFF (CFS) = 34.95  
 EFFECTIVE AREA (ACRES) = 184.58 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 184.6 PEAK FLOW RATE (CFS) = 130.87  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 1.91  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.91 FLOW VELOCITY (FEET/SEC.) = 4.95  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.00 = 6663.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13505.00 TO NODE 13505.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 848.10 DOWNSTREAM (FEET) = 811.10  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1234.61 CHANNEL SLOPE = 0.0300  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 1.92  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.016  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.35	0.30	0.811	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.811  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 144.55  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.44  
 AVERAGE FLOW DEPTH (FEET) = 1.92 TRAVEL TIME (MIN.) = 3.78  
 Tc (MIN.) = 38.64  
 SUBAREA AREA (ACRES) = 39.35 SUBAREA RUNOFF (CFS) = 27.36  
 EFFECTIVE AREA (ACRES) = 223.93 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 223.9 PEAK FLOW RATE (CFS) = 146.29  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 1.93  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.93 FLOW VELOCITY (FEET/SEC.) = 5.46  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.50 = 7897.64 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13505.50 TO NODE 13506.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 811.10 DOWNSTREAM (FEET) = 781.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1415.98 CHANNEL SLOPE = 0.0213  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.26  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.951  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	54.33	0.30	0.738	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.738  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 164.12  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.00  
 AVERAGE FLOW DEPTH (FEET) = 2.26 TRAVEL TIME (MIN.) = 4.72  
 Tc (MIN.) = 43.36  
 SUBAREA AREA (ACRES) = 54.33 SUBAREA RUNOFF (CFS) = 35.67  
 EFFECTIVE AREA (ACRES) = 278.26 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
 TOTAL AREA (ACRES) = 278.3 PEAK FLOW RATE (CFS) = 168.84  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.29  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.29 FLOW VELOCITY (FEET/SEC.) = 5.05  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.00 = 9313.62 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13506.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 781.00 DOWNSTREAM (FEET) = 743.17  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1542.62 CHANNEL SLOPE = 0.0245  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.34  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.896  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	61.33	0.30	0.783	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 187.08  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.47  
 AVERAGE FLOW DEPTH (FEET) = 2.33 TRAVEL TIME (MIN.) = 4.70  
 Tc (MIN.) = 48.06  
 SUBAREA AREA (ACRES) = 61.33 SUBAREA RUNOFF (CFS) = 36.49  
 EFFECTIVE AREA (ACRES) = 339.59 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90



TOTAL AREA (ACRES) = 339.6 PEAK FLOW RATE (CFS) = 191.60  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.36  
  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.36 FLOW VELOCITY (FEET/SEC.) = 5.51  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.50 = 10856.24 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.50 TO NODE 13520.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 743.17 DOWNSTREAM (FEET) = 717.04  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1370.93 CHANNEL SLOPE = 0.0191  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.61  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.850  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.86	0.30	0.848	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.848  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 202.28  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.11  
 AVERAGE FLOW DEPTH (FEET) = 2.60 TRAVEL TIME (MIN.) = 4.47  
 Tc (MIN.) = 52.53  
 SUBAREA AREA (ACRES) = 39.86 SUBAREA RUNOFF (CFS) = 21.36  
 EFFECTIVE AREA (ACRES) = 379.45 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
 TOTAL AREA (ACRES) = 379.5 PEAK FLOW RATE (CFS) = 198.81  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.58 FLOW VELOCITY (FEET/SEC.) = 5.09  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 52.53  
 RAINFALL INTENSITY (INCH/HR) = 0.85  
 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.89  
 EFFECTIVE STREAM AREA (ACRES) = 379.45  
 TOTAL STREAM AREA (ACRES) = 379.45  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 198.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13510.00 TO NODE 13511.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

ELEVATION DATA: UPSTREAM (FEET) = 1216.90 DOWNSTREAM (FEET) = 1022.78

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.615  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.752  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	6.66	0.30	1.000	0	14.62

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 8.70  
 TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 8.70

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13511.00 TO NODE 13512.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1022.78 DOWNSTREAM (FEET) = 954.27  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1027.63 CHANNEL SLOPE = 0.0667  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.56  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.511  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.30	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 22.66  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.87  
 AVERAGE FLOW DEPTH (FEET) = 0.53 TRAVEL TIME (MIN.) = 4.42  
 Tc (MIN.) = 19.04  
 SUBAREA AREA (ACRES) = 25.40 SUBAREA RUNOFF (CFS) = 27.68  
 EFFECTIVE AREA (ACRES) = 32.06 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 34.94  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.68 FLOW VELOCITY (FEET/SEC.) = 4.51  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13512.00 = 1931.31 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13512.00 TO NODE 13513.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 954.27 DOWNSTREAM(FEET) = 872.45
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.42 CHANNEL SLOPE = 0.0425
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.29
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.280

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 90.23 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 74.92
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.02
AVERAGE FLOW DEPTH(FEET) = 1.20 TRAVEL TIME(MIN.) = 6.39
Tc(MIN.) = 25.43

SUBAREA AREA(ACRES) = 90.23 SUBAREA RUNOFF(CFS) = 79.57
EFFECTIVE AREA(ACRES) = 122.29 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 122.3 PEAK FLOW RATE(CFS) = 107.84
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.48 FLOW VELOCITY(FEET/SEC.) = 5.61
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13513.00 = 3857.73 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13513.00 TO NODE 13514.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 872.45 DOWNSTREAM(FEET) = 813.12
CHANNEL LENGTH THRU SUBAREA(FEET) = 1895.66 CHANNEL SLOPE = 0.0313
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.06
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.161

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 135.65 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 160.51
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.70
AVERAGE FLOW DEPTH(FEET) = 2.01 TRAVEL TIME(MIN.) = 5.54
Tc(MIN.) = 30.98

SUBAREA AREA(ACRES) = 135.65 SUBAREA RUNOFF(CFS) = 105.17
EFFECTIVE AREA(ACRES) = 257.94 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 257.9 PEAK FLOW RATE(CFS) = 199.99
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.26 FLOW VELOCITY(FEET/SEC.) = 6.08
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13514.00 = 5753.39 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13514.00 TO NODE 13515.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 813.12 DOWNSTREAM(FEET) = 773.74
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.15 CHANNEL SLOPE = 0.0204
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.81
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.050

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 109.30 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 236.93
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.48
AVERAGE FLOW DEPTH(FEET) = 2.78 TRAVEL TIME(MIN.) = 5.86
Tc(MIN.) = 36.84

SUBAREA AREA(ACRES) = 109.30 SUBAREA RUNOFF(CFS) = 73.79
EFFECTIVE AREA(ACRES) = 367.24 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 367.2 PEAK FLOW RATE(CFS) = 247.92
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.84 FLOW VELOCITY(FEET/SEC.) = 5.56
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13515.00 = 7679.54 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 773.74 DOWNSTREAM(FEET) = 717.04
CHANNEL LENGTH THRU SUBAREA(FEET) = 2279.49 CHANNEL SLOPE = 0.0249
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.12
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.957

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 231.44 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 316.46  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.38  
 AVERAGE FLOW DEPTH(FEET) = 3.07 TRAVEL TIME(MIN.) = 5.95  
 Tc(MIN.) = 42.79  
 SUBAREA AREA(ACRES) = 231.44 SUBAREA RUNOFF(CFS) = 136.94  
 EFFECTIVE AREA(ACRES) = 598.68 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 598.7 PEAK FLOW RATE(CFS) = 354.24  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.25 FLOW VELOCITY(FEET/SEC.) = 6.59  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13520.00 = 9959.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 42.79  
 RAINFALL INTENSITY(INCH/HR) = 0.96  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 598.68  
 TOTAL STREAM AREA(ACRES) = 598.68  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 354.24

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	198.81	52.53	0.850	0.30( 0.27)	0.89	379.5	13500.00
2	354.24	42.79	0.957	0.30( 0.30)	1.00	598.7	13510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	546.15	42.79	0.957	0.30( 0.29)	0.96	907.8	13510.00
2	495.01	52.53	0.850	0.30( 0.29)	0.96	978.1	13500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 546.15 Tc(MIN.) = 42.79  
 EFFECTIVE AREA(ACRES) = 907.77 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 978.1  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.00 TO NODE 13520.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 717.04 DOWNSTREAM(FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2019.22 CHANNEL SLOPE = 0.0084  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.73  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.889

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 598.35  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.77  
 AVERAGE FLOW DEPTH(FEET) = 2.72 TRAVEL TIME(MIN.) = 5.84  
 Tc(MIN.) = 48.63  
 SUBAREA AREA(ACRES) = 193.31 SUBAREA RUNOFF(CFS) = 104.36  
 EFFECTIVE AREA(ACRES) = 1101.08 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 1171.4 PEAK FLOW RATE(CFS) = 594.89  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.71 FLOW VELOCITY(FEET/SEC.) = 5.75  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.50 = 14246.39 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	594.89	48.63	0.889	0.30( 0.29)	0.96	1101.1	13510.00
2	533.21	58.56	0.793	0.30( 0.29)	0.96	1171.4	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 594.89 Tc(MIN.) = 48.63  
 AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 1101.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.50 TO NODE 13521.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 661.95  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1622.36 CHANNEL SLOPE = 0.0235  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.10  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.856

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

LAND USE            GROUP    (ACRES)   (INCH/HR)   (DECIMAL)   CN  
 USER-DEFINED       -       129.79     0.30     0.897     -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 629.16  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.28  
 AVERAGE FLOW DEPTH(FEET) = 2.09    TRAVEL TIME(MIN.) = 3.26  
 Tc(MIN.) = 51.89  
 SUBAREA AREA(ACRES) = 129.79        SUBAREA RUNOFF(CFS) = 68.52  
 EFFECTIVE AREA(ACRES) = 1230.87    AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 1301.2        PEAK FLOW RATE(CFS) = 630.06  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.10

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.10    FLOW VELOCITY(FEET/SEC.) = 8.29  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13521.00 = 15868.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	630.06	51.89	0.856	0.30( 0.29)	0.96	1230.9	13510.00
2	567.14	61.95	0.770	0.30( 0.29)	0.95	1301.2	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 630.06    Tc(MIN.) = 51.89  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96    EFFECTIVE AREA(ACRES) = 1230.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 13521.00 TO NODE 13522.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 661.95    DOWNSTREAM(FEET) = 632.19  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2746.01    CHANNEL SLOPE = 0.0108  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.77  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.791  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	278.60	0.30	0.905	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 695.20  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.59  
 AVERAGE FLOW DEPTH(FEET) = 2.76    TRAVEL TIME(MIN.) = 6.95  
 Tc(MIN.) = 58.84  
 SUBAREA AREA(ACRES) = 278.60        SUBAREA RUNOFF(CFS) = 130.24  
 EFFECTIVE AREA(ACRES) = 1509.47    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.95  
 TOTAL AREA(ACRES) = 1579.8        PEAK FLOW RATE(CFS) = 688.52  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.74    FLOW VELOCITY(FEET/SEC.) = 6.57  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13522.00 = 18614.76 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	688.52	58.84	0.791	0.30( 0.28)	0.95	1509.5	13510.00
2	640.29	69.13	0.734	0.30( 0.28)	0.94	1579.8	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 688.52    Tc(MIN.) = 58.84  
 AREA-AVERAGED Fm(INCH/HR) = 0.28    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.95    EFFECTIVE AREA(ACRES) = 1509.47

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1579.8    TC(MIN.) = 58.84  
 EFFECTIVE AREA(ACRES) = 1509.47    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.947  
 PEAK FLOW RATE(CFS) = 688.52

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	688.52	58.84	0.791	0.30( 0.28)	0.95	1509.5	13510.00
2	640.29	69.13	0.734	0.30( 0.28)	0.94	1579.8	13500.00

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2011 Advanced Engineering Software (aes)  
Ver. 18.0 Release Date: 07/01/2011 License ID 1264

Analysis prepared by:

RBF Consulting

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 25-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P25EVAA.DAT  
TIME/DATE OF STUDY: 16:41 11/13/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.766
- 2) 10.00; 3.118
- 3) 15.00; 2.394
- 4) 20.00; 1.986
- 5) 25.00; 1.734
- 6) 30.00; 1.526
- 7) 40.00; 1.325
- 8) 50.00; 1.173
- 9) 60.00; 1.046
- 10) 90.00; 0.877
- 11) 120.00; 0.765
- 12) 180.00; 0.636
- 13) 360.00; 0.466
- 14) 1200.00; 0.203

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 571.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.305  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.006  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56	7.31

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 2.84  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 2.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.006  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.170  
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 11.75  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 14.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.006  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 2.60 0.30 0.200 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 9.23  
EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.06  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19  
TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 23.82

\*\*\*\*\*

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 571.00 DOWNSTREAM ELEVATION(FEET) = 530.50  
STREET LENGTH(FEET) = 1215.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 28.68

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.46  
HALFSTREET FLOOD WIDTH(FEET) = 16.84  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.26  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.44  
STREET FLOW TRAVEL TIME(MIN.) = 3.85 Tc(MIN.) = 11.15

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.951

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.20	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	2.40	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.135  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 9.69  
EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 27.15

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.45  
FLOW VELOCITY(FEET/SEC.) = 5.20 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.37  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1542.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.15  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.951  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.119  
SUBAREA AREA(ACRES) = 22.60 SUBAREA RUNOFF(CFS) = 59.29  
EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.04  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.13  
TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 86.45

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.15  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.951  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.198  
SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 16.39  
EFFECTIVE AREA(ACRES) = 39.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
TOTAL AREA(ACRES) = 39.3 PEAK FLOW RATE(CFS) = 102.84

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.50 DOWNSTREAM(FEET) = 522.00  
FLOW LENGTH(FEET) = 837.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.83  
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 102.84  
PIPE TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 12.33  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2379.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.33  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.780  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 15.30 0.30 0.100 56  
 PUBLIC PARK B 0.70 0.30 0.850 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.133  
 SUBAREA AREA(ACRES) = 16.00 SUBAREA RUNOFF(CFS) = 39.46  
 EFFECTIVE AREA(ACRES) = 55.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA(ACRES) = 55.3 PEAK FLOW RATE(CFS) = 136.26

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 522.00 DOWNSTREAM(FEET) = 473.00  
 FLOW LENGTH(FEET) = 568.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 28.16  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 136.26  
 PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 12.67  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2947.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.67  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.732  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	2.10	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
COMMERCIAL	B	0.50	0.30	0.100	56
PUBLIC PARK	B	13.00	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.820  
 SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 35.57  
 EFFECTIVE AREA(ACRES) = 71.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 71.2 PEAK FLOW RATE(CFS) = 169.41

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 127.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 435.00  
 FLOW LENGTH(FEET) = 588.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.95

ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 169.41  
 PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 13.03  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<

=====

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 100.00 TO NODE 121.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 574.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.633  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56	8.44

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 1.93  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.93

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 574.00 DOWNSTREAM ELEVATION(FEET) = 557.00  
 STREET LENGTH(FEET) = 221.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.70  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.39  
 HALFSTREET FLOOD WIDTH(FEET) = 13.01  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.95  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.74



STREET FLOW TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 8.97  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.458  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 7.90 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.10 0.30 0.400 56  
 APARTMENTS B 2.20 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.257  
 SUBAREA AREA(ACRES) = 14.30 SUBAREA RUNOFF(CFS) = 43.51  
 EFFECTIVE AREA(ACRES) = 14.90 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.26  
 TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 45.35

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 17.07  
 FLOW VELOCITY(FEET/SEC.) = 8.11 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.79  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 551.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 557.00 DOWNSTREAM ELEVATION(FEET) = 527.00  
 STREET LENGTH(FEET) = 317.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 58.60  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.49  
 HALFSTREET FLOOD WIDTH(FEET) = 18.24  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.26  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.52  
 STREET FLOW TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 9.54  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.270  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.50 0.30 0.400 56  
 APARTMENTS B 0.70 0.30 0.200 56

COMMERCIAL B 0.40 0.30 0.100 56  
 CONDOMINIUMS B 3.50 0.30 0.350 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.352  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 26.49  
 EFFECTIVE AREA(ACRES) = 24.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 24.2 PEAK FLOW RATE(CFS) = 69.31

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.51 HALFSTREET FLOOD WIDTH(FEET) = 19.49  
 FLOW VELOCITY(FEET/SEC.) = 9.66 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.93  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 123.00 = 868.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 527.00 DOWNSTREAM ELEVATION(FEET) = 496.00  
 STREET LENGTH(FEET) = 315.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 84.68  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.54  
 HALFSTREET FLOOD WIDTH(FEET) = 20.90  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.34  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 5.54  
 STREET FLOW TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 10.05

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.111  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 2.90 0.30 0.400 56  
 CONDOMINIUMS B 1.40 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.00 0.30 0.400 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 CONDOMINIUMS B 2.70 0.30 0.350 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387  
 SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 30.73  
 EFFECTIVE AREA(ACRES) = 35.60 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32

TOTAL AREA (ACRES) = 35.6 PEAK FLOW RATE (CFS) = 96.58

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.56 HALFSTREET FLOOD WIDTH (FEET) = 22.07
FLOW VELOCITY (FEET/SEC.) = 10.63 DEPTH\*VELOCITY (FT\*FT/SEC.) = 5.92
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 124.00 = 1183.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 10.05

RAINFALL INTENSITY (INCH/HR) = 3.11

AREA-AVERAGED Fm (INCH/HR) = 0.10

AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.32

EFFECTIVE STREAM AREA (ACRES) = 35.60

TOTAL STREAM AREA (ACRES) = 35.60

PEAK FLOW RATE (CFS) AT CONFLUENCE = 96.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 317.00

ELEVATION DATA: UPSTREAM (FEET) = 699.00 DOWNSTREAM (FEET) = 610.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.111

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.411

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER
"OPEN BRUSH" B 1.50 0.30 1.000 66 9.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 4.20

TOTAL AREA (ACRES) = 1.50 PEAK FLOW RATE (CFS) = 4.20

\*\*\*\*\*

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 610.00 DOWNSTREAM (FEET) = 575.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 206.00 CHANNEL SLOPE = 0.1699

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.245

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 2.80 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.91

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.80

AVERAGE FLOW DEPTH (FEET) = 0.62 TRAVEL TIME (MIN.) = 0.50

Tc (MIN.) = 9.62

SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 7.42

EFFECTIVE AREA (ACRES) = 4.30 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 4.3 PEAK FLOW RATE (CFS) = 11.40

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.71 FLOW VELOCITY (FEET/SEC.) = 7.44

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 523.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 575.00 DOWNSTREAM (FEET) = 548.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.1350

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.109

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 3.30 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.57

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.42

AVERAGE FLOW DEPTH (FEET) = 0.84 TRAVEL TIME (MIN.) = 0.45

Tc (MIN.) = 10.07

SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 8.34

EFFECTIVE AREA (ACRES) = 7.60 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 7.6 PEAK FLOW RATE (CFS) = 19.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.91 FLOW VELOCITY (FEET/SEC.) = 7.82

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 723.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 548.00 DOWNSTREAM (FEET) = 524.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 318.00 CHANNEL SLOPE = 0.0755

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.990  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	2.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 22.00  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.46  
 AVERAGE FLOW DEPTH (FEET) = 1.07 TRAVEL TIME (MIN.) = 0.82  
 Tc (MIN.) = 10.89  
 SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 5.57  
 EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 23.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.10 FLOW VELOCITY (FEET/SEC.) = 6.58  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 1041.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 524.00 DOWNSTREAM (FEET) = 515.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 94.00 CHANNEL SLOPE = 0.0957  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.960  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	3.70	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 28.39  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.56  
 AVERAGE FLOW DEPTH (FEET) = 1.12 TRAVEL TIME (MIN.) = 0.21  
 Tc (MIN.) = 11.09  
 SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 8.86  
 EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 32.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.18 FLOW VELOCITY (FEET/SEC.) = 7.80  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 1135.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 507.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 207.00 CHANNEL SLOPE = 0.0386  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.876  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	8.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 42.18  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.94  
 AVERAGE FLOW DEPTH (FEET) = 1.54 TRAVEL TIME (MIN.) = 0.58  
 Tc (MIN.) = 11.67  
 SUBAREA AREA (ACRES) = 8.30 SUBAREA RUNOFF (CFS) = 19.24  
 EFFECTIVE AREA (ACRES) = 21.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 21.9 PEAK FLOW RATE (CFS) = 50.77

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.65 FLOW VELOCITY (FEET/SEC.) = 6.21  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 1342.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 507.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 338.00 CHANNEL SLOPE = 0.0207  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.720  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	0.60	0.30	1.000	66
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
NATURAL FAIR COVER "OPEN BRUSH"	B	13.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 66.15  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.25  
 AVERAGE FLOW DEPTH (FEET) = 2.05 TRAVEL TIME (MIN.) = 1.07  
 Tc (MIN.) = 12.75  
 SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 30.76  
 EFFECTIVE AREA (ACRES) = 36.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 36.0 PEAK FLOW RATE (CFS) = 78.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.18 FLOW VELOCITY(FEET/SEC.) = 5.48  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 1680.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 137.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 496.00  
FLOW LENGTH(FEET) = 726.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.75  
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 78.47  
PIPE TRAVEL TIME(MIN.) = 1.38 Tc(MIN.) = 14.13  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.13  
RAINFALL INTENSITY(INCH/HR) = 2.52  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 36.00  
TOTAL STREAM AREA(ACRES) = 36.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 78.47

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	96.58	10.05	3.111	0.30( 0.10)	0.32	35.6	100.00
2	78.47	14.13	2.520	0.30( 0.30)	1.00	36.0	130.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	167.22	10.05	3.111	0.30( 0.18)	0.60	61.2	100.00
2	156.11	14.13	2.520	0.30( 0.20)	0.66	71.6	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 167.22 Tc(MIN.) = 10.05  
EFFECTIVE AREA(ACRES) = 61.20 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 71.6  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 444.00  
FLOW LENGTH(FEET) = 888.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.79  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 167.22  
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 10.62  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 125.00 = 3294.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.62  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.028  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCs SOIL AREA Fp Ap SCs  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 7.50 0.30 0.400 56  
NATURAL FAIR COVER  
"OPEN BRUSH" B 0.10 0.30 1.000 66  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.407  
SUBAREA AREA(ACRES) = 8.60 SUBAREA RUNOFF(CFS) = 22.49  
EFFECTIVE AREA(ACRES) = 69.80 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 179.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 444.00 DOWNSTREAM(FEET) = 438.00  
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.07  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 179.30  
PIPE TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 11.46  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.46

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.906  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	4.30	0.30	0.200	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.70	0.30	0.400	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.20	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 7.10 SUBAREA RUNOFF (CFS) = 18.14  
 EFFECTIVE AREA (ACRES) = 76.90 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 87.3 PEAK FLOW RATE (CFS) = 189.78

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.46  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.906  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.51  
 EFFECTIVE AREA (ACRES) = 77.10 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 87.5 PEAK FLOW RATE (CFS) = 190.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 11.46  
 RAINFALL INTENSITY (INCH/HR) = 2.91  
 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.55  
 EFFECTIVE STREAM AREA (ACRES) = 77.10  
 TOTAL STREAM AREA (ACRES) = 87.50  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 190.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====  
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 557.00 DOWNSTREAM (FEET) = 546.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.105  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.402  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.50	0.30	0.100	56	6.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 1.97  
 TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 1.97

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION (FEET) = 546.00 DOWNSTREAM ELEVATION (FEET) = 488.00  
 STREET LENGTH (FEET) = 671.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.86  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.32  
 HALfstREET FLOOD WIDTH (FEET) = 8.78  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.15  
 PRODUCT OF DEPTH & VELOCITY (FT\*FT/SEC.) = 1.97  
 STREET FLOW TRAVEL TIME (MIN.) = 1.82 Tc (MIN.) = 7.92  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.803

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.50	0.30	0.200	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	3.90	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293  
 SUBAREA AREA (ACRES) = 5.30 SUBAREA RUNOFF (CFS) = 17.72  
 EFFECTIVE AREA (ACRES) = 5.80 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA (ACRES) = 5.8 PEAK FLOW RATE (CFS) = 19.42

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 11.60  
 FLOW VELOCITY (FEET/SEC.) = 6.96 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.57  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1001.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 7.92  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.803  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	14.60	0.30	0.200	56
COMMERCIAL	B	1.10	0.30	0.100	56
CONDOMINIUMS	B	4.30	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.227  
 SUBAREA AREA (ACRES) = 20.00 SUBAREA RUNOFF (CFS) = 67.22  
 EFFECTIVE AREA (ACRES) = 25.80 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 25.8 PEAK FLOW RATE (CFS) = 86.64

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

-----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION (FEET) = 488.00 DOWNSTREAM ELEVATION (FEET) = 460.00  
 STREET LENGTH (FEET) = 371.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 108.44  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.60  
 HALFSTREET FLOOD WIDTH (FEET) = 24.34  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 9.89  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 5.91  
 STREET FLOW TRAVEL TIME (MIN.) = 0.63 Tc (MIN.) = 8.55  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.597

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.50	0.30	0.200	56

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 10.00 0.30 0.200 56  
 APARTMENTS B 1.70 0.30 0.200 56  
 COMMERCIAL B 0.50 0.30 0.100 56  
 CONDOMINIUMS B 1.00 0.30 0.350 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.207  
 SUBAREA AREA (ACRES) = 13.70 SUBAREA RUNOFF (CFS) = 43.58  
 EFFECTIVE AREA (ACRES) = 39.50 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA (ACRES) = 39.5 PEAK FLOW RATE (CFS) = 125.44

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.62 HALFSTREET FLOOD WIDTH (FEET) = 25.74  
 FLOW VELOCITY (FEET/SEC.) = 10.26 DEPTH\*VELOCITY (FT\*FT/SEC.) = 6.39  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1372.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 113.00 TO NODE 126.00 IS CODE = 31

-----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 460.00 DOWNSTREAM (FEET) = 438.00  
 FLOW LENGTH (FEET) = 500.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.9 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 21.36  
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 125.44  
 PIPE TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 8.94  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 1872.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 8.94  
 RAINFALL INTENSITY (INCH/HR) = 3.47  
 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.23  
 EFFECTIVE STREAM AREA (ACRES) = 39.50  
 TOTAL STREAM AREA (ACRES) = 39.50  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 125.44

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	190.29	11.46	2.906	0.30 ( 0.16)	0.55	77.1	100.00
1	170.66	15.58	2.347	0.30 ( 0.18)	0.60	87.5	130.00
2	125.44	8.94	3.468	0.30 ( 0.07)	0.23	39.5	110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	304.22	8.94	3.468	0.30 ( 0.13)	0.42	99.6	110.00
2	295.00	11.46	2.906	0.30 ( 0.13)	0.44	116.6	100.00
3	254.73	15.58	2.347	0.30 ( 0.15)	0.48	127.0	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 304.22 Tc(MIN.) = 8.94  
EFFECTIVE AREA(ACRES) = 99.62 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 127.0  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 435.00  
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 66.0 INCH PIPE IS 51.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.36  
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 304.22  
PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 9.26  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.26  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.362  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	5.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.366  
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 22.83  
EFFECTIVE AREA(ACRES) = 107.42 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 134.8 PEAK FLOW RATE(CFS) = 312.99

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.26  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.362  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	1.50	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 14.14  
EFFECTIVE AREA(ACRES) = 112.32 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 139.7 PEAK FLOW RATE(CFS) = 327.13

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	327.13	9.26	3.362	0.30 ( 0.13)	0.42	112.3	110.00
2	317.52	11.78	2.860	0.30 ( 0.13)	0.44	129.3	100.00
3	273.61	15.91	2.320	0.30 ( 0.14)	0.48	139.7	130.00

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	169.41	13.03	2.679	0.30 ( 0.09)	0.29	71.2	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	479.23	9.26	3.362	0.30 ( 0.11)	0.38	162.9	110.00
2	481.39	11.78	2.860	0.30 ( 0.12)	0.39	193.7	100.00
3	473.65	13.03	2.679	0.30 ( 0.12)	0.39	203.6	100.00
4	419.54	15.91	2.320	0.30 ( 0.12)	0.42	210.9	130.00

TOTAL AREA(ACRES) = 210.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 481.39 Tc(MIN.) = 11.784  
EFFECTIVE AREA(ACRES) = 193.68 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
TOTAL AREA(ACRES) = 210.9  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.10 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 500.20 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 44.56
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 481.39
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 11.97
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.10 = 4750.20 FEET.

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*****
FLOW PROCESS FROM NODE 127.10 TO NODE 127.20 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 353.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 595.30 CHANNEL SLOPE = 0.0218
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.650
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 3.50 0.30 0.100 56
COMMERCIAL B 0.10 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 485.63
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.88
AVERAGE FLOW DEPTH(FEET) = 1.18 TRAVEL TIME(MIN.) = 1.26
Tc(MIN.) = 13.23
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 8.49
EFFECTIVE AREA(ACRES) = 197.28 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 214.5 PEAK FLOW RATE(CFS) = 481.39
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.17 FLOW VELOCITY(FEET/SEC.) = 7.85
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.20 = 5345.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.20 TO NODE 127.30 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 340.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 476.00 CHANNEL SLOPE = 0.0273
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.514
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 3.10 0.30 0.100 56
COMMERCIAL B 0.10 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 484.97
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.43
AVERAGE FLOW DEPTH(FEET) = 1.10 TRAVEL TIME(MIN.) = 0.94
Tc(MIN.) = 14.17
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 7.15
EFFECTIVE AREA(ACRES) = 200.48 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 217.7 PEAK FLOW RATE(CFS) = 481.39
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.10 FLOW VELOCITY(FEET/SEC.) = 8.42
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.30 = 5821.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.30 TO NODE 13569.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 338.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 506.00 CHANNEL SLOPE = 0.0040
CHANNEL BASE(FEET) = 150.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.242
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.80 0.30 0.100 56
COMMERCIAL B 0.60 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 484.77
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.13
AVERAGE FLOW DEPTH(FEET) = 1.02 TRAVEL TIME(MIN.) = 2.70
Tc(MIN.) = 16.87
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 6.77
EFFECTIVE AREA(ACRES) = 203.88 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 221.1 PEAK FLOW RATE(CFS) = 481.39
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.02 FLOW VELOCITY(FEET/SEC.) = 3.11
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 13569.00 = 6327.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 12
-----

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>>>>CLEAR MEMORY BANK # 1 <<<<
=====
END OF STUDY SUMMARY:

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TOTAL AREA (ACRES) = 221.1 TC (MIN.) = 16.87  
 EFFECTIVE AREA (ACRES) = 203.88 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.375  
 PEAK FLOW RATE (CFS) = 481.39

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	479.23	14.36	2.487	0.30 ( 0.11)	0.36	173.1	110.00
2	481.39	16.87	2.242	0.30 ( 0.11)	0.37	203.9	100.00
3	473.65	18.15	2.137	0.30 ( 0.11)	0.38	213.8	100.00
4	419.54	21.27	1.922	0.30 ( 0.12)	0.40	221.1	130.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2012 Advanced Engineering Software (aes)  
Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 25-YR ULTIMATE EV DECEMBER 2013 MCHANDOO/TMULI \*  
\*\*\*\*\*

FILE NAME: 2P25EVBB.DAT  
TIME/DATE OF STUDY: 16:37 12/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.808
- 2) 10.00; 3.143
- 3) 15.00; 2.408
- 4) 20.00; 1.996
- 5) 25.00; 1.742
- 6) 30.00; 1.531
- 7) 40.00; 1.331
- 8) 50.00; 1.178
- 9) 60.00; 1.052
- 10) 90.00; 0.883
- 11) 120.00; 0.772
- 12) 180.00; 0.643
- 13) 360.00; 0.472
- 14) 1200.00; 0.207

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00  
ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 543.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.596  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.944  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.80	0.30	0.100	56	7.60

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 2.82  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 2.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 543.00 DOWNSTREAM ELEVATION(FEET) = 523.00  
STREET LENGTH(FEET) = 502.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.40  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.30  
HALFSTREET FLOOD WIDTH(FEET) = 6.95  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.01  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.19  
STREET FLOW TRAVEL TIME(MIN.) = 2.09 Tc(MIN.) = 9.68  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.249

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.20	0.30	0.200	56
COMMERCIAL	B	1.30	0.30	0.100	56

NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.261  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.14  
 EFFECTIVE AREA(ACRES) = 2.60 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 7.45

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 8.24  
 FLOW VELOCITY(FEET/SEC.) = 4.29 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.39  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 810.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.68  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.249  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 1.40 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 4.06  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 11.51

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 523.00 DOWNSTREAM ELEVATION(FEET) = 468.00  
 STREET LENGTH(FEET) = 987.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.52  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.38  
 HALFSTREET FLOOD WIDTH(FEET) = 11.11  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.80  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.21  
 STREET FLOW TRAVEL TIME(MIN.) = 2.84 Tc(MIN.) = 12.52  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.773  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56  
 COMMERCIAL B 2.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.426  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 10.00  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 19.79

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 12.05  
 FLOW VELOCITY(FEET/SEC.) = 6.03 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.41  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 1797.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 468.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.04  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.41  
 HALFSTREET FLOOD WIDTH(FEET) = 13.63  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.22  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.52  
 STREET FLOW TRAVEL TIME(MIN.) = 2.62 Tc(MIN.) = 15.14  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.397  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.10 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 COMMERCIAL B 1.90 0.30 0.100 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 6.49  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 23.51

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 13.71  
 FLOW VELOCITY(FEET/SEC.) = 6.28 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.56  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2774.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
 MAINLINE Tc(MIN.) = 15.14  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.397  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.30 0.30 1.000 66  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 2.45  
 EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
 TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 25.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 204.00 TO NODE 218.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

-----  
 UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 343.00  
 STREET LENGTH(FEET) = 1228.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.56  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.44  
 HALFSTREET FLOOD WIDTH(FEET) = 15.43  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.37  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.79  
 STREET FLOW TRAVEL TIME(MIN.) = 3.21 Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 COMMERCIAL B 0.50 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.40 0.30 1.000 66  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.70 0.30 0.500 56  
 COMMERCIAL B 1.50 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.80 0.30 1.000 66  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 7.19  
 EFFECTIVE AREA(ACRES) = 16.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 16.6 PEAK FLOW RATE(CFS) = 30.15

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 15.51  
 FLOW VELOCITY(FEET/SEC.) = 6.44 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.83  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
 MAINLINE Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 1.20 0.30 0.500 56  
 COMMERCIAL B 0.10 0.30 0.100 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
 COMMERCIAL B 0.10 0.30 0.100 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450  
 SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 2.88  
 EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 33.03

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

-----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 18.35  
 RAINFALL INTENSITY(INCH/HR) = 2.13  
 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.39  
EFFECTIVE STREAM AREA (ACRES) = 18.20  
TOTAL STREAM AREA (ACRES) = 18.20  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 33.03

\*\*\*\*\*  
FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----

INITIAL SUBAREA FLOW-LENGTH (FEET) = 268.00  
ELEVATION DATA: UPSTREAM (FEET) = 514.00 DOWNSTREAM (FEET) = 511.50

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.724  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.901

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	B	2.30	0.30	0.500	56	9.27
APARTMENTS	B	0.40	0.30	0.200	56	7.72

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456

SUBAREA RUNOFF (CFS) = 9.15

TOTAL AREA (ACRES) = 2.70 PEAK FLOW RATE (CFS) = 9.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 511.50 DOWNSTREAM ELEVATION (FEET) = 503.00  
STREET LENGTH (FEET) = 503.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.93  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.45  
HALFSTREET FLOOD WIDTH (FEET) = 16.29  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.69  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.67  
STREET FLOW TRAVEL TIME (MIN.) = 2.27 Tc (MIN.) = 9.99  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.145

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.20	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.475  
SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 19.46  
EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.14  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47  
TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 26.77

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.50 HALFSTREET FLOOD WIDTH (FEET) = 18.79  
FLOW VELOCITY (FEET/SEC.) = 4.00 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.99  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 771.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc (MIN.) = 9.99

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.145

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.281

SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 3.58

EFFECTIVE AREA (ACRES) = 11.20 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45

TOTAL AREA (ACRES) = 11.2 PEAK FLOW RATE (CFS) = 30.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 503.00 DOWNSTREAM ELEVATION (FEET) = 476.00  
STREET LENGTH (FEET) = 423.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.89  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.44  
HALFSTREET FLOOD WIDTH(FEET) = 15.35  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.94  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.03  
STREET FLOW TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 11.01  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.995

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 1.00 0.30 0.500 56  
COMMERCIAL B 0.10 0.30 0.100 56  
CONDOMINIUMS B 0.10 0.30 0.350 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.454  
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 3.09  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 31.92

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 15.35  
FLOW VELOCITY(FEET/SEC.) = 6.94 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.03  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 11.01  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.995  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.50 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
COMMERCIAL B 0.30 0.30 0.100 56  
CONDOMINIUMS B 3.30 0.30 0.350 56  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.332  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 12.77  
EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 44.69

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 11.01  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.995  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 3.40 0.30 0.100 56  
CONDOMINIUMS B 8.10 0.30 0.350 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.276  
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 30.14  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 74.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

-----  
UPSTREAM ELEVATION(FEET) = 476.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
STREET LENGTH(FEET) = 789.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 74.82  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.65  
HALFSTREET FLOOD WIDTH(FEET) = 27.23  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.49  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.56  
STREET FLOW TRAVEL TIME(MIN.) = 2.39 Tc(MIN.) = 13.40  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.642  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 74.82  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.65 HALFSTREET FLOOD WIDTH(FEET) = 27.23  
FLOW VELOCITY(FEET/SEC.) = 5.49 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.56  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1983.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.40  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.642  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	8.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.40	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 32.30  
 EFFECTIVE AREA(ACRES) = 43.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
 TOTAL AREA(ACRES) = 43.2 PEAK FLOW RATE(CFS) = 98.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 460.00 DOWNSTREAM ELEVATION(FEET) = 419.00  
STREET LENGTH(FEET) = 529.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 102.25  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.58  
 HALFSTREET FLOOD WIDTH(FEET) = 23.63  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.87  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 5.77  
 STREET FLOW TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 14.30  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.511  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.80	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 8.50  
 EFFECTIVE AREA(ACRES) = 47.20 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 47.2 PEAK FLOW RATE(CFS) = 101.39

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 23.55  
FLOW VELOCITY(FEET/SEC.) = 9.85 DEPTH\*VELOCITY(FT\*FT/SEC.) = 5.74  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 2512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.30  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.511  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.70	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 11.90  
 EFFECTIVE AREA(ACRES) = 52.80 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
 TOTAL AREA(ACRES) = 52.8 PEAK FLOW RATE(CFS) = 113.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.30  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.511  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.90	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.50	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 15.94  
 EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 129.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 419.00 DOWNSTREAM ELEVATION(FEET) = 405.00  
STREET LENGTH(FEET) = 174.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 129.23  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.62  
HALFSTREET FLOOD WIDTH(FEET) = 25.74  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.57  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.58  
STREET FLOW TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 14.57  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.471  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 129.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 25.74  
FLOW VELOCITY(FEET/SEC.) = 10.57 DEPTH\*VELOCITY(FT\*FT/SEC.) = 6.58  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 2686.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 372.00  
FLOW LENGTH(FEET) = 395.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.60  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 129.23  
PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 14.81  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 3081.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.81  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.436  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500					
SUBAREA AREA(ACRES) = 2.20		SUBAREA RUNOFF(CFS) = 4.53			
EFFECTIVE AREA(ACRES) = 62.50		AREA-AVERAGED Fm(INCH/HR) = 0.13			
AREA-AVERAGED Fp(INCH/HR) = 0.30		AREA-AVERAGED Ap = 0.44			
TOTAL AREA(ACRES) = 62.5		PEAK FLOW RATE(CFS) = 129.66			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.81  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.436  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 3.50 0.30 0.500 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 6.90 0.30 0.500 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 21.81  
EFFECTIVE AREA(ACRES) = 73.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 73.1 PEAK FLOW RATE(CFS) = 151.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 343.00  
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.30  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 151.47  
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 15.25  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 3688.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.25



\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.388  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.443  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.42  
 EFFECTIVE AREA (ACRES) = 73.80 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 73.8 PEAK FLOW RATE (CFS) = 151.47  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
 -----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 15.25  
 RAINFALL INTENSITY (INCH/HR) = 2.39  
 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.44  
 EFFECTIVE STREAM AREA (ACRES) = 73.80  
 TOTAL STREAM AREA (ACRES) = 73.80  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 151.47

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	33.03	18.35	2.132	0.30 ( 0.12)	0.39	18.2	200.00
2	151.47	15.25	2.388	0.30 ( 0.13)	0.44	73.8	210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	182.39	15.25	2.388	0.30 ( 0.13)	0.43	88.9	210.00
2	167.32	18.35	2.132	0.30 ( 0.13)	0.43	92.0	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 182.39 Tc (MIN.) = 15.25  
 EFFECTIVE AREA (ACRES) = 88.92 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA (ACRES) = 92.0  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 343.00 DOWNSTREAM (FEET) = 326.50  
 FLOW LENGTH (FEET) = 734.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 35.4 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 18.38  
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 182.39  
 PIPE TRAVEL TIME (MIN.) = 0.67 Tc (MIN.) = 15.91  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 219.00 = 4736.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 15.91  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.333  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56  
 COMMERCIAL  
 B 0.60 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.70 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.90 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 5.66  
 EFFECTIVE AREA (ACRES) = 91.82 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 94.9 PEAK FLOW RATE (CFS) = 182.39  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 15.91  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.333  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL  
 B 0.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 1.19  
 EFFECTIVE AREA (ACRES) = 92.42 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA (ACRES) = 95.5 PEAK FLOW RATE (CFS) = 183.12

\*\*\*\*\*

FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 326.50 DOWNSTREAM (FEET) = 325.00  
FLOW LENGTH (FEET) = 161.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.5 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.24  
ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 183.12  
PIPE TRAVEL TIME (MIN.) = 0.20 Tc (MIN.) = 16.11  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 220.00 = 4897.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.11  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.316  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.90	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.60	0.30	0.400	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	18.40	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	4.30	0.30	0.400	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.50	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	6.90	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462  
SUBAREA AREA (ACRES) = 38.60 SUBAREA RUNOFF (CFS) = 75.66  
EFFECTIVE AREA (ACRES) = 131.02 AREA-AVERAGED Fm (INCH/HR) = 0.13  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA (ACRES) = 134.1 PEAK FLOW RATE (CFS) = 257.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 245.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 325.00 DOWNSTREAM (FEET) = 315.00  
FLOW LENGTH (FEET) = 1019.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 14.62  
ESTIMATED PIPE DIAMETER (INCH) = 63.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 257.39  
PIPE TRAVEL TIME (MIN.) = 1.16 Tc (MIN.) = 17.28  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.28  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.221  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.30	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.00	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379  
SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 5.50  
EFFECTIVE AREA (ACRES) = 133.92 AREA-AVERAGED Fm (INCH/HR) = 0.13  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA (ACRES) = 137.0 PEAK FLOW RATE (CFS) = 257.39  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.28  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.221  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.264  
SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.12  
EFFECTIVE AREA (ACRES) = 135.02 AREA-AVERAGED Fm (INCH/HR) = 0.13  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA (ACRES) = 138.1 PEAK FLOW RATE (CFS) = 257.39  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.28  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.221  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.40	0.30	0.400	56

  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.434  
 SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 6.02  
 EFFECTIVE AREA(ACRES) = 138.22 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA(ACRES) = 141.3 PEAK FLOW RATE(CFS) = 259.74

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 10

-----  
 >>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<  
 =====

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 220.50 TO NODE 221.00 IS CODE = 21

-----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 251.00  
 ELEVATION DATA: UPSTREAM(FEET) = 551.00 DOWNSTREAM(FEET) = 547.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.785  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.215  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"1 DWELLING/ACRE"	B	3.10	0.30	0.800	56	9.79
RESIDENTIAL						
"1 DWELLING/ACRE"	B	3.10	0.30	0.800	56	9.79

  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA RUNOFF(CFS) = 16.60  
 TOTAL AREA(ACRES) = 6.20 PEAK FLOW RATE(CFS) = 16.60

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 542.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0130  
 CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.006  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56

  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.163  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.85  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.61  
 AVERAGE FLOW DEPTH(FEET) = 0.38 TRAVEL TIME(MIN.) = 1.15  
 Tc(MIN.) = 10.93  
 SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 12.51  
 EFFECTIVE AREA(ACRES) = 10.90 AREA-AVERAGED Fm(INCH/HR) = 0.16  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA(ACRES) = 10.9 PEAK FLOW RATE(CFS) = 27.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.43 FLOW VELOCITY(FEET/SEC.) = 5.98  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 222.00 = 637.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62

-----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 542.00 DOWNSTREAM ELEVATION(FEET) = 531.00  
 STREET LENGTH(FEET) = 1146.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018  
  
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.78  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.63  
 HALFSTREET FLOOD WIDTH(FEET) = 25.98  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.68  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.31  
 STREET FLOW TRAVEL TIME(MIN.) = 5.19 Tc(MIN.) = 16.12  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.316

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					

"11+ DWELLINGS/ACRE" B 11.50 0.30 0.200 56  
 APARTMENTS B 2.90 0.30 0.200 56  
 COMMERCIAL B 0.70 0.30 0.100 56  
 PUBLIC PARK B 2.60 0.30 0.850 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.292  
 SUBAREA AREA(ACRES) = 17.70 SUBAREA RUNOFF(CFS) = 35.49  
 EFFECTIVE AREA(ACRES) = 28.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 28.6 PEAK FLOW RATE(CFS) = 56.66

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.67 HALFSTREET FLOOD WIDTH(FEET) = 28.26  
 FLOW VELOCITY(FEET/SEC.) = 3.87 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.58  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 223.00 = 1783.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 531.00 DOWNSTREAM ELEVATION(FEET) = 520.00  
 STREET LENGTH(FEET) = 702.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 67.82  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.65  
 HALFSTREET FLOOD WIDTH(FEET) = 27.54  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.87  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.19  
 STREET FLOW TRAVEL TIME(MIN.) = 2.40 Tc(MIN.) = 18.53  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.118  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.40	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
CONDOMINIUMS	B	0.70	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175  
 SUBAREA AREA(ACRES) = 12.00 SUBAREA RUNOFF(CFS) = 22.30  
 EFFECTIVE AREA(ACRES) = 40.60 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32

TOTAL AREA(ACRES) = 40.6 PEAK FLOW RATE(CFS) = 73.87

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.67 HALFSTREET FLOOD WIDTH(FEET) = 28.70  
 FLOW VELOCITY(FEET/SEC.) = 4.97 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.33  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 224.00 = 2485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 463.00  
 FLOW LENGTH(FEET) = 1760.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.96  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 73.87  
 PIPE TRAVEL TIME(MIN.) = 1.73 Tc(MIN.) = 20.26  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 225.00 = 4245.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.26  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.983  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.20	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	0.30	0.30	0.350	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	2.00	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.235  
 SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 19.79  
 EFFECTIVE AREA(ACRES) = 52.10 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 52.1 PEAK FLOW RATE(CFS) = 88.75

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.26  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.983  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.20	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	0.30	0.30	0.350	56

```

LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      6.40    0.30     0.500    56
CONDOMINIUMS          B      0.90    0.30     0.350    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      5.20    0.30     0.500    56
CONDOMINIUMS          B      0.80    0.30     0.350    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.481
SUBAREA AREA(ACRES) = 13.30    SUBAREA RUNOFF(CFS) = 22.01
EFFECTIVE AREA(ACRES) = 65.40    AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 65.4    PEAK FLOW RATE(CFS) = 110.76

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*****
FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 31
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```
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 425.00
FLOW LENGTH(FEET) = 639.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.33
ESTIMATED PIPE DIAMETER(INCH) = 33.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 110.76
PIPE TRAVEL TIME(MIN.) = 0.46    Tc(MIN.) = 20.71
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 226.00 = 4884.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 226.00 TO NODE 226.00 IS CODE = 81
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```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
MAINLINE Tc(MIN.) = 20.71
```

```
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.960
```

```
SUBAREA LOSS RATE DATA(AMC II):
```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.90	0.30	0.500	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.30	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.00	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 30.23  
EFFECTIVE AREA(ACRES) = 83.50 AREA-AVERAGED Fm(INCH/HR) = 0.10  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34  
TOTAL AREA(ACRES) = 83.5 PEAK FLOW RATE(CFS) = 139.62

```

*****
FLOW PROCESS FROM NODE 226.00 TO NODE 243.00 IS CODE = 31
-----

```

```
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 653.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 26.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.95
ESTIMATED PIPE DIAMETER(INCH) = 39.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 139.62
PIPE TRAVEL TIME(MIN.) = 0.47    Tc(MIN.) = 21.19
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 243.00 = 5537.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81
-----

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```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
MAINLINE Tc(MIN.) = 21.19
```

```
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.936
```

```
SUBAREA LOSS RATE DATA(AMC II):
```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.60	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 7.47  
EFFECTIVE AREA(ACRES) = 88.00 AREA-AVERAGED Fm(INCH/HR) = 0.10  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34  
TOTAL AREA(ACRES) = 88.0 PEAK FLOW RATE(CFS) = 145.28

```

*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1
-----

```

```
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
TOTAL NUMBER OF STREAMS = 2
```

```
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
```

TIME OF CONCENTRATION(MIN.) = 21.19  
RAINFALL INTENSITY(INCH/HR) = 1.94  
AREA-AVERAGED Fm(INCH/HR) = 0.10  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.34  
EFFECTIVE STREAM AREA(ACRES) = 88.00  
TOTAL STREAM AREA(ACRES) = 88.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 145.28

```

*****
FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21
-----

```

```
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 547.50

```

```
Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.751  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.559  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 APARTMENTS B 0.60 0.30 0.200 56 8.75  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 1.89  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.89

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 547.50 DOWNSTREAM(FEET) = 541.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 802.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 3.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.946  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 APARTMENTS B 0.20 0.30 0.200 56  
 COMMERCIAL B 5.90 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.93  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.16  
 AVERAGE FLOW DEPTH(FEET) = 0.98 TRAVEL TIME(MIN.) = 2.59  
 Tc(MIN.) = 11.34  
 SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 16.00  
 EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 17.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.22 FLOW VELOCITY(FEET/SEC.) = 5.94  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1132.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 541.00 DOWNSTREAM(FEET) = 533.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 849.00 CHANNEL SLOPE = 0.0094  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.667  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 14.90 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 35.26  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.47  
 AVERAGE FLOW DEPTH(FEET) = 1.54 TRAVEL TIME(MIN.) = 1.89  
 Tc(MIN.) = 13.24  
 SUBAREA AREA(ACRES) = 14.90 SUBAREA RUNOFF(CFS) = 35.36  
 EFFECTIVE AREA(ACRES) = 21.60 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 21.6 PEAK FLOW RATE(CFS) = 51.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.77 FLOW VELOCITY(FEET/SEC.) = 8.22  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1981.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.24  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.667  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 APARTMENTS B 0.20 0.30 0.200 56  
 COMMERCIAL B 1.80 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124  
 SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 4.97  
 EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 56.21

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.24  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.667  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.40 0.30 0.100 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 COMMERCIAL B 1.30 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.117  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.26  
 EFFECTIVE AREA(ACRES) = 25.50 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 25.5 PEAK FLOW RATE(CFS) = 60.48

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31

```

=====
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 537.00 DOWNSTREAM(FEET) = 510.00
FLOW LENGTH(FEET) = 513.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.18
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 60.48
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 13.68
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2494.00 FEET.

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.68
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.601
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE           GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B          9.40    0.30    0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 20.99
EFFECTIVE AREA(ACRES) = 34.90 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 34.9 PEAK FLOW RATE(CFS) = 79.97

```

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.68
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.601
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE           GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B          0.70    0.30    0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B          2.50    0.30    0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 7.18
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 87.15

```

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31

```

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 478.00
FLOW LENGTH(FEET) = 474.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.17
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 87.15
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 14.02
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 2968.00 FEET.

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FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.02
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.551
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE           GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B          1.70    0.30    0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B          1.60    0.30    0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 7.31
EFFECTIVE AREA(ACRES) = 41.40 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21
TOTAL AREA(ACRES) = 41.4 PEAK FLOW RATE(CFS) = 92.74

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*****
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 478.00 DOWNSTREAM(FEET) = 471.00
FLOW LENGTH(FEET) = 473.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.09
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 92.74
PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 14.63
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 3441.00 FEET.

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*****
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.63
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.463
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE           GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B          1.40    0.30    0.200    56

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RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 7.10 0.30 0.400 56  
 APARTMENTS B 2.70 0.30 0.200 56  
 COMMERCIAL B 1.10 0.30 0.100 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.307  
 SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 26.25  
 EFFECTIVE AREA(ACRES) = 53.70 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA(ACRES) = 53.7 PEAK FLOW RATE(CFS) = 115.69

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.63  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.463  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.90 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 5.40 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
 COMMERCIAL B 0.60 0.30 0.100 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.378  
 SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 20.93  
 EFFECTIVE AREA(ACRES) = 63.60 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 63.6 PEAK FLOW RATE(CFS) = 136.62

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 471.00 DOWNSTREAM(FEET) = 468.00  
 FLOW LENGTH(FEET) = 283.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.72  
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 136.62  
 PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 15.00  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 237.00 = 3724.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.408  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 6.10 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.60 0.30 0.400 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.218  
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 14.13  
 EFFECTIVE AREA(ACRES) = 70.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 70.3 PEAK FLOW RATE(CFS) = 147.63

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 468.00 DOWNSTREAM(FEET) = 461.00  
 FLOW LENGTH(FEET) = 698.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.83  
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 147.63  
 PIPE TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 15.90  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 238.00 = 4422.00 FEET.

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 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.90  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.333  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 8.40 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.220  
 SUBAREA AREA(ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 18.37  
 EFFECTIVE AREA(ACRES) = 79.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 79.3 PEAK FLOW RATE(CFS) = 161.26

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.90  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.333  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS



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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      2.10      0.30      0.200      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 2.10      SUBAREA RUNOFF (CFS) = 4.30
EFFECTIVE AREA (ACRES) = 81.40      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.25
TOTAL AREA (ACRES) = 81.4      PEAK FLOW RATE (CFS) = 165.56

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FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 461.00 DOWNSTREAM(FEET) = 440.00
FLOW LENGTH(FEET) = 582.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 21.36
ESTIMATED PIPE DIAMETER (INCH) = 42.00      NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 165.56
PIPE TRAVEL TIME (MIN.) = 0.45      Tc (MIN.) = 16.36
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 5004.00 FEET.

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FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.36
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.296
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      5.00      0.30      0.200      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 5.00      SUBAREA RUNOFF (CFS) = 10.06
EFFECTIVE AREA (ACRES) = 86.40      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 86.4      PEAK FLOW RATE (CFS) = 172.88

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FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 418.00
FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 20.80
ESTIMATED PIPE DIAMETER (INCH) = 42.00      NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 172.88
PIPE TRAVEL TIME (MIN.) = 0.52      Tc (MIN.) = 16.88
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 5654.00 FEET.

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*****
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.88
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.253
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      5.30      0.30      0.200      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 5.30      SUBAREA RUNOFF (CFS) = 10.46
EFFECTIVE AREA (ACRES) = 91.70      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 91.7      PEAK FLOW RATE (CFS) = 180.01

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FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.88
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.253
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      1.20      0.30      0.200      56
COMMERCIAL              B      0.20      0.30      0.100      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186
SUBAREA AREA (ACRES) = 1.40      SUBAREA RUNOFF (CFS) = 2.77
EFFECTIVE AREA (ACRES) = 93.10      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 93.1      PEAK FLOW RATE (CFS) = 182.78

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*****
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.88
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.253
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      1.20      0.30      0.200      56
SCHOOL                  B      0.70      0.30      0.600      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA (ACRES) = 1.90      SUBAREA RUNOFF (CFS) = 3.67
EFFECTIVE AREA (ACRES) = 95.00      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24

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TOTAL AREA (ACRES) = 95.0 PEAK FLOW RATE (CFS) = 186.45

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FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 418.00 DOWNSTREAM(FEET) = 404.00
FLOW LENGTH(FEET) = 1279.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 42.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.97
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 186.45
PIPE TRAVEL TIME(MIN.) = 1.53 Tc(MIN.) = 18.41
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 241.00 = 6933.00 FEET.

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FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.41
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.127
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.10 0.30 0.200 56
COMMERCIAL B 1.20 0.30 0.100 56
PUBLIC PARK B 6.30 0.30 0.850 56
SCHOOL B 4.60 0.30 0.600 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.60 0.30 0.200 56
COMMERCIAL B 4.00 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 18.80 SUBAREA RUNOFF(CFS) = 33.52
EFFECTIVE AREA(ACRES) = 113.80 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 113.8 PEAK FLOW RATE(CFS) = 209.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.41
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.127
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK B 3.90 0.30 0.850 56
SCHOOL B 10.80 0.30 0.600 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.666
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 25.50
EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 234.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 403.00
FLOW LENGTH(FEET) = 66.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.90
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 234.72
PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 18.47
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 6999.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.47
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.122
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.40 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 16.40 0.30 0.200 56
COMMERCIAL B 1.30 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.193
SUBAREA AREA(ACRES) = 19.10 SUBAREA RUNOFF(CFS) = 35.48
EFFECTIVE AREA(ACRES) = 147.60 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 147.6 PEAK FLOW RATE(CFS) = 269.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 1270.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 50.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.14
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 269.58
PIPE TRAVEL TIME(MIN.) = 1.61 Tc(MIN.) = 20.08
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 20.08  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.992  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.00	0.30	0.200	56
PUBLIC PARK	B	2.00	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.80	0.30	0.200	56
COMMERCIAL	B	1.50	0.30	0.100	56
CONDOMINIUMS	B	0.10	0.30	0.350	56
PUBLIC PARK	B	1.10	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.421  
 SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 14.27  
 EFFECTIVE AREA(ACRES) = 156.10 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32  
 TOTAL AREA(ACRES) = 156.1 PEAK FLOW RATE(CFS) = 269.58  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

-----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 20.08  
 RAINFALL INTENSITY(INCH/HR) = 1.99  
 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.32  
 EFFECTIVE STREAM AREA(ACRES) = 156.10  
 TOTAL STREAM AREA(ACRES) = 156.10  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 269.58

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	145.28	21.19	1.936	0.30( 0.10)	0.34	88.0	220.50
2	269.58	20.08	1.992	0.30( 0.09)	0.32	156.1	230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	411.49	20.08	1.992	0.30( 0.10)	0.32	239.5	230.00
2	406.88	21.19	1.936	0.30( 0.10)	0.32	244.1	220.50

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 411.49 Tc(MIN.) = 20.08  
 EFFECTIVE AREA(ACRES) = 239.51 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32  
 TOTAL AREA(ACRES) = 244.1  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 244.00 IS CODE = 31

-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 394.00 DOWNSTREAM(FEET) = 340.00  
 FLOW LENGTH(FEET) = 849.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 33.35  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 411.49  
 PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 20.50  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 244.00 = 9118.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 244.00 TO NODE 244.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN.) = 20.50  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.970  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.70	0.30	0.500	56
PUBLIC PARK	B	0.30	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
PUBLIC PARK	B	0.10	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.537  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 4.89  
 EFFECTIVE AREA(ACRES) = 242.51 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33  
 TOTAL AREA(ACRES) = 247.1 PEAK FLOW RATE(CFS) = 411.49  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 244.00 TO NODE 245.00 IS CODE = 31

-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 315.00  
 FLOW LENGTH(FEET) = 777.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 60.0 INCH PIPE IS 45.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 25.63  
 ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 411.49  
 PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 21.01

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.01

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.945

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56

PUBLIC PARK B 0.20 0.30 0.850 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56

PUBLIC PARK B 0.10 0.30 0.850 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631

SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 1.26

EFFECTIVE AREA(ACRES) = 243.31 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33

TOTAL AREA(ACRES) = 247.9 PEAK FLOW RATE(CFS) = 411.49

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	411.49	21.01	1.945	0.30( 0.10)	0.33	243.3	230.00
2	406.88	22.12	1.888	0.30( 0.10)	0.33	247.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	259.74	17.28	2.221	0.30( 0.13)	0.44	138.2	210.00
2	234.15	20.44	1.973	0.30( 0.13)	0.44	141.3	200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	648.62	17.28	2.221	0.30( 0.11)	0.37	338.3	210.00
2	640.79	20.44	1.973	0.30( 0.11)	0.37	378.1	200.00
3	641.99	21.01	1.945	0.30( 0.11)	0.37	384.6	230.00
4	630.22	22.12	1.888	0.30( 0.11)	0.37	389.2	220.50

TOTAL AREA(ACRES) = 389.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 648.62 Tc(MIN.) = 17.275

EFFECTIVE AREA(ACRES) = 338.28 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 389.2

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 3 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 246.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 306.00

FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 81.0 INCH PIPE IS 64.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.12

ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 648.62

PIPE TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 17.76

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 246.00 = 10514.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.76

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.180

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.90 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.50 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56

CONDOMINIUMS B 9.10 0.30 0.350 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.80 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.410

SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 30.18

EFFECTIVE AREA(ACRES) = 354.58 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38

TOTAL AREA(ACRES) = 405.5 PEAK FLOW RATE(CFS) = 659.82

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.76  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.180  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.60	0.30	0.400	56
CONDOMINIUMS	B	7.40	0.30	0.350	56
PUBLIC PARK	B	0.30	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.375  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 17.31  
 EFFECTIVE AREA(ACRES) = 363.88 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 414.8 PEAK FLOW RATE(CFS) = 677.13

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 246.00 TO NODE 247.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----

ELEVATION DATA: UPSTREAM(FEET) = 306.00 DOWNSTREAM(FEET) = 300.00  
 FLOW LENGTH(FEET) = 185.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 55.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 29.08  
 ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 677.13  
 PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 17.87  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 247.00 = 10699.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----

MAINLINE Tc(MIN.) = 17.87  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.172  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.30	0.30	0.400	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.413  
 SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 3.69  
 EFFECTIVE AREA(ACRES) = 365.88 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 416.8 PEAK FLOW RATE(CFS) = 677.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----

MAINLINE Tc(MIN.) = 17.87  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.172  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.40	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.80	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.365  
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 4.82  
 EFFECTIVE AREA(ACRES) = 368.48 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 419.4 PEAK FLOW RATE(CFS) = 682.78

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 248.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 271.00  
 FLOW LENGTH(FEET) = 859.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 29.64  
 ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 682.78  
 PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 18.35  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----

MAINLINE Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.60	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.60	0.30	0.400	56
COMMERCIAL	B	1.00	0.30	0.100	56

NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356  
 SUBAREA AREA(ACRES) = 4.80 SUBAREA RUNOFF(CFS) = 8.75  
 EFFECTIVE AREA(ACRES) = 373.28 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 424.2 PEAK FLOW RATE(CFS) = 682.78  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.50	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367					
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.64					
EFFECTIVE AREA(ACRES) = 374.18 AREA-AVERAGED Fm(INCH/HR) = 0.11					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38					
TOTAL AREA(ACRES) = 425.1 PEAK FLOW RATE(CFS) = 682.78					
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE					

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.70	0.30	0.400	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.20	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.80	0.30	0.400	56
CONDOMINIUMS	B	0.20	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	3.20	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.466					
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 14.70					
EFFECTIVE AREA(ACRES) = 382.38 AREA-AVERAGED Fm(INCH/HR) = 0.11					

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 433.3 PEAK FLOW RATE(CFS) = 694.67

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	5.70	0.30	0.400	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400					
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 10.32					
EFFECTIVE AREA(ACRES) = 388.08 AREA-AVERAGED Fm(INCH/HR) = 0.11					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38					
TOTAL AREA(ACRES) = 439.0 PEAK FLOW RATE(CFS) = 704.99					

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	6.40	0.30	1.000	66
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.40	0.30	1.000	66
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.60	0.30	1.000	66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 8.40 SUBAREA RUNOFF(CFS) = 13.85					
EFFECTIVE AREA(ACRES) = 396.48 AREA-AVERAGED Fm(INCH/HR) = 0.12					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39					
TOTAL AREA(ACRES) = 447.4 PEAK FLOW RATE(CFS) = 718.84					

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====  
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00

ELEVATION DATA: UPSTREAM(FEET) = 413.04 DOWNSTREAM(FEET) = 405.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.928

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.166

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
CONDOMINIUMS RESIDENTIAL	B	0.20	0.30	0.350	56	7.70
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56	6.93
CONDOMINIUMS	B	0.10	0.30	0.350	56	7.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.312

SUBAREA RUNOFF(CFS) = 1.47

TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 405.00 DOWNSTREAM ELEVATION(FEET) = 385.00

STREET LENGTH(FEET) = 587.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.40

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.30

HALFSTREET FLOOD WIDTH(FEET) = 7.78

AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.68

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.11

STREET FLOW TRAVEL TIME(MIN.) = 2.66 Tc(MIN.) = 9.59

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.281

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.20	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.224

SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 7.81

EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.07

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24

TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 8.96

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 10.04

FLOW VELOCITY(FEET/SEC.) = 4.09 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.40

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 917.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 385.00 DOWNSTREAM(FEET) = 378.50

FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.99

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 8.96

PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 9.83

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1079.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.83

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.199

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56
COMMERCIAL	B	1.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 6.84

EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.05

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18

TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 15.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 378.50 DOWNSTREAM(FEET) = 348.50

FLOW LENGTH(FEET) = 637.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 13.32

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 15.57

PIPE TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 10.63

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 1716.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.63

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.050

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.60	0.30	0.500	56
COMMERCIAL	B	1.70	0.30	0.100	56
CONDOMINIUMS	B	1.00	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
COMMERCIAL	B	0.70	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.240					
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 12.06					
EFFECTIVE AREA(ACRES) = 10.00 AREA-AVERAGED Fm(INCH/HR) = 0.06					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21					
TOTAL AREA(ACRES) = 10.0 PEAK FLOW RATE(CFS) = 26.90					

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 348.50 DOWNSTREAM(FEET) = 306.00  
 FLOW LENGTH(FEET) = 944.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.87  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 26.90  
 PIPE TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 11.69  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.69

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.895

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.20	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.50	0.30	0.500	56
RESIDENTIAL					

"8-10 DWELLINGS/ACRE" B 1.90 0.30 0.400 56  
 COMMERCIAL B 2.00 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
 SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 18.33  
 EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.27  
 TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 43.83

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.69

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.895

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	4.40	0.30	0.200	56
COMMERCIAL	B	0.10	0.30	0.100	56
APARTMENTS	B	6.70	0.30	0.200	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.199					
SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 28.58					
EFFECTIVE AREA(ACRES) = 28.50 AREA-AVERAGED Fm(INCH/HR) = 0.07					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24					
TOTAL AREA(ACRES) = 28.5 PEAK FLOW RATE(CFS) = 72.41					

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.69

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.895

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.10	0.30	1.000	66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 7.24					
EFFECTIVE AREA(ACRES) = 31.60 AREA-AVERAGED Fm(INCH/HR) = 0.09					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31					
TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 79.65					

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 11.69  
 RAINFALL INTENSITY(INCH/HR) = 2.89  
 AREA-AVERAGED Fm(INCH/HR) = 0.09



AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.31  
 EFFECTIVE STREAM AREA (ACRES) = 31.60  
 TOTAL STREAM AREA (ACRES) = 31.60  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 79.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 400.00 TO NODE 420.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 300.40  
 ELEVATION DATA: UPSTREAM (FEET) = 312.80 DOWNSTREAM (FEET) = 310.80

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.115  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.771  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.50	0.30	0.100	56	8.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 1.68  
 TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 1.68

\*\*\*\*\*

FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<

UPSTREAM ELEVATION (FEET) = 310.80 DOWNSTREAM ELEVATION (FEET) = 307.00  
 STREET LENGTH (FEET) = 266.50 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 67.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 62.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.54  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.33  
 HALFSTREET FLOOD WIDTH (FEET) = 9.75  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.53  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.83  
 STREET FLOW TRAVEL TIME (MIN.) = 1.76 Tc (MIN.) = 9.87  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.185

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.60	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 1.70  
 EFFECTIVE AREA (ACRES) = 1.10 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 3.12

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.35 HALFSTREET FLOOD WIDTH (FEET) = 10.78  
 FLOW VELOCITY (FEET/SEC.) = 2.64 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.92  
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.00 = 566.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 307.00 DOWNSTREAM (FEET) = 305.50  
 FLOW LENGTH (FEET) = 105.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.68  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 3.12  
 PIPE TRAVEL TIME (MIN.) = 0.31 Tc (MIN.) = 10.18  
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.10 = 671.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 10.18  
 RAINFALL INTENSITY (INCH/HR) = 3.12  
 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.10  
 EFFECTIVE STREAM AREA (ACRES) = 1.10  
 TOTAL STREAM AREA (ACRES) = 1.10  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 3.12

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	79.65	11.69	2.895	0.30 ( 0.09)	0.31	31.6	300.00
2	3.12	10.18	3.116	0.30 ( 0.03)	0.10	1.1	400.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	77.99	10.18	3.116	0.30 ( 0.09)	0.31	28.6	400.00

2 82.55 11.69 2.895 0.30( 0.09) 0.31 32.7 300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 82.55 Tc(MIN.) = 11.69
EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.7
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 426.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 305.50 DOWNSTREAM(FEET) = 301.00
FLOW LENGTH(FEET) = 261.40 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 29.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.39
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 82.55
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 12.01
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.10 = 2921.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.01
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.847
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.49
EFFECTIVE AREA(ACRES) = 32.90 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.9 PEAK FLOW RATE(CFS) = 82.55
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.20 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 289.00
FLOW LENGTH(FEET) = 448.56 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.26
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 82.55
PIPE TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 12.47
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.20 = 3369.96 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.20 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.47
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.779
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.20
EFFECTIVE AREA(ACRES) = 33.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 33.4 PEAK FLOW RATE(CFS) = 82.55
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.30 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 289.00 DOWNSTREAM(FEET) = 282.00
FLOW LENGTH(FEET) = 260.45 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.29
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 82.55
PIPE TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 12.74
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.30 = 3630.41 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.30 TO NODE 426.30 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.74
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.740
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.80 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 2.59
EFFECTIVE AREA(ACRES) = 34.50 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 34.5 PEAK FLOW RATE(CFS) = 82.55

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 426.30 TO NODE 248.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 271.00
FLOW LENGTH(FEET) = 411.44 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.25
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 82.55
PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 13.16
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.
*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.16
RAINFALL INTENSITY(INCH/HR) = 2.68
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 34.50
TOTAL STREAM AREA(ACRES) = 34.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 82.55
*****
FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----
INITIAL SUBAREA FLOW-LENGTH(FEET) = 233.60
ELEVATION DATA: UPSTREAM(FEET) = 306.50 DOWNSTREAM(FEET) = 301.80

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.882
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.514
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.20 0.30 0.100 56 5.88
COMMERCIAL B 0.20 0.30 0.100 56 5.88
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 1.61
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.61
*****
FLOW PROCESS FROM NODE 426.00 TO NODE 427.00 IS CODE = 61
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 301.80 DOWNSTREAM ELEVATION(FEET) = 294.00
STREET LENGTH(FEET) = 478.70 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.73
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.33
HALFSTREET FLOOD WIDTH(FEET) = 9.73
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.73
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.90
STREET FLOW TRAVEL TIME(MIN.) = 2.93 Tc(MIN.) = 8.81
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.539
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.20 0.30 0.100 56
COMMERCIAL B 0.50 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 2.21
EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 3.47

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.93
FLOW VELOCITY(FEET/SEC.) = 2.87 DEPTH*VELOCITY(FT*FT/SEC.) = 1.00
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 427.00 = 712.30 FEET.
*****
FLOW PROCESS FROM NODE 427.00 TO NODE 428.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 294.00 DOWNSTREAM ELEVATION(FEET) = 286.00
STREET LENGTH(FEET) = 300.80 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

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Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.17  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 10.64  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.60  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.24

STREET FLOW TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 10.20

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.113

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.39

EFFECTIVE AREA(ACRES) = 1.60 AREA-AVERAGED Fm(INCH/HR) = 0.03

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 4.44

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.96

FLOW VELOCITY(FEET/SEC.) = 3.65 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.28

LONGEST FLOWPATH FROM NODE 425.00 TO NODE 428.00 = 1013.10 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 428.00 TO NODE 429.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 286.00 DOWNSTREAM ELEVATION(FEET) = 276.00

STREET LENGTH(FEET) = 242.40 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.97

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.34

HALFSTREET FLOOD WIDTH(FEET) = 10.42

AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.44

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.52

STREET FLOW TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 11.11

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.980

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.06

EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.03

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 5.31

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.75

FLOW VELOCITY(FEET/SEC.) = 4.51 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.56

LONGEST FLOWPATH FROM NODE 425.00 TO NODE 429.00 = 1255.50 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 429.00 TO NODE 429.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.11

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.980

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL	B	0.50	0.30	0.400	56

"8-10 DWELLINGS/ACRE"

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 1.50 0.30 0.400 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 5.15

EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.08

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25

TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 10.46

\*\*\*\*\*

FLOW PROCESS FROM NODE 429.00 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 273.00

FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.23

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 10.46

PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 11.27

LONGEST FLOWPATH FROM NODE 425.00 TO NODE 248.00 = 1355.50 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 11.27

RAINFALL INTENSITY(INCH/HR) = 2.96  
 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.25  
 EFFECTIVE STREAM AREA(ACRES) = 4.00  
 TOTAL STREAM AREA(ACRES) = 4.00  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 10.46

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	78.44	11.69	2.894	0.30( 0.09)	0.31	30.4	400.00
1	82.55	13.16	2.678	0.30( 0.09)	0.31	34.5	300.00
2	10.46	11.27	2.956	0.30( 0.08)	0.25	4.0	425.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	87.75	11.27	2.956	0.30( 0.09)	0.30	33.3	425.00
2	88.67	11.69	2.894	0.30( 0.09)	0.30	34.4	400.00
3	92.00	13.16	2.678	0.30( 0.09)	0.31	38.5	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 92.00 Tc(MIN.) = 13.16  
 EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 38.5  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	87.75	11.27	2.956	0.30( 0.09)	0.30	33.3	425.00
2	88.67	11.69	2.894	0.30( 0.09)	0.30	34.4	400.00
3	92.00	13.16	2.678	0.30( 0.09)	0.31	38.5	300.00

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	718.84	18.35	2.132	0.30( 0.12)	0.39	396.5	210.00
2	707.92	21.52	1.919	0.30( 0.12)	0.39	436.3	200.00
3	707.21	22.09	1.890	0.30( 0.12)	0.38	442.8	230.00
4	691.92	23.20	1.834	0.30( 0.12)	0.38	447.4	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	709.95	11.27	2.956	0.30( 0.11)	0.38	276.9	425.00
2	720.02	11.69	2.894	0.30( 0.11)	0.38	287.1	400.00
3	747.36	13.16	2.678	0.30( 0.11)	0.38	322.8	300.00
4	791.40	18.35	2.132	0.30( 0.11)	0.38	435.0	210.00
5	772.91	21.52	1.919	0.30( 0.11)	0.38	474.8	200.00
6	771.17	22.09	1.890	0.30( 0.11)	0.38	481.3	230.00
7	753.88	23.20	1.834	0.30( 0.11)	0.38	485.9	220.50

TOTAL AREA(ACRES) = 485.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 791.40 Tc(MIN.) = 18.353  
 EFFECTIVE AREA(ACRES) = 434.98 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 485.9  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 249.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 261.00  
 FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 78.0 INCH PIPE IS 59.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 29.00  
 ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 791.40  
 PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 18.55  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 429.00 TO NODE 430.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 262.70

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.459

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.322

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
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COMMERCIAL B 0.20 0.30 0.100 56 6.46  
COMMERCIAL B 0.40 0.30 0.100 56 6.46  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 2.32  
TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 2.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 262.70 DOWNSTREAM ELEVATION(FEET) = 258.98  
STREET LENGTH(FEET) = 345.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.26

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 11.72  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.39  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.87  
STREET FLOW TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 8.87  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.521

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.89  
EFFECTIVE AREA(ACRES) = 1.20 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 3.77

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.52  
FLOW VELOCITY(FEET/SEC.) = 2.47 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.93  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.00 = 675.60 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.00 TO NODE 431.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 258.98 DOWNSTREAM(FEET) = 258.00

FLOW LENGTH(FEET) = 91.03 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.39  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 3.77  
PIPE TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 9.15  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.10 = 766.63 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 9.15  
RAINFALL INTENSITY(INCH/HR) = 3.43  
AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 1.20  
TOTAL STREAM AREA(ACRES) = 1.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 410.00 TO NODE 440.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 299.70  
ELEVATION DATA: UPSTREAM(FEET) = 312.69 DOWNSTREAM(FEET) = 310.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.196

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.744

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.40	0.30	0.100	56	8.20

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF(CFS) = 1.34

TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.34

\*\*\*\*\*  
FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 306.50  
STREET LENGTH(FEET) = 299.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017  
SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.89  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 8.38  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.38  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.73  
STREET FLOW TRAVEL TIME(MIN.) = 2.09 Tc(MIN.) = 10.29

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.101  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.10 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.11  
EFFECTIVE AREA(ACRES) = 0.80 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 2.21

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 9.03  
FLOW VELOCITY(FEET/SEC.) = 2.49 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.79  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 441.00 = 598.70 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 61  
-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 306.50 DOWNSTREAM ELEVATION(FEET) = 299.00  
STREET LENGTH(FEET) = 341.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.97  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 9.43  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.12  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.01  
STREET FLOW TRAVEL TIME(MIN.) = 1.83 Tc(MIN.) = 12.11

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.833  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.20 0.30 0.100 56  
COMMERCIAL B 0.40 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.51  
EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 3.53

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 10.33  
FLOW VELOCITY(FEET/SEC.) = 3.20 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.09  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 442.00 = 940.30 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 299.00 DOWNSTREAM ELEVATION(FEET) = 288.50  
STREET LENGTH(FEET) = 390.10 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.22  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 10.63  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.65  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.26  
STREET FLOW TRAVEL TIME(MIN.) = 1.78 Tc(MIN.) = 13.89

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.571  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.30 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.37  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 4.57

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 11.13  
FLOW VELOCITY(FEET/SEC.) = 3.67 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.30  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 443.00 = 1330.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 443.00 TO NODE 444.00 IS CODE = 61

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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 288.50 DOWNSTREAM ELEVATION(FEET) = 281.00  
STREET LENGTH(FEET) = 272.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.00

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 11.52  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.78  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.36  
STREET FLOW TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 15.10  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.400  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.85  
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 5.12

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.62  
FLOW VELOCITY(FEET/SEC.) = 3.81 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.38  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 444.00 = 1603.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 444.00 TO NODE 445.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 281.00 DOWNSTREAM ELEVATION(FEET) = 268.10  
STREET LENGTH(FEET) = 462.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.82

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 12.32  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.91  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.46  
STREET FLOW TRAVEL TIME(MIN.) = 1.97 Tc(MIN.) = 17.07  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.238  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.70	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.39  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 6.16

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.62  
FLOW VELOCITY(FEET/SEC.) = 3.98 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.51  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 445.00 = 2065.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 445.00 TO NODE 446.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 268.10 DOWNSTREAM ELEVATION(FEET) = 257.00  
STREET LENGTH(FEET) = 532.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.06

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.41  
HALFSTREET FLOOD WIDTH(FEET) = 14.29  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.66  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.49  
STREET FLOW TRAVEL TIME(MIN.) = 2.43 Tc(MIN.) = 19.50



\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.038  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.10 0.30 0.100 56  
 COMMERCIAL B 0.60 0.30 0.100 56  
 COMMERCIAL B 0.30 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA (ACRES) = 1.00 SUBAREA RUNOFF (CFS) = 1.81  
 EFFECTIVE AREA (ACRES) = 4.10 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 4.1 PEAK FLOW RATE (CFS) = 7.41

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.41 HALFSTREET FLOOD WIDTH (FEET) = 14.51  
 FLOW VELOCITY (FEET/SEC.) = 3.73 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.53  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 446.00 = 2598.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 446.00 TO NODE 431.10 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 257.00 DOWNSTREAM (FEET) = 256.50  
 FLOW LENGTH (FEET) = 100.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.9 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.78  
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 7.41  
 PIPE TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 19.85  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 19.85  
 RAINFALL INTENSITY (INCH/HR) = 2.01  
 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.10  
 EFFECTIVE STREAM AREA (ACRES) = 4.10  
 TOTAL STREAM AREA (ACRES) = 4.10  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 7.41

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3.77	9.15	3.427	0.30 (0.03)	0.10	1.2	429.00
2	7.41	19.85	2.009	0.30 (0.03)	0.10	4.1	410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.63	9.15	3.427	0.30 (0.03)	0.10	3.1	429.00
2	9.60	19.85	2.009	0.30 (0.03)	0.10	5.3	410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 9.63 Tc (MIN.) = 9.15  
 EFFECTIVE AREA (ACRES) = 3.09 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 5.3  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 249.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 258.00 DOWNSTREAM (FEET) = 257.00  
 FLOW LENGTH (FEET) = 230.42 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.69  
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 9.63  
 PIPE TRAVEL TIME (MIN.) = 0.82 Tc (MIN.) = 9.97  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<<  
 =====

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.63	9.97	3.155	0.30 (0.03)	0.10	3.1	429.00
2	9.60	20.66	1.962	0.30 (0.03)	0.10	5.3	410.00

LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	709.95	11.48	2.926	0.30 (0.11)	0.38	276.9	425.00
2	720.02	11.90	2.864	0.30 (0.11)	0.38	287.1	400.00
3	747.36	13.36	2.648	0.30 (0.11)	0.38	322.8	300.00
4	791.40	18.55	2.115	0.30 (0.11)	0.38	435.0	210.00
5	772.91	21.72	1.909	0.30 (0.11)	0.38	474.8	200.00
6	771.17	22.29	1.880	0.30 (0.11)	0.38	481.3	230.00
7	753.88	23.40	1.823	0.30 (0.11)	0.38	485.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	676.18	9.97	3.155	0.30	( 0.11)	0.38	243.5	429.00
2	719.57	11.48	2.926	0.30	( 0.11)	0.38	280.3	425.00
3	729.64	11.90	2.864	0.30	( 0.11)	0.38	290.5	400.00
4	756.99	13.36	2.648	0.30	( 0.11)	0.38	326.6	300.00
5	801.01	18.55	2.115	0.30	( 0.11)	0.38	439.8	210.00
6	788.68	20.66	1.962	0.30	( 0.11)	0.38	466.8	410.00
7	782.25	21.72	1.909	0.30	( 0.11)	0.38	480.1	200.00
8	780.36	22.29	1.880	0.30	( 0.11)	0.38	486.6	230.00
9	762.79	23.40	1.823	0.30	( 0.11)	0.37	491.2	220.50

TOTAL AREA (ACRES) = 491.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 801.01 Tc (MIN.) = 18.551  
EFFECTIVE AREA (ACRES) = 439.84 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA (ACRES) = 491.2  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 491.2 TC (MIN.) = 18.55  
EFFECTIVE AREA (ACRES) = 439.84 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.380  
PEAK FLOW RATE (CFS) = 801.01

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	676.18	9.97	3.155	0.30 ( 0.11)	0.38	243.5	429.00
2	719.57	11.48	2.926	0.30 ( 0.11)	0.38	280.3	425.00
3	729.64	11.90	2.864	0.30 ( 0.11)	0.38	290.5	400.00
4	756.99	13.36	2.648	0.30 ( 0.11)	0.38	326.6	300.00
5	801.01	18.55	2.115	0.30 ( 0.11)	0.38	439.8	210.00
6	788.68	20.66	1.962	0.30 ( 0.11)	0.38	466.8	410.00
7	782.25	21.72	1.909	0.30 ( 0.11)	0.38	480.1	200.00
8	780.36	22.29	1.880	0.30 ( 0.11)	0.38	486.6	230.00
9	762.79	23.40	1.823	0.30 ( 0.11)	0.37	491.2	220.50

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506101D.DAT  
TIME/DATE OF STUDY: 12:41 04/15/2013  
=====

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:  
=====

---\*TIME-OF-CONCENTRATION MODEL\*---

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.060
- 2) 6.00; 3.660
- 3) 7.00; 3.350
- 4) 8.00; 3.100
- 5) 9.00; 2.900
- 6) 10.00; 2.730
- 7) 11.00; 2.580
- 8) 12.00; 2.460
- 9) 13.00; 2.350
- 10) 14.00; 2.250
- 11) 15.00; 2.160
- 12) 20.00; 1.830
- 13) 25.00; 1.610
- 14) 30.00; 1.450
- 15) 40.00; 1.230
- 16) 50.00; 1.090
- 17) 60.00; 0.980
- 18) 90.00; 0.770
- 19) 120.00; 0.660
- 20) 180.00; 0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10100.00 TO NODE 10101.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 820.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.606  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.797  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.10	0.30	1.000	98	9.61
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.30	1.000	98	9.61

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
 SUBAREA RUNOFF(CFS) = 0.90  
 TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 0.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 10101.00 TO NODE 10102.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 790.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 152.00 CHANNEL SLOPE = 0.1974  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 0.90  
 FLOW VELOCITY(FEET/SEC.) = 4.11 FLOW DEPTH(FEET) = 0.27  
 TRAVEL TIME(MIN.) = 0.62  $T_c$ (MIN.) = 10.22  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10102.00 = 479.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10102.00 TO NODE 10102.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 10.22  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.697  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.50      0.30       1.000      -
USER-DEFINED  -        0.30      0.30       1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.80  SUBAREA RUNOFF (CFS) = 1.73
EFFECTIVE AREA (ACRES) = 1.20  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.2  PEAK FLOW RATE (CFS) = 2.59

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*****
FLOW PROCESS FROM NODE 10102.00 TO NODE 10103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 790.00  DOWNSTREAM(FEET) = 762.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00  CHANNEL SLOPE = 0.1400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.59
FLOW VELOCITY(FEET/SEC.) = 4.79  FLOW DEPTH(FEET) = 0.42
TRAVEL TIME(MIN.) = 0.70  Tc(MIN.) = 10.92
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10103.00 = 679.00 FEET.

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 10.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.592
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.40  0.30  1.000  -
USER-DEFINED      -        0.80  0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.20  SUBAREA RUNOFF (CFS) = 2.48
EFFECTIVE AREA (ACRES) = 2.40  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 2.4  PEAK FLOW RATE (CFS) = 4.95

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 762.00  DOWNSTREAM(FEET) = 754.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 124.00  CHANNEL SLOPE = 0.0645
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.95
FLOW VELOCITY(FEET/SEC.) = 4.18  FLOW DEPTH(FEET) = 0.63
TRAVEL TIME(MIN.) = 0.49  Tc(MIN.) = 11.41
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10104.00 = 803.00 FEET.

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.41
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.531
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.70  0.30  1.000  -
USER-DEFINED      -        1.10  0.30  1.000  -
USER-DEFINED      -        0.10  0.30  1.000  -
USER-DEFINED      -        0.40  0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 4.62
EFFECTIVE AREA (ACRES) = 4.70  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.7  PEAK FLOW RATE (CFS) = 9.44

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 754.00  DOWNSTREAM(FEET) = 740.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00  CHANNEL SLOPE = 0.0255
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 9.44
FLOW VELOCITY(FEET/SEC.) = 3.48  FLOW DEPTH(FEET) = 0.95
TRAVEL TIME(MIN.) = 2.63  Tc(MIN.) = 14.05
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10105.00 = 1353.00 FEET.

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.05
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.246
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        3.40  0.30  1.000  -
USER-DEFINED      -        0.60  0.30  1.000  -
USER-DEFINED      -        6.00  0.30  1.000  -
USER-DEFINED      -        0.60  0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 10.60  SUBAREA RUNOFF (CFS) = 18.56
EFFECTIVE AREA (ACRES) = 15.30  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 15.3  PEAK FLOW RATE (CFS) = 26.79

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10106.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 740.00 DOWNSTREAM(FEET) = 623.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 929.00 CHANNEL SLOPE = 0.1259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 26.79
FLOW VELOCITY(FEET/SEC.) = 8.25 FLOW DEPTH(FEET) = 1.04
TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 15.92
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10106.00 = 2282.00 FEET.
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10106.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.099
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 10.40 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 4.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 25.10
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 49.87
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 592.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 417.00 CHANNEL SLOPE = 0.0743
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 49.87
FLOW VELOCITY(FEET/SEC.) = 7.88 FLOW DEPTH(FEET) = 1.45
TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 16.81
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10107.00 = 2699.00 FEET.
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10107.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.81

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* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.041
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 5.10 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 2.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 14.89
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 63.14
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 592.00 DOWNSTREAM(FEET) = 590.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0333
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.000
CHANNEL FLOW THRU SUBAREA(CFS) = 63.14
FLOW VELOCITY(FEET/SEC.) = 6.19 FLOW DEPTH(FEET) = 1.84
TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 16.97
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10108.00 = 2759.00 FEET.
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.97
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.030
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 7.00 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 7.50 0.30 1.000 -
USER-DEFINED - 1.80 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 28.19
EFFECTIVE AREA(ACRES) = 58.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.4 PEAK FLOW RATE(CFS) = 90.94
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 16.97
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.030
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.20     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20    SUBAREA RUNOFF(CFS) = 0.31
EFFECTIVE AREA(ACRES) = 58.60  AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.6    PEAK FLOW RATE(CFS) = 91.26

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*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10109.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 590.00  DOWNSTREAM(FEET) = 526.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 973.00  CHANNEL SLOPE = 0.0658
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 91.26
FLOW VELOCITY(FEET/SEC.) = 8.75  FLOW DEPTH(FEET) = 1.86
TRAVEL TIME(MIN.) = 1.85  Tc(MIN.) = 18.82
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10109.00 = 3732.00 FEET.

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*****
FLOW PROCESS FROM NODE 10109.00 TO NODE 10109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 18.82
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.908
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        16.40     0.30     1.000    -
USER-DEFINED        -         0.60     0.30     1.000    -
USER-DEFINED        -         3.00     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.00    SUBAREA RUNOFF(CFS) = 28.94
EFFECTIVE AREA(ACRES) = 78.60  AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.6    PEAK FLOW RATE(CFS) = 113.75

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*****
FLOW PROCESS FROM NODE 10109.00 TO NODE 10110.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 526.00  DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1045.00  CHANNEL SLOPE = 0.0679

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CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 113.75
FLOW VELOCITY(FEET/SEC.) = 9.37  FLOW DEPTH(FEET) = 2.01
TRAVEL TIME(MIN.) = 1.86  Tc(MIN.) = 20.68
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10110.00 = 4777.00 FEET.

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*****
FLOW PROCESS FROM NODE 10110.00 TO NODE 10110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 20.68
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.800
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.00     0.30     1.000    -
USER-DEFINED        -         0.50     0.30     1.000    -
USER-DEFINED        -        31.60     0.30     1.000    -
USER-DEFINED        -         1.60     0.30     1.000    -
USER-DEFINED        -         0.40     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.10    SUBAREA RUNOFF(CFS) = 47.39
EFFECTIVE AREA(ACRES) = 113.70  AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.7    PEAK FLOW RATE(CFS) = 153.52

```

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*****
FLOW PROCESS FROM NODE 10110.00 TO NODE 10111.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

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=====
ELEVATION DATA: UPSTREAM(FEET) = 455.00  DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 675.00  CHANNEL SLOPE = 0.0667
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 153.52
FLOW VELOCITY(FEET/SEC.) = 10.06  FLOW DEPTH(FEET) = 2.26
TRAVEL TIME(MIN.) = 1.12  Tc(MIN.) = 21.80
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10111.00 = 5452.00 FEET.

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*****
FLOW PROCESS FROM NODE 10111.00 TO NODE 10111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 21.80
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.751
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         7.40     0.30     1.000    -
USER-DEFINED        -         6.00     0.30     1.000    -
USER-DEFINED        -        24.80     0.30     1.000    -
USER-DEFINED        -         0.90     0.30     1.000    -

```

USER-DEFINED - 4.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 43.20 SUBAREA RUNOFF (CFS) = 56.42  
EFFECTIVE AREA (ACRES) = 156.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 156.9 PEAK FLOW RATE (CFS) = 204.90

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10111.00 TO NODE 10112.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	410.00	DOWNSTREAM (FEET) =	405.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	143.00	CHANNEL SLOPE =	0.0350
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	4.00
CHANNEL FLOW THRU SUBAREA (CFS) =	204.90		
FLOW VELOCITY (FEET/SEC.) =	8.46	FLOW DEPTH (FEET) =	2.84
TRAVEL TIME (MIN.) =	0.28	Tc (MIN.) =	22.08
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10112.00 =	5595.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 22.08

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.739

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	7.90	0.30	1.000	-
USER-DEFINED	-	25.90	0.30	1.000	-
USER-DEFINED	-	19.30	0.30	1.000	-
USER-DEFINED	-	2.10	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 56.20 SUBAREA RUNOFF (CFS) = 72.77

EFFECTIVE AREA (ACRES) = 213.10 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 213.1 PEAK FLOW RATE (CFS) = 275.92

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10113.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	405.00	DOWNSTREAM (FEET) =	363.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	1642.00	CHANNEL SLOPE =	0.0256
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	275.92		
FLOW VELOCITY (FEET/SEC.) =	8.11	FLOW DEPTH (FEET) =	3.37

TRAVEL TIME (MIN.) = 3.37 Tc (MIN.) = 25.45  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10113.00 = 7237.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 25.45

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.596

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	33.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 35.40 SUBAREA RUNOFF (CFS) = 41.28  
EFFECTIVE AREA (ACRES) = 248.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 248.5 PEAK FLOW RATE (CFS) = 289.76

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10114.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	363.00	DOWNSTREAM (FEET) =	340.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	918.00	CHANNEL SLOPE =	0.0251
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	289.76		
FLOW VELOCITY (FEET/SEC.) =	8.14	FLOW DEPTH (FEET) =	3.44
TRAVEL TIME (MIN.) =	1.88	Tc (MIN.) =	27.33
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10114.00 =	8155.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 27.33

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.535

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	10.10	0.30	1.000	-
USER-DEFINED	-	17.70	0.30	1.000	-
USER-DEFINED	-	52.90	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 83.10 SUBAREA RUNOFF (CFS) = 92.40

EFFECTIVE AREA(ACRES) = 331.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 331.6 PEAK FLOW RATE(CFS) = 368.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 27.33  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.535  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 1.67  
EFFECTIVE AREA(ACRES) = 333.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 333.1 PEAK FLOW RATE(CFS) = 370.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 10114.00 TO NODE 10115.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 301.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1467.00 CHANNEL SLOPE = 0.0266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 370.39  
FLOW VELOCITY(FEET/SEC.) = 8.86 FLOW DEPTH(FEET) = 3.73  
TRAVEL TIME(MIN.) = 2.76 Tc(MIN.) = 30.09  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10115.00 = 9622.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10115.00 TO NODE 10115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 30.09  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.448  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.60 0.30 1.000 -  
USER-DEFINED - 24.30 0.30 1.000 -  
USER-DEFINED - 47.70 0.30 1.000 -  
USER-DEFINED - 9.80 0.30 1.000 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 94.00 SUBAREA RUNOFF(CFS) = 97.13  
EFFECTIVE AREA(ACRES) = 427.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 427.1 PEAK FLOW RATE(CFS) = 441.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 10115.00 TO NODE 10116.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 272.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1696.00 CHANNEL SLOPE = 0.0171  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 441.30  
FLOW VELOCITY(FEET/SEC.) = 7.85 FLOW DEPTH(FEET) = 4.33  
TRAVEL TIME(MIN.) = 3.60 Tc(MIN.) = 33.69  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10116.00 = 11318.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 33.69  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.369  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.90 0.30 1.000 -  
USER-DEFINED - 4.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 32.00 0.30 1.000 -  
USER-DEFINED - 3.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 45.60 SUBAREA RUNOFF(CFS) = 43.87  
EFFECTIVE AREA(ACRES) = 472.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 472.7 PEAK FLOW RATE(CFS) = 454.72

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FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 33.69  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.369  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 1.000 -  
USER-DEFINED - 7.70 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.70 SUBAREA RUNOFF(CFS) = 9.33  
EFFECTIVE AREA(ACRES) = 482.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 482.4 PEAK FLOW RATE(CFS) = 464.05



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*****
FLOW PROCESS FROM NODE 10116.00 TO NODE 10117.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 272.00 DOWNSTREAM(FEET) = 252.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 878.00 CHANNEL SLOPE = 0.0228
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 464.05
FLOW VELOCITY(FEET/SEC.) = 8.86 FLOW DEPTH(FEET) = 4.18
TRAVEL TIME(MIN.) = 1.65 Tc(MIN.) = 35.34
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10117.00 = 12196.00 FEET.
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 35.34
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.332
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 8.20 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 11.45
EFFECTIVE AREA(ACRES) = 494.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 494.7 PEAK FLOW RATE(CFS) = 464.05
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 35.34
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.332
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 14.60 0.30 1.000 -
USER-DEFINED - 6.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 3.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996
SUBAREA AREA(ACRES) = 25.00 SUBAREA RUNOFF(CFS) = 23.26
EFFECTIVE AREA(ACRES) = 519.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

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AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 519.7 PEAK FLOW RATE(CFS) = 482.99
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10118.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 252.00 DOWNSTREAM(FEET) = 249.00
FLOW LENGTH(FEET) = 280.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 78.0 INCH PIPE IS 60.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.64
ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 482.99
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 35.61
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10118.00 = 12476.00 FEET.
*****
FLOW PROCESS FROM NODE 10118.00 TO NODE 10119.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 249.00 DOWNSTREAM(FEET) = 240.00
FLOW LENGTH(FEET) = 892.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 78.0 INCH PIPE IS 61.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.15
ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 482.99
PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 36.47
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10119.00 = 13368.00 FEET.
*****
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 36.47
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.308
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.100 -
USER-DEFINED - 1.00 0.30 0.600 -
USER-DEFINED - 0.80 0.30 0.850 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.706
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 3.55
EFFECTIVE AREA(ACRES) = 523.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 523.3 PEAK FLOW RATE(CFS) = 482.99
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****

```

FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.47  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.308  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	9.60	0.30	0.600	-
USER-DEFINED	-	1.00	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.627  
 SUBAREA AREA (ACRES) = 13.60 SUBAREA RUNOFF (CFS) = 13.70  
 EFFECTIVE AREA (ACRES) = 536.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 536.9 PEAK FLOW RATE (CFS) = 488.60

FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.47  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.308  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.09  
 EFFECTIVE AREA (ACRES) = 537.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 537.0 PEAK FLOW RATE (CFS) = 488.69

FLOW PROCESS FROM NODE 10119.00 TO NODE 10120.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 240.00 DOWNSTREAM(FEET) = 239.00  
 FLOW LENGTH(FEET) = 120.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 81.0 INCH PIPE IS 64.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.99  
 ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 488.69  
 PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 36.60  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10120.00 = 13488.00 FEET.

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.60  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.305  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.657  
 SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 5.58  
 EFFECTIVE AREA (ACRES) = 542.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA (ACRES) = 542.6 PEAK FLOW RATE (CFS) = 492.94

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.60  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.305  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.717  
 SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 5.00  
 EFFECTIVE AREA (ACRES) = 547.70 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA (ACRES) = 547.7 PEAK FLOW RATE (CFS) = 497.95

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.60  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.305  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	2.70	0.30	1.000	-
USER-DEFINED	-	11.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 14.29  
EFFECTIVE AREA(ACRES) = 563.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 563.5 PEAK FLOW RATE(CFS) = 512.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10121.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 239.00 DOWNSTREAM(FEET) = 213.00  
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 36.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 46.59  
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 512.23  
PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 36.67  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10121.00 = 13682.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10121.00 TO NODE 10122.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 213.00 DOWNSTREAM(FEET) = 176.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 995.00 CHANNEL SLOPE = 0.0372  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 512.23  
FLOW VELOCITY(FEET/SEC.) = 10.91 FLOW DEPTH(FEET) = 3.96  
TRAVEL TIME(MIN.) = 1.52 Tc(MIN.) = 38.19  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10122.00 = 14677.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 38.19  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.270  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.80 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 6.37  
EFFECTIVE AREA(ACRES) = 570.80 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98

TOTAL AREA(ACRES) = 570.8 PEAK FLOW RATE(CFS) = 512.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 38.19  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.270  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 3.30 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 3.00 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 9.17  
EFFECTIVE AREA(ACRES) = 581.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 581.3 PEAK FLOW RATE(CFS) = 512.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 38.19  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.270  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 3.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 3.50 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 6.90  
EFFECTIVE AREA(ACRES) = 589.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 589.2 PEAK FLOW RATE(CFS) = 516.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 38.19  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.270  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 1.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$  (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 1.57  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.98  
TOTAL AREA (ACRES) = 591.0 PEAK FLOW RATE (CFS) = 518.50

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 591.0 TC (MIN.) = 38.19  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.984  
PEAK FLOW RATE (CFS) = 518.50

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2007 Advanced Engineering Software (aes)  
Ver. 13.4 Release Date: 01/25/2007 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506102D.DAT  
TIME/DATE OF STUDY: 13:56 01/08/2009  
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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.080
- 2) 10.00; 2.729
- 3) 15.00; 2.163
- 4) 20.00; 1.834
- 5) 25.00; 1.614
- 6) 30.00; 1.440
- 7) 40.00; 1.233
- 8) 50.00; 1.085
- 9) 60.00; 0.950
- 10) 90.00; 0.775
- 11) 120.00; 0.657
- 12) 180.00; 0.530
- 13) 360.00; 0.367
- 14) 1440.00; 0.153

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10200.00 TO NODE 10201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 293.00  
ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 617.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.991

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.732

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
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RESIDENTIAL

"3-4 DWELLINGS/ACRE" - 0.73 0.30 0.600 0 9.99

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600

SUBAREA RUNOFF(CFS) = 1.68

TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 1.68

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10201.00 TO NODE 10202.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 617.00 DOWNSTREAM ELEVATION(FEET) = 613.00  
STREET LENGTH(FEET) = 323.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.60

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.34

HALFSTREET FLOOD WIDTH(FEET) = 9.19

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.51

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.86

STREET FLOW TRAVEL TIME(MIN.) = 2.14 Tc(MIN.) = 12.13

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.488

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

USER-DEFINED - 0.88 0.30 0.600 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 1.84  
EFFECTIVE AREA(ACRES) = 1.62 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 3.36

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.39  
FLOW VELOCITY(FEET/SEC.) = 2.64 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.97  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10202.00 = 616.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10202.00 TO NODE 10203.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 613.00 DOWNSTREAM ELEVATION(FEET) = 594.00  
STREET LENGTH(FEET) = 613.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.02  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 10.12  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.13  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.49  
STREET FLOW TRAVEL TIME(MIN.) = 2.47 Tc(MIN.) = 14.60  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.208

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.82 0.30 0.614 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.614  
SUBAREA AREA(ACRES) = 1.82 SUBAREA RUNOFF(CFS) = 3.32  
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 6.27

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 11.21  
FLOW VELOCITY(FEET/SEC.) = 4.33 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.66  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10203.00 = 1229.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10203.00 TO NODE 10204.00 IS CODE = 63  
-----

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 594.00 DOWNSTREAM ELEVATION(FEET) = 578.00  
STREET LENGTH(FEET) = 433.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.30  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.54  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.79  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.87  
STREET FLOW TRAVEL TIME(MIN.) = 1.51 Tc(MIN.) = 16.11  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.090

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.21 0.30 0.655 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.655  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 2.06  
EFFECTIVE AREA(ACRES) = 4.64 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 7.96

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 11.98  
FLOW VELOCITY(FEET/SEC.) = 4.90 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.95  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10204.00 = 1662.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 578.00 DOWNSTREAM(FEET) = 575.00  
FLOW LENGTH(FEET) = 147.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.28  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 7.96  
PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 16.41  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10205.00 = 1809.00 FEET.

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*****
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.41
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.071
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
    LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -         3.61    0.30    0.917    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917
SUBAREA AREA(ACRES) = 3.61      SUBAREA RUNOFF(CFS) = 5.83
EFFECTIVE AREA(ACRES) = 8.25   AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75
TOTAL AREA(ACRES) = 8.3       PEAK FLOW RATE(CFS) = 13.71
*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 563.00
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.35
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.71
PIPE TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 17.41
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10206.00 = 2374.00 FEET.
*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.41
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.004
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
    LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -         4.75    0.30    0.669    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.669
SUBAREA AREA(ACRES) = 4.75      SUBAREA RUNOFF(CFS) = 7.71
EFFECTIVE AREA(ACRES) = 13.00   AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 13.0       PEAK FLOW RATE(CFS) = 20.92
*****
FLOW PROCESS FROM NODE 10206.00 TO NODE 10207.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 563.00 DOWNSTREAM(FEET) = 547.00

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FLOW LENGTH(FEET) = 599.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.47
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.92
PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 18.28
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10207.00 = 2973.00 FEET.
*****
FLOW PROCESS FROM NODE 10206.10 TO NODE 10207.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.28
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.947
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
    LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -         4.59    0.30    0.664    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.664
SUBAREA AREA(ACRES) = 4.59      SUBAREA RUNOFF(CFS) = 7.21
EFFECTIVE AREA(ACRES) = 17.58   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 17.6       PEAK FLOW RATE(CFS) = 27.46
*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 516.00
FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.79
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 27.46
PIPE TRAVEL TIME(MIN.) = 0.63 Tc(MIN.) = 18.92
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10208.00 = 3573.00 FEET.
*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.92
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.905
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
    LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -         3.60    0.30    0.697    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.697
SUBAREA AREA(ACRES) = 3.60      SUBAREA RUNOFF(CFS) = 5.50
EFFECTIVE AREA(ACRES) = 21.18   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 21.2       PEAK FLOW RATE(CFS) = 32.30

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*****
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 516.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 604.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.21
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 32.30
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 19.50
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10209.00 = 4177.00 FEET.

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*****
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.50
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.867
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 8.21 0.30 0.645 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645
SUBAREA AREA(ACRES) = 8.21 SUBAREA RUNOFF(CFS) = 12.37
EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 43.93

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*****
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 678.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.98
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 43.93
PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 20.10
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10210.00 = 4855.00 FEET.

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*****
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.10
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.830
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 10.49 0.30 0.986 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 10.49 SUBAREA RUNOFF(CFS) = 14.49
EFFECTIVE AREA(ACRES) = 39.89 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 39.9 PEAK FLOW RATE(CFS) = 57.44

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*****
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 280.00
FLOW LENGTH(FEET) = 2662.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.01
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 57.44
PIPE TRAVEL TIME(MIN.) = 2.22 Tc(MIN.) = 22.31
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10211.00 = 7517.00 FEET.

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*****
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.31
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.732
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 10.00 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 12.89
EFFECTIVE AREA(ACRES) = 49.89 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 49.9 PEAK FLOW RATE(CFS) = 66.83

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*****
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 280.00 DOWNSTREAM(FEET) = 176.00
FLOW LENGTH(FEET) = 935.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.89
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 66.83
PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 22.92
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10212.00 = 8452.00 FEET.

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FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.92
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.706
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 18.37 0.30 0.926 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.926
SUBAREA AREA(ACRES) = 18.37 SUBAREA RUNOFF(CFS) = 23.61
EFFECTIVE AREA(ACRES) = 68.26 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 68.3 PEAK FLOW RATE(CFS) = 89.25

\*\*\*\*\*
FLOW PROCESS FROM NODE 10212.00 TO NODE 10242.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 176.00 DOWNSTREAM(FEET) = 169.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00 CHANNEL SLOPE = 0.0211
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.663
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.97 0.30 0.970 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 90.47
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.70
AVERAGE FLOW DEPTH(FEET) = 2.30 TRAVEL TIME(MIN.) = 0.97
Tc(MIN.) = 23.89
SUBAREA AREA(ACRES) = 1.97 SUBAREA RUNOFF(CFS) = 2.43
EFFECTIVE AREA(ACRES) = 70.23 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 89.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.29 FLOW VELOCITY(FEET/SEC.) = 5.69
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<

\*\*\*\*\*
FLOW PROCESS FROM NODE 10220.00 TO NODE 10221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 308.00 DOWNSTREAM(FEET) = 300.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.111
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.156
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"GRASS" - 1.03 0.30 1.000 0 15.11
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.72
TOTAL AREA(ACRES) = 1.03 PEAK FLOW RATE(CFS) = 1.72

\*\*\*\*\*
FLOW PROCESS FROM NODE 10221.10 TO NODE 10222.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 300.00 DOWNSTREAM ELEVATION(FEET) = 261.00
STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.03

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.21
HALFSTREET FLOOD WIDTH(FEET) = 2.43
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.10
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.26
STREET FLOW TRAVEL TIME(MIN.) = 1.19 Tc(MIN.) = 16.30
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.078

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.64 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 2.62
EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 4.27

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.25 HALFSTREET FLOOD WIDTH(FEET) = 4.36  
FLOW VELOCITY(FEET/SEC.) = 5.62 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.38  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10222.00 = 764.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10221.20 TO NODE 10222.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.30  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.078  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.12 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.12 SUBAREA RUNOFF(CFS) = 4.98  
EFFECTIVE AREA(ACRES) = 5.78 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 9.25

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.10 TO NODE 10223.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 261.00 DOWNSTREAM ELEVATION(FEET) = 208.00  
STREET LENGTH(FEET) = 622.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.57

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 8.12  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.23  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.00  
STREET FLOW TRAVEL TIME(MIN.) = 1.66 Tc(MIN.) = 17.96  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.968

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.75 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 2.63  
EFFECTIVE AREA(ACRES) = 7.54 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.5 PEAK FLOW RATE(CFS) = 11.32

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.42  
FLOW VELOCITY(FEET/SEC.) = 6.29 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.06  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10223.00 = 1386.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.20 TO NODE 10223.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.96  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.968  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.91 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.91 SUBAREA RUNOFF(CFS) = 11.88  
EFFECTIVE AREA(ACRES) = 15.45 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 23.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 10223.10 TO NODE 10224.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 208.00 DOWNSTREAM ELEVATION(FEET) = 204.00  
STREET LENGTH(FEET) = 758.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.18

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.60  
HALFSTREET FLOOD WIDTH(FEET) = 21.88  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.63  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.57  
STREET FLOW TRAVEL TIME(MIN.) = 4.80 Tc(MIN.) = 22.77  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.712

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.70 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 5.97  
EFFECTIVE AREA(ACRES) = 20.15 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.1 PEAK FLOW RATE(CFS) = 25.61

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 21.71  
FLOW VELOCITY(FEET/SEC.) = 2.61 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.55  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10224.00 = 2144.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.20 TO NODE 10224.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 22.77  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.712  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.21	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 1.54  
EFFECTIVE AREA(ACRES) = 21.35 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 27.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 204.00 DOWNSTREAM(FEET) = 201.00  
FLOW LENGTH(FEET) = 422.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.47  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 27.14  
PIPE TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 23.71  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10225.00 = 2566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 23.71  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.671  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.81	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 4.81 SUBAREA RUNOFF(CFS) = 5.94  
EFFECTIVE AREA(ACRES) = 26.17 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 26.2 PEAK FLOW RATE(CFS) = 32.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 201.00 DOWNSTREAM(FEET) = 197.00  
FLOW LENGTH(FEET) = 799.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.77  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 32.29  
PIPE TRAVEL TIME(MIN.) = 1.97 Tc(MIN.) = 25.68  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10238.00 = 3365.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 25.68  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.590  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.24	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.24 SUBAREA RUNOFF(CFS) = 4.92  
EFFECTIVE AREA(ACRES) = 30.41 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.4 PEAK FLOW RATE(CFS) = 35.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 25.68  
RAINFALL INTENSITY(INCH/HR) = 1.59  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 30.41  
TOTAL STREAM AREA(ACRES) = 30.41  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 35.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10230.00 TO NODE 10231.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 276.00
ELEVATION DATA: UPSTREAM (FEET) = 503.00 DOWNSTREAM (FEET) = 390.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.944
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.825

Table with 7 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.). Includes rows for AGRICULTURAL POOR COVER and "FALLOW".

\*\*\*\*\*
FLOW PROCESS FROM NODE 10231.10 TO NODE 10232.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 390.00 DOWNSTREAM (FEET) = 301.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 394.00 CHANNEL SLOPE = 0.2259
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.619

Table with 7 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Includes rows for USER-DEFINED and various hydraulic calculations.

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.53 FLOW VELOCITY (FEET/SEC.) = 9.37
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10232.00 = 670.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10231.20 TO NODE 10232.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

Table with 7 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Includes rows for MAINLINE Tc and SUBAREA LOSS RATE DATA.

USER-DEFINED - 6.38 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 6.38 SUBAREA RUNOFF (CFS) = 19.05
EFFECTIVE AREA (ACRES) = 9.01 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 9.0 PEAK FLOW RATE (CFS) = 26.92

\*\*\*\*\*
FLOW PROCESS FROM NODE 10232.00 TO NODE 10233.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION (FEET) = 301.00 DOWNSTREAM ELEVATION (FEET) = 277.00
STREET LENGTH (FEET) = 341.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.61

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.83
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.44
HALFSTREET FLOOD WIDTH (FEET) = 14.01
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.39
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.24
STREET FLOW TRAVEL TIME (MIN.) = 0.77 Tc (MIN.) = 7.47
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.411

Table with 7 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Includes rows for USER-DEFINED and various hydraulic calculations.

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.45 HALFSTREET FLOOD WIDTH (FEET) = 14.62
FLOW VELOCITY (FEET/SEC.) = 7.53 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.39
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10233.00 = 1011.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10233.10 TO NODE 10234.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 277.00 DOWNSTREAM ELEVATION(FEET) = 226.00  
STREET LENGTH(FEET) = 682.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 40.29

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.46  
HALFSTREET FLOOD WIDTH(FEET) = 15.26  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.00  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.71  
STREET FLOW TRAVEL TIME(MIN.) = 1.42 Tc(MIN.) = 8.90

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.027

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.27	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.27 SUBAREA RUNOFF(CFS) = 10.48  
EFFECTIVE AREA(ACRES) = 16.78 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 41.20

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 15.44  
FLOW VELOCITY(FEET/SEC.) = 8.01 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.74  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10234.00 = 1693.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10233.20 TO NODE 10234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.90

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.027

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 38.29  
EFFECTIVE AREA(ACRES) = 32.38 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 79.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.10 TO NODE 10235.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 3 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 226.00 DOWNSTREAM ELEVATION(FEET) = 205.00  
STREET LENGTH(FEET) = 759.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 84.48

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.66  
HALFSTREET FLOOD WIDTH(FEET) = 25.04  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.54  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.31  
STREET FLOW TRAVEL TIME(MIN.) = 1.93 Tc(MIN.) = 10.83

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.635

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.74	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 9.97  
EFFECTIVE AREA(ACRES) = 37.13 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 79.49

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.65 HALFSTREET FLOOD WIDTH(FEET) = 24.41  
FLOW VELOCITY(FEET/SEC.) = 6.46 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.18  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10235.00 = 2452.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.20 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.83

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.635

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.02 SUBAREA RUNOFF(CFS) = 16.85  
EFFECTIVE AREA(ACRES) = 45.15 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.1 PEAK FLOW RATE (CFS) = 94.88

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.30 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.83  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.635  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.62 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.62 SUBAREA RUNOFF (CFS) = 5.50  
EFFECTIVE AREA (ACRES) = 47.76 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 100.37

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.00 TO NODE 10236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 205.00 DOWNSTREAM (FEET) = 201.00  
FLOW LENGTH (FEET) = 489.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.6 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.70  
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 100.37  
PIPE TRAVEL TIME (MIN.) = 0.76 Tc (MIN.) = 11.59  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10236.00 = 2941.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.10 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.59  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.549  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.89 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.89 SUBAREA RUNOFF (CFS) = 5.85  
EFFECTIVE AREA (ACRES) = 50.65 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 50.7 PEAK FLOW RATE (CFS) = 102.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.20 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 11.59  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.549  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.84 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.84 SUBAREA RUNOFF (CFS) = 9.79  
EFFECTIVE AREA (ACRES) = 55.49 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 112.31

\*\*\*\*\*

FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 201.00 DOWNSTREAM (FEET) = 199.00  
FLOW LENGTH (FEET) = 278.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.48  
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 112.31  
PIPE TRAVEL TIME (MIN.) = 0.44 Tc (MIN.) = 12.03  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10237.00 = 3219.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 12.03  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.499  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.62 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.62 SUBAREA RUNOFF (CFS) = 3.21  
EFFECTIVE AREA (ACRES) = 57.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 57.1 PEAK FLOW RATE (CFS) = 113.02

\*\*\*\*\*

FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 199.00 DOWNSTREAM (FEET) = 197.00  
FLOW LENGTH (FEET) = 345.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.76  
ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 113.02  
 PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 12.62  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.62  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.432  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.38 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.38 SUBAREA RUNOFF(CFS) = 2.65  
 EFFECTIVE AREA(ACRES) = 58.49 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 113.02  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 12.62  
 RAINFALL INTENSITY(INCH/HR) = 2.43  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 58.49  
 TOTAL STREAM AREA(ACRES) = 58.49  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 113.02

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	35.32	25.68	1.590	0.30( 0.30)	1.00	30.4	10220.00
2	113.02	12.62	2.432	0.30( 0.30)	1.00	58.5	10230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	141.71	12.62	2.432	0.30( 0.30)	1.00	73.4	10230.00
2	103.73	25.68	1.590	0.30( 0.30)	1.00	88.9	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 141.71 Tc(MIN.) = 12.62  
 EFFECTIVE AREA(ACRES) = 73.44 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 88.9  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.00 TO NODE 10239.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 197.00 DOWNSTREAM(FEET) = 193.00  
 FLOW LENGTH(FEET) = 753.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 42.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.03  
 ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 141.71  
 PIPE TRAVEL TIME(MIN.) = 1.25 Tc(MIN.) = 13.87  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10239.00 = 4317.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.10 TO NODE 10239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.87  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.290  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.72 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.72 SUBAREA RUNOFF(CFS) = 4.87  
 EFFECTIVE AREA(ACRES) = 76.16 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 91.6 PEAK FLOW RATE(CFS) = 141.71  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.20 TO NODE 10239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.87  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.290  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 34.37 0.30 0.991 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.991  
 SUBAREA AREA(ACRES) = 34.37 SUBAREA RUNOFF(CFS) = 61.65  
 EFFECTIVE AREA(ACRES) = 110.53 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 126.0 PEAK FLOW RATE(CFS) = 198.09

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FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 193.00 DOWNSTREAM(FEET) = 191.00
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 48.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.69
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 198.09
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 14.30
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10240.00 = 4618.00 FEET.

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*****
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.30
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.242
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.22     0.30    0.916   -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.916
SUBAREA AREA(ACRES) = 2.22 SUBAREA RUNOFF(CFS) = 3.94
EFFECTIVE AREA(ACRES) = 112.75 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 128.2 PEAK FLOW RATE(CFS) = 198.09
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10240.00 TO NODE 10241.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 191.00 DOWNSTREAM(FEET) = 180.00
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.05
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 198.09
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 14.39
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10241.00 = 4768.00 FEET.

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*****
FLOW PROCESS FROM NODE 10241.00 TO NODE 10242.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 169.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 267.00 CHANNEL SLOPE = 0.0412
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.187

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.16     0.30    0.958   -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.958
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 199.94
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.09
AVERAGE FLOW DEPTH(FEET) = 2.45 TRAVEL TIME(MIN.) = 0.40
Tc(MIN.) = 14.79
SUBAREA AREA(ACRES) = 2.16 SUBAREA RUNOFF(CFS) = 3.69
EFFECTIVE AREA(ACRES) = 114.91 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 130.4 PEAK FLOW RATE(CFS) = 198.09
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.44 FLOW VELOCITY(FEET/SEC.) = 11.10
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

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*****
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 11
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>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<
=====

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** MAIN STREAM CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap      Ae      HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES)  NODE
1           198.09 14.79  2.187  0.30( 0.30) 0.99  114.9  10230.00
2           142.03 28.02  1.509  0.30( 0.30) 1.00  130.4  10220.00
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

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```

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap      Ae      HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES)  NODE
1           89.25 23.89  1.663  0.30( 0.25) 0.85  70.2  10200.00
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

```

```

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap      Ae      HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES)  NODE
1           273.90 14.79  2.187  0.30( 0.29) 0.95  158.4  10230.00
2           248.79 23.89  1.663  0.30( 0.28) 0.94  195.8  10200.00
3           221.53 28.02  1.509  0.30( 0.28) 0.94  200.6  10220.00
TOTAL AREA(ACRES) = 200.6

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```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 273.90 Tc(MIN.) = 14.791
EFFECTIVE AREA(ACRES) = 158.40 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 200.6
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

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*****
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 12
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>>>>CLEAR MEMORY BANK # 1 <<<<

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*****
FLOW PROCESS FROM NODE 10242.00 TO NODE 10256.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 169.00 DOWNSTREAM(FEET) = 163.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 315.00 CHANNEL SLOPE = 0.0190
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.139
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 9.10 0.30 0.995 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 281.44
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.07
AVERAGE FLOW DEPTH(FEET) = 3.22 TRAVEL TIME(MIN.) = 0.58
Tc(MIN.) = 15.37
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 15.08
EFFECTIVE AREA(ACRES) = 167.51 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 209.7 PEAK FLOW RATE(CFS) = 279.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 3.21 FLOW VELOCITY(FEET/SEC.) = 9.05
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

*****
FLOW PROCESS FROM NODE 10243.00 TO NODE 10256.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 15.37
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.139
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.01 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.01 SUBAREA RUNOFF(CFS) = 11.59
EFFECTIVE AREA(ACRES) = 174.51 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 216.7 PEAK FLOW RATE(CFS) = 290.76

*****
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 15.37

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RAINFALL INTENSITY(INCH/HR) = 2.14
AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 174.51
TOTAL STREAM AREA(ACRES) = 216.71
PEAK FLOW RATE(CFS) AT CONFLUENCE = 290.76

*****
FLOW PROCESS FROM NODE 10250.00 TO NODE 10251.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----
INITIAL SUBAREA FLOW-LENGTH(FEET) = 284.00
ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 243.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.802
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.044
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"WOODLAND,GRASS" - 1.04 0.30 1.000 0 16.80
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.63
TOTAL AREA(ACRES) = 1.04 PEAK FLOW RATE(CFS) = 1.63

*****
FLOW PROCESS FROM NODE 10251.00 TO NODE 10252.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 243.00 DOWNSTREAM ELEVATION(FEET) = 240.00
STREET LENGTH(FEET) = 301.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.68
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.30
HALFSTREET FLOOD WIDTH(FEET) = 6.91
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.01
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.60
STREET FLOW TRAVEL TIME(MIN.) = 2.49 Tc(MIN.) = 19.30
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.880

```

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.47	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 2.09  
EFFECTIVE AREA(ACRES) = 2.51 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 3.57

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 8.09  
FLOW VELOCITY(FEET/SEC.) = 2.11 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.68  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10252.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10252.00 TO NODE 10253.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 240.00 DOWNSTREAM ELEVATION(FEET) = 234.00  
STREET LENGTH(FEET) = 544.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.49

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 10.51  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.51  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.92

STREET FLOW TRAVEL TIME(MIN.) = 3.61 Tc(MIN.) = 22.91  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.706

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.60 SUBAREA RUNOFF(CFS) = 5.83  
EFFECTIVE AREA(ACRES) = 7.12 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 9.00

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 12.15  
FLOW VELOCITY(FEET/SEC.) = 2.70 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.08

LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10253.00 = 1129.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 234.00 DOWNSTREAM(FEET) = 219.00  
FLOW LENGTH(FEET) = 362.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.14  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 9.00  
PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 23.45  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10254.00 = 1491.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.45  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.682  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.55	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 10.63  
EFFECTIVE AREA(ACRES) = 15.66 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.7 PEAK FLOW RATE(CFS) = 19.48

\*\*\*\*\*

FLOW PROCESS FROM NODE 10254.00 TO NODE 10255.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 219.00 DOWNSTREAM(FEET) = 182.00  
FLOW LENGTH(FEET) = 716.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.42  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 19.48  
PIPE TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 24.28  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10255.00 = 2207.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10255.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 182.00 DOWNSTREAM(FEET) = 163.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 228.00 CHANNEL SLOPE = 0.0833  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.627  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 13.88 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.77  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.81  
 AVERAGE FLOW DEPTH (FEET) = 1.03 TRAVEL TIME (MIN.) = 0.43  
 Tc (MIN.) = 24.71  
 SUBAREA AREA (ACRES) = 13.88 SUBAREA RUNOFF (CFS) = 16.57  
 EFFECTIVE AREA (ACRES) = 29.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 29.5 PEAK FLOW RATE (CFS) = 35.28

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.12 FLOW VELOCITY (FEET/SEC.) = 9.40  
 LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10256.00 = 2435.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 24.71  
 RAINFALL INTENSITY (INCH/HR) = 1.63  
 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 29.54  
 TOTAL STREAM AREA (ACRES) = 29.54  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 35.28

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	290.76	15.37	2.139	0.30 ( 0.29)	0.96	174.5	10230.00
1	258.03	24.48	1.637	0.30 ( 0.28)	0.95	211.9	10200.00
1	234.75	28.63	1.488	0.30 ( 0.28)	0.95	216.7	10220.00
2	35.28	24.71	1.627	0.30 ( 0.30)	1.00	29.5	10250.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	321.17	15.37	2.139	0.30 ( 0.29)	0.96	192.9	10230.00
2	293.25	24.48	1.637	0.30 ( 0.29)	0.95	241.2	10200.00
3	292.00	24.71	1.627	0.30 ( 0.29)	0.95	241.7	10250.00
4	266.33	28.63	1.488	0.30 ( 0.29)	0.95	246.3	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 321.17 Tc (MIN.) = 15.37  
 EFFECTIVE AREA (ACRES) = 192.89 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 246.3  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 246.3 TC (MIN.) = 15.37  
 EFFECTIVE AREA (ACRES) = 192.89 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 PEAK FLOW RATE (CFS) = 321.17

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	321.17	15.37	2.139	0.30 ( 0.29)	0.96	192.9	10230.00
2	293.25	24.48	1.637	0.30 ( 0.29)	0.95	241.2	10200.00
3	292.00	24.71	1.627	0.30 ( 0.29)	0.95	241.7	10250.00
4	266.33	28.63	1.488	0.30 ( 0.29)	0.95	246.3	10220.00

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506103D.DAT  
TIME/DATE OF STUDY: 12:44 04/15/2013  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.060
- 2) 6.00; 3.660
- 3) 7.00; 3.350
- 4) 8.00; 3.100
- 5) 9.00; 2.900
- 6) 10.00; 2.730
- 7) 11.00; 2.580
- 8) 12.00; 2.460
- 9) 13.00; 2.350
- 10) 14.00; 2.250
- 11) 15.00; 2.160
- 12) 20.00; 1.830
- 13) 25.00; 1.610
- 14) 30.00; 1.450
- 15) 40.00; 1.230
- 16) 50.00; 1.090
- 17) 60.00; 0.980
- 18) 90.00; 0.770
- 19) 120.00; 0.660
- 20) 180.00; 0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10300.00 TO NODE 10301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 627.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 5.147  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.001  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "5-7 DWELLINGS/ACRE"	-	1.20	0.30	0.500	95	5.15

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.500  
 SUBAREA RUNOFF(CFS) = 4.16  
 TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 4.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 10301.00 TO NODE 10302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 510.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.2609  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.16  
 FLOW VELOCITY(FEET/SEC.) = 6.76 FLOW DEPTH(FEET) = 0.45  
 TRAVEL TIME(MIN.) = 0.28  $T_c$ (MIN.) = 5.43  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10302.00 = 443.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10302.00 TO NODE 10302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 5.43  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.888  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 5.05  
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 9.08

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10302.00 TO NODE 10303.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 467.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.2575  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.08  
FLOW VELOCITY(FEET/SEC.) = 8.20 FLOW DEPTH(FEET) = 0.61  
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 5.77  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10303.00 = 610.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10303.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.77  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.752  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 7.13  
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 15.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10304.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 467.00 DOWNSTREAM(FEET) = 446.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 15.88  
FLOW VELOCITY(FEET/SEC.) = 8.31 FLOW DEPTH(FEET) = 0.80  
TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 6.00  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10304.00 = 725.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10304.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.660  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.500 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 7.53  
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 23.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10305.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 446.00 DOWNSTREAM(FEET) = 366.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 423.00 CHANNEL SLOPE = 0.1891  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 23.01  
FLOW VELOCITY(FEET/SEC.) = 9.24 FLOW DEPTH(FEET) = 0.91  
TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 6.76  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10305.00 = 1148.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10305.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.76  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.423  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.912  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 9.64  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.65  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 31.09

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10306.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 300.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 574.00 CHANNEL SLOPE = 0.1150  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.09  
FLOW VELOCITY (FEET/SEC.) = 8.28 FLOW DEPTH (FEET) = 1.12  
TRAVEL TIME (MIN.) = 1.16 Tc (MIN.) = 7.92  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10306.00 = 1722.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10306.00 TO NODE 10306.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 7.92  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.120  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 9.15  
EFFECTIVE AREA (ACRES) = 14.30 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA (ACRES) = 14.3 PEAK FLOW RATE (CFS) = 37.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10306.00 TO NODE 10307.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 300.00 DOWNSTREAM (FEET) = 293.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0350  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 37.32  
FLOW VELOCITY (FEET/SEC.) = 5.54 FLOW DEPTH (FEET) = 1.50  
TRAVEL TIME (MIN.) = 0.60 Tc (MIN.) = 8.52  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10307.00 = 1922.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10307.00 TO NODE 10307.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 8.52  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.996  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.70  
EFFECTIVE AREA (ACRES) = 15.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 15.0 PEAK FLOW RATE (CFS) = 37.42

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10307.00 TO NODE 10308.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 293.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0850  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 37.42  
FLOW VELOCITY (FEET/SEC.) = 9.57 FLOW DEPTH (FEET) = 1.14  
TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 8.87  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10308.00 = 2122.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10308.00 TO NODE 10308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 8.87  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.926  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	8.50	0.30	0.500	-
USER-DEFINED	-	3.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.696  
SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 34.24  
EFFECTIVE AREA (ACRES) = 29.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA (ACRES) = 29.0 PEAK FLOW RATE (CFS) = 70.72

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10308.00 TO NODE 10309.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 250.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 600.00 CHANNEL SLOPE = 0.0433  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 70.72  
FLOW VELOCITY (FEET/SEC.) = 8.73 FLOW DEPTH (FEET) = 1.64  
TRAVEL TIME (MIN.) = 1.15 Tc (MIN.) = 10.01  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10309.00 = 2722.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.01  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.728  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.00	0.30	0.600	-
USER-DEFINED	-	1.80	0.30	0.850	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	0.500	-
USER-DEFINED	-	2.10	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.662  
 SUBAREA AREA (ACRES) = 15.40 SUBAREA RUNOFF (CFS) = 35.06  
 EFFECTIVE AREA (ACRES) = 44.40 AREA-AVERAGED Fm (INCH/HR) = 0.21  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
 TOTAL AREA (ACRES) = 44.4 PEAK FLOW RATE (CFS) = 100.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.01  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.728  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.30	0.850	-
USER-DEFINED	-	8.80	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.967  
 SUBAREA AREA (ACRES) = 15.80 SUBAREA RUNOFF (CFS) = 34.67  
 EFFECTIVE AREA (ACRES) = 60.20 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA (ACRES) = 60.2 PEAK FLOW RATE (CFS) = 135.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10309.00 TO NODE 10310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 250.00 DOWNSTREAM(FEET) = 208.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1021.00 CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 135.27  
 FLOW VELOCITY(FEET/SEC.) = 10.07 FLOW DEPTH(FEET) = 2.12  
 TRAVEL TIME(MIN.) = 1.69 Tc(MIN.) = 11.70  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10310.00 = 3743.00 FEET.

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.70  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.496  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	1.80	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.668  
 SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 13.63  
 EFFECTIVE AREA (ACRES) = 66.80 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA (ACRES) = 66.8 PEAK FLOW RATE (CFS) = 136.31

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.70  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.496  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	8.00	0.30	0.600	-
USER-DEFINED	-	7.10	0.30	0.850	-
USER-DEFINED	-	8.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814  
 SUBAREA AREA (ACRES) = 23.50 SUBAREA RUNOFF (CFS) = 47.62  
 EFFECTIVE AREA (ACRES) = 90.30 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA (ACRES) = 90.3 PEAK FLOW RATE (CFS) = 183.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10310.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 208.00 DOWNSTREAM(FEET) = 189.00  
 FLOW LENGTH(FEET) = 1595.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.49  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 183.93  
 PIPE TRAVEL TIME(MIN.) = 1.83 Tc(MIN.) = 13.54  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10335.00 = 5338.00 FEET.



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*****
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.54
RAINFALL INTENSITY(INCH/HR) = 2.30
AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.77
EFFECTIVE STREAM AREA(ACRES) = 90.30
TOTAL STREAM AREA(ACRES) = 90.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 183.93

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*****
FLOW PROCESS FROM NODE 10320.00 TO NODE 10321.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 671.00 DOWNSTREAM(FEET) = 622.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.795
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.742
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.00 0.30 0.500 95 5.79
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 3.23
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 3.23

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*****
FLOW PROCESS FROM NODE 10321.00 TO NODE 10322.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 622.00 DOWNSTREAM(FEET) = 599.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 227.00 CHANNEL SLOPE = 0.1013
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.23
FLOW VELOCITY(FEET/SEC.) = 5.58 FLOW DEPTH(FEET) = 0.44
TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 6.47
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10322.00 = 557.00 FEET.

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*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10322.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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MAINLINE Tc(MIN.) = 6.47
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.513
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.30 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 4.24
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 7.26

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*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10323.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 599.00 DOWNSTREAM(FEET) = 539.00
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.13
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.26
PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 6.59
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10323.00 = 719.00 FEET.

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*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10323.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 6.59
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.477
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.30 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.50
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 8.68

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*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10324.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 539.00 DOWNSTREAM(FEET) = 530.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 97.00 CHANNEL SLOPE = 0.0928
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 8.68

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FLOW VELOCITY(FEET/SEC.) = 5.55 FLOW DEPTH(FEET) = 0.72  
TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 6.88  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10324.00 = 816.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10324.00 TO NODE 10324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.88  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.387

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.24  
EFFECTIVE AREA(ACRES) = 4.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.7 PEAK FLOW RATE(CFS) = 13.69

\*\*\*\*\*

FLOW PROCESS FROM NODE 10324.00 TO NODE 10325.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 210.00 CHANNEL SLOPE = 0.1429  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 13.69  
FLOW VELOCITY(FEET/SEC.) = 7.30 FLOW DEPTH(FEET) = 0.79  
TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 7.36  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10325.00 = 1026.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.36  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 4.76  
EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 17.91

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10326.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 460.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 345.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 17.91  
FLOW VELOCITY(FEET/SEC.) = 7.20 FLOW DEPTH(FEET) = 0.91  
TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 8.16  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10326.00 = 1371.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10326.00 TO NODE 10326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.16  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.068

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 4.99  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 21.80

\*\*\*\*\*

FLOW PROCESS FROM NODE 10326.00 TO NODE 10327.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 430.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 263.00 CHANNEL SLOPE = 0.1141  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 21.80  
FLOW VELOCITY(FEET/SEC.) = 7.55 FLOW DEPTH(FEET) = 0.98  
TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 8.74  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10327.00 = 1634.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10327.00 TO NODE 10327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.74  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.952

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.10	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500

SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 10.34  
EFFECTIVE AREA (ACRES) = 12.40 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 12.4 PEAK FLOW RATE (CFS) = 31.27

\*\*\*\*\*

FLOW PROCESS FROM NODE 10327.00 TO NODE 10328.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 430.00 DOWNSTREAM (FEET) = 375.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 437.00 CHANNEL SLOPE = 0.1259  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.27  
FLOW VELOCITY (FEET/SEC.) = 10.66 FLOW DEPTH (FEET) = 0.99  
TRAVEL TIME (MIN.) = 0.68 Tc (MIN.) = 9.42  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10328.00 = 2071.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10328.00 TO NODE 10328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.42

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.828

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.500	-
USER-DEFINED	-	1.20	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.772

SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 7.48

EFFECTIVE AREA (ACRES) = 15.60 AREA-AVERAGED Fm (INCH/HR) = 0.17

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56

TOTAL AREA (ACRES) = 15.6 PEAK FLOW RATE (CFS) = 37.37

\*\*\*\*\*

FLOW PROCESS FROM NODE 10328.00 TO NODE 10329.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 375.00 DOWNSTREAM (FEET) = 372.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 224.00 CHANNEL SLOPE = 0.0134  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 37.37  
FLOW VELOCITY (FEET/SEC.) = 4.79 FLOW DEPTH (FEET) = 1.61  
TRAVEL TIME (MIN.) = 0.78 Tc (MIN.) = 10.20  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10329.00 = 2295.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10329.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.20

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.700

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.20	0.30	0.500	-
USER-DEFINED	-	1.40	0.30	0.850	-
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.571

SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 25.49

EFFECTIVE AREA (ACRES) = 26.80 AREA-AVERAGED Fm (INCH/HR) = 0.17

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56

TOTAL AREA (ACRES) = 26.8 PEAK FLOW RATE (CFS) = 61.05

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10330.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 372.00 DOWNSTREAM (FEET) = 300.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 452.00 CHANNEL SLOPE = 0.1593  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 61.05  
FLOW VELOCITY (FEET/SEC.) = 13.72 FLOW DEPTH (FEET) = 1.22  
TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 10.75  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10330.00 = 2747.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10330.00 TO NODE 10330.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.75

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.617

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.850	-
USER-DEFINED	-	4.20	0.30	0.500	-
USER-DEFINED	-	2.50	0.30	0.850	-
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.673

SUBAREA AREA (ACRES) = 7.80 SUBAREA RUNOFF (CFS) = 16.96

EFFECTIVE AREA (ACRES) = 34.60 AREA-AVERAGED Fm (INCH/HR) = 0.18

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59

TOTAL AREA (ACRES) = 34.6 PEAK FLOW RATE (CFS) = 76.02

\*\*\*\*\*

FLOW PROCESS FROM NODE 10330.00 TO NODE 10331.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 295.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 182.00 CHANNEL SLOPE = 0.0275  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 76.02  
FLOW VELOCITY(FEET/SEC.) = 7.47 FLOW DEPTH(FEET) = 1.84  
TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 11.16  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10331.00 = 2929.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10331.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 11.16  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.561  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 11.30 0.30 0.500 -  
USER-DEFINED - 0.20 0.30 0.600 -  
USER-DEFINED - 4.20 0.30 0.850 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.652  
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 40.45  
EFFECTIVE AREA(ACRES) = 53.60 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 53.6 PEAK FLOW RATE(CFS) = 114.72

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10332.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 295.00 DOWNSTREAM(FEET) = 245.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.00 CHANNEL SLOPE = 0.0542  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 114.72  
FLOW VELOCITY(FEET/SEC.) = 10.71 FLOW DEPTH(FEET) = 1.89  
TRAVEL TIME(MIN.) = 1.43 Tc(MIN.) = 12.59  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10332.00 = 3851.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10332.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 12.59  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.395  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.850 -

USER-DEFINED - 1.40 0.30 0.500 -  
USER-DEFINED - 15.40 0.30 0.850 -  
USER-DEFINED - 8.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.881  
SUBAREA AREA(ACRES) = 25.60 SUBAREA RUNOFF(CFS) = 49.09  
EFFECTIVE AREA(ACRES) = 79.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 79.2 PEAK FLOW RATE(CFS) = 155.79

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10333.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 199.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 564.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 155.79  
FLOW VELOCITY(FEET/SEC.) = 13.47 FLOW DEPTH(FEET) = 1.96  
TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 13.29  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10333.00 = 4415.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10333.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 13.29  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.321  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 0.500 -  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 5.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.761  
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 15.63  
EFFECTIVE AREA(ACRES) = 87.50 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 87.5 PEAK FLOW RATE(CFS) = 166.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10334.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 195.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 454.00 CHANNEL SLOPE = 0.0088  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 166.16  
FLOW VELOCITY(FEET/SEC.) = 5.96 FLOW DEPTH(FEET) = 3.05

TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 14.56  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10334.00 = 4869.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10334.00 TO NODE 10334.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.56  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.200  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.800 -  
USER-DEFINED - 2.60 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 6.49  
EFFECTIVE AREA(ACRES) = 91.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71  
TOTAL AREA(ACRES) = 91.2 PEAK FLOW RATE(CFS) = 166.16  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10334.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 195.00 DOWNSTREAM(FEET) = 189.00  
FLOW LENGTH(FEET) = 1291.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 60.0 INCH PIPE IS 48.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.78  
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 166.16  
PIPE TRAVEL TIME(MIN.) = 2.20 Tc(MIN.) = 16.76  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 16.76  
RAINFALL INTENSITY(INCH/HR) = 2.04  
AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.71  
EFFECTIVE STREAM AREA(ACRES) = 91.20  
TOTAL STREAM AREA(ACRES) = 91.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 166.16

\*\* CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE

1 183.93 13.54 2.296 0.30( 0.23) 0.77 90.3 10300.00  
2 166.16 16.76 2.044 0.30( 0.21) 0.71 91.2 10320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	336.64	13.54	2.296	0.30( 0.22)	0.75	164.0	10300.00
2	327.59	16.76	2.044	0.30( 0.22)	0.74	181.5	10320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 336.64 Tc(MIN.) = 13.54  
EFFECTIVE AREA(ACRES) = 163.96 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA(ACRES) = 181.5  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10335.00 TO NODE 10336.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 189.00 DOWNSTREAM(FEET) = 188.00  
FLOW LENGTH(FEET) = 103.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 69.0 INCH PIPE IS 53.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.49  
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 336.64  
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 13.65  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10336.00 = 6263.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10336.00 TO NODE 10337.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 54.0 INCH PIPE IS 41.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.88  
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 336.64  
PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 13.78  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10337.00 = 6475.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10337.00 TO NODE 10338.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 161.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0218  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 336.64  
FLOW VELOCITY (FEET/SEC.) = 9.97 FLOW DEPTH (FEET) = 3.35  
TRAVEL TIME (MIN.) = 1.46 Tc (MIN.) = 15.24  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10338.00 = 7347.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.24  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.144  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.850 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.943  
SUBAREA AREA (ACRES) = 4.20 SUBAREA RUNOFF (CFS) = 7.04  
EFFECTIVE AREA (ACRES) = 168.16 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 185.7 PEAK FLOW RATE (CFS) = 336.64  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.24  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.144  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 8.30  
EFFECTIVE AREA (ACRES) = 173.16 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 190.7 PEAK FLOW RATE (CFS) = 336.64  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10339.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 161.00 DOWNSTREAM (FEET) = 159.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 328.00 CHANNEL SLOPE = 0.0061

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 336.64  
FLOW VELOCITY (FEET/SEC.) = 6.18 FLOW DEPTH (FEET) = 4.26  
TRAVEL TIME (MIN.) = 0.88 Tc (MIN.) = 16.13  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10339.00 = 7675.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 16.13  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.086  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 2.30 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.767  
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 11.52  
EFFECTIVE AREA (ACRES) = 180.06 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 336.64  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 16.13  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.086  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 6.30 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 2.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.876  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 15.10  
EFFECTIVE AREA (ACRES) = 189.26 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 206.8 PEAK FLOW RATE (CFS) = 336.64  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10390.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

```
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 159.00 DOWNSTREAM(FEET) = 155.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 782.00 CHANNEL SLOPE = 0.0051
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 336.64
FLOW VELOCITY(FEET/SEC.) = 5.78 FLOW DEPTH(FEET) = 4.41
TRAVEL TIME(MIN.) = 2.25 Tc(MIN.) = 18.38
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.
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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
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```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```
MAINLINE Tc(MIN.) = 18.38
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.937
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 0.800 -
USER-DEFINED - 3.70 0.30 0.850 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 2.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.901
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 9.30
EFFECTIVE AREA(ACRES) = 195.46 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 213.0 PEAK FLOW RATE(CFS) = 336.64
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10
-----
```

```
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====
```

```
*****
FLOW PROCESS FROM NODE 10340.00 TO NODE 10341.00 IS CODE = 21
-----
```

```
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
```

```
INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 585.00
```

```
Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.581
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.643
```

```
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE" - 0.10 0.30 0.800 95 10.58
PUBLIC PARK - 0.50 0.30 0.850 95 10.90
AGRICULTURAL GOOD COVER
```

```
"ROW CROPS, STRAIGHT ROW" - 0.40 0.30 1.000 95 21.09
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA RUNOFF(CFS) = 2.13
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.13
```

```
*****
FLOW PROCESS FROM NODE 10341.00 TO NODE 10342.00 IS CODE = 63
-----
```

```
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====
```

```
UPSTREAM ELEVATION(FEET) = 585.00 DOWNSTREAM ELEVATION(FEET) = 570.00
STREET LENGTH(FEET) = 250.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00
```

```
DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020
```

```
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64
```

```
**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.25
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.26
HALFSTREET FLOOD WIDTH(FEET) = 5.17
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.65
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.22
STREET FLOW TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 11.48
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.523
```

```
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.70 0.30 0.800 -
USER-DEFINED - 1.40 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 4.24
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 6.27
```

```
END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 6.70
FLOW VELOCITY(FEET/SEC.) = 4.91 DEPTH*VELOCITY(FT*FT/SEC.) = 1.43
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10342.00 = 558.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
-----
```

```
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====
```

```
UPSTREAM ELEVATION(FEET) = 570.00 DOWNSTREAM ELEVATION(FEET) = 560.00
```

STREET LENGTH(FEET) = 415.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.49  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.36  
 HALfstREET FLOOD WIDTH(FEET) = 9.95  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.60  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.29  
 STREET FLOW TRAVEL TIME(MIN.) = 1.92 Tc(MIN.) = 13.40  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.310  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.800	-
USER-DEFINED	-	1.20	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.825  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.46  
 EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
 TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 10.13

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.37 HALfstREET FLOOD WIDTH(FEET) = 10.76  
 FLOW VELOCITY(FEET/SEC.) = 3.76 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.40  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10343.00 = 973.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10343.00 TO NODE 10344.00 IS CODE = 63  
 -----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 4 USED)<<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 560.00 DOWNSTREAM ELEVATION(FEET) = 550.00  
 STREET LENGTH(FEET) = 616.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.51  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.42  
 HALfstREET FLOOD WIDTH(FEET) = 12.89  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.38  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.41  
 STREET FLOW TRAVEL TIME(MIN.) = 3.04 Tc(MIN.) = 16.44  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.065  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.30	0.800	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814  
 SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 4.75  
 EFFECTIVE AREA(ACRES) = 8.40 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 13.67

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.43 HALfstREET FLOOD WIDTH(FEET) = 13.40  
 FLOW VELOCITY(FEET/SEC.) = 3.44 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.47  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10344.00 = 1589.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10344.00 TO NODE 10345.00 IS CODE = 63  
 -----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 4 USED)<<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 550.00 DOWNSTREAM ELEVATION(FEET) = 510.00  
 STREET LENGTH(FEET) = 474.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.03  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.36  
 HALfstREET FLOOD WIDTH(FEET) = 9.95  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.80  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.43  
 STREET FLOW TRAVEL TIME(MIN.) = 1.16 Tc(MIN.) = 17.60  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.989  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.80	0.30	0.800	-
USER-DEFINED	-	0.20	0.30	0.850	-



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 4.72  
EFFECTIVE AREA(ACRES) = 11.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 11.4 PEAK FLOW RATE(CFS) = 17.81

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.46  
FLOW VELOCITY(FEET/SEC.) = 6.94 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.55  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10345.00 = 2063.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10345.00 TO NODE 10346.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 510.00 DOWNSTREAM ELEVATION(FEET) = 484.00  
STREET LENGTH(FEET) = 231.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.54

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.66  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 10.25  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.92  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.88  
STREET FLOW TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 18.08  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.956

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.40 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 3.71  
EFFECTIVE AREA(ACRES) = 13.80 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 13.8 PEAK FLOW RATE(CFS) = 21.19

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.61  
FLOW VELOCITY(FEET/SEC.) = 8.06 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.98  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10346.00 = 2294.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10346.00 TO NODE 10347.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 484.00 DOWNSTREAM ELEVATION(FEET) = 378.00  
STREET LENGTH(FEET) = 995.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.55

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.11  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.37  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.13  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.14  
STREET FLOW TRAVEL TIME(MIN.) = 2.04 Tc(MIN.) = 20.12  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.825

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 5.85  
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 25.39

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.62  
FLOW VELOCITY(FEET/SEC.) = 8.24 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.22  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10347.00 = 3289.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10347.00 TO NODE 10348.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 378.00 DOWNSTREAM ELEVATION(FEET) = 303.00  
STREET LENGTH(FEET) = 751.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.56

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.00  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.42  
HALFSTREET FLOOD WIDTH(FEET) = 12.89  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.37  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.48  
STREET FLOW TRAVEL TIME(MIN.) = 1.50 Tc(MIN.) = 21.62  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.759

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.20 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 11.21  
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 35.54

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 13.65  
FLOW VELOCITY(FEET/SEC.) = 8.65 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.73  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10348.00 = 4040.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10348.00 TO NODE 10349.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 303.00 DOWNSTREAM ELEVATION(FEET) = 252.00  
STREET LENGTH(FEET) = 607.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.32  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.46  
HALFSTREET FLOOD WIDTH(FEET) = 15.21  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.46  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.91  
STREET FLOW TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 22.81  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.706  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.30 0.30 0.800 -  
USER-DEFINED - 3.00 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.815  
SUBAREA AREA(ACRES) = 10.30 SUBAREA RUNOFF(CFS) = 13.55  
EFFECTIVE AREA(ACRES) = 36.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 36.4 PEAK FLOW RATE(CFS) = 47.86

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 16.03  
FLOW VELOCITY(FEET/SEC.) = 8.68 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.15  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10349.00 = 4647.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10349.00 TO NODE 10350.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 252.00 DOWNSTREAM ELEVATION(FEET) = 246.00  
STREET LENGTH(FEET) = 224.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 56.33  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.59  
HALFSTREET FLOOD WIDTH(FEET) = 21.47  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.87  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.45  
STREET FLOW TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 23.45  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.678  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 12.60 0.30 0.800 -  
USER-DEFINED - 0.50 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.802  
SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 16.95  
EFFECTIVE AREA(ACRES) = 49.50 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 49.5 PEAK FLOW RATE(CFS) = 63.89

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.61 HALFSTREET FLOOD WIDTH(FEET) = 22.59  
FLOW VELOCITY(FEET/SEC.) = 6.04 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.68

LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10350.00 = 4871.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10350.00 TO NODE 10351.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 237.00  
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.67  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 63.89  
PIPE TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 24.13  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10351.00 = 5390.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10351.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.13  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.648  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 5.60 0.30 0.800 -  
USER-DEFINED - 0.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.784  
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 8.27  
EFFECTIVE AREA(ACRES) = 56.00 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 56.0 PEAK FLOW RATE(CFS) = 70.82

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10352.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 237.00 DOWNSTREAM(FEET) = 230.00  
FLOW LENGTH(FEET) = 675.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.86  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 70.82  
PIPE TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 25.17  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10352.00 = 6065.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 25.17

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.605

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.00 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.300  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.91  
EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 70.82  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 25.17  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.605  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 0.100 -  
USER-DEFINED - 9.40 0.30 0.800 -  
USER-DEFINED - 1.10 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755  
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 14.01  
EFFECTIVE AREA(ACRES) = 68.70 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
TOTAL AREA(ACRES) = 68.7 PEAK FLOW RATE(CFS) = 84.55

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10353.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 230.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 19.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 31.72  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 84.55  
PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 25.33  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10353.00 = 6366.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10353.00 TO NODE 10353.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 25.33  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.600  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            0.10       0.30       0.100       -  
 USER-DEFINED       -            6.00       0.30       0.800       -  
 USER-DEFINED       -            1.30       0.30       0.850       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.799  
 SUBAREA AREA(ACRES) = 7.40       SUBAREA RUNOFF(CFS) = 9.06  
 EFFECTIVE AREA(ACRES) = 76.10    AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 76.1        PEAK FLOW RATE(CFS) = 93.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10353.00 TO NODE 10354.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 180.00    DOWNSTREAM(FEET) = 172.00  
 FLOW LENGTH(FEET) = 458.00    MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.12  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00    NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 93.29  
 PIPE TRAVEL TIME(MIN.) = 0.54    Tc(MIN.) = 25.87  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10354.00 = 6824.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10354.00 TO NODE 10390.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 172.00    DOWNSTREAM(FEET) = 155.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00    CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030    MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 93.29  
 FLOW VELOCITY(FEET/SEC.) = 9.17    FLOW DEPTH(FEET) = 1.84  
 TRAVEL TIME(MIN.) = 0.75    Tc(MIN.) = 26.62  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 26.62  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.558  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS  
                           LAND USE    GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            0.60       0.30       0.100       -  
 USER-DEFINED       -            0.10       0.30       0.850       -  
 USER-DEFINED       -            0.10       0.30       1.000       -  
 USER-DEFINED       -            0.30       0.30       0.100       -  
 USER-DEFINED       -            0.90       0.30       0.850       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.520

SUBAREA AREA(ACRES) = 2.00        SUBAREA RUNOFF(CFS) = 2.52  
 EFFECTIVE AREA(ACRES) = 78.10    AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.78  
 TOTAL AREA(ACRES) = 78.1        PEAK FLOW RATE(CFS) = 93.29  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 26.62  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.558  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS  
                           LAND USE    GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            0.60       0.30       1.000       -  
 USER-DEFINED       -            0.60       0.30       1.000       -  
 USER-DEFINED       -            0.30       0.30       0.850       -  
 USER-DEFINED       -            0.10       0.30       1.000       -  
 USER-DEFINED       -            0.10       0.30       0.100       -  
 USER-DEFINED       -            2.10       0.30       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.964  
 SUBAREA AREA(ACRES) = 3.80        SUBAREA RUNOFF(CFS) = 4.34  
 EFFECTIVE AREA(ACRES) = 81.90    AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 81.9        PEAK FLOW RATE(CFS) = 97.32

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 26.62  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.558  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS  
                           LAND USE    GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            2.50       0.30       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.50        SUBAREA RUNOFF(CFS) = 2.83  
 EFFECTIVE AREA(ACRES) = 84.40    AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 84.4        PEAK FLOW RATE(CFS) = 100.15

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
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>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
 =====  
 \*\* MAIN STREAM CONFLUENCE DATA \*\*  
 STREAM            Q        Tc    Intensity    Fp(Fm)    Ap    Ae    HEADWATER  
 NUMBER            (CFS)    (MIN.)    (INCH/HR)    (INCH/HR)    (ACRES)    NODE  
 1            100.15    26.62    1.558    0.30( 0.24)    0.80    84.4    10340.00  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	336.64	18.38	1.937	0.30 ( 0.23)	0.77	195.5	10300.00
2	327.59	21.63	1.758	0.30 ( 0.23)	0.76	213.0	10320.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	425.65	18.38	1.937	0.30 ( 0.23)	0.77	253.7	10300.00
2	421.33	21.63	1.758	0.30 ( 0.23)	0.77	281.6	10320.00
3	384.92	26.62	1.558	0.30 ( 0.23)	0.77	297.4	10340.00

TOTAL AREA (ACRES) = 297.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 425.65 Tc (MIN.) = 18.380  
EFFECTIVE AREA (ACRES) = 253.74 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
TOTAL AREA (ACRES) = 297.4  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10360.00 TO NODE 10361.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
ELEVATION DATA: UPSTREAM (FEET) = 337.00 DOWNSTREAM (FEET) = 292.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.697

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.625

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.30	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"GRASS"	-	0.50	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.10	0.30	1.000	95	10.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 1.88  
TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 1.88

\*\*\*\*\*

FLOW PROCESS FROM NODE 10361.00 TO NODE 10362.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 292.00 DOWNSTREAM (FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 199.00 CHANNEL SLOPE = 0.0101  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 1.88  
FLOW VELOCITY (FEET/SEC.) = 2.05 FLOW DEPTH (FEET) = 0.55  
TRAVEL TIME (MIN.) = 1.62 Tc (MIN.) = 12.32  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10362.00 = 529.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.32

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.425

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.11  
EFFECTIVE AREA (ACRES) = 2.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 3.83

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10363.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 290.00 DOWNSTREAM (FEET) = 288.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 3.83  
FLOW VELOCITY (FEET/SEC.) = 2.73 FLOW DEPTH (FEET) = 0.68  
TRAVEL TIME (MIN.) = 0.90 Tc (MIN.) = 13.22  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10363.00 = 676.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10363.00 TO NODE 10363.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.22  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.328  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.40 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 0.850 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.39  
 EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 8.04

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10363.00 TO NODE 10364.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 288.00 DOWNSTREAM(FEET) = 286.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.04  
 FLOW VELOCITY(FEET/SEC.) = 3.29 FLOW DEPTH(FEET) = 0.90  
 TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 13.96  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10364.00 = 823.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10364.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.96  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.254  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.40 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
 SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 3.35  
 EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 11.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10365.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 286.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 11.10  
 FLOW VELOCITY(FEET/SEC.) = 2.93 FLOW DEPTH(FEET) = 1.12  
 TRAVEL TIME(MIN.) = 1.41 Tc(MIN.) = 15.37  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10365.00 = 1071.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10365.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.37  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.135  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.90 0.30 1.000 -  
 USER-DEFINED - 1.80 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.850 -  
 USER-DEFINED - 0.50 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 5.79  
 EFFECTIVE AREA(ACRES) = 9.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 16.22

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10366.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 16.22  
 FLOW VELOCITY(FEET/SEC.) = 3.23 FLOW DEPTH(FEET) = 1.29  
 TRAVEL TIME(MIN.) = 1.28 Tc(MIN.) = 16.65  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10366.00 = 1319.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10366.00 TO NODE 10366.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.65  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.051  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.20 0.30 1.000 -  
 USER-DEFINED - 2.30 0.30 1.000 -

USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 2.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995  
SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 13.41  
EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 28.88

\*\*\*\*\*

FLOW PROCESS FROM NODE 10366.00 TO NODE 10367.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 279.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 292.00 CHANNEL SLOPE = 0.0103  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 28.88  
FLOW VELOCITY (FEET/SEC.) = 4.07 FLOW DEPTH (FEET) = 1.54  
TRAVEL TIME (MIN.) = 1.20 Tc (MIN.) = 17.85  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10367.00 = 1611.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10367.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.85

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.972

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972

SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 2.42

EFFECTIVE AREA (ACRES) = 19.90 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 19.9 PEAK FLOW RATE (CFS) = 30.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10368.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 279.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 378.00 CHANNEL SLOPE = 0.0079  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 30.00  
FLOW VELOCITY (FEET/SEC.) = 3.73 FLOW DEPTH (FEET) = 1.64

TRAVEL TIME (MIN.) = 1.69 Tc (MIN.) = 19.54  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10368.00 = 1989.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10368.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 19.54

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.860

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.973

SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 3.11

EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 31.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10369.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 247.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 229.00 CHANNEL SLOPE = 0.1266  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.11  
FLOW VELOCITY (FEET/SEC.) = 10.64 FLOW DEPTH (FEET) = 0.99  
TRAVEL TIME (MIN.) = 0.36 Tc (MIN.) = 19.90  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10369.00 = 2218.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10369.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 19.90

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.837

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	9.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996

SUBAREA AREA (ACRES) = 11.60 SUBAREA RUNOFF (CFS) = 16.06

EFFECTIVE AREA (ACRES) = 33.70 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 33.7 PEAK FLOW RATE (CFS) = 46.70

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10369.00 TO NODE 10370.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	247.00	DOWNSTREAM(FEET) =	226.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	179.00	CHANNEL SLOPE =	0.1173
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH(FEET) =	2.00
CHANNEL FLOW THRU SUBAREA(CFS) =	46.70		
FLOW VELOCITY(FEET/SEC.) =	11.48	FLOW DEPTH(FEET) =	1.16
TRAVEL TIME(MIN.) =	0.26	Tc(MIN.) =	20.16
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10370.00 =	2397.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10370.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) =	20.16				
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	1.823				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	3.60	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	5.60	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.997				
SUBAREA AREA(ACRES) =	11.10	SUBAREA RUNOFF(CFS) =	15.22		
EFFECTIVE AREA(ACRES) =	44.80	AREA-AVERAGED Fm(INCH/HR) =	0.30		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.99		
TOTAL AREA(ACRES) =	44.8	PEAK FLOW RATE(CFS) =	61.50		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10371.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	226.00	DOWNSTREAM(FEET) =	188.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	434.00	CHANNEL SLOPE =	0.0876
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH(FEET) =	2.00
CHANNEL FLOW THRU SUBAREA(CFS) =	61.50		
FLOW VELOCITY(FEET/SEC.) =	10.95	FLOW DEPTH(FEET) =	1.37
TRAVEL TIME(MIN.) =	0.66	Tc(MIN.) =	20.82
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10371.00 =	2831.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10371.00 TO NODE 10371.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.82  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.794  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.20	0.30	0.850	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	7.20	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.958				
SUBAREA AREA(ACRES) =	10.70	SUBAREA RUNOFF(CFS) =	14.51		
EFFECTIVE AREA(ACRES) =	55.50	AREA-AVERAGED Fm(INCH/HR) =	0.30		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.99		
TOTAL AREA(ACRES) =	55.5	PEAK FLOW RATE(CFS) =	74.84		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10371.00 TO NODE 10389.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	188.00	DOWNSTREAM(FEET) =	157.00
FLOW LENGTH(FEET) =	1918.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	36.0 INCH PIPE IS	27.5 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) =	12.93		
ESTIMATED PIPE DIAMETER(INCH) =	36.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	74.84		
PIPE TRAVEL TIME(MIN.) =	2.47	Tc(MIN.) =	23.29
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 =	4749.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS =	2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:	
TIME OF CONCENTRATION(MIN.) =	23.29
RAINFALL INTENSITY(INCH/HR) =	1.69
AREA-AVERAGED Fm(INCH/HR) =	0.30
AREA-AVERAGED Fp(INCH/HR) =	0.30
AREA-AVERAGED Ap =	0.99
EFFECTIVE STREAM AREA(ACRES) =	55.50
TOTAL STREAM AREA(ACRES) =	55.50
PEAK FLOW RATE(CFS) AT CONFLUENCE =	74.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10380.00 TO NODE 10381.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) =	241.00		
ELEVATION DATA: UPSTREAM(FEET) =	275.00	DOWNSTREAM(FEET) =	273.00



Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.110  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.322  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.30	0.100	95	7.11
PUBLIC PARK	-	1.10	0.30	0.850	95	11.30

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.735  
 SUBAREA RUNOFF(CFS) = 3.63  
 TOTAL AREA(ACRES) = 1.30 PEAK FLOW RATE(CFS) = 3.63

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10381.00 TO NODE 10382.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 273.00 DOWNSTREAM ELEVATION(FEET) = 271.00  
 STREET LENGTH(FEET) = 238.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.70  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.37  
 HALfstREET FLOOD WIDTH(FEET) = 10.51  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.20  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.81  
 STREET FLOW TRAVEL TIME(MIN.) = 1.80 Tc(MIN.) = 8.91  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.918

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	1.40	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.718  
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 4.13  
 EFFECTIVE AREA(ACRES) = 3.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 7.29

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.39 HALfstREET FLOOD WIDTH(FEET) = 11.76  
 FLOW VELOCITY(FEET/SEC.) = 2.32 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.91  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10382.00 = 479.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10382.00 TO NODE 10383.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 271.00 DOWNSTREAM ELEVATION(FEET) = 268.00  
 STREET LENGTH(FEET) = 357.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.55  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.43  
 HALfstREET FLOOD WIDTH(FEET) = 13.79  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.52  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.09  
 STREET FLOW TRAVEL TIME(MIN.) = 2.36 Tc(MIN.) = 11.27  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.548

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	1.30	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.452  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 6.51  
 EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 12.80

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.46 HALfstREET FLOOD WIDTH(FEET) = 14.96  
 FLOW VELOCITY(FEET/SEC.) = 2.64 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.21  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10383.00 = 836.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10383.00 TO NODE 10384.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 268.00 DOWNSTREAM ELEVATION(FEET) = 264.00  
 STREET LENGTH(FEET) = 473.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020  
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.83  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.49  
HALFSTREET FLOOD WIDTH(FEET) = 16.68  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.83  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.39  
STREET FLOW TRAVEL TIME(MIN.) = 2.78 Tc(MIN.) = 14.05  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.245

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.500 -  
USER-DEFINED - 0.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 0.100 -  
USER-DEFINED - 3.00 0.30 0.500 -  
USER-DEFINED - 0.60 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.548  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 8.05  
EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.57  
TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 19.22

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.51 HALFSTREET FLOOD WIDTH(FEET) = 17.62  
FLOW VELOCITY(FEET/SEC.) = 2.92 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.49  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10384.00 = 1309.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10384.00 TO NODE 10385.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 264.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
STREET LENGTH(FEET) = 463.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.55  
\*\*\*STREET FLOWING FULL\*\*\*

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.57  
HALFSTREET FLOOD WIDTH(FEET) = 20.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.82  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.60  
STREET FLOW TRAVEL TIME(MIN.) = 2.73 Tc(MIN.) = 16.79  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.042

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 0.600 -  
USER-DEFINED - 0.30 0.30 0.600 -  
USER-DEFINED - 0.60 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 0.500 -  
USER-DEFINED - 4.00 0.30 0.600 -  
USER-DEFINED - 0.80 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.650  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 10.64  
EFFECTIVE AREA(ACRES) = 16.70 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 16.7 PEAK FLOW RATE(CFS) = 27.98

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
FLOW VELOCITY(FEET/SEC.) = 2.98 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.74  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10385.00 = 1772.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10385.00 TO NODE 10385.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 16.79  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.042  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.34  
EFFECTIVE AREA(ACRES) = 16.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 16.9 PEAK FLOW RATE(CFS) = 28.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10385.00 TO NODE 10386.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 261.00 DOWNSTREAM(FEET) = 200.00  
FLOW LENGTH(FEET) = 712.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.81  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 28.32

PIPE TRAVEL TIME(MIN.) = 0.63 Tc(MIN.) = 17.42  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10386.00 = 2484.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 0.100 -  
USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 0.100 -  
USER-DEFINED - 0.30 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.561  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.31  
EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 30.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 0.100 -  
USER-DEFINED - 0.10 0.30 0.600 -  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.30 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.544  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 6.78  
EFFECTIVE AREA(ACRES) = 22.40 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 22.4 PEAK FLOW RATE(CFS) = 36.78

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.100 -  
USER-DEFINED - 0.20 0.30 0.500 -  
USER-DEFINED - 0.10 0.30 0.600 -  
USER-DEFINED - 0.30 0.30 0.850 -  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 0.10 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 6.09  
EFFECTIVE AREA(ACRES) = 25.90 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54  
TOTAL AREA(ACRES) = 25.9 PEAK FLOW RATE(CFS) = 42.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.70 0.30 0.100 -  
USER-DEFINED - 0.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.228  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 3.48  
EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52  
TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 46.34

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 2.10 0.30 0.100 -  
USER-DEFINED - 0.20 0.30 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.225  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.22  
EFFECTIVE AREA(ACRES) = 30.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49  
TOTAL AREA(ACRES) = 30.9 PEAK FLOW RATE(CFS) = 51.56

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.100 -  
USER-DEFINED - 1.50 0.30 0.600 -  
USER-DEFINED - 1.70 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.204  
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 12.57  
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 64.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10387.00 IS CODE = 31  
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 200.00 DOWNSTREAM(FEET) = 163.00  
FLOW LENGTH(FEET) = 1145.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.16  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 64.13  
PIPE TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 18.60  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10387.00 = 3629.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.60  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.922  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.100 -  
USER-DEFINED - 23.80 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 0.100 -  
USER-DEFINED - 6.90 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.830  
SUBAREA AREA(ACRES) = 32.90 SUBAREA RUNOFF(CFS) = 49.55  
EFFECTIVE AREA(ACRES) = 71.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 71.0 PEAK FLOW RATE(CFS) = 111.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81  
=====

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.60  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.922  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 1.20 0.30 0.100 -  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.641  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 5.92  
EFFECTIVE AREA(ACRES) = 74.80 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 74.8 PEAK FLOW RATE(CFS) = 116.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10388.00 IS CODE = 31  
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 163.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 26.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.23  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 116.93  
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 18.73  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10388.00 = 3779.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.73  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.914  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.80 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.400 -  
USER-DEFINED - 0.60 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 10.14  
EFFECTIVE AREA(ACRES) = 80.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 80.9 PEAK FLOW RATE(CFS) = 126.49

```

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.73
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.914
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
    LAND USE         GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.10    0.30    0.100   -
USER-DEFINED         -        10.70    0.30    0.400   -
USER-DEFINED         -         2.30    0.30    0.850   -
USER-DEFINED         -         0.50    0.30    1.000   -
USER-DEFINED         -         0.30    0.30    1.000   -
USER-DEFINED         -         0.70    0.30    0.400   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.502
SUBAREA AREA(ACRES) = 14.60   SUBAREA RUNOFF(CFS) = 23.17
EFFECTIVE AREA(ACRES) = 95.50   AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 95.5     PEAK FLOW RATE(CFS) = 149.66

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.73
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.914
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
    LAND USE         GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.70    0.30    0.850   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.70   SUBAREA RUNOFF(CFS) = 1.05
EFFECTIVE AREA(ACRES) = 96.20   AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 96.2     PEAK FLOW RATE(CFS) = 150.71

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10389.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 158.00   DOWNSTREAM(FEET) = 157.00
FLOW LENGTH(FEET) = 51.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.53
ESTIMATED PIPE DIAMETER(INCH) = 45.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 150.71
PIPE TRAVEL TIME(MIN.) = 0.05   Tc(MIN.) = 18.78
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10389.00 = 3830.00 FEET.

*****

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FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 18.78
RAINFALL INTENSITY(INCH/HR) = 1.91
AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.58
EFFECTIVE STREAM AREA(ACRES) = 96.20
TOTAL STREAM AREA(ACRES) = 96.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 150.71

** CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)   Ap   Ae   HEADWATER
NUMBER     (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1          74.84 23.29  1.685  0.30( 0.30) 0.99  55.5 10360.00
2         150.71 18.78  1.911  0.30( 0.17) 0.58  96.2 10380.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)   Ap   Ae   HEADWATER
NUMBER     (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1          220.84 18.78  1.911  0.30( 0.21) 0.71  140.9 10380.00
2          206.00 23.29  1.685  0.30( 0.22) 0.73  151.7 10360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 220.84   Tc(MIN.) = 18.78
EFFECTIVE AREA(ACRES) = 140.95   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 151.7
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

*****
FLOW PROCESS FROM NODE 10389.00 TO NODE 10390.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 157.00   DOWNSTREAM(FEET) = 155.00
FLOW LENGTH(FEET) = 312.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 50.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.86
ESTIMATED PIPE DIAMETER(INCH) = 63.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 220.84
PIPE TRAVEL TIME(MIN.) = 0.44   Tc(MIN.) = 19.22
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

MAINLINE Tc(MIN.) = 19.22  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.882  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 5.70 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 13.53  
 EFFECTIVE AREA(ACRES) = 150.45 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 161.2 PEAK FLOW RATE(CFS) = 225.31

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.22  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.882  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 3.13  
 EFFECTIVE AREA(ACRES) = 152.65 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 163.4 PEAK FLOW RATE(CFS) = 228.45

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	228.45	19.22	1.882	0.30( 0.22)	0.73	152.6	10380.00
2	212.05	23.73	1.666	0.30( 0.22)	0.75	163.4	10360.00

LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	425.65	18.38	1.937	0.30( 0.23)	0.77	253.7	10300.00
2	421.33	21.63	1.758	0.30( 0.23)	0.77	281.6	10320.00
3	384.92	26.62	1.558	0.30( 0.23)	0.77	297.4	10340.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	651.40	18.38	1.937	0.30( 0.23)	0.76	399.7	10300.00
2	652.99	19.22	1.882	0.30( 0.23)	0.76	413.6	10380.00
3	641.00	21.63	1.758	0.30( 0.23)	0.76	440.0	10320.00
4	618.06	23.73	1.666	0.30( 0.23)	0.76	451.6	10360.00
5	581.15	26.62	1.558	0.30( 0.23)	0.76	460.8	10340.00

TOTAL AREA(ACRES) = 460.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 652.99 Tc(MIN.) = 19.219  
 EFFECTIVE AREA(ACRES) = 413.56 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA(ACRES) = 460.8  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12  
 -----

>>>>CLEAR MEMORY BANK # 1 <<<<<

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 460.8 TC(MIN.) = 19.22  
 EFFECTIVE AREA(ACRES) = 413.56 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.758  
 PEAK FLOW RATE(CFS) = 652.99

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	651.40	18.38	1.937	0.30( 0.23)	0.76	399.7	10300.00
2	652.99	19.22	1.882	0.30( 0.23)	0.76	413.6	10380.00
3	641.00	21.63	1.758	0.30( 0.23)	0.76	440.0	10320.00
4	618.06	23.73	1.666	0.30( 0.23)	0.76	451.6	10360.00
5	581.15	26.62	1.558	0.30( 0.23)	0.76	460.8	10340.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506104D.DAT  
TIME/DATE OF STUDY: 12:47 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.060
- 2) 6.00; 3.660
- 3) 7.00; 3.350
- 4) 8.00; 3.100
- 5) 9.00; 2.900
- 6) 10.00; 2.730
- 7) 11.00; 2.580
- 8) 12.00; 2.460
- 9) 13.00; 2.350
- 10) 14.00; 2.250
- 11) 15.00; 2.160
- 12) 20.00; 1.830
- 13) 25.00; 1.610
- 14) 30.00; 1.450
- 15) 40.00; 1.230
- 16) 50.00; 1.090
- 17) 60.00; 0.980
- 18) 90.00; 0.770
- 19) 120.00; 0.660
- 20) 180.00; 0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH	LIP	HIKE	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10400.00 TO NODE 10401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00  
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 540.00  
=====

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.434  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.526  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
PUBLIC PARK	-	0.50	0.30	0.850	95	6.43

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.850  
 SUBAREA RUNOFF(CFS) = 1.47  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 10401.00 TO NODE 10402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.3419  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.47  
 FLOW VELOCITY(FEET/SEC.) = 5.72 FLOW DEPTH(FEET) = 0.29  
 TRAVEL TIME(MIN.) = 0.34  $T_c$ (MIN.) = 6.77  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10402.00 = 424.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 6.77  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.420  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.940  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.41  
EFFECTIVE AREA(ACRES) = 1.00 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 2.84

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10403.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.2439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.84  
FLOW VELOCITY(FEET/SEC.) = 6.09 FLOW DEPTH(FEET) = 0.39  
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 7.11  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10403.00 = 547.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10403.00 TO NODE 10403.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.11  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.322  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 2.47  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 5.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 10403.00 TO NODE 10404.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 420.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 266.00 CHANNEL SLOPE = 0.1880  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 5.22  
FLOW VELOCITY(FEET/SEC.) = 6.34 FLOW DEPTH(FEET) = 0.52  
TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 7.81  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10404.00 = 813.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10404.00 TO NODE 10404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.81  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.148  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.863  
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 5.98  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 10.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 10404.00 TO NODE 10405.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 370.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 289.00 CHANNEL SLOPE = 0.1730  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.90  
FLOW VELOCITY(FEET/SEC.) = 7.43 FLOW DEPTH(FEET) = 0.70  
TRAVEL TIME(MIN.) = 0.65 Tc(MIN.) = 8.46  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10405.00 = 1102.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10405.00 TO NODE 10405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.46  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.008  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 9.91  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 20.28

\*\*\*\*\*

FLOW PROCESS FROM NODE 10405.00 TO NODE 10406.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 367.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 23.00 CHANNEL SLOPE = 0.1304

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 20.28  
 FLOW VELOCITY (FEET/SEC.) = 7.76 FLOW DEPTH (FEET) = 0.93  
 TRAVEL TIME (MIN.) = 0.05 Tc (MIN.) = 8.51  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10406.00 = 1125.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10406.00 TO NODE 10406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.51  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.999  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 5.19  
 EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 25.40

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10406.00 TO NODE 10407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 367.00 DOWNSTREAM (FEET) = 344.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 214.00 CHANNEL SLOPE = 0.1075  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 25.40  
 FLOW VELOCITY (FEET/SEC.) = 7.68 FLOW DEPTH (FEET) = 1.05  
 TRAVEL TIME (MIN.) = 0.46 Tc (MIN.) = 8.97  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10407.00 = 1339.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10407.00 TO NODE 10407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.97  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.906  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.00	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
 SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 4.77  
 EFFECTIVE AREA (ACRES) = 12.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 29.31

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10407.00 TO NODE 10408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 344.00 DOWNSTREAM (FEET) = 327.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 919.00 CHANNEL SLOPE = 0.0185  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 29.31  
 FLOW VELOCITY (FEET/SEC.) = 5.09 FLOW DEPTH (FEET) = 1.39  
 TRAVEL TIME (MIN.) = 3.01 Tc (MIN.) = 11.98  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10408.00 = 2258.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10408.00 TO NODE 10408.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.98  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.462  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.800	-
USER-DEFINED	-	7.90	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.849  
 SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 15.89  
 EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 40.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10408.00 TO NODE 10409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 327.00 DOWNSTREAM (FEET) = 314.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 807.00 CHANNEL SLOPE = 0.0161  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 40.29  
 FLOW VELOCITY (FEET/SEC.) = 5.25 FLOW DEPTH (FEET) = 1.60  
 TRAVEL TIME (MIN.) = 2.56 Tc (MIN.) = 14.54  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10409.00 = 3065.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10409.00 TO NODE 10409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 14.54  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.201  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.800	-
USER-DEFINED	-	7.90	0.30	0.850	-

```

LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        6.90     0.30      0.800     -
USER-DEFINED  -        5.70     0.30      0.850     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.823
SUBAREA AREA (ACRES) = 12.60  SUBAREA RUNOFF (CFS) = 22.16
EFFECTIVE AREA (ACRES) = 32.90  AREA-AVERAGED Fm (INCH/HR) = 0.25
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.84
TOTAL AREA (ACRES) = 32.9  PEAK FLOW RATE (CFS) = 57.68

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*****
FLOW PROCESS FROM NODE 10409.00 TO NODE 10410.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 314.00  DOWNSTREAM(FEET) = 266.00
FLOW LENGTH(FEET) = 213.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 33.02
ESTIMATED PIPE DIAMETER (INCH) = 21.00  NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 57.68
PIPE TRAVEL TIME (MIN.) = 0.11  Tc (MIN.) = 14.65
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10410.00 = 3278.00 FEET.

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*****
FLOW PROCESS FROM NODE 10410.00 TO NODE 10411.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 266.00  DOWNSTREAM(FEET) = 170.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 1470.00  CHANNEL SLOPE = 0.0653
CHANNEL BASE (FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 57.68
FLOW VELOCITY (FEET/SEC.) = 9.69  FLOW DEPTH (FEET) = 1.41
TRAVEL TIME (MIN.) = 2.53  Tc (MIN.) = 17.18
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10411.00 = 4748.00 FEET.

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*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10411.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 17.18
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.016
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.60     0.30     0.100     -
USER-DEFINED  -        0.10     0.30     0.850     -
USER-DEFINED  -        0.40     0.30     0.100     -
USER-DEFINED  -        6.60     0.30     0.800     -
USER-DEFINED  -        0.80     0.30     0.850     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.723
SUBAREA AREA (ACRES) = 8.50  SUBAREA RUNOFF (CFS) = 13.76

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EFFECTIVE AREA (ACRES) = 41.40  AREA-AVERAGED Fm (INCH/HR) = 0.25
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.82
TOTAL AREA (ACRES) = 41.4  PEAK FLOW RATE (CFS) = 65.97

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*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10412.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 170.00  DOWNSTREAM(FEET) = 161.00
FLOW LENGTH (FEET) = 1129.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 30.1 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.59
ESTIMATED PIPE DIAMETER (INCH) = 39.00  NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 65.97
PIPE TRAVEL TIME (MIN.) = 1.96  Tc (MIN.) = 19.14
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10412.00 = 5877.00 FEET.

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*****
FLOW PROCESS FROM NODE 10412.00 TO NODE 10413.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 161.00  DOWNSTREAM(FEET) = 141.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 360.00  CHANNEL SLOPE = 0.0556
CHANNEL BASE (FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 65.97
FLOW VELOCITY (FEET/SEC.) = 9.41  FLOW DEPTH (FEET) = 1.53
TRAVEL TIME (MIN.) = 0.64  Tc (MIN.) = 19.78
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10413.00 = 6237.00 FEET.

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*****
FLOW PROCESS FROM NODE 10413.00 TO NODE 10413.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 19.78
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.845
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        1.20     0.30     0.100     -
USER-DEFINED  -        0.40     0.30     0.850     -
USER-DEFINED  -        0.30     0.30     0.100     -
USER-DEFINED  -        0.10     0.30     0.850     -
USER-DEFINED  -        0.90     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.509
SUBAREA AREA (ACRES) = 2.90  SUBAREA RUNOFF (CFS) = 4.42
EFFECTIVE AREA (ACRES) = 44.30  AREA-AVERAGED Fm (INCH/HR) = 0.24
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.80
TOTAL AREA (ACRES) = 44.3  PEAK FLOW RATE (CFS) = 65.97
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF STUDY SUMMARY:

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TOTAL AREA (ACRES) = 44.3 TC (MIN.) = 19.78  
EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.24  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.798  
PEAK FLOW RATE (CFS) = 65.97

=====  
=====

END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506105K.DAT  
TIME/DATE OF STUDY: 12:50 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.060
- 2) 6.00; 3.660
- 3) 7.00; 3.350
- 4) 8.00; 3.100
- 5) 9.00; 2.900
- 6) 10.00; 2.730
- 7) 11.00; 2.580
- 8) 12.00; 2.460
- 9) 13.00; 2.350
- 10) 14.00; 2.250
- 11) 15.00; 2.160
- 12) 20.00; 1.830
- 13) 25.00; 1.610
- 14) 30.00; 1.450
- 15) 40.00; 1.230
- 16) 50.00; 1.090
- 17) 60.00; 0.980
- 18) 90.00; 0.770
- 19) 120.00; 0.660
- 20) 180.00; 0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

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FLOW PROCESS FROM NODE 10500.00 TO NODE 10501.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 1123.00 DOWNSTREAM(FEET) = 1085.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.984  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.582  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.20	0.30	1.000	95	10.98
NATURAL FAIR COVER "GRASS"	-	0.30	0.30	1.000	95	10.98

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
 SUBAREA RUNOFF(CFS) = 1.03  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.03

\*\*\*\*\*

FLOW PROCESS FROM NODE 10501.00 TO NODE 10502.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 1085.00 DOWNSTREAM(FEET) = 1050.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 181.00 CHANNEL SLOPE = 0.1934  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.03  
 FLOW VELOCITY(FEET/SEC.) = 4.21 FLOW DEPTH(FEET) = 0.29  
 TRAVEL TIME(MIN.) = 0.72  $T_c$ (MIN.) = 11.70  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10502.00 = 507.00 FEET.

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FLOW PROCESS FROM NODE 10502.00 TO NODE 10502.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
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MAINLINE  $T_c$ (MIN.) = 11.70  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.496  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.10     0.30      1.000     -
USER-DEFINED  -        0.80     0.30      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 1.78
EFFECTIVE AREA (ACRES) = 1.40  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.4    PEAK FLOW RATE (CFS) = 2.77

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*****
FLOW PROCESS FROM NODE 10502.00 TO NODE 10503.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1025.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 193.00  CHANNEL SLOPE = 0.1295
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.77
FLOW VELOCITY(FEET/SEC.) = 4.77  FLOW DEPTH(FEET) = 0.44
TRAVEL TIME(MIN.) = 0.67  Tc(MIN.) = 12.38
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10503.00 = 700.00 FEET.

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10503.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.38
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.419
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.50   0.30  1.000  -
USER-DEFINED      -        1.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 4.39
EFFECTIVE AREA (ACRES) = 3.70  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 3.7    PEAK FLOW RATE (CFS) = 7.06

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10504.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1025.00  DOWNSTREAM(FEET) = 1020.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00  CHANNEL SLOPE = 0.0151
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.06
FLOW VELOCITY(FEET/SEC.) = 3.30  FLOW DEPTH(FEET) = 0.84
TRAVEL TIME(MIN.) = 1.68  Tc(MIN.) = 14.05
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10504.00 = 1032.00 FEET.

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FLOW PROCESS FROM NODE 10504.00 TO NODE 10504.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.05
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.245
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.10   0.30  1.000  -
USER-DEFINED      -        0.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 1.58
EFFECTIVE AREA (ACRES) = 4.60  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.6    PEAK FLOW RATE (CFS) = 8.05

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10505.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1020.00  DOWNSTREAM(FEET) = 975.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 397.00  CHANNEL SLOPE = 0.1134
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 8.05
FLOW VELOCITY(FEET/SEC.) = 7.27  FLOW DEPTH(FEET) = 0.61
TRAVEL TIME(MIN.) = 0.91  Tc(MIN.) = 14.96
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10505.00 = 1429.00 FEET.

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10505.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.96
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.164
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.20   0.30  1.000  -
USER-DEFINED      -        1.20   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.40  SUBAREA RUNOFF (CFS) = 2.35
EFFECTIVE AREA (ACRES) = 6.00  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.0    PEAK FLOW RATE (CFS) = 10.06

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10506.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 905.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 334.00 CHANNEL SLOPE = 0.2096
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.06
FLOW VELOCITY(FEET/SEC.) = 9.63 FLOW DEPTH(FEET) = 0.59
TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 15.54
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10506.00 = 1763.00 FEET.

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FLOW PROCESS FROM NODE 10506.00 TO NODE 10506.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.54
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.124
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         6.10   0.30  1.000  -
USER-DEFINED       -         3.70   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 16.09
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 25.94

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10507.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 790.00 CHANNEL SLOPE = 0.0380
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 25.94
FLOW VELOCITY(FEET/SEC.) = 5.23 FLOW DEPTH(FEET) = 1.29
TRAVEL TIME(MIN.) = 2.52 Tc(MIN.) = 18.06
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10507.00 = 2553.00 FEET.

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FLOW PROCESS FROM NODE 10507.00 TO NODE 10507.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 18.06
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.958
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         2.70   0.30  1.000  -
USER-DEFINED       -         6.30   0.30  1.000  -
USER-DEFINED       -         0.30   0.30  1.000  -

```

```

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 13.88
EFFECTIVE AREA(ACRES) = 25.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 37.46

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10508.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 755.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 37.46
FLOW VELOCITY(FEET/SEC.) = 8.42 FLOW DEPTH(FEET) = 1.22
TRAVEL TIME(MIN.) = 2.22 Tc(MIN.) = 20.28
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10508.00 = 3673.00 FEET.

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10508.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 20.28
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.818
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         0.80   0.30  1.000  -
USER-DEFINED       -        11.10  0.30  1.000  -
USER-DEFINED       -         3.10   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 20.49
EFFECTIVE AREA(ACRES) = 40.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 54.78

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10509.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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```

ELEVATION DATA: UPSTREAM(FEET) = 755.00 DOWNSTREAM(FEET) = 533.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1578.00 CHANNEL SLOPE = 0.1407
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 54.78
FLOW VELOCITY(FEET/SEC.) = 10.29 FLOW DEPTH(FEET) = 1.33
TRAVEL TIME(MIN.) = 2.56 Tc(MIN.) = 22.83
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10509.00 = 5251.00 FEET.

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FLOW PROCESS FROM NODE 10509.00 TO NODE 10509.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.83

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.705

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.80	0.30	1.000	-
USER-DEFINED	-	11.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	8.30	0.30	1.000	-
USER-DEFINED	-	38.10	0.30	1.000	-
USER-DEFINED	-	8.70	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 77.40 SUBAREA RUNOFF (CFS) = 97.90

EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 148.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 10509.00 TO NODE 10510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 415.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1236.00 CHANNEL SLOPE = 0.0955  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 148.63  
 FLOW VELOCITY (FEET/SEC.) = 11.39 FLOW DEPTH (FEET) = 2.09  
 TRAVEL TIME (MIN.) = 1.81 Tc (MIN.) = 24.64  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10510.00 = 6487.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 24.64

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.626

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	30.10	0.30	1.000	-
USER-DEFINED	-	15.30	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	11.30	0.30	1.000	-
USER-DEFINED	-	5.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 64.90 SUBAREA RUNOFF (CFS) = 77.44

EFFECTIVE AREA (ACRES) = 182.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 182.4 PEAK FLOW RATE (CFS) = 217.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10511.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1161.00 CHANNEL SLOPE = 0.0973  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 217.65  
 FLOW VELOCITY (FEET/SEC.) = 12.61 FLOW DEPTH (FEET) = 2.40  
 TRAVEL TIME (MIN.) = 1.53 Tc (MIN.) = 26.18  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10511.00 = 7648.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10511.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 26.18

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.572

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.50	0.30	1.000	-
USER-DEFINED	-	10.80	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	22.10	0.30	1.000	-
USER-DEFINED	-	4.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 54.80 SUBAREA RUNOFF (CFS) = 62.76

EFFECTIVE AREA (ACRES) = 237.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 237.2 PEAK FLOW RATE (CFS) = 271.64

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 302.00 DOWNSTREAM (FEET) = 190.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1644.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 271.64  
 FLOW VELOCITY (FEET/SEC.) = 11.65 FLOW DEPTH (FEET) = 2.79  
 TRAVEL TIME (MIN.) = 2.35 Tc (MIN.) = 28.53  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10512.00 = 9292.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10512.00 TO NODE 10512.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<



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=====
MAINLINE Tc(MIN.) = 28.53
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.497
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.50     0.30     1.000     -
USER-DEFINED            -        0.20     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     1.000     -
USER-DEFINED            -        0.10     0.30     1.000     -
USER-DEFINED            -       14.20     0.30     1.000     -
USER-DEFINED            -        2.80     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 19.50      SUBAREA RUNOFF(CFS) = 21.01
EFFECTIVE AREA(ACRES) = 256.70   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 256.7        PEAK FLOW RATE(CFS) = 276.59

*****
FLOW PROCESS FROM NODE 10512.00 TO NODE 10513.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 190.00 DOWNSTREAM(FEET) = 183.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 86.00 CHANNEL SLOPE = 0.0814
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00
CHANNEL FLOW THRU SUBAREA(CFS) = 276.59
FLOW VELOCITY(FEET/SEC.) = 12.54 FLOW DEPTH(FEET) = 2.71
TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 28.64
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10513.00 = 9378.00 FEET.

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 28.64
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.493
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.10     0.30     0.100     -
USER-DEFINED            -        1.30     0.30     1.000     -
USER-DEFINED            -       29.90     0.30     1.000     -
USER-DEFINED            -       11.90     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     1.000     -
USER-DEFINED            -        0.60     0.30     0.100     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 45.50      SUBAREA RUNOFF(CFS) = 49.05
EFFECTIVE AREA(ACRES) = 302.20   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 302.2        PEAK FLOW RATE(CFS) = 324.79

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FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 28.64
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.493
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        9.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30      SUBAREA RUNOFF(CFS) = 9.99
EFFECTIVE AREA(ACRES) = 311.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 311.5        PEAK FLOW RATE(CFS) = 334.78

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10514.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 171.00
FLOW LENGTH(FEET) = 1209.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 53.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.64
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 334.78
PIPE TRAVEL TIME(MIN.) = 1.29 Tc(MIN.) = 29.93
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10514.00 = 10587.00 FEET.

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10514.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 29.93
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.452
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.20     0.30     0.100     -
USER-DEFINED            -        0.40     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     0.100     -
USER-DEFINED            -       31.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 33.60      SUBAREA RUNOFF(CFS) = 35.31
EFFECTIVE AREA(ACRES) = 345.10   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 345.1        PEAK FLOW RATE(CFS) = 358.53

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10515.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

ELEVATION DATA: UPSTREAM(FEET) = 171.00 DOWNSTREAM(FEET) = 165.00  
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.22  
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 358.53  
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 30.51  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10515.00 = 11152.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10515.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 30.51  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.439  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 1.30 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 15.30 0.30 0.100 -  
USER-DEFINED - 1.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.202  
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 23.81  
EFFECTIVE AREA(ACRES) = 364.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 364.3 PEAK FLOW RATE(CFS) = 378.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10525.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 709.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 72.0 INCH PIPE IS 55.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.06  
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 378.16  
PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 31.25  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 31.25  
RAINFALL INTENSITY(INCH/HR) = 1.42  
AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.95  
EFFECTIVE STREAM AREA(ACRES) = 364.30  
TOTAL STREAM AREA(ACRES) = 364.30  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 378.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10520.00 TO NODE 10521.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 289.00  
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 180.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.311  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.272  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL - 0.30 0.30 0.100 95 7.31  
PUBLIC PARK - 1.20 0.30 0.850 95 11.62  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.700  
SUBAREA RUNOFF(CFS) = 4.13  
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 4.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10521.00 TO NODE 10522.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 180.00 DOWNSTREAM ELEVATION(FEET) = 176.00  
STREET LENGTH(FEET) = 408.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.02  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 11.21  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.43  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.93  
STREET FLOW TRAVEL TIME(MIN.) = 2.80 Tc(MIN.) = 10.11  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.713

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.60	0.30	0.100	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520  
 SUBAREA AREA (ACRES) = 2.50 SUBAREA RUNOFF (CFS) = 5.75  
 EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 9.13

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.41 HALFSTREET FLOOD WIDTH (FEET) = 12.54  
 FLOW VELOCITY (FEET/SEC.) = 2.59 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.06  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10522.00 = 697.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10522.00 TO NODE 10523.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 176.00 DOWNSTREAM ELEVATION (FEET) = 173.00  
 STREET LENGTH (FEET) = 333.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.01  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.47  
 HALFSTREET FLOOD WIDTH (FEET) = 15.74  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.81  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.33  
 STREET FLOW TRAVEL TIME (MIN.) = 1.97 Tc (MIN.) = 12.09  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.451

SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	4.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.109  
 SUBAREA AREA (ACRES) = 5.40 SUBAREA RUNOFF (CFS) = 11.75  
 EFFECTIVE AREA (ACRES) = 9.40 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA (ACRES) = 9.4 PEAK FLOW RATE (CFS) = 19.94

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.51 HALFSTREET FLOOD WIDTH (FEET) = 17.62  
 FLOW VELOCITY (FEET/SEC.) = 3.03 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.55  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10523.00 = 1030.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10523.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.09  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.451  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.90	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	0.100	-
USER-DEFINED	-	4.80	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	4.90	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.785  
 SUBAREA AREA (ACRES) = 12.70 SUBAREA RUNOFF (CFS) = 25.32  
 EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 45.26

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10524.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 173.00 DOWNSTREAM (FEET) = 165.00  
 FLOW LENGTH (FEET) = 736.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.91  
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 45.26  
 PIPE TRAVEL TIME (MIN.) = 1.24 Tc (MIN.) = 13.32  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10524.00 = 1766.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10524.00 TO NODE 10524.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.32  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.318  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.308  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 3.60  
EFFECTIVE AREA(ACRES) = 23.90 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 23.9 PEAK FLOW RATE(CFS) = 46.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10524.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 623.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.08  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 46.22  
PIPE TRAVEL TIME(MIN.) = 1.03 Tc(MIN.) = 14.35  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10525.00 = 2389.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.35  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.218  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	6.80	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 16.07  
EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64  
TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 60.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.35  
RAINFALL INTENSITY(INCH/HR) = 2.22  
AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.64  
EFFECTIVE STREAM AREA(ACRES) = 33.00

TOTAL STREAM AREA(ACRES) = 33.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 60.15

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	378.16	31.25	1.423	0.30( 0.29)	0.95	364.3	10500.00
2	60.15	14.35	2.218	0.30( 0.19)	0.64	33.0	10520.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	355.40	14.35	2.218	0.30( 0.27)	0.90	200.4	10520.00
2	414.68	31.25	1.423	0.30( 0.28)	0.93	397.3	10500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 414.68 Tc(MIN.) = 31.25  
EFFECTIVE AREA(ACRES) = 397.30 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
TOTAL AREA(ACRES) = 397.3  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10526.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 158.00 DOWNSTREAM(FEET) = 148.00  
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 61.83  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 414.68  
PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 31.25  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10526.00 = 11891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10526.00 TO NODE 10527.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 148.00 DOWNSTREAM(FEET) = 135.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 296.00 CHANNEL SLOPE = 0.0439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 414.68  
FLOW VELOCITY(FEET/SEC.) = 13.68 FLOW DEPTH(FEET) = 3.18  
TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 31.61  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10527.00 = 12187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 31.61  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.414  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.40  
 EFFECTIVE AREA(ACRES) = 398.70 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 398.7 PEAK FLOW RATE(CFS) = 414.68  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 31.61  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.414  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
 SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 4.94  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 403.6 PEAK FLOW RATE(CFS) = 414.68  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 403.6 TC(MIN.) = 31.61  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.927  
 PEAK FLOW RATE(CFS) = 414.68

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	355.73	14.74	2.184	0.30( 0.27)	0.90	206.7	10520.00
2	414.68	31.61	1.414	0.30( 0.28)	0.93	403.6	10500.00

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

-----  
FILE NAME: 0506106D.DAT  
TIME/DATE OF STUDY: 12:51 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.060
- 2) 6.00; 3.660
- 3) 7.00; 3.350
- 4) 8.00; 3.100
- 5) 9.00; 2.900
- 6) 10.00; 2.730
- 7) 11.00; 2.580
- 8) 12.00; 2.460
- 9) 13.00; 2.350
- 10) 14.00; 2.250
- 11) 15.00; 2.160
- 12) 20.00; 1.830
- 13) 25.00; 1.610
- 14) 30.00; 1.450
- 15) 40.00; 1.230
- 16) 50.00; 1.090
- 17) 60.00; 0.980
- 18) 90.00; 0.770
- 19) 120.00; 0.660
- 20) 180.00; 0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10600.00 TO NODE 10601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 311.00  
ELEVATION DATA: UPSTREAM(FEET) = 166.00 DOWNSTREAM(FEET) = 164.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.602  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.640  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	-	0.50	0.30	0.500	95	10.60
PUBLIC PARK	-	0.60	0.30	0.850	95	13.16

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 0.691  
 SUBAREA RUNOFF(CFS) = 2.41  
 TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 2.41

\*\*\*\*\*

FLOW PROCESS FROM NODE 10601.00 TO NODE 10602.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 164.00 DOWNSTREAM ELEVATION(FEET) = 162.00  
STREET LENGTH(FEET) = 220.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.56  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 9.34  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.14

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.74  
STREET FLOW TRAVEL TIME (MIN.) = 1.71 Tc (MIN.) = 12.31  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.426  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.517  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 4.29  
EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 6.49

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.38 HALFSTREET FLOOD WIDTH (FEET) = 10.98  
FLOW VELOCITY (FEET/SEC.) = 2.33 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.88  
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10602.00 = 531.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10602.00 TO NODE 10603.00 IS CODE = 63  
-----  
>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
>>>> (STREET TABLE SECTION # 5 USED) <<<<<<  
-----  
UPSTREAM ELEVATION (FEET) = 162.00 DOWNSTREAM ELEVATION (FEET) = 159.00  
STREET LENGTH (FEET) = 328.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.09  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.42  
HALFSTREET FLOOD WIDTH (FEET) = 13.32  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.57  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.09  
STREET FLOW TRAVEL TIME (MIN.) = 2.13 Tc (MIN.) = 14.44  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.210  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.500	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	2.40	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527  
SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 7.20

EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.16  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 13.07

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.45 HALFSTREET FLOOD WIDTH (FEET) = 14.80  
FLOW VELOCITY (FEET/SEC.) = 2.74 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.25  
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10603.00 = 859.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10603.00 TO NODE 10604.00 IS CODE = 63  
-----  
>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
>>>> (STREET TABLE SECTION # 5 USED) <<<<<<  
-----  
UPSTREAM ELEVATION (FEET) = 159.00 DOWNSTREAM ELEVATION (FEET) = 155.00  
STREET LENGTH (FEET) = 465.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 19.38  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.51  
HALFSTREET FLOOD WIDTH (FEET) = 17.62  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.94  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.50  
STREET FLOW TRAVEL TIME (MIN.) = 2.63 Tc (MIN.) = 17.07  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.023  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.30	0.500	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.513  
SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 12.62  
EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.16  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 24.49

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.54 HALFSTREET FLOOD WIDTH (FEET) = 19.34  
FLOW VELOCITY (FEET/SEC.) = 3.12 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.70  
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10604.00 = 1324.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10604.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.07
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.023
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.30    0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.10    SUBAREA RUNOFF(CFS) = 0.16
EFFECTIVE AREA(ACRES) = 14.70  AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 14.7    PEAK FLOW RATE(CFS) = 24.65

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10605.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 155.00  DOWNSTREAM(FEET) = 140.00
FLOW LENGTH(FEET) = 214.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.96
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 24.65
PIPE TRAVEL TIME(MIN.) = 0.21  Tc(MIN.) = 17.28
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10605.00 = 1538.00 FEET.

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10605.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.28
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.009
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20    0.30    0.100    -
USER-DEFINED        -         1.70    0.30    0.100    -
USER-DEFINED        -        10.20    0.30    0.800    -
USER-DEFINED        -         2.90    0.30    0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.682
SUBAREA AREA(ACRES) = 16.00  SUBAREA RUNOFF(CFS) = 25.99
EFFECTIVE AREA(ACRES) = 30.70  AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 30.7    PEAK FLOW RATE(CFS) = 50.46

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10606.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

```

```

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 140.00  DOWNSTREAM(FEET) = 133.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00  CHANNEL SLOPE = 0.0400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 50.46
FLOW VELOCITY(FEET/SEC.) = 7.79  FLOW DEPTH(FEET) = 1.47
TRAVEL TIME(MIN.) = 0.37  Tc(MIN.) = 17.66
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10606.00 = 1713.00 FEET.

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.66
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.985
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.30    0.500    -
USER-DEFINED        -         0.30    0.30    0.850    -
USER-DEFINED        -         0.10    0.30    1.000    -
USER-DEFINED        -         1.10    0.30    1.000    -
USER-DEFINED        -         0.10    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 1.80  SUBAREA RUNOFF(CFS) = 2.77
EFFECTIVE AREA(ACRES) = 32.50  AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 32.5    PEAK FLOW RATE(CFS) = 52.54

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.66
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.985
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.30    0.850    -
USER-DEFINED        -         1.20    0.30    1.000    -
USER-DEFINED        -         0.10    0.30    1.000    -
USER-DEFINED        -         1.80    0.30    1.000    -
USER-DEFINED        -         0.10    0.30    0.850    -
USER-DEFINED        -         0.20    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980
SUBAREA AREA(ACRES) = 3.80  SUBAREA RUNOFF(CFS) = 5.78
EFFECTIVE AREA(ACRES) = 36.30  AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.66
TOTAL AREA(ACRES) = 36.3    PEAK FLOW RATE(CFS) = 58.32

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81

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-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.66  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.985  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.91  
EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.67  
TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 59.23  
=====

END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 36.9 TC(MIN.) = 17.66  
EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR)= 0.20  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.670  
PEAK FLOW RATE(CFS) = 59.23  
=====

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 25 Yr \*  
\* From Node: 40300 To Node: 40313 \*  
\*\*\*\*\*

FILE NAME: 0610403W.DAT  
TIME/DATE OF STUDY: 09:46 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.983
- 2) 10.00; 3.242
- 3) 15.00; 2.468
- 4) 20.00; 2.035
- 5) 25.00; 1.772
- 6) 30.00; 1.553
- 7) 40.00; 1.354
- 8) 50.00; 1.200
- 9) 60.00; 1.077
- 10) 90.00; 0.909
- 11) 120.00; 0.800
- 12) 180.00; 0.670
- 13) 360.00; 0.498
- 14) 1440.00; 0.219

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40300.00 TO NODE 40301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 316.00  
ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 720.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.541  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.402  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.39	0.30	1.000	0	9.54

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.10  
TOTAL AREA(ACRES) = 0.39 PEAK FLOW RATE(CFS) = 1.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40301.00 TO NODE 40302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 191.00 CHANNEL SLOPE = 0.2356  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.224  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.88	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.26  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.54  
AVERAGE FLOW DEPTH(FEET) = 0.37 TRAVEL TIME(MIN.) = 0.57  
Tc(MIN.) = 10.12  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 2.33  
EFFECTIVE AREA(ACRES) = 1.28 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.3 PEAK FLOW RATE(CFS) = 3.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.42 FLOW VELOCITY(FEET/SEC.) = 6.23  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40302.00 = 507.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40302.00 TO NODE 40303.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 625.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 179.00 CHANNEL SLOPE = 0.2793  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.160

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.84	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.44

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.15

AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.42

Tc(MIN.) = 10.53

SUBAREA AREA(ACRES) = 0.84 SUBAREA RUNOFF(CFS) = 2.15

EFFECTIVE AREA(ACRES) = 2.12 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.1 PEAK FLOW RATE(CFS) = 5.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.49 FLOW VELOCITY(FEET/SEC.) = 7.46

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40303.00 = 686.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40303.00 TO NODE 40304.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 625.00 DOWNSTREAM(FEET) = 557.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.4224  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.118

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.94	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.17

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.96

AVERAGE FLOW DEPTH(FEET) = 0.55 TRAVEL TIME(MIN.) = 0.27

Tc(MIN.) = 10.80

SUBAREA AREA(ACRES) = 2.94 SUBAREA RUNOFF(CFS) = 7.46

EFFECTIVE AREA(ACRES) = 5.06 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.1 PEAK FLOW RATE(CFS) = 12.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.63 FLOW VELOCITY(FEET/SEC.) = 10.76

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40304.00 = 847.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40304.00 TO NODE 40305.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 557.00 DOWNSTREAM(FEET) = 548.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 42.00 CHANNEL SLOPE = 0.2143  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.105

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.68	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.94

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.66

AVERAGE FLOW DEPTH(FEET) = 0.76 TRAVEL TIME(MIN.) = 0.08

Tc(MIN.) = 10.88

SUBAREA AREA(ACRES) = 1.68 SUBAREA RUNOFF(CFS) = 4.23

EFFECTIVE AREA(ACRES) = 6.73 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 17.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.80 FLOW VELOCITY(FEET/SEC.) = 8.94

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40305.00 = 889.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40305.00 TO NODE 40306.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 548.00 DOWNSTREAM(FEET) = 515.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 217.00 CHANNEL SLOPE = 0.1521  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.040

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.67	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.76

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.53

AVERAGE FLOW DEPTH(FEET) = 0.94 TRAVEL TIME(MIN.) = 0.42

Tc(MIN.) = 11.31

SUBAREA AREA(ACRES) = 4.67 SUBAREA RUNOFF(CFS) = 11.53

EFFECTIVE AREA(ACRES) = 11.41 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.4 PEAK FLOW RATE (CFS) = 28.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.03 FLOW VELOCITY (FEET/SEC.) = 8.92  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40306.00 = 1106.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40306.00 TO NODE 40307.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 502.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 180.00 CHANNEL SLOPE = 0.0722  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.976

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.44	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 38.29

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.29

AVERAGE FLOW DEPTH (FEET) = 1.32 TRAVEL TIME (MIN.) = 0.41

Tc (MIN.) = 11.72

SUBAREA AREA (ACRES) = 8.44 SUBAREA RUNOFF (CFS) = 20.32

EFFECTIVE AREA (ACRES) = 19.84 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 19.8 PEAK FLOW RATE (CFS) = 47.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.44 FLOW VELOCITY (FEET/SEC.) = 7.71

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40307.00 = 1286.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40307.00 TO NODE 40308.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 502.00 DOWNSTREAM (FEET) = 469.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 553.00 CHANNEL SLOPE = 0.0597  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.787

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.07	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 59.08

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.57

AVERAGE FLOW DEPTH (FEET) = 1.61 TRAVEL TIME (MIN.) = 1.22

Tc (MIN.) = 12.94

SUBAREA AREA (ACRES) = 10.07 SUBAREA RUNOFF (CFS) = 22.55  
EFFECTIVE AREA (ACRES) = 29.92 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 29.9 PEAK FLOW RATE (CFS) = 66.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.69 FLOW VELOCITY (FEET/SEC.) = 7.83

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40308.00 = 1839.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40308.00 TO NODE 40309.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 469.00 DOWNSTREAM (FEET) = 433.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 631.00 CHANNEL SLOPE = 0.0571  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.583

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.09	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 76.32

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.96

AVERAGE FLOW DEPTH (FEET) = 1.79 TRAVEL TIME (MIN.) = 1.32

Tc (MIN.) = 14.26

SUBAREA AREA (ACRES) = 9.09 SUBAREA RUNOFF (CFS) = 18.67

EFFECTIVE AREA (ACRES) = 39.01 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 39.0 PEAK FLOW RATE (CFS) = 80.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.82 FLOW VELOCITY (FEET/SEC.) = 8.06

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40309.00 = 2470.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40309.00 TO NODE 40310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 433.00 DOWNSTREAM (FEET) = 406.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 595.00 CHANNEL SLOPE = 0.0454  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.419

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.61	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 91.21

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.63

AVERAGE FLOW DEPTH(FEET) = 2.00 TRAVEL TIME(MIN.) = 1.30  
Tc(MIN.) = 15.56  
SUBAREA AREA(ACRES) = 11.61 SUBAREA RUNOFF(CFS) = 22.15  
EFFECTIVE AREA(ACRES) = 50.62 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 50.6 PEAK FLOW RATE(CFS) = 96.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.04 FLOW VELOCITY(FEET/SEC.) = 7.73  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40310.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40310.00 TO NODE 40311.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 406.00 DOWNSTREAM(FEET) = 353.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1122.00 CHANNEL SLOPE = 0.0472  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.259  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 15.32 0.30 0.897 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 110.27  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.07  
AVERAGE FLOW DEPTH(FEET) = 1.91 TRAVEL TIME(MIN.) = 1.86  
Tc(MIN.) = 17.41  
SUBAREA AREA(ACRES) = 15.32 SUBAREA RUNOFF(CFS) = 27.43  
EFFECTIVE AREA(ACRES) = 65.94 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 65.9 PEAK FLOW RATE(CFS) = 116.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.95 FLOW VELOCITY(FEET/SEC.) = 10.22  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40311.00 = 4187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40311.00 TO NODE 40312.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 843.00 CHANNEL SLOPE = 0.0451  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.142  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 26.00 0.30 0.886 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.886

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 138.63  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.47  
AVERAGE FLOW DEPTH(FEET) = 2.10 TRAVEL TIME(MIN.) = 1.34  
Tc(MIN.) = 18.76  
SUBAREA AREA(ACRES) = 26.00 SUBAREA RUNOFF(CFS) = 43.92  
EFFECTIVE AREA(ACRES) = 91.94 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 91.9 PEAK FLOW RATE(CFS) = 153.69

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.18 FLOW VELOCITY(FEET/SEC.) = 10.79  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40312.00 = 5030.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40312.00 TO NODE 40313.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 310.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 226.00 CHANNEL SLOPE = 0.0221  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.103  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.53 0.30 0.896 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.896  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 155.78  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.27  
AVERAGE FLOW DEPTH(FEET) = 2.51 TRAVEL TIME(MIN.) = 0.46  
Tc(MIN.) = 19.21  
SUBAREA AREA(ACRES) = 2.53 SUBAREA RUNOFF(CFS) = 4.18  
EFFECTIVE AREA(ACRES) = 94.47 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 94.5 PEAK FLOW RATE(CFS) = 154.60

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.50 FLOW VELOCITY(FEET/SEC.) = 8.25  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40313.00 = 5256.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40313.00 TO NODE 40313.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 19.21  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.103  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 80.58 0.30 0.984 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
SUBAREA AREA(ACRES) = 80.58 SUBAREA RUNOFF(CFS) = 131.11  
EFFECTIVE AREA(ACRES) = 175.05 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30    AREA-AVERAGED  $A_p$  = 0.97  
TOTAL AREA (ACRES) = 175.0    PEAK FLOW RATE (CFS) = 285.71

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 175.0    TC (MIN.) = 19.21  
EFFECTIVE AREA (ACRES) = 175.05    AREA-AVERAGED  $F_m$  (INCH/HR) = 0.29  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30    AREA-AVERAGED  $A_p$  = 0.965  
PEAK FLOW RATE (CFS) = 285.71

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 25 Yr \*  
\* From Node: 40400 To Node: 40453 \*  
\*\*\*\*\*

FILE NAME: 0610404W.DAT  
TIME/DATE OF STUDY: 09:46 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.983
- 2) 10.00; 3.242
- 3) 15.00; 2.468
- 4) 20.00; 2.035
- 5) 25.00; 1.772
- 6) 30.00; 1.553
- 7) 40.00; 1.354
- 8) 50.00; 1.200
- 9) 60.00; 1.077
- 10) 90.00; 0.909
- 11) 120.00; 0.800
- 12) 180.00; 0.670
- 13) 360.00; 0.498
- 14) 1440.00; 0.219

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40400.00 TO NODE 40401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 928.00 DOWNSTREAM(FEET) = 750.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.081  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.911  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.75	0.30	1.000	0	8.08

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.44  
TOTAL AREA(ACRES) = 0.75 PEAK FLOW RATE(CFS) = 2.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40401.00 TO NODE 40402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 710.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 107.00 CHANNEL SLOPE = 0.3738  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.831  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.17	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.31  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.77  
AVERAGE FLOW DEPTH(FEET) = 0.43 TRAVEL TIME(MIN.) = 0.23  
Tc(MIN.) = 8.31  
SUBAREA AREA(ACRES) = 1.17 SUBAREA RUNOFF(CFS) = 3.73  
EFFECTIVE AREA(ACRES) = 1.93 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 6.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.49 FLOW VELOCITY(FEET/SEC.) = 8.66  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40402.00 = 434.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40402.00 TO NODE 40403.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 710.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.2756  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.741

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.05	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.74

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.18

AVERAGE FLOW DEPTH(FEET) = 0.56 TRAVEL TIME(MIN.) = 0.26

Tc(MIN.) = 8.57

SUBAREA AREA(ACRES) = 1.05 SUBAREA RUNOFF(CFS) = 3.24

EFFECTIVE AREA(ACRES) = 2.97 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 9.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.60 FLOW VELOCITY(FEET/SEC.) = 8.53

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40403.00 = 561.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40403.00 TO NODE 40404.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 113.00 CHANNEL SLOPE = 0.2212  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.662

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.95	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.16

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.34

AVERAGE FLOW DEPTH(FEET) = 0.70 TRAVEL TIME(MIN.) = 0.23

Tc(MIN.) = 8.79

SUBAREA AREA(ACRES) = 1.95 SUBAREA RUNOFF(CFS) = 5.90

EFFECTIVE AREA(ACRES) = 4.92 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 14.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.75 FLOW VELOCITY(FEET/SEC.) = 8.77

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40404.00 = 674.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40404.00 TO NODE 40405.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 650.00 DOWNSTREAM(FEET) = 610.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 219.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.514

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.15	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.00

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.58

AVERAGE FLOW DEPTH(FEET) = 0.84 TRAVEL TIME(MIN.) = 0.43

Tc(MIN.) = 9.22

SUBAREA AREA(ACRES) = 2.15 SUBAREA RUNOFF(CFS) = 6.21

EFFECTIVE AREA(ACRES) = 7.07 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 20.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.88 FLOW VELOCITY(FEET/SEC.) = 8.80

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40405.00 = 893.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40405.00 TO NODE 40406.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 605.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 43.00 CHANNEL SLOPE = 0.1163  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.482

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.60

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.80

AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 0.09

Tc(MIN.) = 9.31

SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 8.31

EFFECTIVE AREA(ACRES) = 9.97 AREA-AVERAGED Fm(INCH/HR) = 0.30



AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 10.0 PEAK FLOW RATE (CFS) = 28.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.08 FLOW VELOCITY (FEET/SEC.) = 8.15  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40406.00 = 936.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40406.00 TO NODE 40407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 605.00 DOWNSTREAM (FEET) = 602.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 52.00 CHANNEL SLOPE = 0.0577  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.436

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 34.92  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.58  
AVERAGE FLOW DEPTH (FEET) = 1.33 TRAVEL TIME (MIN.) = 0.13  
Tc (MIN.) = 9.44  
SUBAREA AREA (ACRES) = 4.51 SUBAREA RUNOFF (CFS) = 12.73  
EFFECTIVE AREA (ACRES) = 14.48 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 14.5 PEAK FLOW RATE (CFS) = 40.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.41 FLOW VELOCITY (FEET/SEC.) = 6.81  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40407.00 = 988.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40407.00 TO NODE 40408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 602.00 DOWNSTREAM (FEET) = 559.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 533.00 CHANNEL SLOPE = 0.0807  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.158

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.99	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 48.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.09  
AVERAGE FLOW DEPTH (FEET) = 1.41 TRAVEL TIME (MIN.) = 1.10  
Tc (MIN.) = 10.54

SUBAREA AREA (ACRES) = 5.99 SUBAREA RUNOFF (CFS) = 15.40  
EFFECTIVE AREA (ACRES) = 20.47 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.5 PEAK FLOW RATE (CFS) = 52.65

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.46 FLOW VELOCITY (FEET/SEC.) = 8.23  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40408.00 = 1521.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40408.00 TO NODE 40409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 559.00 DOWNSTREAM (FEET) = 509.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 702.00 CHANNEL SLOPE = 0.0712  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.935

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.05	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 59.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.12  
AVERAGE FLOW DEPTH (FEET) = 1.57 TRAVEL TIME (MIN.) = 1.44  
Tc (MIN.) = 11.98  
SUBAREA AREA (ACRES) = 6.05 SUBAREA RUNOFF (CFS) = 14.35  
EFFECTIVE AREA (ACRES) = 26.51 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.5 PEAK FLOW RATE (CFS) = 62.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.60 FLOW VELOCITY (FEET/SEC.) = 8.21  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40409.00 = 2223.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40409.00 TO NODE 40447.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 509.00 DOWNSTREAM (FEET) = 482.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 440.00 CHANNEL SLOPE = 0.0614  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.793

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.09	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 69.71  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.98

AVERAGE FLOW DEPTH (FEET) = 1.71 TRAVEL TIME (MIN.) = 0.92  
Tc (MIN.) = 12.90  
SUBAREA AREA (ACRES) = 6.09 SUBAREA RUNOFF (CFS) = 13.65  
EFFECTIVE AREA (ACRES) = 32.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 32.6 PEAK FLOW RATE (CFS) = 73.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.74 FLOW VELOCITY (FEET/SEC.) = 8.08  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 12.90  
RAINFALL INTENSITY (INCH/HR) = 2.79  
AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA (ACRES) = 32.60  
TOTAL STREAM AREA (ACRES) = 32.60  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 73.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40410.00 TO NODE 40411.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 329.00  
ELEVATION DATA: UPSTREAM (FEET) = 878.00 DOWNSTREAM (FEET) = 726.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.371  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.810  
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL, BROADLEAF"	-	0.69	0.30	1.000	0	8.37

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF (CFS) = 2.17  
TOTAL AREA (ACRES) = 0.69 PEAK FLOW RATE (CFS) = 2.17

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40411.00 TO NODE 40412.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 726.00 DOWNSTREAM (FEET) = 687.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 101.00 CHANNEL SLOPE = 0.3861  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.733

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.91	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.68  
AVERAGE FLOW DEPTH (FEET) = 0.39 TRAVEL TIME (MIN.) = 0.22  
Tc (MIN.) = 8.59  
SUBAREA AREA (ACRES) = 0.91 SUBAREA RUNOFF (CFS) = 2.81  
EFFECTIVE AREA (ACRES) = 1.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 1.6 PEAK FLOW RATE (CFS) = 4.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.45 FLOW VELOCITY (FEET/SEC.) = 8.22  
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40412.00 = 430.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40412.00 TO NODE 40413.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 687.00 DOWNSTREAM (FEET) = 658.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 153.00 CHANNEL SLOPE = 0.1895  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.601  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.96	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.35  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.71  
AVERAGE FLOW DEPTH (FEET) = 0.56 TRAVEL TIME (MIN.) = 0.38  
Tc (MIN.) = 8.97  
SUBAREA AREA (ACRES) = 0.96 SUBAREA RUNOFF (CFS) = 2.84  
EFFECTIVE AREA (ACRES) = 2.55 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 2.6 PEAK FLOW RATE (CFS) = 7.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.60 FLOW VELOCITY (FEET/SEC.) = 7.02  
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40413.00 = 583.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40413.00 TO NODE 40414.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 658.00 DOWNSTREAM (FEET) = 615.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 247.00 CHANNEL SLOPE = 0.1741  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.409  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.09  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.45  
 AVERAGE FLOW DEPTH (FEET) = 0.70 TRAVEL TIME (MIN.) = 0.55  
 Tc (MIN.) = 9.52  
 SUBAREA AREA (ACRES) = 2.51 SUBAREA RUNOFF (CFS) = 7.02  
 EFFECTIVE AREA (ACRES) = 5.06 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.1 PEAK FLOW RATE (CFS) = 14.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.77 FLOW VELOCITY (FEET/SEC.) = 7.89  
 LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40414.00 = 830.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40414.00 TO NODE 40415.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 615.00 DOWNSTREAM (FEET) = 567.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 414.00 CHANNEL SLOPE = 0.1159  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.172  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.38	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 19.82  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.43  
 AVERAGE FLOW DEPTH (FEET) = 0.94 TRAVEL TIME (MIN.) = 0.93  
 Tc (MIN.) = 10.45  
 SUBAREA AREA (ACRES) = 4.38 SUBAREA RUNOFF (CFS) = 11.32  
 EFFECTIVE AREA (ACRES) = 9.44 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.4 PEAK FLOW RATE (CFS) = 24.40

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.02 FLOW VELOCITY (FEET/SEC.) = 7.83  
 LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40415.00 = 1244.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40415.00 TO NODE 40416.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 567.00 DOWNSTREAM (FEET) = 538.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 301.00 CHANNEL SLOPE = 0.0963  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.074  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.77	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 34.10  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.88  
 AVERAGE FLOW DEPTH (FEET) = 1.20 TRAVEL TIME (MIN.) = 0.64  
 Tc (MIN.) = 11.09  
 SUBAREA AREA (ACRES) = 7.77 SUBAREA RUNOFF (CFS) = 19.39  
 EFFECTIVE AREA (ACRES) = 17.21 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 17.2 PEAK FLOW RATE (CFS) = 42.95

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.31 FLOW VELOCITY (FEET/SEC.) = 8.38  
 LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40416.00 = 1545.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40416.00 TO NODE 40417.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 538.00 DOWNSTREAM (FEET) = 529.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 116.00 CHANNEL SLOPE = 0.0776  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.039  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 62.92  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.52  
 AVERAGE FLOW DEPTH (FEET) = 1.57 TRAVEL TIME (MIN.) = 0.23  
 Tc (MIN.) = 11.31  
 SUBAREA AREA (ACRES) = 16.20 SUBAREA RUNOFF (CFS) = 39.94  
 EFFECTIVE AREA (ACRES) = 33.41 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 33.4 PEAK FLOW RATE (CFS) = 82.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.74 FLOW VELOCITY (FEET/SEC.) = 9.10  
 LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40417.00 = 1661.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40417.00 TO NODE 40447.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 529.00 DOWNSTREAM(FEET) = 482.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 891.00 CHANNEL SLOPE = 0.0527
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.759
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 14.55 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 98.45
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.24
AVERAGE FLOW DEPTH(FEET) = 2.00 TRAVEL TIME(MIN.) = 1.80
Tc(MIN.) = 13.12
SUBAREA AREA(ACRES) = 14.55 SUBAREA RUNOFF(CFS) = 32.20
EFFECTIVE AREA(ACRES) = 47.96 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 48.0 PEAK FLOW RATE(CFS) = 106.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.06 FLOW VELOCITY(FEET/SEC.) = 8.38
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40447.00 = 2552.00 FEET.

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FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 13.12
RAINFALL INTENSITY(INCH/HR) = 2.76
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 47.96
TOTAL STREAM AREA(ACRES) = 47.96
PEAK FLOW RATE(CFS) AT CONFLUENCE = 106.14

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\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	73.14	12.90	2.793	0.30( 0.30)	1.00	32.6	40400.00
2	106.14	13.12	2.759	0.30( 0.30)	1.00	48.0	40410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	178.96	12.90	2.793	0.30( 0.30)	1.00	79.8	40400.00
2	178.30	13.12	2.759	0.30( 0.30)	1.00	80.6	40410.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 178.96 Tc(MIN.) = 12.90
EFFECTIVE AREA(ACRES) = 79.76 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 80.6
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

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*****
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
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*****
FLOW PROCESS FROM NODE 40420.00 TO NODE 40421.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00
ELEVATION DATA: UPSTREAM(FEET) = 925.00 DOWNSTREAM(FEET) = 815.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.799
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.661
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" - 0.31 0.30 1.000 0 8.80
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.93
TOTAL AREA(ACRES) = 0.31 PEAK FLOW RATE(CFS) = 0.93

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*****
FLOW PROCESS FROM NODE 40421.00 TO NODE 40422.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 815.00 DOWNSTREAM(FEET) = 743.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.5854
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.557
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.37
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.92
AVERAGE FLOW DEPTH(FEET) = 0.26 TRAVEL TIME(MIN.) = 0.30
Tc(MIN.) = 9.10
SUBAREA AREA(ACRES) = 0.30 SUBAREA RUNOFF(CFS) = 0.87

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EFFECTIVE AREA(ACRES) = 0.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 1.77

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.28 FLOW VELOCITY(FEET/SEC.) = 7.56  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40422.00 = 444.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40422.00 TO NODE 40423.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 743.00 DOWNSTREAM(FEET) = 665.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 142.00 CHANNEL SLOPE = 0.5493  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.455  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.91  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.09  
AVERAGE FLOW DEPTH(FEET) = 0.35 TRAVEL TIME(MIN.) = 0.29  
Tc(MIN.) = 9.39  
SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 2.27  
EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 3.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 FLOW VELOCITY(FEET/SEC.) = 8.92  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40423.00 = 586.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40423.00 TO NODE 40424.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 665.00 DOWNSTREAM(FEET) = 630.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 99.00 CHANNEL SLOPE = 0.3535  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.381  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.32	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.43  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.71  
AVERAGE FLOW DEPTH(FEET) = 0.44 TRAVEL TIME(MIN.) = 0.21

Tc(MIN.) = 9.60  
SUBAREA AREA(ACRES) = 0.32 SUBAREA RUNOFF(CFS) = 0.88  
EFFECTIVE AREA(ACRES) = 1.72 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 4.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 7.97  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40424.00 = 685.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40424.00 TO NODE 40425.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 615.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 35.00 CHANNEL SLOPE = 0.4286  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.360  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.87	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.35  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.48  
AVERAGE FLOW DEPTH(FEET) = 0.51 TRAVEL TIME(MIN.) = 0.06  
Tc(MIN.) = 9.66  
SUBAREA AREA(ACRES) = 1.87 SUBAREA RUNOFF(CFS) = 5.14  
EFFECTIVE AREA(ACRES) = 3.59 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 3.6 PEAK FLOW RATE(CFS) = 9.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.57 FLOW VELOCITY(FEET/SEC.) = 10.17  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40425.00 = 720.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40425.00 TO NODE 40426.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 615.00 DOWNSTREAM(FEET) = 574.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 260.00 CHANNEL SLOPE = 0.1577  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.201  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.19	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.44

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.20  
AVERAGE FLOW DEPTH (FEET) = 0.73 TRAVEL TIME (MIN.) = 0.60  
Tc (MIN.) = 10.26  
SUBAREA AREA (ACRES) = 1.19 SUBAREA RUNOFF (CFS) = 3.11  
EFFECTIVE AREA (ACRES) = 4.78 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 4.8 PEAK FLOW RATE (CFS) = 12.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.75 FLOW VELOCITY (FEET/SEC.) = 7.39  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40426.00 = 980.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40426.00 TO NODE 40427.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 574.00 DOWNSTREAM (FEET) = 533.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 322.00 CHANNEL SLOPE = 0.1273  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.085  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.82 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 14.76  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.16  
AVERAGE FLOW DEPTH (FEET) = 0.83 TRAVEL TIME (MIN.) = 0.75  
Tc (MIN.) = 11.01  
SUBAREA AREA (ACRES) = 1.82 SUBAREA RUNOFF (CFS) = 4.56  
EFFECTIVE AREA (ACRES) = 6.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 6.6 PEAK FLOW RATE (CFS) = 16.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.87 FLOW VELOCITY (FEET/SEC.) = 7.34  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40427.00 = 1302.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40427.00 TO NODE 40428.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 521.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 160.00 CHANNEL SLOPE = 0.0750  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.023  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 6.79 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 24.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.65  
AVERAGE FLOW DEPTH (FEET) = 1.12 TRAVEL TIME (MIN.) = 0.40  
Tc (MIN.) = 11.42  
SUBAREA AREA (ACRES) = 6.79 SUBAREA RUNOFF (CFS) = 16.64  
EFFECTIVE AREA (ACRES) = 13.39 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 13.4 PEAK FLOW RATE (CFS) = 32.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.24 FLOW VELOCITY (FEET/SEC.) = 7.13  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40428.00 = 1462.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40428.00 TO NODE 40429.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 521.00 DOWNSTREAM (FEET) = 508.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 221.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.938  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.74 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 37.26  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.71  
AVERAGE FLOW DEPTH (FEET) = 1.36 TRAVEL TIME (MIN.) = 0.55  
Tc (MIN.) = 11.96  
SUBAREA AREA (ACRES) = 3.74 SUBAREA RUNOFF (CFS) = 8.88  
EFFECTIVE AREA (ACRES) = 17.13 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.1 PEAK FLOW RATE (CFS) = 40.67

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.41 FLOW VELOCITY (FEET/SEC.) = 6.85  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40429.00 = 1683.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40429.00 TO NODE 40446.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 508.00 DOWNSTREAM (FEET) = 489.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 306.00 CHANNEL SLOPE = 0.0621  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.826  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 0.99 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 41.80  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.04  
AVERAGE FLOW DEPTH (FEET) = 1.41 TRAVEL TIME (MIN.) = 0.72  
Tc (MIN.) = 12.69  
SUBAREA AREA (ACRES) = 0.99 SUBAREA RUNOFF (CFS) = 2.25  
EFFECTIVE AREA (ACRES) = 18.12 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 18.1 PEAK FLOW RATE (CFS) = 41.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.40 FLOW VELOCITY (FEET/SEC.) = 7.01  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40446.00 = 1989.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40446.00 TO NODE 40446.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40430.00 TO NODE 40431.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 302.00  
ELEVATION DATA: UPSTREAM (FEET) = 1035.00 DOWNSTREAM (FEET) = 875.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.870  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.984  
SUBAREA Tc AND LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"CHAPARRAL, BROADLEAF" - 0.40 0.30 1.000 0 7.87  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF (CFS) = 1.34  
TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 1.34

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40431.00 TO NODE 40432.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 875.00 DOWNSTREAM (FEET) = 800.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 160.00 CHANNEL SLOPE = 0.4688  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.856  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 0.65 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.38  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.23  
AVERAGE FLOW DEPTH (FEET) = 0.33 TRAVEL TIME (MIN.) = 0.37  
Tc (MIN.) = 8.24  
SUBAREA AREA (ACRES) = 0.65 SUBAREA RUNOFF (CFS) = 2.07  
EFFECTIVE AREA (ACRES) = 1.05 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 3.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.38 FLOW VELOCITY (FEET/SEC.) = 7.91  
LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40432.00 = 462.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40432.00 TO NODE 40433.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 800.00 DOWNSTREAM (FEET) = 712.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 150.00 CHANNEL SLOPE = 0.5867  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.766  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.08 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.05  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.70  
AVERAGE FLOW DEPTH (FEET) = 0.42 TRAVEL TIME (MIN.) = 0.26  
Tc (MIN.) = 8.50  
SUBAREA AREA (ACRES) = 1.08 SUBAREA RUNOFF (CFS) = 3.38  
EFFECTIVE AREA (ACRES) = 2.13 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 2.1 PEAK FLOW RATE (CFS) = 6.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.46 FLOW VELOCITY (FEET/SEC.) = 10.37  
LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40433.00 = 612.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40433.00 TO NODE 40434.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 657.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 120.00 CHANNEL SLOPE = 0.4583  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.698  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.98 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.69  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.30  
 AVERAGE FLOW DEPTH(FEET) = 0.56 TRAVEL TIME(MIN.) = 0.19  
 Tc(MIN.) = 8.69  
 SUBAREA AREA(ACRES) = 1.98 SUBAREA RUNOFF(CFS) = 6.06  
 EFFECTIVE AREA(ACRES) = 4.11 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 12.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 11.09  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40434.00 = 732.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40434.00 TO NODE 40435.00 IS CODE = 51

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 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM(FEET) = 657.00 DOWNSTREAM(FEET) = 620.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.2298  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.595  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.34 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.06  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.08  
 AVERAGE FLOW DEPTH(FEET) = 0.77 TRAVEL TIME(MIN.) = 0.30  
 Tc(MIN.) = 8.99  
 SUBAREA AREA(ACRES) = 2.34 SUBAREA RUNOFF(CFS) = 6.94  
 EFFECTIVE AREA(ACRES) = 6.46 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 6.5 PEAK FLOW RATE(CFS) = 19.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.82 FLOW VELOCITY(FEET/SEC.) = 9.51  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40435.00 = 893.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40435.00 TO NODE 40445.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 579.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 358.00 CHANNEL SLOPE = 0.1145  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.321  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.75 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.53  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.57  
 AVERAGE FLOW DEPTH(FEET) = 0.97 TRAVEL TIME(MIN.) = 0.79  
 Tc(MIN.) = 9.77  
 SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 4.77  
 EFFECTIVE AREA(ACRES) = 8.21 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 22.32

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.99 FLOW VELOCITY(FEET/SEC.) = 7.61  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40445.00 = 1251.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40445.00 TO NODE 40445.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 9.77  
 RAINFALL INTENSITY(INCH/HR) = 3.32  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 8.21  
 TOTAL STREAM AREA(ACRES) = 8.21  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 22.32

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40440.00 TO NODE 40441.00 IS CODE = 21

-----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
 ELEVATION DATA: UPSTREAM(FEET) = 1020.00 DOWNSTREAM(FEET) = 898.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.586  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.735  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 NATURAL FAIR COVER  
 "CHAPARRAL,BROADLEAF" - 0.75 0.30 1.000 0 8.59  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 2.32  
 TOTAL AREA(ACRES) = 0.75 PEAK FLOW RATE(CFS) = 2.32



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*****
FLOW PROCESS FROM NODE 40441.00 TO NODE 40442.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 898.00 DOWNSTREAM(FEET) = 760.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 253.00 CHANNEL SLOPE = 0.5455
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.567
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.89 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.62
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.78
AVERAGE FLOW DEPTH(FEET) = 0.37 TRAVEL TIME(MIN.) = 0.48
Tc(MIN.) = 9.07
SUBAREA AREA(ACRES) = 0.89 SUBAREA RUNOFF(CFS) = 2.61
EFFECTIVE AREA(ACRES) = 1.64 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 4.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.41 FLOW VELOCITY(FEET/SEC.) = 9.33
LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40442.00 = 572.00 FEET.

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*****
FLOW PROCESS FROM NODE 40442.00 TO NODE 40443.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 760.00 DOWNSTREAM(FEET) = 653.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 188.00 CHANNEL SLOPE = 0.5691
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.464
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.80 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.39
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.53
AVERAGE FLOW DEPTH(FEET) = 0.48 TRAVEL TIME(MIN.) = 0.30
Tc(MIN.) = 9.36
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.14
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 9.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.54 FLOW VELOCITY(FEET/SEC.) = 11.25

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LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40443.00 = 760.00 FEET.
*****
FLOW PROCESS FROM NODE 40443.00 TO NODE 40444.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 653.00 DOWNSTREAM(FEET) = 605.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 198.00 CHANNEL SLOPE = 0.2424
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.336
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.16 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.11
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.03
AVERAGE FLOW DEPTH(FEET) = 0.72 TRAVEL TIME(MIN.) = 0.37
Tc(MIN.) = 9.73
SUBAREA AREA(ACRES) = 3.16 SUBAREA RUNOFF(CFS) = 8.63
EFFECTIVE AREA(ACRES) = 6.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.6 PEAK FLOW RATE(CFS) = 18.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.80 FLOW VELOCITY(FEET/SEC.) = 9.48
LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40444.00 = 958.00 FEET.

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FLOW PROCESS FROM NODE 40444.00 TO NODE 40445.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 605.00 DOWNSTREAM(FEET) = 579.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 243.00 CHANNEL SLOPE = 0.1070
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.197
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.67 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.22
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.22
AVERAGE FLOW DEPTH(FEET) = 0.97 TRAVEL TIME(MIN.) = 0.56
Tc(MIN.) = 10.29
SUBAREA AREA(ACRES) = 1.67 SUBAREA RUNOFF(CFS) = 4.37
EFFECTIVE AREA(ACRES) = 8.27 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 21.58

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.99 FLOW VELOCITY(FEET/SEC.) = 7.35  
 LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40445.00 = 1201.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40445.00 TO NODE 40445.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 10.29  
 RAINFALL INTENSITY(INCH/HR) = 3.20  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 8.27  
 TOTAL STREAM AREA(ACRES) = 8.27  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 21.58

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	22.32	9.77	3.321	0.30( 0.30)	1.00	8.2	40430.00
2	21.58	10.29	3.197	0.30( 0.30)	1.00	8.3	40440.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	43.69	9.77	3.321	0.30( 0.30)	1.00	16.1	40430.00
2	42.98	10.29	3.197	0.30( 0.30)	1.00	16.5	40440.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 43.69 Tc(MIN.) = 9.77  
 EFFECTIVE AREA(ACRES) = 16.07 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 16.5  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40445.00 = 1251.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40445.00 TO NODE 40446.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 579.00 DOWNSTREAM(FEET) = 489.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 636.00 CHANNEL SLOPE = 0.1415  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.113

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE USER-DEFINED	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
		3.79	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 48.48  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.00  
 AVERAGE FLOW DEPTH(FEET) = 1.27 TRAVEL TIME(MIN.) = 1.06  
 Tc(MIN.) = 10.83  
 SUBAREA AREA(ACRES) = 3.79 SUBAREA RUNOFF(CFS) = 9.58  
 EFFECTIVE AREA(ACRES) = 19.85 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 20.3 PEAK FLOW RATE(CFS) = 50.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.29 FLOW VELOCITY(FEET/SEC.) = 10.03  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40446.00 = 1887.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	50.27	10.83	3.113	0.30( 0.30)	1.00	19.9	40430.00
2	49.84	11.36	3.032	0.30( 0.30)	1.00	20.3	40440.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 50.27 Tc(MIN.) = 10.83  
 AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 19.85

\*\*\*\*\*

FLOW PROCESS FROM NODE 40446.00 TO NODE 40446.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	50.27	10.83	3.113	0.30( 0.30)	1.00	19.9	40430.00
2	49.84	11.36	3.032	0.30( 0.30)	1.00	20.3	40440.00

LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40446.00 = 1887.00 FEET.

\*\* MEMORY BANK # 2 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	41.19	12.69	2.826	0.30( 0.30)	1.00	18.1	40420.00

LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40446.00 = 1989.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	89.44	10.83	3.113	0.30( 0.30)	1.00	35.3	40430.00
2	89.72	11.36	3.032	0.30( 0.30)	1.00	36.5	40440.00
3	87.26	12.69	2.826	0.30( 0.30)	1.00	38.4	40420.00

TOTAL AREA(ACRES) = 38.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 89.72 Tc(MIN.) = 11.357  
 EFFECTIVE AREA(ACRES) = 36.49 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 38.4  
 LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40446.00 = 1989.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40446.00 TO NODE 40446.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40446.00 TO NODE 40447.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 489.00 DOWNSTREAM(FEET) = 482.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.0419  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.974

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 90.43

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.40

AVERAGE FLOW DEPTH(FEET) = 2.02 TRAVEL TIME(MIN.) = 0.38

Tc(MIN.) = 11.73

SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 1.42

EFFECTIVE AREA(ACRES) = 37.08 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 39.0 PEAK FLOW RATE(CFS) = 89.72

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.01 FLOW VELOCITY(FEET/SEC.) = 7.39

LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40447.00 = 2156.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	89.44	11.21	3.055	0.30( 0.30)	1.00	35.9	40430.00
2	89.72	11.73	2.974	0.30( 0.30)	1.00	37.1	40440.00
3	87.26	13.07	2.767	0.30( 0.30)	1.00	39.0	40420.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 89.72 Tc(MIN.) = 11.73

AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 37.08

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	89.44	11.21	3.055	0.30( 0.30)	1.00	35.9	40430.00
2	89.72	11.73	2.974	0.30( 0.30)	1.00	37.1	40440.00
3	87.26	13.07	2.767	0.30( 0.30)	1.00	39.0	40420.00

LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40447.00 = 2156.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	178.96	12.90	2.793	0.30( 0.30)	1.00	79.8	40400.00
2	178.30	13.12	2.759	0.30( 0.30)	1.00	80.6	40410.00

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	261.29	11.21	3.055	0.30( 0.30)	1.00	105.2	40430.00
2	264.29	11.73	2.974	0.30( 0.30)	1.00	109.6	40440.00
3	266.53	12.90	2.793	0.30( 0.30)	1.00	118.5	40400.00
4	265.71	13.07	2.767	0.30( 0.30)	1.00	119.4	40420.00
5	265.28	13.12	2.759	0.30( 0.30)	1.00	119.5	40410.00

TOTAL AREA(ACRES) = 119.5

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 266.53 Tc(MIN.) = 12.901

EFFECTIVE AREA(ACRES) = 118.51 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 119.5

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40448.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 482.00 DOWNSTREAM(FEET) = 447.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 926.00 CHANNEL SLOPE = 0.0378  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.542

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	24.32	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 291.07

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.52

AVERAGE FLOW DEPTH(FEET) = 3.19 TRAVEL TIME(MIN.) = 1.62

Tc(MIN.) = 14.52

SUBAREA AREA(ACRES) = 24.32 SUBAREA RUNOFF(CFS) = 49.06

EFFECTIVE AREA(ACRES) = 142.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 143.9 PEAK FLOW RATE (CFS) = 288.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 3.18 FLOW VELOCITY (FEET/SEC.) = 9.51  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40448.00 = 3589.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	291.80	12.84	2.803	0.30 (0.30)	1.00	129.5	40430.00
2	292.01	13.36	2.722	0.30 (0.30)	1.00	133.9	40440.00
3	288.16	14.52	2.542	0.30 (0.30)	1.00	142.8	40400.00
4	286.52	14.69	2.516	0.30 (0.30)	1.00	143.7	40420.00
5	285.85	14.74	2.508	0.30 (0.30)	1.00	143.9	40410.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 292.01 Tc (MIN.) = 13.36  
AREA-AVERAGED Fm (INCH/HR) = 0.30 AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA (ACRES) = 133.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40448.00 TO NODE 40449.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 447.00 DOWNSTREAM (FEET) = 433.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 443.00 CHANNEL SLOPE = 0.0316  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.604

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	108.49	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 404.52

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.67

AVERAGE FLOW DEPTH (FEET) = 3.73 TRAVEL TIME (MIN.) = 0.76

Tc (MIN.) = 14.12

SUBAREA AREA (ACRES) = 108.49 SUBAREA RUNOFF (CFS) = 224.98

EFFECTIVE AREA (ACRES) = 242.43 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 252.3 PEAK FLOW RATE (CFS) = 502.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 4.05 FLOW VELOCITY (FEET/SEC.) = 10.20

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40449.00 = 4032.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	510.86	13.60	2.684	0.30 (0.30)	1.00	238.0	40430.00
2	502.74	14.12	2.604	0.30 (0.30)	1.00	242.4	40440.00
3	484.56	15.29	2.442	0.30 (0.30)	1.00	251.3	40400.00
4	482.88	15.46	2.428	0.30 (0.30)	1.00	252.2	40420.00
5	482.24	15.51	2.423	0.30 (0.30)	1.00	252.3	40410.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 510.86 Tc (MIN.) = 13.60

AREA-AVERAGED Fm (INCH/HR) = 0.30 AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA (ACRES) = 238.04

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40449.00 TO NODE 40450.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 433.00 DOWNSTREAM (FEET) = 398.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1065.00 CHANNEL SLOPE = 0.0329  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.444

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	36.85	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 546.40

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.59

AVERAGE FLOW DEPTH (FEET) = 4.15 TRAVEL TIME (MIN.) = 1.68

Tc (MIN.) = 15.28

SUBAREA AREA (ACRES) = 36.85 SUBAREA RUNOFF (CFS) = 71.09

EFFECTIVE AREA (ACRES) = 274.89 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 289.2 PEAK FLOW RATE (CFS) = 530.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 4.10 FLOW VELOCITY (FEET/SEC.) = 10.51

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40450.00 = 5097.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	530.34	15.28	2.444	0.30 (0.30)	1.00	274.9	40430.00
2	527.33	15.80	2.398	0.30 (0.30)	1.00	279.3	40440.00
3	517.47	16.99	2.295	0.30 (0.30)	1.00	288.2	40400.00
4	515.09	17.16	2.280	0.30 (0.30)	1.00	289.0	40420.00
5	514.33	17.21	2.276	0.30 (0.30)	1.00	289.2	40410.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 530.34 Tc (MIN.) = 15.28

AREA-AVERAGED Fm (INCH/HR) = 0.30 AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA (ACRES) = 274.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40450.00 TO NODE 40451.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 398.00 DOWNSTREAM (FEET) = 386.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 401.00 CHANNEL SLOPE = 0.0299  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.388  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 71.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 597.81  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.44  
 AVERAGE FLOW DEPTH (FEET) = 4.37 TRAVEL TIME (MIN.) = 0.64  
 Tc (MIN.) = 15.92  
 SUBAREA AREA (ACRES) = 71.80 SUBAREA RUNOFF (CFS) = 134.95  
 EFFECTIVE AREA (ACRES) = 346.69 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 361.0 PEAK FLOW RATE (CFS) = 651.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 4.51 FLOW VELOCITY (FEET/SEC.) = 10.67  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40451.00 = 5498.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	651.58	15.92	2.388	0.30 (0.30)	1.00	346.7	40430.00
2	645.38	16.44	2.342	0.30 (0.30)	1.00	351.1	40440.00
3	628.31	17.64	2.239	0.30 (0.30)	1.00	360.0	40400.00
4	624.89	17.81	2.224	0.30 (0.30)	1.00	360.8	40420.00
5	623.87	17.86	2.220	0.30 (0.30)	1.00	361.0	40410.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 651.58 Tc (MIN.) = 15.92  
 AREA-AVERAGED Fm (INCH/HR) = 0.30 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA (ACRES) = 346.69

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40451.00 TO NODE 40452.00 IS CODE = 51  
 -----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 386.00 DOWNSTREAM (FEET) = 358.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 957.00 CHANNEL SLOPE = 0.0293  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.283  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 12.07 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 662.35  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.18  
 AVERAGE FLOW DEPTH (FEET) = 4.09 TRAVEL TIME (MIN.) = 1.21  
 Tc (MIN.) = 17.13  
 SUBAREA AREA (ACRES) = 12.07 SUBAREA RUNOFF (CFS) = 21.55  
 EFFECTIVE AREA (ACRES) = 358.76 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 373.1 PEAK FLOW RATE (CFS) = 651.58

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 4.07 FLOW VELOCITY (FEET/SEC.) = 13.12  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40452.00 = 6455.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	651.58	17.13	2.283	0.30 (0.30)	1.00	358.8	40430.00
2	645.38	17.66	2.237	0.30 (0.30)	1.00	363.1	40440.00
3	628.31	18.86	2.134	0.30 (0.30)	1.00	372.0	40400.00
4	624.89	19.03	2.119	0.30 (0.30)	1.00	372.9	40420.00
5	623.87	19.08	2.114	0.30 (0.30)	1.00	373.1	40410.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 651.58 Tc (MIN.) = 17.13  
 AREA-AVERAGED Fm (INCH/HR) = 0.30 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA (ACRES) = 358.76

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40452.00 TO NODE 40453.00 IS CODE = 51  
 -----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 358.00 DOWNSTREAM (FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 973.00 CHANNEL SLOPE = 0.0576  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.201  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 9.14 0.30 0.970 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 659.43  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 16.98  
 AVERAGE FLOW DEPTH (FEET) = 3.60 TRAVEL TIME (MIN.) = 0.96  
 Tc (MIN.) = 18.08  
 SUBAREA AREA (ACRES) = 9.14 SUBAREA RUNOFF (CFS) = 15.70  
 EFFECTIVE AREA (ACRES) = 367.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 382.2 PEAK FLOW RATE (CFS) = 651.58  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.58 FLOW VELOCITY (FEET/SEC.) = 16.92  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40453.00 = 7428.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	651.58	18.08	2.201	0.30 (0.30)	1.00	367.9	40430.00
2	645.38	18.61	2.155	0.30 (0.30)	1.00	372.3	40440.00
3	628.31	19.82	2.050	0.30 (0.30)	1.00	381.2	40400.00
4	624.89	20.00	2.035	0.30 (0.30)	1.00	382.0	40420.00
5	623.87	20.05	2.032	0.30 (0.30)	1.00	382.2	40410.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 651.58 Tc(MIN.) = 18.08  
AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 367.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 40453.00 TO NODE 40453.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.08  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.201  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 28.26 0.30 0.882 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.882  
SUBAREA AREA(ACRES) = 28.26 SUBAREA RUNOFF(CFS) = 49.25  
EFFECTIVE AREA(ACRES) = 396.16 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 410.5 PEAK FLOW RATE(CFS) = 678.70

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 410.5 TC(MIN.) = 18.08  
EFFECTIVE AREA(ACRES) = 396.16 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.991  
PEAK FLOW RATE(CFS) = 678.70

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	678.70	18.08	2.201	0.30( 0.30)	0.99	396.2	40430.00
2	669.61	18.61	2.155	0.30( 0.30)	0.99	400.5	40440.00
3	645.94	19.82	2.050	0.30( 0.30)	0.99	409.4	40400.00
4	641.61	20.00	2.035	0.30( 0.30)	0.99	410.3	40420.00
5	640.93	20.05	2.032	0.30( 0.30)	0.99	410.5	40410.00

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 25 Yr \*  
\* From Node: 40500 To Node: 40519 \*  
\*\*\*\*\*

FILE NAME: 0610405W.DAT  
TIME/DATE OF STUDY: 09:47 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.983
- 2) 10.00; 3.242
- 3) 15.00; 2.468
- 4) 20.00; 2.035
- 5) 25.00; 1.772
- 6) 30.00; 1.553
- 7) 40.00; 1.354
- 8) 50.00; 1.200
- 9) 60.00; 1.077
- 10) 90.00; 0.909
- 11) 120.00; 0.800
- 12) 180.00; 0.670
- 13) 360.00; 0.498
- 14) 1440.00; 0.219

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO	STREET-CROSSFALL:	CURB GUTTER-GEOMETRIES:				MANNING	
	WIDTH		CROSSFALL	IN- / OUT- / PARK-	HEIGHT	WIDTH		LIP
	(FT)	(FT)	SIDE / SIDE/ WAY	(FT)	(FT)	(FT)	(FT)	(n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
- \*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40500.00 TO NODE 40501.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 961.00 DOWNSTREAM(FEET) = 845.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.819  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.653  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.63	0.30	1.000	0	8.82

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.90  
TOTAL AREA(ACRES) = 0.63 PEAK FLOW RATE(CFS) = 1.90

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40501.00 TO NODE 40502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 845.00 DOWNSTREAM(FEET) = 788.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 141.00 CHANNEL SLOPE = 0.4043  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.546  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.11	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.52  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.65  
AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 0.31  
Tc(MIN.) = 9.13  
SUBAREA AREA(ACRES) = 1.11 SUBAREA RUNOFF(CFS) = 3.25  
EFFECTIVE AREA(ACRES) = 1.74 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 5.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 8.48  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40502.00 = 469.00 FEET.

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FLOW PROCESS FROM NODE 40502.00 TO NODE 40503.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	788.00	DOWNSTREAM(FEET) =	719.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	187.00	CHANNEL SLOPE =	0.3690
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	3.425		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.44	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.11

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.90

AVERAGE FLOW DEPTH(FEET) = 0.52 TRAVEL TIME(MIN.) = 0.35

Tc(MIN.) = 9.48

SUBAREA AREA(ACRES) = 1.44 SUBAREA RUNOFF(CFS) = 4.05

EFFECTIVE AREA(ACRES) = 3.18 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 8.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.56 FLOW VELOCITY(FEET/SEC.) = 9.45

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40503.00 = 656.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40503.00 TO NODE 40504.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	719.00	DOWNSTREAM(FEET) =	545.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	302.00	CHANNEL SLOPE =	0.5762
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	3.281		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.36	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.45

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.23

AVERAGE FLOW DEPTH(FEET) = 0.61 TRAVEL TIME(MIN.) = 0.41

Tc(MIN.) = 9.89

SUBAREA AREA(ACRES) = 3.36 SUBAREA RUNOFF(CFS) = 9.02

EFFECTIVE AREA(ACRES) = 6.54 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 6.5 PEAK FLOW RATE(CFS) = 17.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.67 FLOW VELOCITY(FEET/SEC.) = 13.09

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40504.00 = 958.00 FEET.

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FLOW PROCESS FROM NODE 40504.00 TO NODE 40505.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	545.00	DOWNSTREAM(FEET) =	470.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	328.00	CHANNEL SLOPE =	0.2287
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	3.180		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.58	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.97

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.58

AVERAGE FLOW DEPTH(FEET) = 0.97 TRAVEL TIME(MIN.) = 0.52

Tc(MIN.) = 10.41

SUBAREA AREA(ACRES) = 9.58 SUBAREA RUNOFF(CFS) = 24.83

EFFECTIVE AREA(ACRES) = 16.12 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 41.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.10 FLOW VELOCITY(FEET/SEC.) = 11.48

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40505.00 = 1286.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40505.00 TO NODE 40506.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	470.00	DOWNSTREAM(FEET) =	410.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	507.00	CHANNEL SLOPE =	0.1183
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	3.044		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.98	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 55.34

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.63

AVERAGE FLOW DEPTH(FEET) = 1.38 TRAVEL TIME(MIN.) = 0.88

Tc(MIN.) = 11.28

SUBAREA AREA(ACRES) = 10.98 SUBAREA RUNOFF(CFS) = 27.12

EFFECTIVE AREA(ACRES) = 27.10 AREA-AVERAGED Fm(INCH/HR) = 0.30



AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 27.1 PEAK FLOW RATE (CFS) = 66.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.48 FLOW VELOCITY (FEET/SEC.) = 10.12  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40506.00 = 1793.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40506.00 TO NODE 40507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 410.00 DOWNSTREAM (FEET) = 355.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 698.00 CHANNEL SLOPE = 0.0788  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.839  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.53	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 72.11  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.82  
AVERAGE FLOW DEPTH (FEET) = 1.65 TRAVEL TIME (MIN.) = 1.32  
Tc (MIN.) = 12.60  
SUBAREA AREA (ACRES) = 4.53 SUBAREA RUNOFF (CFS) = 10.35  
EFFECTIVE AREA (ACRES) = 31.63 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 31.6 PEAK FLOW RATE (CFS) = 72.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.65 FLOW VELOCITY (FEET/SEC.) = 8.84  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40507.00 = 2491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40507.00 TO NODE 40518.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 355.00 DOWNSTREAM (FEET) = 341.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 604.00 CHANNEL SLOPE = 0.0232  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.621  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 81.72  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.16  
AVERAGE FLOW DEPTH (FEET) = 1.95 TRAVEL TIME (MIN.) = 1.41  
Tc (MIN.) = 14.01

SUBAREA AREA (ACRES) = 9.02 SUBAREA RUNOFF (CFS) = 18.86  
EFFECTIVE AREA (ACRES) = 40.66 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 40.7 PEAK FLOW RATE (CFS) = 84.95

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.98 FLOW VELOCITY (FEET/SEC.) = 7.23  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40518.00 = 3095.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40518.00 TO NODE 40518.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 14.01  
RAINFALL INTENSITY (INCH/HR) = 2.62  
AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA (ACRES) = 40.66  
TOTAL STREAM AREA (ACRES) = 40.66  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 84.95

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40510.00 TO NODE 40511.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 329.00  
ELEVATION DATA: UPSTREAM (FEET) = 851.00 DOWNSTREAM (FEET) = 735.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.835  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.648  
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	-	0.48	0.30	1.000	0	8.84

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF (CFS) = 1.44  
TOTAL AREA (ACRES) = 0.48 PEAK FLOW RATE (CFS) = 1.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40511.00 TO NODE 40512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 735.00 DOWNSTREAM (FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 116.00 CHANNEL SLOPE = 0.7328  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.571

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.73	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.50  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.80  
AVERAGE FLOW DEPTH(FEET) = 0.31 TRAVEL TIME(MIN.) = 0.22  
Tc(MIN.) = 9.06  
SUBAREA AREA(ACRES) = 0.73 SUBAREA RUNOFF(CFS) = 2.13  
EFFECTIVE AREA(ACRES) = 1.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 3.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.35 FLOW VELOCITY(FEET/SEC.) = 9.74  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40512.00 = 445.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40512.00 TO NODE 40513.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 650.00 DOWNSTREAM(FEET) = 581.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 152.00 CHANNEL SLOPE = 0.4539  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.472

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.36	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.48  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.90  
AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.28  
Tc(MIN.) = 9.34  
SUBAREA AREA(ACRES) = 1.36 SUBAREA RUNOFF(CFS) = 3.88  
EFFECTIVE AREA(ACRES) = 2.56 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 7.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.50 FLOW VELOCITY(FEET/SEC.) = 9.72  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40513.00 = 597.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40513.00 TO NODE 40514.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 581.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00 CHANNEL SLOPE = 0.4629  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.376

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.32	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.52  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.60  
AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 0.28  
Tc(MIN.) = 9.62  
SUBAREA AREA(ACRES) = 2.32 SUBAREA RUNOFF(CFS) = 6.42  
EFFECTIVE AREA(ACRES) = 4.88 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 13.50

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.63 FLOW VELOCITY(FEET/SEC.) = 11.33  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40514.00 = 772.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40514.00 TO NODE 40515.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 440.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 206.00 CHANNEL SLOPE = 0.2913  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.257

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.15	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.36  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.04  
AVERAGE FLOW DEPTH(FEET) = 0.74 TRAVEL TIME(MIN.) = 0.34  
Tc(MIN.) = 9.96  
SUBAREA AREA(ACRES) = 2.15 SUBAREA RUNOFF(CFS) = 5.73  
EFFECTIVE AREA(ACRES) = 7.03 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.0 PEAK FLOW RATE(CFS) = 18.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.78 FLOW VELOCITY(FEET/SEC.) = 10.37  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40515.00 = 978.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40515.00 TO NODE 40516.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 390.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 269.00 CHANNEL SLOPE = 0.1859  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.175  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.24	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 25.49  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.40  
 AVERAGE FLOW DEPTH(FEET) = 0.95 TRAVEL TIME(MIN.) = 0.48  
 Tc(MIN.) = 10.43  
 SUBAREA AREA(ACRES) = 5.24 SUBAREA RUNOFF(CFS) = 13.57  
 EFFECTIVE AREA(ACRES) = 12.27 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 31.75

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.03 FLOW VELOCITY(FEET/SEC.) = 9.92  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40516.00 = 1247.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40516.00 TO NODE 40517.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 390.00 DOWNSTREAM(FEET) = 355.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 384.00 CHANNEL SLOPE = 0.0911  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.049  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.01	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 36.72  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.88  
 AVERAGE FLOW DEPTH(FEET) = 1.25 TRAVEL TIME(MIN.) = 0.81  
 Tc(MIN.) = 11.25  
 SUBAREA AREA(ACRES) = 4.01 SUBAREA RUNOFF(CFS) = 9.92  
 EFFECTIVE AREA(ACRES) = 16.28 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 16.3 PEAK FLOW RATE(CFS) = 40.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.29 FLOW VELOCITY(FEET/SEC.) = 8.11  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40517.00 = 1631.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40517.00 TO NODE 40518.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 355.00 DOWNSTREAM(FEET) = 341.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 512.00 CHANNEL SLOPE = 0.0273  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.854  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.89	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 50.50  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.77  
 AVERAGE FLOW DEPTH(FEET) = 1.58 TRAVEL TIME(MIN.) = 1.26  
 Tc(MIN.) = 12.51  
 SUBAREA AREA(ACRES) = 8.89 SUBAREA RUNOFF(CFS) = 20.44  
 EFFECTIVE AREA(ACRES) = 25.17 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 25.2 PEAK FLOW RATE(CFS) = 57.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.66 FLOW VELOCITY(FEET/SEC.) = 7.00  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40518.00 = 2143.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40518.00 TO NODE 40518.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 12.51  
 RAINFALL INTENSITY(INCH/HR) = 2.85  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 25.17  
 TOTAL STREAM AREA(ACRES) = 25.17  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 57.86

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	84.95	14.01	2.621	0.30( 0.30)	1.00	40.7	40500.00
2	57.86	12.51	2.854	0.30( 0.30)	1.00	25.2	40510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	141.31	12.51	2.854	0.30( 0.30)	1.00	61.5	40510.00
2	137.54	14.01	2.621	0.30( 0.30)	1.00	65.8	40500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 141.31 Tc(MIN.) = 12.51  
 EFFECTIVE AREA(ACRES) = 61.48 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 65.8  
 LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40518.00 = 3095.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40518.00 TO NODE 40519.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 341.00 DOWNSTREAM(FEET) = 295.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 996.00 CHANNEL SLOPE = 0.0462  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.615  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.05	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 147.61  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.75  
 AVERAGE FLOW DEPTH(FEET) = 2.14 TRAVEL TIME(MIN.) = 1.54  
 Tc(MIN.) = 14.05  
 SUBAREA AREA(ACRES) = 6.05 SUBAREA RUNOFF(CFS) = 12.59  
 EFFECTIVE AREA(ACRES) = 67.52 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 71.9 PEAK FLOW RATE(CFS) = 141.31  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.10 FLOW VELOCITY(FEET/SEC.) = 10.65  
 LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40519.00 = 4091.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40519.00 TO NODE 40519.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.05  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.615  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.50	0.30	0.982	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 19.84  
 EFFECTIVE AREA(ACRES) = 77.02 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 81.4 PEAK FLOW RATE(CFS) = 160.50

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 81.4 TC(MIN.) = 14.05  
 EFFECTIVE AREA(ACRES) = 77.02 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.998  
 PEAK FLOW RATE(CFS) = 160.50

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	160.50	14.05	2.615	0.30( 0.30)	1.00	77.0	40510.00
2	155.23	15.56	2.419	0.30( 0.30)	1.00	81.4	40500.00

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 25 Yr \*  
\* From Node: 40600 To Node: 40615 \*  
\*\*\*\*\*

FILE NAME: 0610406W.DAT  
TIME/DATE OF STUDY: 09:47 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.983
- 2) 10.00; 3.242
- 3) 15.00; 2.468
- 4) 20.00; 2.035
- 5) 25.00; 1.772
- 6) 30.00; 1.553
- 7) 40.00; 1.354
- 8) 50.00; 1.200
- 9) 60.00; 1.077
- 10) 90.00; 0.909
- 11) 120.00; 0.800
- 12) 180.00; 0.670
- 13) 360.00; 0.498
- 14) 1440.00; 0.219

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40600.00 TO NODE 40601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 279.00  
ELEVATION DATA: UPSTREAM(FEET) = 1054.00 DOWNSTREAM(FEET) = 1000.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.326  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.477  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.54	0.30	1.000	0	9.33

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.55  
TOTAL AREA(ACRES) = 0.54 PEAK FLOW RATE(CFS) = 1.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40601.00 TO NODE 40602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 985.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 199.00 CHANNEL SLOPE = 0.0754  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.210  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.76	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.55  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.75  
AVERAGE FLOW DEPTH(FEET) = 0.48 TRAVEL TIME(MIN.) = 0.88  
Tc(MIN.) = 10.21  
SUBAREA AREA(ACRES) = 0.76 SUBAREA RUNOFF(CFS) = 1.99  
EFFECTIVE AREA(ACRES) = 1.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.3 PEAK FLOW RATE(CFS) = 3.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.53 FLOW VELOCITY(FEET/SEC.) = 4.06  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40602.00 = 478.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40602.00 TO NODE 40603.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	985.00	DOWNSTREAM(FEET) =	958.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	282.00	CHANNEL SLOPE =	0.0957
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	3.059		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.11	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.79

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.83

AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 0.97

Tc(MIN.) = 11.18

SUBAREA AREA(ACRES) = 1.11 SUBAREA RUNOFF(CFS) = 2.76

EFFECTIVE AREA(ACRES) = 2.41 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 5.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 5.15

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40603.00 = 760.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40603.00 TO NODE 40604.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	958.00	DOWNSTREAM(FEET) =	940.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	219.00	CHANNEL SLOPE =	0.0822
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	2.943		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.36	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.42

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.90

AVERAGE FLOW DEPTH(FEET) = 0.66 TRAVEL TIME(MIN.) = 0.75

Tc(MIN.) = 11.93

SUBAREA AREA(ACRES) = 0.36 SUBAREA RUNOFF(CFS) = 0.85

EFFECTIVE AREA(ACRES) = 2.77 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.8 PEAK FLOW RATE(CFS) = 6.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.67 FLOW VELOCITY(FEET/SEC.) = 4.94

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40604.00 = 979.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40604.00 TO NODE 40605.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	940.00	DOWNSTREAM(FEET) =	800.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	547.00	CHANNEL SLOPE =	0.2559
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	2.775		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.93

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.38

AVERAGE FLOW DEPTH(FEET) = 0.63 TRAVEL TIME(MIN.) = 1.09

Tc(MIN.) = 13.02

SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 6.68

EFFECTIVE AREA(ACRES) = 5.77 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 12.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.69 FLOW VELOCITY(FEET/SEC.) = 8.96

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40605.00 = 1526.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40605.00 TO NODE 40606.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	800.00	DOWNSTREAM(FEET) =	680.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	277.00	CHANNEL SLOPE =	0.4332
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	2.712		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.22	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.26

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.38

AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 0.41

Tc(MIN.) = 13.42

SUBAREA AREA(ACRES) = 2.22 SUBAREA RUNOFF(CFS) = 4.83

EFFECTIVE AREA(ACRES) = 7.99 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.0 PEAK FLOW RATE (CFS) = 17.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.70 FLOW VELOCITY (FEET/SEC.) = 11.83  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40606.00 = 1803.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40606.00 TO NODE 40607.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 680.00 DOWNSTREAM (FEET) = 670.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 59.00 CHANNEL SLOPE = 0.1695  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.695

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.34	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.41  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.23  
AVERAGE FLOW DEPTH (FEET) = 0.99 TRAVEL TIME (MIN.) = 0.11  
Tc (MIN.) = 13.53  
SUBAREA AREA (ACRES) = 9.34 SUBAREA RUNOFF (CFS) = 20.13  
EFFECTIVE AREA (ACRES) = 17.33 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.3 PEAK FLOW RATE (CFS) = 37.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.12 FLOW VELOCITY (FEET/SEC.) = 9.98  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40607.00 = 1862.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40607.00 TO NODE 40608.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 670.00 DOWNSTREAM (FEET) = 585.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 246.00 CHANNEL SLOPE = 0.3455  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.649

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.64	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 42.25  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.55  
AVERAGE FLOW DEPTH (FEET) = 1.02 TRAVEL TIME (MIN.) = 0.30  
Tc (MIN.) = 13.83

SUBAREA AREA (ACRES) = 4.64 SUBAREA RUNOFF (CFS) = 9.80  
EFFECTIVE AREA (ACRES) = 21.96 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 46.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.06 FLOW VELOCITY (FEET/SEC.) = 13.83  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40608.00 = 2108.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40608.00 TO NODE 40609.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 585.00 DOWNSTREAM (FEET) = 494.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 482.00 CHANNEL SLOPE = 0.1888  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.540

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.61	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 55.10  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.50  
AVERAGE FLOW DEPTH (FEET) = 1.26 TRAVEL TIME (MIN.) = 0.70  
Tc (MIN.) = 14.53  
SUBAREA AREA (ACRES) = 8.61 SUBAREA RUNOFF (CFS) = 17.36  
EFFECTIVE AREA (ACRES) = 30.57 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 30.6 PEAK FLOW RATE (CFS) = 61.65

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.32 FLOW VELOCITY (FEET/SEC.) = 11.85  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40609.00 = 2590.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40609.00 TO NODE 40610.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 494.00 DOWNSTREAM (FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 236.00 CHANNEL SLOPE = 0.1017  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.479

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	18.33	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 79.62  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.99



AVERAGE FLOW DEPTH (FEET) = 1.63 TRAVEL TIME (MIN.) = 0.39  
Tc (MIN.) = 14.92  
SUBAREA AREA (ACRES) = 18.33 SUBAREA RUNOFF (CFS) = 35.95  
EFFECTIVE AREA (ACRES) = 48.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 48.9 PEAK FLOW RATE (CFS) = 95.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.75 FLOW VELOCITY (FEET/SEC.) = 10.44  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40610.00 = 2826.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40610.00 TO NODE 40611.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 425.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 560.00 CHANNEL SLOPE = 0.0804  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.392  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.11 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 105.44  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.79  
AVERAGE FLOW DEPTH (FEET) = 1.89 TRAVEL TIME (MIN.) = 0.95  
Tc (MIN.) = 15.88  
SUBAREA AREA (ACRES) = 10.11 SUBAREA RUNOFF (CFS) = 19.03  
EFFECTIVE AREA (ACRES) = 59.01 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 59.0 PEAK FLOW RATE (CFS) = 111.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.93 FLOW VELOCITY (FEET/SEC.) = 9.91  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40611.00 = 3386.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40611.00 TO NODE 40612.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 425.00 DOWNSTREAM (FEET) = 373.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 906.00 CHANNEL SLOPE = 0.0574  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.248  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 20.87 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 129.39  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.10  
AVERAGE FLOW DEPTH (FEET) = 2.18 TRAVEL TIME (MIN.) = 1.66  
Tc (MIN.) = 17.54  
SUBAREA AREA (ACRES) = 20.87 SUBAREA RUNOFF (CFS) = 36.59  
EFFECTIVE AREA (ACRES) = 79.89 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 79.9 PEAK FLOW RATE (CFS) = 140.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.25 FLOW VELOCITY (FEET/SEC.) = 9.26  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40612.00 = 4292.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40612.00 TO NODE 40613.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 373.00 DOWNSTREAM (FEET) = 326.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1220.00 CHANNEL SLOPE = 0.0385  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.073  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 13.07 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 150.48  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.08  
AVERAGE FLOW DEPTH (FEET) = 2.23 TRAVEL TIME (MIN.) = 2.02  
Tc (MIN.) = 19.55  
SUBAREA AREA (ACRES) = 13.07 SUBAREA RUNOFF (CFS) = 20.86  
EFFECTIVE AREA (ACRES) = 92.95 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 93.0 PEAK FLOW RATE (CFS) = 148.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.22 FLOW VELOCITY (FEET/SEC.) = 10.06  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40613.00 = 5512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40613.00 TO NODE 40614.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 326.00 DOWNSTREAM (FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 209.00 CHANNEL SLOPE = 0.1722  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.057  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 14.71 0.30 0.999 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 159.99  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 18.00  
 AVERAGE FLOW DEPTH(FEET) = 1.72 TRAVEL TIME(MIN.) = 0.19  
 Tc(MIN.) = 19.75  
 SUBAREA AREA(ACRES) = 14.71 SUBAREA RUNOFF(CFS) = 23.26  
 EFFECTIVE AREA(ACRES) = 107.67 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 107.7 PEAK FLOW RATE(CFS) = 170.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.77 FLOW VELOCITY(FEET/SEC.) = 18.21  
 LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40614.00 = 5721.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40614.00 TO NODE 40615.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 290.00 DOWNSTREAM(FEET) = 286.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0104  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.996

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	23.56	0.30	0.971	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.971  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 188.29  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.52  
 AVERAGE FLOW DEPTH(FEET) = 3.10 TRAVEL TIME(MIN.) = 0.99  
 Tc(MIN.) = 20.73  
 SUBAREA AREA(ACRES) = 23.56 SUBAREA RUNOFF(CFS) = 36.15  
 EFFECTIVE AREA(ACRES) = 131.23 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 131.2 PEAK FLOW RATE(CFS) = 200.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.18 FLOW VELOCITY(FEET/SEC.) = 6.62  
 LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40615.00 = 6107.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40615.00 TO NODE 40615.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.73  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.996  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.74	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 3.74 SUBAREA RUNOFF(CFS) = 5.72  
 EFFECTIVE AREA(ACRES) = 134.97 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 135.0 PEAK FLOW RATE(CFS) = 206.23

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 135.0 TC(MIN.) = 20.73  
 EFFECTIVE AREA(ACRES) = 134.97 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.995  
 PEAK FLOW RATE(CFS) = 206.23

END OF RATIONAL METHOD ANALYSIS



Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 25 Yr \*  
\* From Node: 50100 To Node: 50167 \*  
\*\*\*\*\*

FILE NAME: 0610501W.DAT  
TIME/DATE OF STUDY: 09:47 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:  
=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.955
- 2) 10.00; 3.226
- 3) 15.00; 2.458
- 4) 20.00; 2.028
- 5) 25.00; 1.767
- 6) 30.00; 1.549
- 7) 40.00; 1.350
- 8) 50.00; 1.197
- 9) 60.00; 1.073
- 10) 90.00; 0.905
- 11) 120.00; 0.795
- 12) 180.00; 0.665
- 13) 360.00; 0.494
- 14) 1440.00; 0.217

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL IN- / OUT- / PARK- / SIDE / SIDE / WAY	STREET-CROSSFALL: (FT)	CURB HEIGHT (FT)	GUTTER-WIDTH (FT)	GEOMETRIES LIP (FT)	MANNING HIKE FACTOR (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150	
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150	
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150	
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150	
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150	

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50100.00 TO NODE 50101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00  
ELEVATION DATA: UPSTREAM(FEET) = 1072.00 DOWNSTREAM(FEET) = 1063.00

Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.598  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.520  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.60	0.30	1.000	0	14.60
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000						
SUBAREA RUNOFF(CFS) = 1.21						
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.21						

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50101.00 TO NODE 50102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 1063.00 DOWNSTREAM(FEET) = 975.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 273.00 CHANNEL SLOPE = 0.3223  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.424

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.29	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.49  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.71  
AVERAGE FLOW DEPTH(FEET) = 0.29 TRAVEL TIME(MIN.) = 0.80  
Tc(MIN.) = 15.39

SUBAREA AREA(ACRES) = 0.29 SUBAREA RUNOFF(CFS) = 0.56  
EFFECTIVE AREA(ACRES) = 0.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 1.72

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 FLOW VELOCITY(FEET/SEC.) = 5.96  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50102.00 = 597.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50102.00 TO NODE 50103.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	975.00	DOWNSTREAM(FEET) =	948.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	111.00	CHANNEL SLOPE =	0.2432
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	2.395		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.22	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.93

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.54

AVERAGE FLOW DEPTH(FEET) = 0.34 TRAVEL TIME(MIN.) = 0.33

Tc(MIN.) = 15.73

SUBAREA AREA(ACRES) = 0.22 SUBAREA RUNOFF(CFS) = 0.42

EFFECTIVE AREA(ACRES) = 1.12 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 2.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 FLOW VELOCITY(FEET/SEC.) = 5.56

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50103.00 = 708.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50103.00 TO NODE 50104.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	948.00	DOWNSTREAM(FEET) =	914.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	136.00	CHANNEL SLOPE =	0.2500
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	2.363		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.66

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.01

AVERAGE FLOW DEPTH(FEET) = 0.38 TRAVEL TIME(MIN.) = 0.38

Tc(MIN.) = 16.11

SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 1.10

EFFECTIVE AREA(ACRES) = 1.71 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 3.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 FLOW VELOCITY(FEET/SEC.) = 6.33

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50104.00 = 844.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50104.00 TO NODE 50105.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	914.00	DOWNSTREAM(FEET) =	895.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	52.00	CHANNEL SLOPE =	0.3654
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	2.354		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.73	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.78

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.96

AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.11

Tc(MIN.) = 16.21

SUBAREA AREA(ACRES) = 1.73 SUBAREA RUNOFF(CFS) = 3.19

EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 6.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.50 FLOW VELOCITY(FEET/SEC.) = 8.52

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50105.00 = 896.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50105.00 TO NODE 50106.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	895.00	DOWNSTREAM(FEET) =	835.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	280.00	CHANNEL SLOPE =	0.2143
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	2.302		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.79

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.83

AVERAGE FLOW DEPTH(FEET) = 0.65 TRAVEL TIME(MIN.) = 0.60

Tc(MIN.) = 16.81

SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 6.86

EFFECTIVE AREA(ACRES) = 7.24 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 7.2 PEAK FLOW RATE (CFS) = 13.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.72 FLOW VELOCITY (FEET/SEC.) = 8.40  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50106.00 = 1176.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50106.00 TO NODE 50107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 835.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 413.00 CHANNEL SLOPE = 0.2179  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.237

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.53	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.01  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.07  
AVERAGE FLOW DEPTH (FEET) = 0.79 TRAVEL TIME (MIN.) = 0.76  
Tc (MIN.) = 17.57

SUBAREA AREA (ACRES) = 4.53 SUBAREA RUNOFF (CFS) = 7.90  
EFFECTIVE AREA (ACRES) = 11.77 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.8 PEAK FLOW RATE (CFS) = 20.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.85 FLOW VELOCITY (FEET/SEC.) = 9.48  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50107.00 = 1589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50107.00 TO NODE 50108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 302.00 CHANNEL SLOPE = 0.2318  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.195

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.76	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 25.45  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.23  
AVERAGE FLOW DEPTH (FEET) = 0.91 TRAVEL TIME (MIN.) = 0.49  
Tc (MIN.) = 18.06

SUBAREA AREA (ACRES) = 5.76 SUBAREA RUNOFF (CFS) = 9.83  
EFFECTIVE AREA (ACRES) = 17.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.5 PEAK FLOW RATE (CFS) = 29.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.97 FLOW VELOCITY (FEET/SEC.) = 10.68  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50108.00 = 1891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50108.00 TO NODE 50109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 655.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 81.00 CHANNEL SLOPE = 0.2469  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.185

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.77	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 43.29  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.89  
AVERAGE FLOW DEPTH (FEET) = 1.10 TRAVEL TIME (MIN.) = 0.11  
Tc (MIN.) = 18.17

SUBAREA AREA (ACRES) = 15.77 SUBAREA RUNOFF (CFS) = 26.76  
EFFECTIVE AREA (ACRES) = 33.31 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 33.3 PEAK FLOW RATE (CFS) = 56.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.22 FLOW VELOCITY (FEET/SEC.) = 12.74  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50109.00 = 1972.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 655.00 DOWNSTREAM (FEET) = 590.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 379.00 CHANNEL SLOPE = 0.1715  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.138

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.53	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 66.06  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.60

AVERAGE FLOW DEPTH (FEET) = 1.38 TRAVEL TIME (MIN.) = 0.54  
Tc (MIN.) = 18.72  
SUBAREA AREA (ACRES) = 11.53 SUBAREA RUNOFF (CFS) = 19.09  
EFFECTIVE AREA (ACRES) = 44.84 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 44.8 PEAK FLOW RATE (CFS) = 74.20

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.44 FLOW VELOCITY (FEET/SEC.) = 11.94  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50110.00 = 2351.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50110.00 TO NODE 50111.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 590.00 DOWNSTREAM (FEET) = 570.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 340.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.081  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 27.15 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 95.96  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.54  
AVERAGE FLOW DEPTH (FEET) = 1.94 TRAVEL TIME (MIN.) = 0.66  
Tc (MIN.) = 19.38  
SUBAREA AREA (ACRES) = 27.15 SUBAREA RUNOFF (CFS) = 43.53  
EFFECTIVE AREA (ACRES) = 71.99 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 72.0 PEAK FLOW RATE (CFS) = 115.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.08 FLOW VELOCITY (FEET/SEC.) = 8.91  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50111.00 = 2691.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50111.00 TO NODE 50112.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 570.00 DOWNSTREAM (FEET) = 567.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 403.00 CHANNEL SLOPE = 0.0074  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.983  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 66.68 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 165.94  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.50  
AVERAGE FLOW DEPTH (FEET) = 3.51 TRAVEL TIME (MIN.) = 1.49  
Tc (MIN.) = 20.88  
SUBAREA AREA (ACRES) = 66.68 SUBAREA RUNOFF (CFS) = 100.99  
EFFECTIVE AREA (ACRES) = 138.68 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 138.7 PEAK FLOW RATE (CFS) = 210.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 3.83 FLOW VELOCITY (FEET/SEC.) = 4.77  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50112.00 = 3094.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50112.00 TO NODE 50140.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 20.88  
RAINFALL INTENSITY (INCH/HR) = 1.98  
AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA (ACRES) = 138.68  
TOTAL STREAM AREA (ACRES) = 138.68  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 210.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50120.00 TO NODE 50121.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH (FEET) = 324.00  
ELEVATION DATA: UPSTREAM (FEET) = 1068.00 DOWNSTREAM (FEET) = 968.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.018  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.566  
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	-	0.29	0.30	1.000	0	9.02
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000						
SUBAREA RUNOFF (CFS) = 0.85						
TOTAL AREA (ACRES) = 0.29 PEAK FLOW RATE (CFS) = 0.85						

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50121.00 TO NODE 50122.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 968.00 DOWNSTREAM (FEET) = 916.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 242.00 CHANNEL SLOPE = 0.2149  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.286  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.55	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.58  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.99  
 AVERAGE FLOW DEPTH (FEET) = 0.33 TRAVEL TIME (MIN.) = 0.81  
 Tc (MIN.) = 9.83  
 SUBAREA AREA (ACRES) = 0.55 SUBAREA RUNOFF (CFS) = 1.47  
 EFFECTIVE AREA (ACRES) = 0.83 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 0.8 PEAK FLOW RATE (CFS) = 2.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.37 FLOW VELOCITY (FEET/SEC.) = 5.43  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50122.00 = 566.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50122.00 TO NODE 50123.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 916.00 DOWNSTREAM (FEET) = 906.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 111.00 CHANNEL SLOPE = 0.0901  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.186  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.68	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.12  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.28  
 AVERAGE FLOW DEPTH (FEET) = 0.49 TRAVEL TIME (MIN.) = 0.43  
 Tc (MIN.) = 10.26  
 SUBAREA AREA (ACRES) = 0.68 SUBAREA RUNOFF (CFS) = 1.76  
 EFFECTIVE AREA (ACRES) = 1.51 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.5 PEAK FLOW RATE (CFS) = 3.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.54 FLOW VELOCITY (FEET/SEC.) = 4.51  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50123.00 = 677.00 FEET.

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FLOW PROCESS FROM NODE 50123.00 TO NODE 50124.00 IS CODE = 51

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 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 906.00 DOWNSTREAM (FEET) = 903.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 60.00 CHANNEL SLOPE = 0.0500  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.146  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.68  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.77  
 AVERAGE FLOW DEPTH (FEET) = 0.64 TRAVEL TIME (MIN.) = 0.27  
 Tc (MIN.) = 10.52  
 SUBAREA AREA (ACRES) = 0.59 SUBAREA RUNOFF (CFS) = 1.51  
 EFFECTIVE AREA (ACRES) = 2.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.1 PEAK FLOW RATE (CFS) = 5.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.68 FLOW VELOCITY (FEET/SEC.) = 3.92  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50124.00 = 737.00 FEET.

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FLOW PROCESS FROM NODE 50124.00 TO NODE 50125.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 903.00 DOWNSTREAM (FEET) = 901.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 29.00 CHANNEL SLOPE = 0.0690  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.130  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.44	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.21  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.74  
 AVERAGE FLOW DEPTH (FEET) = 0.71 TRAVEL TIME (MIN.) = 0.10  
 Tc (MIN.) = 10.63  
 SUBAREA AREA (ACRES) = 1.44 SUBAREA RUNOFF (CFS) = 3.67  
 EFFECTIVE AREA (ACRES) = 3.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.5 PEAK FLOW RATE (CFS) = 9.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.78 FLOW VELOCITY (FEET/SEC.) = 5.00  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50125.00 = 766.00 FEET.

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FLOW PROCESS FROM NODE 50125.00 TO NODE 50126.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 901.00 DOWNSTREAM(FEET) = 889.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 130.00 CHANNEL SLOPE = 0.0923
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.075
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.69    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.38
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.04
AVERAGE FLOW DEPTH(FEET) = 0.83 TRAVEL TIME(MIN.) = 0.36
Tc(MIN.) = 10.99
SUBAREA AREA(ACRES) = 2.69 SUBAREA RUNOFF(CFS) = 6.73
EFFECTIVE AREA(ACRES) = 6.23 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.2 PEAK FLOW RATE(CFS) = 15.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.90 FLOW VELOCITY(FEET/SEC.) = 6.36
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50126.00 = 896.00 FEET.

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FLOW PROCESS FROM NODE 50126.00 TO NODE 50127.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 889.00 DOWNSTREAM(FEET) = 855.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 231.00 CHANNEL SLOPE = 0.1472
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.000
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.18    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.22
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.94
AVERAGE FLOW DEPTH(FEET) = 0.87 TRAVEL TIME(MIN.) = 0.48
Tc(MIN.) = 11.47
SUBAREA AREA(ACRES) = 2.18 SUBAREA RUNOFF(CFS) = 5.30
EFFECTIVE AREA(ACRES) = 8.41 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 20.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.91 FLOW VELOCITY(FEET/SEC.) = 8.18
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50127.00 = 1127.00 FEET.

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FLOW PROCESS FROM NODE 50127.00 TO NODE 50128.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 855.00 DOWNSTREAM(FEET) = 793.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 211.00 CHANNEL SLOPE = 0.2938
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.953
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         5.70    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.25
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.33
AVERAGE FLOW DEPTH(FEET) = 0.90 TRAVEL TIME(MIN.) = 0.31
Tc(MIN.) = 11.78
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 13.60
EFFECTIVE AREA(ACRES) = 14.11 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.1 PEAK FLOW RATE(CFS) = 33.69

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.97 FLOW VELOCITY(FEET/SEC.) = 12.03
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50128.00 = 1338.00 FEET.

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FLOW PROCESS FROM NODE 50128.00 TO NODE 50129.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 793.00 DOWNSTREAM(FEET) = 708.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 353.00 CHANNEL SLOPE = 0.2408
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.877
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         9.99    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.27
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.94
AVERAGE FLOW DEPTH(FEET) = 1.12 TRAVEL TIME(MIN.) = 0.49
Tc(MIN.) = 12.27
SUBAREA AREA(ACRES) = 9.99 SUBAREA RUNOFF(CFS) = 23.17
EFFECTIVE AREA(ACRES) = 24.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 55.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.22 FLOW VELOCITY(FEET/SEC.) = 12.60
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50129.00 = 1691.00 FEET.

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FLOW PROCESS FROM NODE 50129.00 TO NODE 50130.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 708.00 DOWNSTREAM(FEET) = 571.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 735.00 CHANNEL SLOPE = 0.1864
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.722
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 13.71 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 70.85
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.16
AVERAGE FLOW DEPTH(FEET) = 1.39 TRAVEL TIME(MIN.) = 1.01
Tc(MIN.) = 13.28
SUBAREA AREA(ACRES) = 13.71 SUBAREA RUNOFF(CFS) = 29.89
EFFECTIVE AREA(ACRES) = 37.82 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 82.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.48 FLOW VELOCITY(FEET/SEC.) = 12.62
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50130.00 = 2426.00 FEET.

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FLOW PROCESS FROM NODE 50130.00 TO NODE 50131.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 571.00 DOWNSTREAM(FEET) = 566.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 709.00 CHANNEL SLOPE = 0.0071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.345
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.71 0.30 0.986 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 101.55
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.90
AVERAGE FLOW DEPTH(FEET) = 2.95 TRAVEL TIME(MIN.) = 3.03
Tc(MIN.) = 16.31
SUBAREA AREA(ACRES) = 20.71 SUBAREA RUNOFF(CFS) = 38.19
EFFECTIVE AREA(ACRES) = 58.52 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 107.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.01 FLOW VELOCITY(FEET/SEC.) = 3.96
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50131.00 = 3135.00 FEET.

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FLOW PROCESS FROM NODE 50132.00 TO NODE 50131.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.31
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.345
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 154.02 0.30 0.949 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 154.02 SUBAREA RUNOFF(CFS) = 285.61
EFFECTIVE AREA(ACRES) = 212.54 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 212.5 PEAK FLOW RATE(CFS) = 393.40

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FLOW PROCESS FROM NODE 50131.00 TO NODE 50140.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 16.31
RAINFALL INTENSITY(INCH/HR) = 2.35
AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 212.54
TOTAL STREAM AREA(ACRES) = 212.54
PEAK FLOW RATE(CFS) AT CONFLUENCE = 393.40

\*\* CONFLUENCE DATA \*\*
Table with 7 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*
Table with 7 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 592.88 Tc(MIN.) = 16.31
EFFECTIVE AREA(ACRES) = 320.92 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 351.2

LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50140.00 = 3135.00 FEET.

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FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 566.00 DOWNSTREAM(FEET) = 416.00
FLOW LENGTH(FEET) = 376.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 71.42
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 592.88
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 16.40
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50141.00 = 3511.00 FEET.

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FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.40
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.337
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 48.73 0.30 0.922 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.922
SUBAREA AREA(ACRES) = 48.73 SUBAREA RUNOFF(CFS) = 90.39
EFFECTIVE AREA(ACRES) = 369.65 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 400.0 PEAK FLOW RATE(CFS) = 681.09

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FLOW PROCESS FROM NODE 50141.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 416.00 DOWNSTREAM(FEET) = 404.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 972.00 CHANNEL SLOPE = 0.0123
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.158
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.56 0.30 0.610 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.610
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 687.81
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.76
AVERAGE FLOW DEPTH(FEET) = 5.43 TRAVEL TIME(MIN.) = 2.09
Tc(MIN.) = 18.49
SUBAREA AREA(ACRES) = 7.56 SUBAREA RUNOFF(CFS) = 13.44
EFFECTIVE AREA(ACRES) = 377.21 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 407.5 PEAK FLOW RATE(CFS) = 681.09
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 5.41 FLOW VELOCITY(FEET/SEC.) = 7.75
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50162.00 = 4483.00 FEET.

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FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 18.49
RAINFALL INTENSITY(INCH/HR) = 2.16
AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 377.21
TOTAL STREAM AREA(ACRES) = 407.52
PEAK FLOW RATE(CFS) AT CONFLUENCE = 681.09

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FLOW PROCESS FROM NODE 50150.00 TO NODE 50151.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00
ELEVATION DATA: UPSTREAM(FEET) = 1076.00 DOWNSTREAM(FEET) = 988.00

Tc = K \* [(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.235
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.491
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" - 0.46 0.30 1.000 0 9.23
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.31
TOTAL AREA(ACRES) = 0.46 PEAK FLOW RATE(CFS) = 1.31

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FLOW PROCESS FROM NODE 50151.00 TO NODE 50152.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 988.00 DOWNSTREAM(FEET) = 938.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 220.00 CHANNEL SLOPE = 0.2273
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.261
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.09  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.51  
 AVERAGE FLOW DEPTH (FEET) = 0.36 TRAVEL TIME (MIN.) = 0.67  
 Tc (MIN.) = 9.90  
 SUBAREA AREA (ACRES) = 0.59 SUBAREA RUNOFF (CFS) = 1.57  
 EFFECTIVE AREA (ACRES) = 1.04 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.0 PEAK FLOW RATE (CFS) = 2.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.40 FLOW VELOCITY (FEET/SEC.) = 5.81  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50152.00 = 543.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50152.00 TO NODE 50153.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 938.00 DOWNSTREAM (FEET) = 904.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 218.00 CHANNEL SLOPE = 0.1560  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.142  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.13	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.23  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.63  
 AVERAGE FLOW DEPTH (FEET) = 0.50 TRAVEL TIME (MIN.) = 0.65  
 Tc (MIN.) = 10.55  
 SUBAREA AREA (ACRES) = 1.13 SUBAREA RUNOFF (CFS) = 2.90  
 EFFECTIVE AREA (ACRES) = 2.18 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.2 PEAK FLOW RATE (CFS) = 5.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.55 FLOW VELOCITY (FEET/SEC.) = 6.05  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50153.00 = 761.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50153.00 TO NODE 50154.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 904.00 DOWNSTREAM (FEET) = 881.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 212.00 CHANNEL SLOPE = 0.1085  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.051

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.28  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.97  
 AVERAGE FLOW DEPTH (FEET) = 0.72 TRAVEL TIME (MIN.) = 0.59  
 Tc (MIN.) = 11.14  
 SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 7.43  
 EFFECTIVE AREA (ACRES) = 5.18 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.2 PEAK FLOW RATE (CFS) = 12.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.81 FLOW VELOCITY (FEET/SEC.) = 6.49  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50154.00 = 973.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50154.00 TO NODE 50155.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 881.00 DOWNSTREAM (FEET) = 877.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 158.00 CHANNEL SLOPE = 0.0253  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.952  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.37  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.05  
 AVERAGE FLOW DEPTH (FEET) = 1.19 TRAVEL TIME (MIN.) = 0.65  
 Tc (MIN.) = 11.79  
 SUBAREA AREA (ACRES) = 3.81 SUBAREA RUNOFF (CFS) = 9.10  
 EFFECTIVE AREA (ACRES) = 8.99 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.0 PEAK FLOW RATE (CFS) = 21.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.29 FLOW VELOCITY (FEET/SEC.) = 4.27  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50155.00 = 1131.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50155.00 TO NODE 50156.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 877.00 DOWNSTREAM (FEET) = 875.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 195.00 CHANNEL SLOPE = 0.0103

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.794  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.32	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 25.18  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.17  
AVERAGE FLOW DEPTH (FEET) = 1.63 TRAVEL TIME (MIN.) = 1.03  
Tc (MIN.) = 12.81  
SUBAREA AREA (ACRES) = 3.32 SUBAREA RUNOFF (CFS) = 7.45  
EFFECTIVE AREA (ACRES) = 12.31 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 27.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.68 FLOW VELOCITY (FEET/SEC.) = 3.25  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50156.00 = 1326.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50156.00 TO NODE 50157.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 875.00 DOWNSTREAM (FEET) = 850.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 424.00 CHANNEL SLOPE = 0.0590  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.626  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.78	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.59  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.46  
AVERAGE FLOW DEPTH (FEET) = 1.28 TRAVEL TIME (MIN.) = 1.09  
Tc (MIN.) = 13.91  
SUBAREA AREA (ACRES) = 3.78 SUBAREA RUNOFF (CFS) = 7.91  
EFFECTIVE AREA (ACRES) = 16.09 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 16.1 PEAK FLOW RATE (CFS) = 33.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.31 FLOW VELOCITY (FEET/SEC.) = 6.57  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50157.00 = 1750.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50157.00 TO NODE 50158.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 850.00 DOWNSTREAM (FEET) = 835.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 158.00 CHANNEL SLOPE = 0.0949  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.578  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.22	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 45.18  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.41  
AVERAGE FLOW DEPTH (FEET) = 1.34 TRAVEL TIME (MIN.) = 0.31  
Tc (MIN.) = 14.22  
SUBAREA AREA (ACRES) = 11.22 SUBAREA RUNOFF (CFS) = 22.99  
EFFECTIVE AREA (ACRES) = 27.31 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 27.3 PEAK FLOW RATE (CFS) = 55.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.45 FLOW VELOCITY (FEET/SEC.) = 8.91  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50158.00 = 1908.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50158.00 TO NODE 50159.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 835.00 DOWNSTREAM (FEET) = 680.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 721.00 CHANNEL SLOPE = 0.2150  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.446  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	20.87	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 76.14  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.07  
AVERAGE FLOW DEPTH (FEET) = 1.39 TRAVEL TIME (MIN.) = 0.92  
Tc (MIN.) = 15.14  
SUBAREA AREA (ACRES) = 20.87 SUBAREA RUNOFF (CFS) = 40.31  
EFFECTIVE AREA (ACRES) = 48.18 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 48.2 PEAK FLOW RATE (CFS) = 93.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.50 FLOW VELOCITY (FEET/SEC.) = 13.78  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50159.00 = 2629.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50159.00 TO NODE 50160.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 680.00 DOWNSTREAM(FEET) = 558.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 874.00 CHANNEL SLOPE = 0.1396
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.346

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 32.02 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 122.54
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.53
AVERAGE FLOW DEPTH(FEET) = 1.81 TRAVEL TIME(MIN.) = 1.16
Tc(MIN.) = 16.30
SUBAREA AREA(ACRES) = 32.02 SUBAREA RUNOFF(CFS) = 58.96
EFFECTIVE AREA(ACRES) = 80.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 147.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.94 FLOW VELOCITY(FEET/SEC.) = 13.15
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50160.00 = 3503.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 50160.00 TO NODE 50161.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 558.00 DOWNSTREAM(FEET) = 463.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1013.00 CHANNEL SLOPE = 0.0938
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.220

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 13.52 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 159.37
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.53
AVERAGE FLOW DEPTH(FEET) = 2.15 TRAVEL TIME(MIN.) = 1.46
Tc(MIN.) = 17.77
SUBAREA AREA(ACRES) = 13.52 SUBAREA RUNOFF(CFS) = 23.38
EFFECTIVE AREA(ACRES) = 93.72 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 93.7 PEAK FLOW RATE(CFS) = 161.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.16 FLOW VELOCITY(FEET/SEC.) = 11.55
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50161.00 = 4516.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 50161.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 404.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1126.00 CHANNEL SLOPE = 0.0524
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.051

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 19.35 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 177.22
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.51
AVERAGE FLOW DEPTH(FEET) = 2.49 TRAVEL TIME(MIN.) = 1.97
Tc(MIN.) = 19.74
SUBAREA AREA(ACRES) = 19.35 SUBAREA RUNOFF(CFS) = 30.48
EFFECTIVE AREA(ACRES) = 113.07 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.1 PEAK FLOW RATE(CFS) = 178.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.50 FLOW VELOCITY(FEET/SEC.) = 9.52
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 19.74
RAINFALL INTENSITY(INCH/HR) = 2.05
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 113.07
TOTAL STREAM AREA(ACRES) = 113.07
PEAK FLOW RATE(CFS) AT CONFLUENCE = 178.16

\*\* CONFLUENCE DATA \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 681.09 18.49 2.158 0.30( 0.29) 0.96 377.2 50120.00
1 607.26 23.11 1.866 0.30( 0.29) 0.96 407.5 50100.00
2 178.16 19.74 2.051 0.30( 0.30) 1.00 113.1 50150.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE

1 858.21 18.49 2.158 0.30( 0.29) 0.97 483.1 50120.00  
2 839.30 19.74 2.051 0.30( 0.29) 0.97 498.5 50150.00  
3 766.60 23.11 1.866 0.30( 0.29) 0.97 520.6 50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 858.21 Tc(MIN.) = 18.49  
EFFECTIVE AREA(ACRES) = 483.12 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 520.6  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50162.00 TO NODE 50163.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 378.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1158.00 CHANNEL SLOPE = 0.0225  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.012  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 151.93 0.30 0.990 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 975.51  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.61  
AVERAGE FLOW DEPTH(FEET) = 5.54 TRAVEL TIME(MIN.) = 1.82  
Tc(MIN.) = 20.31  
SUBAREA AREA(ACRES) = 151.93 SUBAREA RUNOFF(CFS) = 234.54  
EFFECTIVE AREA(ACRES) = 635.04 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 672.5 PEAK FLOW RATE(CFS) = 983.10

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 5.56 FLOW VELOCITY(FEET/SEC.) = 10.61  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50163.00 = 6800.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50163.00 TO NODE 50164.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 378.00 DOWNSTREAM(FEET) = 356.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 886.00 CHANNEL SLOPE = 0.0248  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.945  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 177.01 0.30 0.989 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.989

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1114.36  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.39  
AVERAGE FLOW DEPTH(FEET) = 5.71 TRAVEL TIME(MIN.) = 1.30  
Tc(MIN.) = 21.61  
SUBAREA AREA(ACRES) = 177.01 SUBAREA RUNOFF(CFS) = 262.53  
EFFECTIVE AREA(ACRES) = 812.05 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 849.5 PEAK FLOW RATE(CFS) = 1206.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 5.89 FLOW VELOCITY(FEET/SEC.) = 11.61  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50164.00 = 7686.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50164.00 TO NODE 50165.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 356.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1762.00 CHANNEL SLOPE = 0.0233  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.812  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 155.27 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1312.58  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.56  
AVERAGE FLOW DEPTH(FEET) = 6.15 TRAVEL TIME(MIN.) = 2.54  
Tc(MIN.) = 24.15  
SUBAREA AREA(ACRES) = 155.27 SUBAREA RUNOFF(CFS) = 211.29  
EFFECTIVE AREA(ACRES) = 967.33 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 1004.8 PEAK FLOW RATE(CFS) = 1321.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 6.17 FLOW VELOCITY(FEET/SEC.) = 11.58  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50165.00 = 9448.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50165.00 TO NODE 50166.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 284.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 893.00 CHANNEL SLOPE = 0.0347  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.757  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 50.24 0.30 0.997 -

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.997  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1354.20  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.55  
 AVERAGE FLOW DEPTH(FEET) = 5.77 TRAVEL TIME(MIN.) = 1.10  
 $T_c$ (MIN.) = 25.24  
 SUBAREA AREA(ACRES) = 50.24 SUBAREA RUNOFF(CFS) = 65.90  
 EFFECTIVE AREA(ACRES) = 1017.56 AREA-AVERAGED  $F_m$ (INCH/HR) = 0.29  
 AREA-AVERAGED  $F_p$ (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.98  
 TOTAL AREA(ACRES) = 1055.0 PEAK FLOW RATE(CFS) = 1339.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 5.75 FLOW VELOCITY(FEET/SEC.) = 13.51  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50166.00 = 10341.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50166.00 TO NODE 50167.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 240.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00 CHANNEL SLOPE = 0.0437  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.707

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	8.36	0.30	0.892	-

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.892

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1344.45

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 14.74

AVERAGE FLOW DEPTH(FEET) = 5.51 TRAVEL TIME(MIN.) = 1.14

$T_c$ (MIN.) = 26.38

SUBAREA AREA(ACRES) = 8.36 SUBAREA RUNOFF(CFS) = 10.83

EFFECTIVE AREA(ACRES) = 1025.92 AREA-AVERAGED  $F_m$ (INCH/HR) = 0.29

AREA-AVERAGED  $F_p$ (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.98

TOTAL AREA(ACRES) = 1063.4 PEAK FLOW RATE(CFS) = 1339.03

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 5.51 FLOW VELOCITY(FEET/SEC.) = 14.73  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50167.00 = 11349.00 FEET.

-----  
 END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1063.4  $T_c$ (MIN.) = 26.38

EFFECTIVE AREA(ACRES) = 1025.92 AREA-AVERAGED  $F_m$ (INCH/HR) = 0.29

AREA-AVERAGED  $F_p$ (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.981

PEAK FLOW RATE(CFS) = 1339.03

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	$T_c$ (MIN.)	Intensity (INCH/HR)	$F_p$ ( $F_m$ ) (INCH/HR)	$A_p$	$A_e$ (ACRES)	HEADWATER NODE
1	1339.03	26.38	1.707	0.30( 0.29)	0.98	1025.9	50120.00
2	1307.01	27.68	1.651	0.30( 0.29)	0.98	1041.3	50150.00
3	1190.23	31.24	1.525	0.30( 0.29)	0.98	1063.4	50100.00

=====  
 =====  
 END OF RATIONAL METHOD ANALYSIS  
 =====





\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 25 Yr \*  
\* From Node: 50500 To Node: 50513 \*  
\*\*\*\*\*

FILE NAME: 0610505W.DAT  
TIME/DATE OF STUDY: 09:49 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.811
- 2) 10.00; 3.144
- 3) 15.00; 2.409
- 4) 20.00; 1.996
- 5) 25.00; 1.742
- 6) 30.00; 1.531
- 7) 40.00; 1.331
- 8) 50.00; 1.178
- 9) 60.00; 1.053
- 10) 90.00; 0.883
- 11) 120.00; 0.772
- 12) 180.00; 0.643
- 13) 360.00; 0.473
- 14) 1440.00; 0.207

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50500.00 TO NODE 50501.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 1122.00 DOWNSTREAM(FEET) = 980.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.501  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.644  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.67	0.30	1.000	0	8.50

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.01  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 2.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50501.00 TO NODE 50502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 832.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 500.00 CHANNEL SLOPE = 0.2960  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.228  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.83	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.11  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.69  
AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 1.25  
Tc(MIN.) = 9.75  
SUBAREA AREA(ACRES) = 0.83 SUBAREA RUNOFF(CFS) = 2.20  
EFFECTIVE AREA(ACRES) = 1.50 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.5 PEAK FLOW RATE(CFS) = 3.96

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.43 FLOW VELOCITY(FEET/SEC.) = 7.07  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50502.00 = 830.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50502.00 TO NODE 50503.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	832.00	DOWNSTREAM(FEET) =	779.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	255.00	CHANNEL SLOPE =	0.2078
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	3.098		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.76	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.69

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.52

AVERAGE FLOW DEPTH(FEET) = 0.62 TRAVEL TIME(MIN.) = 0.57

Tc(MIN.) = 10.31

SUBAREA AREA(ACRES) = 3.76 SUBAREA RUNOFF(CFS) = 9.46

EFFECTIVE AREA(ACRES) = 5.26 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.3 PEAK FLOW RATE(CFS) = 13.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.73 FLOW VELOCITY(FEET/SEC.) = 8.34

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50503.00 = 1085.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50503.00 TO NODE 50504.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	779.00	DOWNSTREAM(FEET) =	765.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	382.00	CHANNEL SLOPE =	0.0366
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	2.901		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.56	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.58

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.75

AVERAGE FLOW DEPTH(FEET) = 1.14 TRAVEL TIME(MIN.) = 1.34

Tc(MIN.) = 11.65

SUBAREA AREA(ACRES) = 4.56 SUBAREA RUNOFF(CFS) = 10.67

EFFECTIVE AREA(ACRES) = 9.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 22.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.24 FLOW VELOCITY(FEET/SEC.) = 4.99

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50504.00 = 1467.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50504.00 TO NODE 50505.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	765.00	DOWNSTREAM(FEET) =	750.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	355.00	CHANNEL SLOPE =	0.0423
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	2.743		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.79	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.15

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.49

AVERAGE FLOW DEPTH(FEET) = 1.28 TRAVEL TIME(MIN.) = 1.08

Tc(MIN.) = 12.73

SUBAREA AREA(ACRES) = 3.79 SUBAREA RUNOFF(CFS) = 8.33

EFFECTIVE AREA(ACRES) = 13.61 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 13.6 PEAK FLOW RATE(CFS) = 29.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.33 FLOW VELOCITY(FEET/SEC.) = 5.62

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50505.00 = 1822.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50505.00 TO NODE 50506.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	750.00	DOWNSTREAM(FEET) =	712.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	261.00	CHANNEL SLOPE =	0.1456
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	2.675		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.43	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 36.79

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.41

AVERAGE FLOW DEPTH(FEET) = 1.14 TRAVEL TIME(MIN.) = 0.46

Tc(MIN.) = 13.19

SUBAREA AREA(ACRES) = 6.43 SUBAREA RUNOFF(CFS) = 13.74

EFFECTIVE AREA(ACRES) = 20.03 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.0 PEAK FLOW RATE (CFS) = 42.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.21 FLOW VELOCITY (FEET/SEC.) = 9.78  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50506.00 = 2083.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50506.00 TO NODE 50507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 464.00 CHANNEL SLOPE = 0.2414  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.580

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.57	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 45.46  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.99  
AVERAGE FLOW DEPTH (FEET) = 1.12 TRAVEL TIME (MIN.) = 0.65  
Tc (MIN.) = 13.84

SUBAREA AREA (ACRES) = 2.57 SUBAREA RUNOFF (CFS) = 5.27  
EFFECTIVE AREA (ACRES) = 22.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.6 PEAK FLOW RATE (CFS) = 46.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.13 FLOW VELOCITY (FEET/SEC.) = 12.07  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50507.00 = 2547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50507.00 TO NODE 50508.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 535.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 310.00 CHANNEL SLOPE = 0.2097  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.516

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.09	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 52.46  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.79  
AVERAGE FLOW DEPTH (FEET) = 1.22 TRAVEL TIME (MIN.) = 0.44  
Tc (MIN.) = 14.28

SUBAREA AREA (ACRES) = 6.09 SUBAREA RUNOFF (CFS) = 12.15  
EFFECTIVE AREA (ACRES) = 28.69 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 28.7 PEAK FLOW RATE (CFS) = 57.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.26 FLOW VELOCITY (FEET/SEC.) = 12.09  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50508.00 = 2857.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50508.00 TO NODE 50509.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 405.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.2658  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.428

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 66.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.66  
AVERAGE FLOW DEPTH (FEET) = 1.28 TRAVEL TIME (MIN.) = 0.60  
Tc (MIN.) = 14.87

SUBAREA AREA (ACRES) = 10.02 SUBAREA RUNOFF (CFS) = 19.20  
EFFECTIVE AREA (ACRES) = 38.72 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.7 PEAK FLOW RATE (CFS) = 74.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.32 FLOW VELOCITY (FEET/SEC.) = 14.09  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50509.00 = 3346.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50509.00 TO NODE 50510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 285.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 706.00 CHANNEL SLOPE = 0.1700  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.340

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 80.21  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.13

AVERAGE FLOW DEPTH (FEET) = 1.48 TRAVEL TIME (MIN.) = 0.97  
Tc (MIN.) = 15.84  
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 12.11  
EFFECTIVE AREA (ACRES) = 45.32 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 83.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.51 FLOW VELOCITY (FEET/SEC.) = 12.23  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50510.00 = 4052.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50510.00 TO NODE 50511.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 285.00 DOWNSTREAM (FEET) = 238.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1169.00 CHANNEL SLOPE = 0.0402  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.167

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 22.45 0.30 0.991 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 102.08  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.31  
AVERAGE FLOW DEPTH (FEET) = 1.91 TRAVEL TIME (MIN.) = 2.09  
Tc (MIN.) = 17.94  
SUBAREA AREA (ACRES) = 22.45 SUBAREA RUNOFF (CFS) = 37.77  
EFFECTIVE AREA (ACRES) = 67.77 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 67.8 PEAK FLOW RATE (CFS) = 113.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.99 FLOW VELOCITY (FEET/SEC.) = 9.55  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50511.00 = 5221.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50511.00 TO NODE 50512.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 238.00 DOWNSTREAM (FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.0102  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.056

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 39.83 0.30 0.990 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 145.45  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.10  
AVERAGE FLOW DEPTH (FEET) = 2.82 TRAVEL TIME (MIN.) = 1.34  
Tc (MIN.) = 19.27  
SUBAREA AREA (ACRES) = 39.83 SUBAREA RUNOFF (CFS) = 63.06  
EFFECTIVE AREA (ACRES) = 107.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 107.6 PEAK FLOW RATE (CFS) = 170.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.99 FLOW VELOCITY (FEET/SEC.) = 6.33  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50512.00 = 5710.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50512.00 TO NODE 50513.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 233.00 DOWNSTREAM (FEET) = 209.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 537.00 CHANNEL SLOPE = 0.0447  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.992

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.40 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 175.87  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.09  
AVERAGE FLOW DEPTH (FEET) = 2.30 TRAVEL TIME (MIN.) = 0.81  
Tc (MIN.) = 20.08  
SUBAREA AREA (ACRES) = 7.40 SUBAREA RUNOFF (CFS) = 11.27  
EFFECTIVE AREA (ACRES) = 114.99 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 115.0 PEAK FLOW RATE (CFS) = 175.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.29 FLOW VELOCITY (FEET/SEC.) = 11.11  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50513.00 = 6247.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50513.00 TO NODE 50513.00 IS CODE = 81

-----  
>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 20.08  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.992  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.19 0.30 0.961 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.961  
SUBAREA AREA (ACRES) = 38.19 SUBAREA RUNOFF (CFS) = 58.57  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.99  
TOTAL AREA (ACRES) = 153.2 PEAK FLOW RATE (CFS) = 233.86

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 153.2 TC (MIN.) = 20.08  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.986  
PEAK FLOW RATE (CFS) = 233.86  
=====

=====  
END OF RATIONAL METHOD ANALYSIS

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 25 Yr \*  
\* From Node: 50600 To Node: 50610 \*  
\*\*\*\*\*

FILE NAME: 0610506W.DAT  
TIME/DATE OF STUDY: 13:46 06/19/2023

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.811
- 2) 10.00; 3.144
- 3) 15.00; 2.409
- 4) 20.00; 1.996
- 5) 25.00; 1.742
- 6) 30.00; 1.531
- 7) 40.00; 1.331
- 8) 50.00; 1.178
- 9) 60.00; 1.053
- 10) 90.00; 0.883
- 11) 120.00; 0.772
- 12) 180.00; 0.643
- 13) 360.00; 0.473
- 14) 1440.00; 0.207

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE/ WAY		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	60.0	30.0	0.020/0.020	0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020	0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020	0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020	0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020	0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
- \*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50600.00 TO NODE 50601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00  
ELEVATION DATA: UPSTREAM(FEET) = 780.00 DOWNSTREAM(FEET) = 730.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.166  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.120  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	1.44	0.30	1.000	0	10.17

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 3.65  
TOTAL AREA(ACRES) = 1.44 PEAK FLOW RATE(CFS) = 3.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50601.00 TO NODE 50602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.1541  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.972  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.27	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.17  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.94  
AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 1.00  
Tc(MIN.) = 11.17  
SUBAREA AREA(ACRES) = 1.27 SUBAREA RUNOFF(CFS) = 3.06  
EFFECTIVE AREA(ACRES) = 2.71 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 6.51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 FLOW VELOCITY(FEET/SEC.) = 6.23  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50602.00 = 671.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50602.00 TO NODE 50603.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) =	675.00	DOWNSTREAM(FEET) =	600.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	258.00	CHANNEL SLOPE =	0.2907
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	2.897		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.31	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.05

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.33

AVERAGE FLOW DEPTH(FEET) = 0.57 TRAVEL TIME(MIN.) = 0.52

Tc(MIN.) = 11.68

SUBAREA AREA(ACRES) = 1.31 SUBAREA RUNOFF(CFS) = 3.06

EFFECTIVE AREA(ACRES) = 4.02 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 9.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.60 FLOW VELOCITY(FEET/SEC.) = 8.70

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50603.00 = 929.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50603.00 TO NODE 50604.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	600.00	DOWNSTREAM(FEET) =	585.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	116.00	CHANNEL SLOPE =	0.1293
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	2.854		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.58	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.21

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.74

AVERAGE FLOW DEPTH(FEET) = 0.74 TRAVEL TIME(MIN.) = 0.29

Tc(MIN.) = 11.97

SUBAREA AREA(ACRES) = 1.58 SUBAREA RUNOFF(CFS) = 3.64

EFFECTIVE AREA(ACRES) = 5.60 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.6 PEAK FLOW RATE(CFS) = 12.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.79 FLOW VELOCITY(FEET/SEC.) = 6.90

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50604.00 = 1045.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50604.00 TO NODE 50605.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	585.00	DOWNSTREAM(FEET) =	584.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	16.00	CHANNEL SLOPE =	0.0625
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	2.848		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.98	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.59

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.79

AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 0.05

Tc(MIN.) = 12.02

SUBAREA AREA(ACRES) = 4.98 SUBAREA RUNOFF(CFS) = 11.42

EFFECTIVE AREA(ACRES) = 10.58 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 10.6 PEAK FLOW RATE(CFS) = 24.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.14 FLOW VELOCITY(FEET/SEC.) = 6.21

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50605.00 = 1061.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50605.00 TO NODE 50606.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	584.00	DOWNSTREAM(FEET) =	579.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	122.00	CHANNEL SLOPE =	0.0410
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	2.794		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.18	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.08

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.58

AVERAGE FLOW DEPTH(FEET) = 1.34 TRAVEL TIME(MIN.) = 0.36

Tc(MIN.) = 12.38

SUBAREA AREA(ACRES) = 5.18 SUBAREA RUNOFF(CFS) = 11.63

EFFECTIVE AREA(ACRES) = 15.76 AREA-AVERAGED Fm(INCH/HR) = 0.30



AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 15.8 PEAK FLOW RATE (CFS) = 35.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.42 FLOW VELOCITY (FEET/SEC.) = 5.82  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50606.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50606.00 TO NODE 50607.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 579.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 637.00 CHANNEL SLOPE = 0.0801  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.595

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.34	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 42.97  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.82  
AVERAGE FLOW DEPTH (FEET) = 1.35 TRAVEL TIME (MIN.) = 1.36  
Tc (MIN.) = 13.74  
SUBAREA AREA (ACRES) = 7.34 SUBAREA RUNOFF (CFS) = 15.16  
EFFECTIVE AREA (ACRES) = 23.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 23.1 PEAK FLOW RATE (CFS) = 47.72

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.41 FLOW VELOCITY (FEET/SEC.) = 8.04  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50607.00 = 1820.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50607.00 TO NODE 50608.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 422.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 529.00 CHANNEL SLOPE = 0.2004  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.482

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.99	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 50.65  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.53  
AVERAGE FLOW DEPTH (FEET) = 1.21 TRAVEL TIME (MIN.) = 0.76  
Tc (MIN.) = 14.50

SUBAREA AREA (ACRES) = 2.99 SUBAREA RUNOFF (CFS) = 5.87  
EFFECTIVE AREA (ACRES) = 26.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.1 PEAK FLOW RATE (CFS) = 51.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.22 FLOW VELOCITY (FEET/SEC.) = 11.52  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50608.00 = 2349.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50608.00 TO NODE 50609.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 422.00 DOWNSTREAM (FEET) = 297.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 708.00 CHANNEL SLOPE = 0.1766  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.366

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.94	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 62.36  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.58  
AVERAGE FLOW DEPTH (FEET) = 1.34 TRAVEL TIME (MIN.) = 1.02  
Tc (MIN.) = 15.52  
SUBAREA AREA (ACRES) = 11.94 SUBAREA RUNOFF (CFS) = 22.21  
EFFECTIVE AREA (ACRES) = 38.04 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.0 PEAK FLOW RATE (CFS) = 70.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.41 FLOW VELOCITY (FEET/SEC.) = 11.92  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50609.00 = 3057.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50609.00 TO NODE 50610.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 297.00 DOWNSTREAM (FEET) = 207.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1321.00 CHANNEL SLOPE = 0.0681  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.196

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.38	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 79.59  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.68

AVERAGE FLOW DEPTH (FEET) = 1.58 TRAVEL TIME (MIN.) = 2.06  
Tc (MIN.) = 17.59  
SUBAREA AREA (ACRES) = 10.38 SUBAREA RUNOFF (CFS) = 17.71  
EFFECTIVE AREA (ACRES) = 48.42 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 82.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.60 FLOW VELOCITY (FEET/SEC.) = 10.77  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50610.00 = 4378.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 17.59  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.196  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.17 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.17 SUBAREA RUNOFF (CFS) = 2.00  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 49.6 PEAK FLOW RATE (CFS) = 84.62

=====

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 49.6 TC (MIN.) = 17.59  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.000  
PEAK FLOW RATE (CFS) = 84.62

=====

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END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 25 Yr \*  
\* From Node: 50700 To Node: 50716 \*  
\*\*\*\*\*

FILE NAME: 0610507W.DAT  
TIME/DATE OF STUDY: 09:49 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.811
- 2) 10.00; 3.144
- 3) 15.00; 2.409
- 4) 20.00; 1.996
- 5) 25.00; 1.742
- 6) 30.00; 1.531
- 7) 40.00; 1.331
- 8) 50.00; 1.178
- 9) 60.00; 1.053
- 10) 90.00; 0.883
- 11) 120.00; 0.772
- 12) 180.00; 0.643
- 13) 360.00; 0.473
- 14) 1440.00; 0.207

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50700.00 TO NODE 50701.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00  
ELEVATION DATA: UPSTREAM(FEET) = 1121.00 DOWNSTREAM(FEET) = 870.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.572  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.953  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.18	0.30	1.000	0	7.57

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.61  
TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 0.61

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50701.00 TO NODE 50702.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 827.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.3386  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.826  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.27  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.52  
AVERAGE FLOW DEPTH(FEET) = 0.28 TRAVEL TIME(MIN.) = 0.38  
Tc(MIN.) = 7.96  
SUBAREA AREA(ACRES) = 0.42 SUBAREA RUNOFF(CFS) = 1.34  
EFFECTIVE AREA(ACRES) = 0.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 1.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 6.13  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50702.00 = 456.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50702.00 TO NODE 50703.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 827.00 DOWNSTREAM(FEET) = 815.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 94.00 CHANNEL SLOPE = 0.1277  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.711

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.34	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.44

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.56

AVERAGE FLOW DEPTH(FEET) = 0.42 TRAVEL TIME(MIN.) = 0.34

Tc(MIN.) = 8.30

SUBAREA AREA(ACRES) = 0.34 SUBAREA RUNOFF(CFS) = 1.04

EFFECTIVE AREA(ACRES) = 0.94 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 2.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 4.71

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50703.00 = 550.00 FEET.

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FLOW PROCESS FROM NODE 50703.00 TO NODE 50704.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 815.00 DOWNSTREAM(FEET) = 800.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 169.00 CHANNEL SLOPE = 0.0888  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.518

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.72	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.39

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.87

AVERAGE FLOW DEPTH(FEET) = 0.61 TRAVEL TIME(MIN.) = 0.58

Tc(MIN.) = 8.88

SUBAREA AREA(ACRES) = 1.72 SUBAREA RUNOFF(CFS) = 4.99

EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 7.72

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.70 FLOW VELOCITY(FEET/SEC.) = 5.30

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50704.00 = 719.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50704.00 TO NODE 50705.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 800.00 DOWNSTREAM(FEET) = 785.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 128.00 CHANNEL SLOPE = 0.1172  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.406

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.12	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.69

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.33

AVERAGE FLOW DEPTH(FEET) = 0.75 TRAVEL TIME(MIN.) = 0.34

Tc(MIN.) = 9.21

SUBAREA AREA(ACRES) = 2.12 SUBAREA RUNOFF(CFS) = 5.93

EFFECTIVE AREA(ACRES) = 4.79 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 13.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.81 FLOW VELOCITY(FEET/SEC.) = 6.74

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50705.00 = 847.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50705.00 TO NODE 50706.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 775.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.237

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.64	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.19

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.60

AVERAGE FLOW DEPTH(FEET) = 1.04 TRAVEL TIME(MIN.) = 0.51

Tc(MIN.) = 9.72

SUBAREA AREA(ACRES) = 3.64 SUBAREA RUNOFF(CFS) = 9.61

EFFECTIVE AREA(ACRES) = 8.42 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.4 PEAK FLOW RATE (CFS) = 22.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.12 FLOW VELOCITY (FEET/SEC.) = 5.93  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50706.00 = 1017.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50706.00 TO NODE 50707.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 775.00 DOWNSTREAM (FEET) = 772.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 162.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.087

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.65	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 28.10  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.05  
AVERAGE FLOW DEPTH (FEET) = 1.52 TRAVEL TIME (MIN.) = 0.67  
Tc (MIN.) = 10.39  
SUBAREA AREA (ACRES) = 4.65 SUBAREA RUNOFF (CFS) = 11.66  
EFFECTIVE AREA (ACRES) = 13.07 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 13.1 PEAK FLOW RATE (CFS) = 32.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.61 FLOW VELOCITY (FEET/SEC.) = 4.23  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50707.00 = 1179.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50707.00 TO NODE 50708.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 772.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 357.00 CHANNEL SLOPE = 0.0756  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.969

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.55	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 37.06  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.38  
AVERAGE FLOW DEPTH (FEET) = 1.29 TRAVEL TIME (MIN.) = 0.81  
Tc (MIN.) = 11.19

SUBAREA AREA (ACRES) = 3.55 SUBAREA RUNOFF (CFS) = 8.53  
EFFECTIVE AREA (ACRES) = 16.62 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 16.6 PEAK FLOW RATE (CFS) = 39.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.33 FLOW VELOCITY (FEET/SEC.) = 7.52  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50708.00 = 1536.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50708.00 TO NODE 50709.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 733.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 444.00 CHANNEL SLOPE = 0.0270  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.763

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.58	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 46.11  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.29  
AVERAGE FLOW DEPTH (FEET) = 1.70 TRAVEL TIME (MIN.) = 1.40  
Tc (MIN.) = 12.59  
SUBAREA AREA (ACRES) = 5.58 SUBAREA RUNOFF (CFS) = 12.37  
EFFECTIVE AREA (ACRES) = 22.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.2 PEAK FLOW RATE (CFS) = 49.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.74 FLOW VELOCITY (FEET/SEC.) = 5.39  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50709.00 = 1980.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50709.00 TO NODE 50710.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 733.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 467.00 CHANNEL SLOPE = 0.1242  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.646

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.17	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 53.63  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.73

AVERAGE FLOW DEPTH (FEET) = 1.36 TRAVEL TIME (MIN.) = 0.80  
Tc (MIN.) = 13.39  
SUBAREA AREA (ACRES) = 4.17 SUBAREA RUNOFF (CFS) = 8.81  
EFFECTIVE AREA (ACRES) = 26.38 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.4 PEAK FLOW RATE (CFS) = 55.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.38 FLOW VELOCITY (FEET/SEC.) = 9.80  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50710.00 = 2447.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50710.00 TO NODE 50711.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 619.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 516.00 CHANNEL SLOPE = 0.1085  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.521  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 21.41 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 77.09  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.14  
AVERAGE FLOW DEPTH (FEET) = 1.59 TRAVEL TIME (MIN.) = 0.85  
Tc (MIN.) = 14.24  
SUBAREA AREA (ACRES) = 21.41 SUBAREA RUNOFF (CFS) = 42.80  
EFFECTIVE AREA (ACRES) = 47.78 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 95.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.73 FLOW VELOCITY (FEET/SEC.) = 10.67  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50711.00 = 2963.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50711.00 TO NODE 50712.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 619.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 650.00 CHANNEL SLOPE = 0.0292  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.364  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.43 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 102.42  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.27  
AVERAGE FLOW DEPTH (FEET) = 2.03 TRAVEL TIME (MIN.) = 1.31  
Tc (MIN.) = 15.55  
SUBAREA AREA (ACRES) = 7.43 SUBAREA RUNOFF (CFS) = 13.79  
EFFECTIVE AREA (ACRES) = 55.21 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.2 PEAK FLOW RATE (CFS) = 102.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.03 FLOW VELOCITY (FEET/SEC.) = 8.26  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50712.00 = 3613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50713.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 794.00 CHANNEL SLOPE = 0.0907  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.283  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 36.47 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 135.11  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.50  
AVERAGE FLOW DEPTH (FEET) = 1.83 TRAVEL TIME (MIN.) = 0.98  
Tc (MIN.) = 16.53  
SUBAREA AREA (ACRES) = 36.47 SUBAREA RUNOFF (CFS) = 65.10  
EFFECTIVE AREA (ACRES) = 91.68 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 163.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.96 FLOW VELOCITY (FEET/SEC.) = 14.23  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50713.00 = 4407.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50713.00 TO NODE 50714.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 423.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1215.00 CHANNEL SLOPE = 0.0864  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.166  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.52 0.30 0.998 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.998  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 179.19  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 14.25  
 AVERAGE FLOW DEPTH(FEET) = 2.05 TRAVEL TIME(MIN.) = 1.42  
 Tc(MIN.) = 17.95  
 SUBAREA AREA(ACRES) = 18.52 SUBAREA RUNOFF(CFS) = 31.11  
 EFFECTIVE AREA(ACRES) = 110.22 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 110.2 PEAK FLOW RATE(CFS) = 185.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.07 FLOW VELOCITY(FEET/SEC.) = 14.39  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50714.00 = 5622.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50714.00 TO NODE 50715.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 319.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 768.00 CHANNEL SLOPE = 0.1354  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.104  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.31 0.30 0.993 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 189.37  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 17.13  
 AVERAGE FLOW DEPTH(FEET) = 1.92 TRAVEL TIME(MIN.) = 0.75  
 Tc(MIN.) = 18.70  
 SUBAREA AREA(ACRES) = 5.31 SUBAREA RUNOFF(CFS) = 8.64  
 EFFECTIVE AREA(ACRES) = 115.52 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 115.5 PEAK FLOW RATE(CFS) = 187.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.91 FLOW VELOCITY(FEET/SEC.) = 17.10  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50715.00 = 6390.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50715.00 TO NODE 50716.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 319.00 DOWNSTREAM(FEET) = 182.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1513.00 CHANNEL SLOPE = 0.0905  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.981  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 79.09 0.30 0.979 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 247.64  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 15.72  
 AVERAGE FLOW DEPTH(FEET) = 2.29 TRAVEL TIME(MIN.) = 1.60  
 Tc(MIN.) = 20.30  
 SUBAREA AREA(ACRES) = 79.09 SUBAREA RUNOFF(CFS) = 120.10  
 EFFECTIVE AREA(ACRES) = 194.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 194.6 PEAK FLOW RATE(CFS) = 294.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.44 FLOW VELOCITY(FEET/SEC.) = 16.45  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50716.00 = 7903.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50716.00 TO NODE 50716.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.30  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.981  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 42.18 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 42.18 SUBAREA RUNOFF(CFS) = 63.81  
 EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 236.8 PEAK FLOW RATE(CFS) = 358.70

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 236.8 TC(MIN.) = 20.30  
 EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.993  
 PEAK FLOW RATE(CFS) = 358.70

END OF RATIONAL METHOD ANALYSIS





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 RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
 (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
 \* Rancho Mission Viejo ROMP Study \*  
 \* Storm Event: 25 Yr \*  
 \* From Node: 50800 To Node: 50811 \*  
 \*\*\*\*\*

FILE NAME: 0610508W.DAT  
 TIME/DATE OF STUDY: 09:49 01/21/2013

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
 \*USER-DEFINED TABLED RAINFALL USED\*  
 NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.811
- 2) 10.00; 3.144
- 3) 15.00; 2.409
- 4) 20.00; 1.996
- 5) 25.00; 1.742
- 6) 30.00; 1.531
- 7) 40.00; 1.331
- 8) 50.00; 1.178
- 9) 60.00; 1.053
- 10) 90.00; 0.883
- 11) 120.00; 0.772
- 12) 180.00; 0.643
- 13) 360.00; 0.473
- 14) 1440.00; 0.207

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
 \*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50800.00 TO NODE 50801.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00  
 ELEVATION DATA: UPSTREAM(FEET) = 795.00 DOWNSTREAM(FEET) = 745.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.302  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.100  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.60	0.30	1.000	0	10.30

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 1.50  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.50

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50801.00 TO NODE 50802.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 725.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 245.00 CHANNEL SLOPE = 0.0816  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.973  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.35	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.53  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.76  
 AVERAGE FLOW DEPTH(FEET) = 0.62 TRAVEL TIME(MIN.) = 0.86  
 Tc(MIN.) = 11.16  
 SUBAREA AREA(ACRES) = 3.35 SUBAREA RUNOFF(CFS) = 8.06  
 EFFECTIVE AREA(ACRES) = 3.94 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 3.9 PEAK FLOW RATE(CFS) = 9.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.77 FLOW VELOCITY(FEET/SEC.) = 5.40  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50802.00 = 566.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50802.00 TO NODE 50803.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 725.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 325.00 CHANNEL SLOPE = 0.0769  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.828

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.52	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.23

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.47

AVERAGE FLOW DEPTH(FEET) = 0.83 TRAVEL TIME(MIN.) = 0.99

Tc(MIN.) = 12.15

SUBAREA AREA(ACRES) = 1.52 SUBAREA RUNOFF(CFS) = 3.47

EFFECTIVE AREA(ACRES) = 5.47 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 12.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.86 FLOW VELOCITY(FEET/SEC.) = 5.64

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50803.00 = 891.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50803.00 TO NODE 50804.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 652.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 594.00 CHANNEL SLOPE = 0.0808  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.601

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.12	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.79

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.40

AVERAGE FLOW DEPTH(FEET) = 0.99 TRAVEL TIME(MIN.) = 1.55

Tc(MIN.) = 13.70

SUBAREA AREA(ACRES) = 6.12 SUBAREA RUNOFF(CFS) = 12.68

EFFECTIVE AREA(ACRES) = 11.59 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 11.6 PEAK FLOW RATE(CFS) = 24.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.09 FLOW VELOCITY(FEET/SEC.) = 6.78

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50804.00 = 1485.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50804.00 TO NODE 50805.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 652.00 DOWNSTREAM(FEET) = 542.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 499.00 CHANNEL SLOPE = 0.2204  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.483

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.17	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.09

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.39

AVERAGE FLOW DEPTH(FEET) = 0.97 TRAVEL TIME(MIN.) = 0.80

Tc(MIN.) = 14.50

SUBAREA AREA(ACRES) = 5.17 SUBAREA RUNOFF(CFS) = 10.16

EFFECTIVE AREA(ACRES) = 16.76 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 32.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.01 FLOW VELOCITY(FEET/SEC.) = 10.72

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50805.00 = 1984.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50805.00 TO NODE 50806.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 542.00 DOWNSTREAM(FEET) = 450.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 650.00 CHANNEL SLOPE = 0.1415  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.356

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.22	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.77

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.41

AVERAGE FLOW DEPTH(FEET) = 1.16 TRAVEL TIME(MIN.) = 1.15

Tc(MIN.) = 15.65

SUBAREA AREA(ACRES) = 5.22 SUBAREA RUNOFF(CFS) = 9.66

EFFECTIVE AREA(ACRES) = 21.99 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 40.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.19 FLOW VELOCITY (FEET/SEC.) = 9.53  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50806.00 = 2634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50806.00 TO NODE 50807.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 450.00 DOWNSTREAM (FEET) = 400.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 639.00 CHANNEL SLOPE = 0.0782  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.249

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.83	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 54.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.25  
AVERAGE FLOW DEPTH (FEET) = 1.48 TRAVEL TIME (MIN.) = 1.29  
Tc (MIN.) = 16.94  
SUBAREA AREA (ACRES) = 15.83 SUBAREA RUNOFF (CFS) = 27.78  
EFFECTIVE AREA (ACRES) = 37.82 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 37.8 PEAK FLOW RATE (CFS) = 66.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.60 FLOW VELOCITY (FEET/SEC.) = 8.65  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50807.00 = 3273.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50807.00 TO NODE 50808.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 400.00 DOWNSTREAM (FEET) = 350.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 448.00 CHANNEL SLOPE = 0.1116  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.188

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 72.68  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.14  
AVERAGE FLOW DEPTH (FEET) = 1.55 TRAVEL TIME (MIN.) = 0.74  
Tc (MIN.) = 17.68

SUBAREA AREA (ACRES) = 7.46 SUBAREA RUNOFF (CFS) = 12.67  
EFFECTIVE AREA (ACRES) = 45.28 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 76.95

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.58 FLOW VELOCITY (FEET/SEC.) = 10.25  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50808.00 = 3721.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50808.00 TO NODE 50809.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 350.00 DOWNSTREAM (FEET) = 283.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 438.00 CHANNEL SLOPE = 0.1530  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.137

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.20	0.30	0.972	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 82.93  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.71  
AVERAGE FLOW DEPTH (FEET) = 1.54 TRAVEL TIME (MIN.) = 0.62  
Tc (MIN.) = 18.30  
SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 11.96  
EFFECTIVE AREA (ACRES) = 52.48 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 52.5 PEAK FLOW RATE (CFS) = 86.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.56 FLOW VELOCITY (FEET/SEC.) = 11.90  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50809.00 = 4159.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50809.00 TO NODE 50810.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 283.00 DOWNSTREAM (FEET) = 243.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 665.00 CHANNEL SLOPE = 0.0602  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.058

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	63.52	0.30	0.983	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.983  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 137.22  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.66

AVERAGE FLOW DEPTH (FEET) = 1.98 TRAVEL TIME (MIN.) = 0.95  
Tc (MIN.) = 19.25  
SUBAREA AREA (ACRES) = 63.52 SUBAREA RUNOFF (CFS) = 100.81  
EFFECTIVE AREA (ACRES) = 116.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 116.0 PEAK FLOW RATE (CFS) = 183.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.21 FLOW VELOCITY (FEET/SEC.) = 12.56  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50810.00 = 4824.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50810.00 TO NODE 50811.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 243.00 DOWNSTREAM (FEET) = 173.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1122.00 CHANNEL SLOPE = 0.0624  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.943

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 11.57 0.30 0.980 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 192.50  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.35  
AVERAGE FLOW DEPTH (FEET) = 2.49 TRAVEL TIME (MIN.) = 1.81  
Tc (MIN.) = 21.06  
SUBAREA AREA (ACRES) = 11.57 SUBAREA RUNOFF (CFS) = 17.17  
EFFECTIVE AREA (ACRES) = 127.57 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 127.6 PEAK FLOW RATE (CFS) = 189.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.47 FLOW VELOCITY (FEET/SEC.) = 10.33  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50811.00 = 5946.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 21.06  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.943  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 3.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 5.47  
EFFECTIVE AREA (ACRES) = 131.27 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 131.3 PEAK FLOW RATE (CFS) = 194.47

=====

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 131.3 TC (MIN.) = 21.06  
EFFECTIVE AREA (ACRES) = 131.27 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.988  
PEAK FLOW RATE (CFS) = 194.47

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 2 \*  
\* HYDROLOGIC ANALYSIS - 25-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E502XX25.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.060
2)	6.000;	3.660
3)	7.000;	3.350
4)	8.000;	3.100
5)	9.000;	2.900
6)	10.000;	2.730
7)	11.000;	2.580
8)	12.000;	2.460
9)	13.000;	2.350
10)	14.000;	2.250
11)	15.000;	2.160
12)	20.000;	1.830
13)	25.000;	1.610
14)	30.000;	1.450
15)	40.000;	1.230
16)	50.000;	1.090
17)	60.000;	0.980
18)	90.000;	0.770
19)	120.000;	0.660
20)	180.000;	0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50200.00 TO NODE 50201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 497.00 DOWNSTREAM(FEET) = 365.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.563  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.987  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.30	1.000	95	8.56
NATURAL FAIR COVER "OPEN BRUSH"	-	0.60	0.30	1.000	95	8.56
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.20	0.30	1.000	95	8.56

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 3.39  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 3.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50201.00 TO NODE 50202.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 365.00 DOWNSTREAM(FEET) = 335.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 259.00 CHANNEL SLOPE = 0.1158  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.39  
FLOW VELOCITY(FEET/SEC.) = 4.79 FLOW DEPTH(FEET) = 0.49  
TRAVEL TIME(MIN.) = 0.90  $T_c$ (MIN.) = 9.46  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50202.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50202.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.46  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.821  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 6.13  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 9.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50203.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 335.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.1020  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.30  
FLOW VELOCITY(FEET/SEC.) = 5.86 FLOW DEPTH(FEET) = 0.73  
TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 10.02  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50203.00 = 781.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50203.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.02  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.727  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 9.17  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 18.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50204.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 304.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0696  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 18.13  
FLOW VELOCITY(FEET/SEC.) = 5.99 FLOW DEPTH(FEET) = 1.00  
TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 10.46  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50204.00 = 939.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50204.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.46  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.661  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 9.31  
EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 26.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50205.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 304.00 DOWNSTREAM(FEET) = 234.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 487.00 CHANNEL SLOPE = 0.1437  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 26.94  
FLOW VELOCITY(FEET/SEC.) = 10.78 FLOW DEPTH(FEET) = 0.91  
TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 11.21  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50205.00 = 1426.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 11.21  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.554  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.100 -

USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.90 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 7.23  
 EFFECTIVE AREA(ACRES) = 16.10 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 32.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN) = 11.21  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.554  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	4.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.850	-
USER-DEFINED	-	3.70	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.882  
 SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 25.97  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
 TOTAL AREA(ACRES) = 28.7 PEAK FLOW RATE(CFS) = 58.93

=====  
 END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 28.7 TC(MIN.) = 11.21  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.910  
 PEAK FLOW RATE(CFS) = 58.93  
 =====

-----  
 END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 3 \*  
\* HYDROLOGIC ANALYSIS - 25-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E503XX25.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.060
2)	6.000;	3.660
3)	7.000;	3.350
4)	8.000;	3.100
5)	9.000;	2.900
6)	10.000;	2.730
7)	11.000;	2.580
8)	12.000;	2.460
9)	13.000;	2.350
10)	14.000;	2.250
11)	15.000;	2.160
12)	20.000;	1.830
13)	25.000;	1.610
14)	30.000;	1.450
15)	40.000;	1.230
16)	50.000;	1.090
17)	60.000;	0.980
18)	90.000;	0.770
19)	120.000;	0.660
20)	180.000;	0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50300.00 TO NODE 50301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00  
ELEVATION DATA: UPSTREAM(FEET) = 1110.00 DOWNSTREAM(FEET) = 1035.00

$T_c = K * [(LENGTH^{**} 3.00) / (ELEVATION CHANGE)]^{**} 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.517  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.812  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.60	0.30	1.000	95	9.52
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.52

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 2.03  
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 2.03

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50301.00 TO NODE 50302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 960.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 225.00 CHANNEL SLOPE = 0.3333  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.03  
FLOW VELOCITY(FEET/SEC.) = 6.19 FLOW DEPTH(FEET) = 0.33  
TRAVEL TIME(MIN.) = 0.61  $T_c$ (MIN.) = 10.12  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50302.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50302.00 TO NODE 50302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN) = 10.12
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.712
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.30    1.000   -
USER-DEFINED        -         1.00    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.10    SUBAREA RUNOFF(CFS) = 2.39
EFFECTIVE AREA(ACRES) = 2.00    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.0        PEAK FLOW RATE(CFS) = 4.34

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*****
FLOW PROCESS FROM NODE 50302.00 TO NODE 50303.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 84.00 CHANNEL SLOPE = 0.1190
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.34
FLOW VELOCITY(FEET/SEC.) = 5.13 FLOW DEPTH(FEET) = 0.53
TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 10.40
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50303.00 = 631.00 FEET.

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*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50303.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 10.40
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.671
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.30    1.000   -
USER-DEFINED        -         0.30    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.70    SUBAREA RUNOFF(CFS) = 1.49
EFFECTIVE AREA(ACRES) = 2.70    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.7        PEAK FLOW RATE(CFS) = 5.76

```

```

*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50304.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 940.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 72.00 CHANNEL SLOPE = 0.1389
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

```

```

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.76
FLOW VELOCITY(FEET/SEC.) = 5.81 FLOW DEPTH(FEET) = 0.58
TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 10.60
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50304.00 = 703.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50304.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

```

=====
MAINLINE Tc(MIN) = 10.60
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.640
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.30    0.30    1.000   -
USER-DEFINED        -         0.90    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.20    SUBAREA RUNOFF(CFS) = 4.63
EFFECTIVE AREA(ACRES) = 4.90    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.9        PEAK FLOW RATE(CFS) = 10.32

```

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*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50305.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 940.00 DOWNSTREAM(FEET) = 890.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.2941
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.32
FLOW VELOCITY(FEET/SEC.) = 8.92 FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 10.92
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50305.00 = 873.00 FEET.

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*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.592
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00    0.30    1.000   -
USER-DEFINED        -         0.80    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.80    SUBAREA RUNOFF(CFS) = 5.78
EFFECTIVE AREA(ACRES) = 7.70    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 7.7        PEAK FLOW RATE(CFS) = 15.88

```

```

*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50306.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 890.00 DOWNSTREAM(FEET) = 785.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 439.00 CHANNEL SLOPE = 0.2392
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 15.88
FLOW VELOCITY(FEET/SEC.) = 9.21 FLOW DEPTH(FEET) = 0.76
TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 11.71
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50306.00 = 1312.00 FEET.

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*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 11.71
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.494
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.80   0.30  1.000  -
USER-DEFINED        -         3.30   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 14.02
EFFECTIVE AREA(ACRES) = 14.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.8 PEAK FLOW RATE(CFS) = 29.23

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*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50307.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 737.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 213.00 CHANNEL SLOPE = 0.2254
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 29.23
FLOW VELOCITY(FEET/SEC.) = 10.48 FLOW DEPTH(FEET) = 0.96
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 12.05
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50307.00 = 1525.00 FEET.

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*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.05
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.454
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00   0.30  1.000  -
USER-DEFINED        -         0.90   0.30  1.000  -
USER-DEFINED        -         0.20   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 6.01
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 34.71

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*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50308.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 737.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 527.00 CHANNEL SLOPE = 0.2600
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 34.71
FLOW VELOCITY(FEET/SEC.) = 11.52 FLOW DEPTH(FEET) = 1.00
TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 12.82
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50308.00 = 2052.00 FEET.

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*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.82
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.370
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         5.70   0.30  1.000  -
USER-DEFINED        -         1.00   0.30  1.000  -
USER-DEFINED        -         3.30   0.30  1.000  -
USER-DEFINED        -         0.40   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 19.38
EFFECTIVE AREA(ACRES) = 28.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 28.3 PEAK FLOW RATE(CFS) = 52.73

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*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50309.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 555.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 561.00 CHANNEL SLOPE = 0.0802
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00

```

CHANNEL FLOW THRU SUBAREA(CFS) = 52.73  
FLOW VELOCITY(FEET/SEC.) = 8.25 FLOW DEPTH(FEET) = 1.46  
TRAVEL TIME(MIN.) = 1.13 Tc(MIN.) = 13.95  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 2613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 13.95  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.255  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 5.45  
EFFECTIVE AREA(ACRES) = 31.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.4 PEAK FLOW RATE(CFS) = 55.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50310.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 555.00 DOWNSTREAM(FEET) = 509.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 401.00 CHANNEL SLOPE = 0.1147  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 55.25  
FLOW VELOCITY(FEET/SEC.) = 9.51 FLOW DEPTH(FEET) = 1.39  
TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 14.65  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50310.00 = 3014.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 14.65  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.191  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	7.60	0.30	1.000	-
USER-DEFINED	-	6.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 29.45

EFFECTIVE AREA(ACRES) = 48.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 48.7 PEAK FLOW RATE(CFS) = 82.90

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50311.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 509.00 DOWNSTREAM(FEET) = 395.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 685.00 CHANNEL SLOPE = 0.1664  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 82.90  
FLOW VELOCITY(FEET/SEC.) = 12.16 FLOW DEPTH(FEET) = 1.51  
TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 15.59  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50311.00 = 3699.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50311.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 15.59  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.121  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 15.41  
EFFECTIVE AREA(ACRES) = 58.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 58.1 PEAK FLOW RATE(CFS) = 95.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50312.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 383.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 216.00 CHANNEL SLOPE = 0.0556  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 95.22  
FLOW VELOCITY(FEET/SEC.) = 8.35 FLOW DEPTH(FEET) = 1.95  
TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 16.02  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50312.00 = 3915.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.02

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.092

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	18.40	0.30	1.000	-
USER-DEFINED	-	11.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 37.70 SUBAREA RUNOFF(CFS) = 60.82

EFFECTIVE AREA(ACRES) = 95.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 95.8 PEAK FLOW RATE(CFS) = 154.56

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.02

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.092

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 5.49

EFFECTIVE AREA(ACRES) = 99.20 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 99.2 PEAK FLOW RATE(CFS) = 160.04

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50313.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 383.00 DOWNSTREAM(FEET) = 350.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 762.00 CHANNEL SLOPE = 0.0433

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00

CHANNEL FLOW THRU SUBAREA(CFS) = 160.04

FLOW VELOCITY(FEET/SEC.) = 8.64 FLOW DEPTH(FEET) = 2.48

TRAVEL TIME(MIN.) = 1.47 Tc(MIN.) = 17.49

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50313.00 = 4677.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.49

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.996

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 9.61

EFFECTIVE AREA(ACRES) = 105.50 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 105.5 PEAK FLOW RATE(CFS) = 161.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.49

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.996

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 10.90 SUBAREA RUNOFF(CFS) = 16.63

EFFECTIVE AREA(ACRES) = 116.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 116.4 PEAK FLOW RATE(CFS) = 177.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50314.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 318.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 957.00 CHANNEL SLOPE = 0.0334

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00

CHANNEL FLOW THRU SUBAREA(CFS) = 177.63

FLOW VELOCITY(FEET/SEC.) = 8.04 FLOW DEPTH(FEET) = 2.71

TRAVEL TIME(MIN.) = 1.98 Tc(MIN.) = 19.48

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50314.00 = 5634.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.48  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.865  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	3.70	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	10.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 21.80 SUBAREA RUNOFF(CFS) = 30.70  
 EFFECTIVE AREA(ACRES) = 138.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 138.2 PEAK FLOW RATE(CFS) = 194.62

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.48  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.865  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.80	0.30	1.000	-
USER-DEFINED	-	15.20	0.30	1.000	-
USER-DEFINED	-	5.90	0.30	1.000	-
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 34.70 SUBAREA RUNOFF(CFS) = 48.87  
 EFFECTIVE AREA(ACRES) = 172.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 172.9 PEAK FLOW RATE(CFS) = 243.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.48  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.865  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 1.13  
 EFFECTIVE AREA(ACRES) = 173.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 173.7 PEAK FLOW RATE(CFS) = 244.61

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50315.00 IS CODE = 51

-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 318.00 DOWNSTREAM(FEET) = 313.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00 CHANNEL SLOPE = 0.0179  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 244.61  
 FLOW VELOCITY(FEET/SEC.) = 6.88 FLOW DEPTH(FEET) = 3.44  
 TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 20.15  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50315.00 = 5914.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50315.00 TO NODE 50315.00 IS CODE = 81

-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 20.15  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.823  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	2.40	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 9.19  
 EFFECTIVE AREA(ACRES) = 180.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 180.4 PEAK FLOW RATE(CFS) = 247.32

\*\*\*\*\*

FLOW PROCESS FROM NODE 50315.00 TO NODE 50316.00 IS CODE = 51

-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 313.00 DOWNSTREAM(FEET) = 285.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 642.00 CHANNEL SLOPE = 0.0436  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 247.32  
 FLOW VELOCITY(FEET/SEC.) = 9.64 FLOW DEPTH(FEET) = 2.92  
 TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 21.26  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50316.00 = 6556.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 21.26  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.774  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 9.69  
EFFECTIVE AREA(ACRES) = 187.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 187.7 PEAK FLOW RATE(CFS) = 249.08

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 21.26  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.774  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 2.92  
EFFECTIVE AREA(ACRES) = 189.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 189.9 PEAK FLOW RATE(CFS) = 252.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50316.00 TO NODE 50317.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 282.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 448.00 CHANNEL SLOPE = 0.0067  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 252.00  
FLOW VELOCITY(FEET/SEC.) = 4.80 FLOW DEPTH(FEET) = 4.18  
TRAVEL TIME(MIN.) = 1.56 Tc(MIN.) = 22.82  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50317.00 = 7004.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81  
-----

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.82  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.706  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	2.60	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	10.20	0.30	1.000	-
USER-DEFINED	-	42.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.997  
SUBAREA AREA(ACRES) = 59.70 SUBAREA RUNOFF(CFS) = 75.59  
EFFECTIVE AREA(ACRES) = 249.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 249.6 PEAK FLOW RATE(CFS) = 315.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.82  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.706  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.30	1.000	-
USER-DEFINED	-	17.50	0.30	1.000	-
USER-DEFINED	-	22.00	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 65.80 SUBAREA RUNOFF(CFS) = 83.26  
EFFECTIVE AREA(ACRES) = 315.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 315.4 PEAK FLOW RATE(CFS) = 399.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50317.00 TO NODE 50318.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 600.00 CHANNEL SLOPE = 0.0817  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 399.15  
FLOW VELOCITY(FEET/SEC.) = 13.76 FLOW DEPTH(FEET) = 3.11  
TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 23.55  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50318.00 = 7604.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81  
-----

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.55

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.674

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	0.100	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.839

SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 8.58

EFFECTIVE AREA(ACRES) = 322.10 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 322.1 PEAK FLOW RATE(CFS) = 399.15

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.55

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.674

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	5.00	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.935

SUBAREA AREA(ACRES) = 7.60 SUBAREA RUNOFF(CFS) = 9.53

EFFECTIVE AREA(ACRES) = 329.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 329.7 PEAK FLOW RATE(CFS) = 408.18

\*\*\*\*\*

FLOW PROCESS FROM NODE 50318.00 TO NODE 50319.00 IS CODE = 51

=====  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 233.00 DOWNSTREAM(FEET) = 228.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 201.00 CHANNEL SLOPE = 0.0249

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00

CHANNEL FLOW THRU SUBAREA(CFS) = 408.18

FLOW VELOCITY(FEET/SEC.) = 10.98 FLOW DEPTH(FEET) = 3.52

TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 23.85

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50319.00 = 7805.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.85

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.661

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 8.03

EFFECTIVE AREA(ACRES) = 336.00 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 336.0 PEAK FLOW RATE(CFS) = 412.23

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.85

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.661

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.994

SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 9.56

EFFECTIVE AREA(ACRES) = 343.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 343.8 PEAK FLOW RATE(CFS) = 421.79

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50320.00 IS CODE = 51

=====  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 228.00 DOWNSTREAM(FEET) = 214.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 809.00 CHANNEL SLOPE = 0.0173

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00

CHANNEL FLOW THRU SUBAREA(CFS) = 421.79



FLOW VELOCITY (FEET/SEC.) = 9.68 FLOW DEPTH (FEET) = 3.81  
TRAVEL TIME (MIN.) = 1.39 Tc (MIN.) = 25.25  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50320.00 = 8614.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 25.25

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.602

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	4.80	0.30	0.850	-
USER-DEFINED	-	5.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.929

SUBAREA AREA (ACRES) = 11.40 SUBAREA RUNOFF (CFS) = 13.58

EFFECTIVE AREA (ACRES) = 355.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 355.2 PEAK FLOW RATE (CFS) = 421.79

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 25.25

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.602

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.90	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.854

SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 13.57

EFFECTIVE AREA (ACRES) = 366.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 366.4 PEAK FLOW RATE (CFS) = 430.88

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 366.4 TC (MIN.) = 25.25

EFFECTIVE AREA (ACRES) = 366.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.985

PEAK FLOW RATE (CFS) = 430.88

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 4 \*  
\* HYDROLOGIC ANALYSIS - 25-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E504XX25.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.000; 4.060
- 2) 6.000; 3.660
- 3) 7.000; 3.350
- 4) 8.000; 3.100
- 5) 9.000; 2.900
- 6) 10.000; 2.730
- 7) 11.000; 2.580
- 8) 12.000; 2.460
- 9) 13.000; 2.350
- 10) 14.000; 2.250
- 11) 15.000; 2.160
- 12) 20.000; 1.830
- 13) 25.000; 1.610
- 14) 30.000; 1.450
- 15) 40.000; 1.230
- 16) 50.000; 1.090
- 17) 60.000; 0.980
- 18) 90.000; 0.770
- 19) 120.000; 0.660
- 20) 180.000; 0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.482  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.658  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.50	0.30	1.000	95	10.48

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.06  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.06

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.06  
FLOW VELOCITY(FEET/SEC.) = 4.79 FLOW DEPTH(FEET) = 0.27  
TRAVEL TIME(MIN.) = 0.91  $T_c$ (MIN.) = 11.39  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.39

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.533  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.80  
 EFFECTIVE AREA (ACRES) = 0.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 1.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 239.00 CHANNEL SLOPE = 0.4184  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1.81  
 FLOW VELOCITY (FEET/SEC.) = 6.60 FLOW DEPTH (FEET) = 0.30  
 TRAVEL TIME (MIN.) = 0.60 Tc (MIN.) = 12.00  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50403.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.460  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.78  
 EFFECTIVE AREA (ACRES) = 1.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.3 PEAK FLOW RATE (CFS) = 2.53

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00 CHANNEL SLOPE = 0.7042  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 2.53

FLOW VELOCITY (FEET/SEC.) = 8.77 FLOW DEPTH (FEET) = 0.31  
 TRAVEL TIME (MIN.) = 0.13 Tc (MIN.) = 12.13  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50404.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.13  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.445  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 2.32  
 EFFECTIVE AREA (ACRES) = 2.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.5 PEAK FLOW RATE (CFS) = 4.83

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 145.00 CHANNEL SLOPE = 0.3448  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 4.83  
 FLOW VELOCITY (FEET/SEC.) = 7.84 FLOW DEPTH (FEET) = 0.45  
 TRAVEL TIME (MIN.) = 0.31 Tc (MIN.) = 12.44  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50405.00 TO NODE 50405.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.44  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.411  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.09  
 EFFECTIVE AREA (ACRES) = 3.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.6 PEAK FLOW RATE (CFS) = 6.84

```

*****
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 6.84
FLOW VELOCITY(FEET/SEC.) = 8.32 FLOW DEPTH(FEET) = 0.52
TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 12.76
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50406.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.76
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.377
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.30  1.000  -
USER-DEFINED        -         0.20   0.30  1.000  -
USER-DEFINED        -         0.80   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 2.24
EFFECTIVE AREA(ACRES) = 4.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 8.97

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.2193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 8.97
FLOW VELOCITY(FEET/SEC.) = 7.71 FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 13.25
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50407.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 13.25
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.325
SUBAREA LOSS RATE DATA(AMC II):

```

```

DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.50   0.30  1.000  -
USER-DEFINED        -         1.20   0.30  1.000  -
USER-DEFINED        -         1.70   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 11.66
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 20.41

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 325.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 490.00 CHANNEL SLOPE = 0.1531
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 20.41
FLOW VELOCITY(FEET/SEC.) = 8.31 FLOW DEPTH(FEET) = 0.91
TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 14.23
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.23
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.229
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.30  1.000  -
USER-DEFINED        -         0.10   0.30  1.000  -
USER-DEFINED        -         0.60   0.30  1.000  -
USER-DEFINED        -         1.30   0.30  1.000  -
USER-DEFINED        -         0.50   0.30  1.000  -
USER-DEFINED        -         1.20   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 6.60
EFFECTIVE AREA(ACRES) = 15.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.0 PEAK FLOW RATE(CFS) = 26.04

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.23
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.229
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.56  
EFFECTIVE AREA(ACRES) = 15.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.9 PEAK FLOW RATE(CFS) = 27.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 27.60  
FLOW VELOCITY(FEET/SEC.) = 6.61 FLOW DEPTH(FEET) = 1.18  
TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 14.42  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.212  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	6.40	0.30	1.000	-
USER-DEFINED	-	6.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 14.80 SUBAREA RUNOFF(CFS) = 25.47  
EFFECTIVE AREA(ACRES) = 30.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.7 PEAK FLOW RATE(CFS) = 52.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.212  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.03  
EFFECTIVE AREA(ACRES) = 31.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.3 PEAK FLOW RATE(CFS) = 53.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 53.88  
FLOW VELOCITY(FEET/SEC.) = 8.23 FLOW DEPTH(FEET) = 1.48  
TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 14.62  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.62  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.194  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 10.91  
EFFECTIVE AREA(ACRES) = 37.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 37.7 PEAK FLOW RATE(CFS) = 64.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.62  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.194  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 1.02  
 EFFECTIVE AREA (ACRES) = 38.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 38.3 PEAK FLOW RATE (CFS) = 65.28

\*\*\*\*\*

FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 312.00 DOWNSTREAM (FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 566.00 CHANNEL SLOPE = 0.0530  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 65.28  
 FLOW VELOCITY (FEET/SEC.) = 7.43 FLOW DEPTH (FEET) = 1.71  
 TRAVEL TIME (MIN.) = 1.27 Tc (MIN.) = 15.89  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 15.89  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.101  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658  
 SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 8.57  
 EFFECTIVE AREA (ACRES) = 43.30 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 43.3 PEAK FLOW RATE (CFS) = 70.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 15.89  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.101  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

USER-DEFINED - 5.80 0.30 1.000 -  
 USER-DEFINED - 0.50 0.30 1.000 -  
 USER-DEFINED - 3.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 10.50 SUBAREA RUNOFF (CFS) = 17.02  
 EFFECTIVE AREA (ACRES) = 53.80 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 53.8 PEAK FLOW RATE (CFS) = 87.67

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 216.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 954.00 CHANNEL SLOPE = 0.0692  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 87.67  
 FLOW VELOCITY (FEET/SEC.) = 11.00 FLOW DEPTH (FEET) = 1.63  
 TRAVEL TIME (MIN.) = 1.45 Tc (MIN.) = 17.34  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 17.34  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.006  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875  
 SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 5.65  
 EFFECTIVE AREA (ACRES) = 57.40 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 57.4 PEAK FLOW RATE (CFS) = 88.70

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 17.34  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.006  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.30 0.30 1.000 -  
 USER-DEFINED - 9.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 16.28  
 EFFECTIVE AREA(ACRES) = 68.00 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 68.0 PEAK FLOW RATE(CFS) = 104.97

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.34  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.006  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.934  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 3.88  
 EFFECTIVE AREA(ACRES) = 70.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 70.5 PEAK FLOW RATE(CFS) = 108.86

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 70.5 TC(MIN.) = 17.34  
 EFFECTIVE AREA(ACRES) = 70.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.967  
 PEAK FLOW RATE(CFS) = 108.86

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 2 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 25-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P201XX25.DAT  
TIME/DATE OF STUDY: 10:20 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.000; 4.060  
2) 6.000; 3.660  
3) 7.000; 3.350  
4) 8.000; 3.100  
5) 9.000; 2.900  
6) 10.000; 2.730  
7) 11.000; 2.580  
8) 12.000; 2.460  
9) 13.000; 2.350  
10) 14.000; 2.250  
11) 15.000; 2.160  
12) 20.000; 1.830  
13) 25.000; 1.610  
14) 30.000; 1.450  
15) 40.000; 1.230  
16) 50.000; 1.090  
17) 60.000; 0.980  
18) 90.000; 0.770  
19) 120.000; 0.660  
20) 180.000; 0.520  
\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20100.00 TO NODE 20101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 830.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.230  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.861  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.30	1.000	95	9.23
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.23

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.38  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20101.00 TO NODE 20102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 276.00 CHANNEL SLOPE = 0.2899  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.38  
FLOW VELOCITY(FEET/SEC.) = 5.38 FLOW DEPTH(FEET) = 0.29  
TRAVEL TIME(MIN.) = 0.86  $T_c$ (MIN.) = 10.09  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20102.00 = 595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20102.00 TO NODE 20102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<



```

=====
MAINLINE Tc(MIN) = 10.09
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.717
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.80   0.30   1.000   -
USER-DEFINED        -         0.20   0.30   1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.00   SUBAREA RUNOFF(CFS) = 2.18
EFFECTIVE AREA(ACRES) = 1.60   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6   PEAK FLOW RATE(CFS) = 3.48

```

```

*****
FLOW PROCESS FROM NODE 20102.00 TO NODE 20103.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.1863
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.48
FLOW VELOCITY(FEET/SEC.) = 5.80 FLOW DEPTH(FEET) = 0.45
TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 10.55
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20103.00 = 756.00 FEET.

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20103.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 10.55
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.648
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50   0.30   1.000   -
USER-DEFINED        -         0.10   0.30   1.000   -
USER-DEFINED        -         0.30   0.30   1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90   SUBAREA RUNOFF(CFS) = 1.90
EFFECTIVE AREA(ACRES) = 2.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.5   PEAK FLOW RATE(CFS) = 5.28

```

```

*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20104.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 690.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 64.00 CHANNEL SLOPE = 0.4688

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```

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.28
FLOW VELOCITY(FEET/SEC.) = 8.88 FLOW DEPTH(FEET) = 0.45
TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 10.67
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20104.00 = 820.00 FEET.

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20104.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 10.67
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.630
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40   0.30   1.000   -
USER-DEFINED        -         3.30   0.30   1.000   -
USER-DEFINED        -         0.10   0.30   1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80   SUBAREA RUNOFF(CFS) = 7.97
EFFECTIVE AREA(ACRES) = 6.30   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.3   PEAK FLOW RATE(CFS) = 13.21

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20105.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 690.00 DOWNSTREAM(FEET) = 670.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 159.00 CHANNEL SLOPE = 0.1258
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 13.21
FLOW VELOCITY(FEET/SEC.) = 6.91 FLOW DEPTH(FEET) = 0.80
TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 11.05
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20105.00 = 979.00 FEET.

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*****
FLOW PROCESS FROM NODE 20105.00 TO NODE 20105.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.05
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.574
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.30   1.000   -
USER-DEFINED        -         1.50   0.30   1.000   -
USER-DEFINED        -         2.20   0.30   1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90   SUBAREA RUNOFF(CFS) = 7.98

```

EFFECTIVE AREA (ACRES) = 10.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 10.2 PEAK FLOW RATE (CFS) = 20.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 20105.00 TO NODE 20106.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 670.00 DOWNSTREAM (FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 192.00 CHANNEL SLOPE = 0.1042  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 20.87  
FLOW VELOCITY (FEET/SEC.) = 7.23 FLOW DEPTH (FEET) = 0.98  
TRAVEL TIME (MIN.) = 0.44 Tc (MIN.) = 11.49  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20106.00 = 1171.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 11.49  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.521  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.10 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 3.80 SUBAREA RUNOFF (CFS) = 7.59  
EFFECTIVE AREA (ACRES) = 14.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 14.0 PEAK FLOW RATE (CFS) = 27.98

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 650.00 DOWNSTREAM (FEET) = 640.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 156.00 CHANNEL SLOPE = 0.0641  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 27.98  
FLOW VELOCITY (FEET/SEC.) = 6.47 FLOW DEPTH (FEET) = 1.20  
TRAVEL TIME (MIN.) = 0.40 Tc (MIN.) = 11.90  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20107.00 = 1327.00 FEET.

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FLOW PROCESS FROM NODE 20107.00 TO NODE 20107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc (MIN) = 11.90  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.472

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.20 0.30 1.000 -  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 7.82  
EFFECTIVE AREA (ACRES) = 18.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 18.0 PEAK FLOW RATE (CFS) = 35.19

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FLOW PROCESS FROM NODE 20107.00 TO NODE 20108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 640.00 DOWNSTREAM (FEET) = 609.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 512.00 CHANNEL SLOPE = 0.0605  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 35.19  
FLOW VELOCITY (FEET/SEC.) = 6.71 FLOW DEPTH (FEET) = 1.32  
TRAVEL TIME (MIN.) = 1.27 Tc (MIN.) = 13.17  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20108.00 = 1839.00 FEET.

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 13.17  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.333  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.200 -  
USER-DEFINED - 1.50 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970  
SUBAREA AREA (ACRES) = 2.70 SUBAREA RUNOFF (CFS) = 4.96  
EFFECTIVE AREA (ACRES) = 20.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.7 PEAK FLOW RATE (CFS) = 37.90

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 600.00
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.42
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 37.90
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 13.37
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20109.00 = 2033.00 FEET.

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FLOW PROCESS FROM NODE 20109.00 TO NODE 20109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 13.37
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.313
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED            -       0.70     0.30     0.200    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.42
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 38.95

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FLOW PROCESS FROM NODE 20109.00 TO NODE 20110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 594.00
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.30
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 38.95
PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 13.90
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20110.00 = 2393.00 FEET.

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FLOW PROCESS FROM NODE 20110.00 TO NODE 20110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 13.90
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.260
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	3.50	0.30	0.200	-
USER-DEFINED	-	2.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-

```

USER-DEFINED            -       0.30     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 15.30
EFFECTIVE AREA(ACRES) = 29.60 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 29.6 PEAK FLOW RATE(CFS) = 53.23

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FLOW PROCESS FROM NODE 20110.00 TO NODE 20111.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 594.00 DOWNSTREAM(FEET) = 590.00
FLOW LENGTH(FEET) = 246.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.05
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 53.23
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 14.24
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20111.00 = 2639.00 FEET.

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FLOW PROCESS FROM NODE 20111.00 TO NODE 20111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 14.24
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.229
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	2.10	0.30	0.200	-
USER-DEFINED	-	2.10	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	4.70	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.792
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 19.89
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 72.28

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*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20112.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 580.00
FLOW LENGTH(FEET) = 628.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.79
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 72.28

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PIPE TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 15.06  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20112.00 = 3267.00 FEET.

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FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN) = 15.06  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.156  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.90 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.200 -  
USER-DEFINED - 4.40 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 7.50 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.797  
SUBAREA AREA(ACRES) = 15.20 SUBAREA RUNOFF(CFS) = 26.23  
EFFECTIVE AREA(ACRES) = 55.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 55.9 PEAK FLOW RATE(CFS) = 95.86

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN) = 15.06  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.156  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 0.100 -  
USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 0.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.04  
EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 99.90

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20112.00 TO NODE 20113.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 580.00 DOWNSTREAM(FEET) = 570.00  
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.87  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 99.90  
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 15.64  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20113.00 = 3786.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN) = 15.64  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.118  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.00 0.30 0.100 -  
USER-DEFINED - 4.30 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 1.80 0.30 1.000 -  
USER-DEFINED - 4.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.877  
SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 21.03  
EFFECTIVE AREA(ACRES) = 70.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 118.92

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN) = 15.64  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.118  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 1.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.787  
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 6.10  
EFFECTIVE AREA(ACRES) = 74.50 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 74.5 PEAK FLOW RATE(CFS) = 125.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20113.00 TO NODE 20114.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00  
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 36.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.52

ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 125.01  
PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 16.51  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20114.00 = 4393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 16.51

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.060

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	4.00	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.747

SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 13.05

EFFECTIVE AREA(ACRES) = 82.40 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 82.4 PEAK FLOW RATE(CFS) = 134.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 16.51

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.060

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	1.000	-
USER-DEFINED	-	8.20	0.30	1.000	-
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	3.70	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.932

SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 28.04

EFFECTIVE AREA(ACRES) = 99.90 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 99.9 PEAK FLOW RATE(CFS) = 162.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20115.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 560.00  
FLOW LENGTH(FEET) = 461.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.40  
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 162.22  
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 17.09  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20115.00 = 4854.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 17.09

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.022

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.60	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	0.100	-
USER-DEFINED	-	6.20	0.30	0.850	-
USER-DEFINED	-	2.20	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798

SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 20.54

EFFECTIVE AREA(ACRES) = 112.70 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 112.7 PEAK FLOW RATE(CFS) = 179.36

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 17.09

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.022

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.09

EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 180.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20116.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 560.00 DOWNSTREAM(FEET) = 528.00  
FLOW LENGTH(FEET) = 219.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 36.71

ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 180.44  
 PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 17.19  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20116.00 = 5073.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20116.00 TO NODE 20117.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 489.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 174.00 CHANNEL SLOPE = 0.2241  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 180.44  
 FLOW VELOCITY(FEET/SEC.) = 20.48 FLOW DEPTH(FEET) = 1.71  
 TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 17.33  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20117.00 = 5247.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.33  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.006  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.910  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 3.90  
 EFFECTIVE AREA(ACRES) = 115.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 115.9 PEAK FLOW RATE(CFS) = 182.72

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.33  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.006  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.200	-
USER-DEFINED	-	3.30	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	6.50	0.30	1.000	-

USER-DEFINED - 0.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.855  
 SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 20.16  
 EFFECTIVE AREA(ACRES) = 128.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 128.7 PEAK FLOW RATE(CFS) = 202.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.33  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.006  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 7.86  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 133.8 PEAK FLOW RATE(CFS) = 210.74

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 133.8 TC(MIN.) = 17.33  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.854  
 PEAK FLOW RATE(CFS) = 210.74

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S31 \*  
\* Rational Method Hydrology Analysis - 25-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S31.DAT  
TIME/DATE OF STUDY: 16:09 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.080
- 2) 10.00; 2.729
- 3) 15.00; 2.163
- 4) 20.00; 1.834
- 5) 25.00; 1.614
- 6) 30.00; 1.440
- 7) 40.00; 1.233
- 8) 50.00; 1.085
- 9) 60.00; 0.950
- 10) 90.00; 0.775
- 11) 120.00; 0.657
- 12) 180.00; 0.530
- 13) 360.00; 0.367
- 14) 1440.00; 0.153

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13100.00 TO NODE 13101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.58  
ELEVATION DATA: UPSTREAM(FEET) = 1069.66 DOWNSTREAM(FEET) = 969.92

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.312  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.185  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.94	0.30	1.000	0	8.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.44  
TOTAL AREA(ACRES) = 0.94 PEAK FLOW RATE(CFS) = 2.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13101.00 TO NODE 13102.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 969.92 DOWNSTREAM(FEET) = 807.20  
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.89 CHANNEL SLOPE = 0.2444  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.25  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.639  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.67	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.47  
AVERAGE FLOW DEPTH(FEET) = 0.23 TRAVEL TIME(MIN.) = 2.48  
Tc(MIN.) = 10.79  
SUBAREA AREA(ACRES) = 7.67 SUBAREA RUNOFF(CFS) = 16.15  
EFFECTIVE AREA(ACRES) = 8.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 18.13  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.32

END OF SUBAREA CHANNEL FLOW HYDRAULICS:



DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 5.40  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13102.00 = 948.47 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13102.00 TO NODE 13103.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	807.20	DOWNSTREAM(FEET) =	769.94
CHANNEL LENGTH THRU SUBAREA(FEET) =	691.01	CHANNEL SLOPE =	0.0539
GIVEN CHANNEL BASE(FEET) =	10.00	CHANNEL FREEBOARD(FEET) =	0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.78  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.336

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	20.65	0.30	0.999	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.12  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.30  
AVERAGE FLOW DEPTH(FEET) = 0.75 TRAVEL TIME(MIN.) = 2.68  
Tc(MIN.) = 13.47

SUBAREA AREA(ACRES) = 20.65 SUBAREA RUNOFF(CFS) = 37.85  
EFFECTIVE AREA(ACRES) = 29.26 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 29.3 PEAK FLOW RATE(CFS) = 53.63  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.93 FLOW VELOCITY(FEET/SEC.) = 4.87  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13103.00 = 1639.48 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	769.94	DOWNSTREAM(FEET) =	693.88
FLOW LENGTH(FEET) =	1563.10	MANNING'S N =	0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO	36.000		
DEPTH OF FLOW IN 36.0 INCH PIPE IS	15.5 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	18.45		
ESTIMATED PIPE DIAMETER(INCH) =	36.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	53.63		
PIPE TRAVEL TIME(MIN.) =	1.41	Tc(MIN.) =	14.88
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13104.00 =	3202.58 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.88  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.176

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	28.00	0.30	0.750	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750  
SUBAREA AREA(ACRES) = 28.00 SUBAREA RUNOFF(CFS) = 49.18  
EFFECTIVE AREA(ACRES) = 57.26 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 57.3 PEAK FLOW RATE(CFS) = 98.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	693.88	DOWNSTREAM(FEET) =	645.69
FLOW LENGTH(FEET) =	1068.98	MANNING'S N =	0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO	36.000		
DEPTH OF FLOW IN 36.0 INCH PIPE IS	22.9 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	20.77		
ESTIMATED PIPE DIAMETER(INCH) =	36.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	98.59		
PIPE TRAVEL TIME(MIN.) =	0.86	Tc(MIN.) =	15.74
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13105.00 =	4271.56 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.74  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.114

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	35.28	0.30	0.867	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867  
SUBAREA AREA(ACRES) = 35.28 SUBAREA RUNOFF(CFS) = 58.88  
EFFECTIVE AREA(ACRES) = 92.54 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 154.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	645.69	DOWNSTREAM(FEET) =	608.48
FLOW LENGTH(FEET) =	1127.55	MANNING'S N =	0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS	30.9 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	20.36		
ESTIMATED PIPE DIAMETER(INCH) =	42.00	NUMBER OF PIPES =	1

PIPE-FLOW(CFS) = 154.28  
PIPE TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 16.66  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.66  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.054  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 37.68 0.30 0.889 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.889  
SUBAREA AREA(ACRES) = 37.68 SUBAREA RUNOFF(CFS) = 60.60  
EFFECTIVE AREA(ACRES) = 130.22 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 130.2 PEAK FLOW RATE(CFS) = 209.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 15.1

>>>>DEFINE MEMORY BANK # 2 <<<<<

PEAK FLOWRATE TABLE FILE NAME: S30.DNA  
MEMORY BANK # 2 DEFINED AS FOLLOWS:  
STREAM Q Tc Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (ACRES) NODE  
1 1841.40 38.39 0.30( 0.24) 0.81 1996.2 13000.00  
2 1786.54 40.48 0.30( 0.24) 0.81 2016.1 13010.00  
TOTAL AREA(ACRES) = 2016.1

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 14.0

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<<

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1841.40	38.39	0.30( 0.24)	0.81	1996.2	13000.00
2	1786.54	40.48	0.30( 0.24)	0.81	2016.1	13010.00
TOTAL AREA(ACRES) = 2016.1						

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13026.00 TO NODE 13106.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 662.66 DOWNSTREAM(FEET) = 608.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 3098.88 CHANNEL SLOPE = 0.0175  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.76  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.191  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	75.28	0.30	0.755	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1874.09  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.67  
AVERAGE FLOW DEPTH(FEET) = 2.76 TRAVEL TIME(MIN.) = 4.43  
Tc(MIN.) = 42.81  
SUBAREA AREA(ACRES) = 75.28 SUBAREA RUNOFF(CFS) = 65.38  
EFFECTIVE AREA(ACRES) = 2071.52 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 2091.4 PEAK FLOW RATE(CFS) = 1841.40

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.73 FLOW VELOCITY(FEET/SEC.) = 11.61  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1841.40	42.81	1.191	0.30( 0.24)	0.80	2071.5	13000.00
2	1786.54	44.94	1.160	0.30( 0.24)	0.80	2091.4	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1841.40 Tc(MIN.) = 42.81  
AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA(ACRES) = 2071.52

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1841.40	42.81	1.191	0.30( 0.24)	0.80	2071.5	13000.00
2	1786.54	44.94	1.160	0.30( 0.24)	0.80	2091.4	13010.00
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.							

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	209.83	16.66	2.054	0.30( 0.26)	0.88	130.2	13100.00

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1576.75	16.66	2.054	0.30 ( 0.24)	0.81	936.5	13100.00
2	1950.17	42.81	1.191	0.30 ( 0.24)	0.81	2201.7	13000.00
3	1891.62	44.94	1.160	0.30 ( 0.24)	0.81	2221.6	13010.00
TOTAL AREA (ACRES) =		2221.6					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1950.17 Tc (MIN.) = 42.814  
 EFFECTIVE AREA (ACRES) = 2201.74 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 2221.6  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13106.00 TO NODE 13107.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 608.48 DOWNSTREAM (FEET) = 584.29  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1650.20 CHANNEL SLOPE = 0.0147  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.04  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.156

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	190.45	0.30	0.755	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.755

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2029.80

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.32

AVERAGE FLOW DEPTH (FEET) = 3.03 TRAVEL TIME (MIN.) = 2.43

Tc (MIN.) = 45.24

SUBAREA AREA (ACRES) = 190.45 SUBAREA RUNOFF (CFS) = 159.25

EFFECTIVE AREA (ACRES) = 2392.19 AREA-AVERAGED Fm (INCH/HR) = 0.24

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80

TOTAL AREA (ACRES) = 2412.1 PEAK FLOW RATE (CFS) = 1968.75

GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 2.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.98 FLOW VELOCITY (FEET/SEC.) = 11.21

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13107.00 = 20924.84 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1667.01	19.23	1.885	0.30 ( 0.24)	0.80	1126.9	13100.00
2	1968.75	45.24	1.156	0.30 ( 0.24)	0.80	2392.2	13000.00
3	1916.07	47.40	1.124	0.30 ( 0.24)	0.80	2412.1	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1968.75 Tc (MIN.) = 45.24  
 AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA (ACRES) = 2392.19

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13107.00 TO NODE 13108.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 584.29 DOWNSTREAM (FEET) = 563.78  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1061.67 CHANNEL SLOPE = 0.0193  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 2.86

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.135

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	314.12	0.30	0.939	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.939

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2089.32

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.52

AVERAGE FLOW DEPTH (FEET) = 2.85 TRAVEL TIME (MIN.) = 1.41

Tc (MIN.) = 46.66

SUBAREA AREA (ACRES) = 314.12 SUBAREA RUNOFF (CFS) = 241.14

EFFECTIVE AREA (ACRES) = 2706.31 AREA-AVERAGED Fm (INCH/HR) = 0.25

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82

TOTAL AREA (ACRES) = 2726.2 PEAK FLOW RATE (CFS) = 2164.85

GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 2.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.91 FLOW VELOCITY (FEET/SEC.) = 12.67

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13108.00 = 21986.51 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2015.05	20.70	1.804	0.30 ( 0.25)	0.83	1441.1	13100.00
2	2164.85	46.66	1.135	0.30 ( 0.25)	0.82	2706.3	13000.00
3	2102.29	48.83	1.102	0.30 ( 0.25)	0.82	2726.2	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 2164.85 Tc (MIN.) = 46.66

AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2706.31

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13108.00 TO NODE 13109.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 563.78 DOWNSTREAM (FEET) = 541.61  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1657.28 CHANNEL SLOPE = 0.0134  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.30  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.099  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 203.63 0.30 0.785 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2243.94  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.35  
 AVERAGE FLOW DEPTH (FEET) = 3.30 TRAVEL TIME (MIN.) = 2.43  
 Tc (MIN.) = 49.09  
 SUBAREA AREA (ACRES) = 203.63 SUBAREA RUNOFF (CFS) = 158.18  
 EFFECTIVE AREA (ACRES) = 2909.94 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 2929.8 PEAK FLOW RATE (CFS) = 2235.30  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.29 FLOW VELOCITY (FEET/SEC.) = 11.34  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13109.00 = 23643.79 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2141.68	23.16	1.695	0.30 (0.25)	0.83	1644.7	13100.00
2	2235.30	49.09	1.099	0.30 (0.25)	0.82	2909.9	13000.00
3	2169.63	51.28	1.068	0.30 (0.24)	0.82	2929.8	13010.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 2235.30 Tc (MIN.) = 49.09  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2909.94

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13109.00 TO NODE 13110.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 541.61 DOWNSTREAM (FEET) = 509.94  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 2016.96 CHANNEL SLOPE = 0.0157  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.23  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.060  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 283.06 0.30 0.791 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.791  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2340.10  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.14  
 AVERAGE FLOW DEPTH (FEET) = 3.23 TRAVEL TIME (MIN.) = 2.77  
 Tc (MIN.) = 51.86

SUBAREA AREA (ACRES) = 283.06 SUBAREA RUNOFF (CFS) = 209.59  
 EFFECTIVE AREA (ACRES) = 3193.00 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3212.9 PEAK FLOW RATE (CFS) = 2343.81  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.23 FLOW VELOCITY (FEET/SEC.) = 12.15  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13110.00 = 25660.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2315.78	25.94	1.581	0.30 (0.25)	0.82	1927.8	13100.00
2	2343.81	51.86	1.060	0.30 (0.24)	0.81	3193.0	13000.00
3	2272.06	54.08	1.030	0.30 (0.24)	0.81	3212.9	13010.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 2343.81 Tc (MIN.) = 51.86  
 AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA (ACRES) = 3193.00

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13110.00 TO NODE 13111.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 509.94 DOWNSTREAM (FEET) = 461.07  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 3058.95 CHANNEL SLOPE = 0.0160  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.29  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.004  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 248.05 0.30 0.783 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2429.71  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.36  
 AVERAGE FLOW DEPTH (FEET) = 3.28 TRAVEL TIME (MIN.) = 4.12  
 Tc (MIN.) = 55.98  
 SUBAREA AREA (ACRES) = 248.05 SUBAREA RUNOFF (CFS) = 171.77  
 EFFECTIVE AREA (ACRES) = 3441.05 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3460.9 PEAK FLOW RATE (CFS) = 2355.48  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.22 FLOW VELOCITY (FEET/SEC.) = 12.24  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13111.00 = 28719.70 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2337.39	30.06	1.439	0.30( 0.25)	0.82	2175.8	13100.00
2	2355.48	55.98	1.004	0.30( 0.24)	0.81	3441.0	13000.00
3	2274.25	58.24	0.974	0.30( 0.24)	0.81	3460.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 2355.48 Tc(MIN.) = 55.98  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3441.05

\*\*\*\*\*

FLOW PROCESS FROM NODE 13111.00 TO NODE 13112.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 461.07 DOWNSTREAM(FEET) = 452.77  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1781.78 CHANNEL SLOPE = 0.0047  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.64  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 0.955

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	179.91	0.30	0.694	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.694

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2415.95

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.14

AVERAGE FLOW DEPTH(FEET) = 4.64 TRAVEL TIME(MIN.) = 3.65

Tc(MIN.) = 59.63

SUBAREA AREA(ACRES) = 179.91 SUBAREA RUNOFF(CFS) = 120.93

EFFECTIVE AREA(ACRES) = 3620.96 AREA-AVERAGED Fm(INCH/HR) = 0.24

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81

TOTAL AREA(ACRES) = 3640.9 PEAK FLOW RATE(CFS) = 2355.48

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 4.57 FLOW VELOCITY(FEET/SEC.) = 8.08

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13112.00 = 30501.48 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2377.04	33.69	1.364	0.30( 0.24)	0.81	2355.7	13100.00
2	2355.48	59.63	0.955	0.30( 0.24)	0.81	3621.0	13000.00
3	2283.49	61.93	0.939	0.30( 0.24)	0.81	3640.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 2377.04 Tc(MIN.) = 33.69  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 2355.71

\*\*\*\*\*

FLOW PROCESS FROM NODE 13112.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 452.77 DOWNSTREAM(FEET) = 427.51

CHANNEL LENGTH THRU SUBAREA(FEET) = 1625.01 CHANNEL SLOPE = 0.0155

GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.33

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.318

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	155.96	0.30	0.836	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.836

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2451.94

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.30

AVERAGE FLOW DEPTH(FEET) = 3.32 TRAVEL TIME(MIN.) = 2.20

Tc(MIN.) = 35.90

SUBAREA AREA(ACRES) = 155.96 SUBAREA RUNOFF(CFS) = 149.81

EFFECTIVE AREA(ACRES) = 2511.67 AREA-AVERAGED Fm(INCH/HR) = 0.24

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81

TOTAL AREA(ACRES) = 3796.8 PEAK FLOW RATE(CFS) = 2430.28

GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.31 FLOW VELOCITY(FEET/SEC.) = 12.26

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13222.00 = 32126.49 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2430.28	35.90	1.318	0.30( 0.24)	0.81	2511.7	13100.00
2	2369.04	61.85	0.939	0.30( 0.24)	0.81	3776.9	13000.00
3	2335.36	64.17	0.926	0.30( 0.24)	0.81	3796.8	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 2430.28 Tc(MIN.) = 35.90  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 2511.67

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 3796.8 TC(MIN.) = 35.90

EFFECTIVE AREA(ACRES) = 2511.67 AREA-AVERAGED Fm(INCH/HR) = 0.24

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.810

PEAK FLOW RATE(CFS) = 2430.28

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2430.28	35.90	1.318	0.30( 0.24)	0.81	2511.7	13100.00
2	2369.04	61.85	0.939	0.30( 0.24)	0.81	3776.9	13000.00
3	2335.36	64.17	0.926	0.30( 0.24)	0.81	3796.8	13010.00

END OF RATIONAL METHOD ANALYSIS



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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S32 \*  
\* Rational Method Hydrology Analysis - 25-Year Expected Value \*  
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FILE NAME: S32.DAT  
TIME/DATE OF STUDY: 16:09 04/15/2013

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.080
- 2) 10.00; 2.729
- 3) 15.00; 2.163
- 4) 20.00; 1.834
- 5) 25.00; 1.614
- 6) 30.00; 1.440
- 7) 40.00; 1.233
- 8) 50.00; 1.085
- 9) 60.00; 0.950
- 10) 90.00; 0.775
- 11) 120.00; 0.657
- 12) 180.00; 0.530
- 13) 360.00; 0.367
- 14) 1440.00; 0.153

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

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FLOW PROCESS FROM NODE 13200.00 TO NODE 13201.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 298.57  
ELEVATION DATA: UPSTREAM(FEET) = 1069.04 DOWNSTREAM(FEET) = 1005.76

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.888  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.67	0.30	1.000	0	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.56  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 1.56

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FLOW PROCESS FROM NODE 13201.00 TO NODE 13202.00 IS CODE = 56  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 1005.76 DOWNSTREAM(FEET) = 896.98  
CHANNEL LENGTH THRU SUBAREA(FEET) = 747.55 CHANNEL SLOPE = 0.1455  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.26  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.396  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.62  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.52  
AVERAGE FLOW DEPTH(FEET) = 0.23 TRAVEL TIME(MIN.) = 3.53  
Tc(MIN.) = 12.94  
SUBAREA AREA(ACRES) = 7.42 SUBAREA RUNOFF(CFS) = 14.00  
EFFECTIVE AREA(ACRES) = 8.09 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.1 PEAK FLOW RATE(CFS) = 15.26  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.33 FLOW VELOCITY(FEET/SEC.) = 4.30  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13202.00 = 1046.12 FEET.

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FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 896.98 DOWNSTREAM(FEET) = 840.27  
FLOW LENGTH(FEET) = 1789.59 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 9.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.13  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 15.26  
PIPE TRAVEL TIME(MIN.) = 2.68 Tc(MIN.) = 15.62  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13203.00 = 2835.71 FEET.

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FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 15.62  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.122  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.89 0.30 0.731 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.731  
SUBAREA AREA(ACRES) = 38.89 SUBAREA RUNOFF(CFS) = 66.60  
EFFECTIVE AREA(ACRES) = 46.98 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
TOTAL AREA(ACRES) = 47.0 PEAK FLOW RATE(CFS) = 79.87

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FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 840.27 DOWNSTREAM(FEET) = 782.97  
FLOW LENGTH(FEET) = 992.54 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 18.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.77  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 79.87  
PIPE TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 16.38  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13204.00 = 3828.25 FEET.

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FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.38  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.072  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 83.09 0.30 0.645 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645  
SUBAREA AREA(ACRES) = 83.09 SUBAREA RUNOFF(CFS) = 140.49  
EFFECTIVE AREA(ACRES) = 130.07 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 130.1 PEAK FLOW RATE(CFS) = 218.24

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FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 782.97 DOWNSTREAM(FEET) = 692.52  
FLOW LENGTH(FEET) = 2046.57 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.73  
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 218.24  
PIPE TRAVEL TIME(MIN.) = 1.38 Tc(MIN.) = 17.76  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13205.00 = 5874.82 FEET.

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FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 17.76  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.981  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 88.51 0.30 0.679 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.679  
SUBAREA AREA(ACRES) = 88.51 SUBAREA RUNOFF(CFS) = 141.62  
EFFECTIVE AREA(ACRES) = 218.58 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 218.6 PEAK FLOW RATE(CFS) = 349.24

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FLOW PROCESS FROM NODE 13205.00 TO NODE 13206.00 IS CODE = 56

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 692.52 DOWNSTREAM(FEET) = 605.24  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2704.69 CHANNEL SLOPE = 0.0323  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.89  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.742



SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	163.73	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 458.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.41  
AVERAGE FLOW DEPTH(FEET) = 2.82 TRAVEL TIME(MIN.) = 4.33  
Tc(MIN.) = 22.09  
SUBAREA AREA(ACRES) = 163.73 SUBAREA RUNOFF(CFS) = 218.81  
EFFECTIVE AREA(ACRES) = 382.31 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 382.3 PEAK FLOW RATE(CFS) = 521.00  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.01 FLOW VELOCITY(FEET/SEC.) = 10.80  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13206.00 = 8579.51 FEET.

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FLOW PROCESS FROM NODE 13206.00 TO NODE 13207.00 IS CODE = 56

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 604.78  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.47  
AVERAGE FLOW DEPTH(FEET) = 3.68 TRAVEL TIME(MIN.) = 4.37  
Tc(MIN.) = 26.46  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 167.41  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 626.89  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.74

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 604.78  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.47  
AVERAGE FLOW DEPTH(FEET) = 3.68 TRAVEL TIME(MIN.) = 4.37  
Tc(MIN.) = 26.46  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 167.41  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 626.89  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.74 FLOW VELOCITY(FEET/SEC.) = 9.58  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13207.00 = 11058.66 FEET.

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FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 56

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 694.52  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.20  
AVERAGE FLOW DEPTH(FEET) = 3.60 TRAVEL TIME(MIN.) = 2.58  
Tc(MIN.) = 29.04  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 135.24  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 719.57  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.67

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 694.52  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.20  
AVERAGE FLOW DEPTH(FEET) = 3.60 TRAVEL TIME(MIN.) = 2.58  
Tc(MIN.) = 29.04  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 135.24  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 719.57  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.67

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.67 FLOW VELOCITY(FEET/SEC.) = 11.32  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

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FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 1

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

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TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 29.04  
RAINFALL INTENSITY(INCH/HR) = 1.47  
AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.81  
EFFECTIVE STREAM AREA(ACRES) = 649.28  
TOTAL STREAM AREA(ACRES) = 649.28  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 719.57

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FLOW PROCESS FROM NODE 13210.00 TO NODE 13211.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.51  
ELEVATION DATA: UPSTREAM(FEET) = 949.80 DOWNSTREAM(FEET) = 828.64

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.525  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.127  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 NATURAL FAIR COVER  
 "OPEN BRUSH" - 1.96 0.30 1.000 0 8.53  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 4.99  
 TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 4.99

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 FLOW PROCESS FROM NODE 13211.00 TO NODE 13212.00 IS CODE = 56  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 828.64 DOWNSTREAM(FEET) = 767.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 652.49 CHANNEL SLOPE = 0.0930  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.45  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.582

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 11.95 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.35  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.92  
 AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 2.77  
 Tc(MIN.) = 11.30

SUBAREA AREA(ACRES) = 11.95 SUBAREA RUNOFF(CFS) = 24.54  
 EFFECTIVE AREA(ACRES) = 13.91 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 28.57  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.55 FLOW VELOCITY(FEET/SEC.) = 4.71  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13212.00 = 967.00 FEET.

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 FLOW PROCESS FROM NODE 13212.00 TO NODE 13213.00 IS CODE = 56  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 767.94 DOWNSTREAM(FEET) = 706.43  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 967.91 CHANNEL SLOPE = 0.0635  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.91  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.223

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 27.07 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 52.11  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.08  
 AVERAGE FLOW DEPTH(FEET) = 0.87 TRAVEL TIME(MIN.) = 3.17  
 Tc(MIN.) = 14.47  
 SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 46.85  
 EFFECTIVE AREA(ACRES) = 40.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 41.0 PEAK FLOW RATE(CFS) = 70.92  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.04 FLOW VELOCITY(FEET/SEC.) = 5.64  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13213.00 = 1934.91 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13213.00 TO NODE 13214.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 706.43 DOWNSTREAM(FEET) = 659.31  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 948.11 CHANNEL SLOPE = 0.0497  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.25  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.009

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 18.09 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 84.84  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.49  
 AVERAGE FLOW DEPTH(FEET) = 1.24 TRAVEL TIME(MIN.) = 2.88  
 Tc(MIN.) = 17.35

SUBAREA AREA(ACRES) = 18.09 SUBAREA RUNOFF(CFS) = 27.82  
 EFFECTIVE AREA(ACRES) = 59.07 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 90.83  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.29 FLOW VELOCITY(FEET/SEC.) = 5.62  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13214.00 = 2883.02 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13214.00 TO NODE 13215.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 659.31 DOWNSTREAM(FEET) = 628.91  
CHANNEL LENGTH THRU SUBAREA(FEET) = 970.24 CHANNEL SLOPE = 0.0313  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.90

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.821

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	71.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 139.77

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.46

AVERAGE FLOW DEPTH(FEET) = 1.86 TRAVEL TIME(MIN.) = 2.96

Tc(MIN.) = 20.31

SUBAREA AREA(ACRES) = 71.42 SUBAREA RUNOFF(CFS) = 97.75

EFFECTIVE AREA(ACRES) = 130.49 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 130.5 PEAK FLOW RATE(CFS) = 178.59

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.13 FLOW VELOCITY(FEET/SEC.) = 5.87

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13215.00 = 3853.26 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13215.00 TO NODE 13216.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 628.91 DOWNSTREAM(FEET) = 598.39  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.63 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.25

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.712

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	36.33	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 201.67

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.22

AVERAGE FLOW DEPTH(FEET) = 2.24 TRAVEL TIME(MIN.) = 2.47

Tc(MIN.) = 22.79

SUBAREA AREA(ACRES) = 36.33 SUBAREA RUNOFF(CFS) = 46.16

EFFECTIVE AREA(ACRES) = 166.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 166.8 PEAK FLOW RATE(CFS) = 211.96

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.30 FLOW VELOCITY(FEET/SEC.) = 6.31

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13216.00 = 4775.89 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13216.00 TO NODE 13217.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 598.39 DOWNSTREAM(FEET) = 568.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.40 CHANNEL SLOPE = 0.0470  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.23

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.649

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	42.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 237.76

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.40

AVERAGE FLOW DEPTH(FEET) = 2.22 TRAVEL TIME(MIN.) = 1.43

Tc(MIN.) = 24.22

SUBAREA AREA(ACRES) = 42.51 SUBAREA RUNOFF(CFS) = 51.60

EFFECTIVE AREA(ACRES) = 209.33 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 209.3 PEAK FLOW RATE(CFS) = 254.07

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.31 FLOW VELOCITY(FEET/SEC.) = 7.53

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13217.00 = 5412.29 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 568.48 DOWNSTREAM(FEET) = 505.65  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1896.50 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.76

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.483

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	73.24	0.30	0.951	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.951  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 293.55  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 6.93  
 AVERAGE FLOW DEPTH( FEET) = 2.74 TRAVEL TIME( MIN.) = 4.56  
 Tc( MIN.) = 28.78  
 SUBAREA AREA( ACRES) = 73.24 SUBAREA RUNOFF( CFS) = 78.92  
 EFFECTIVE AREA( ACRES) = 282.57 AREA-AVERAGED Fm( INCH/HR) = 0.30  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA( ACRES) = 282.6 PEAK FLOW RATE( CFS) = 301.72  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 2.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 2.78 FLOW VELOCITY( FEET/SEC.) = 6.98  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13220.00 = 7308.79 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION( MIN.) = 28.78  
 RAINFALL INTENSITY( INCH/HR) = 1.48  
 AREA-AVERAGED Fm( INCH/HR) = 0.30  
 AREA-AVERAGED Fp( INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.99  
 EFFECTIVE STREAM AREA( ACRES) = 282.57  
 TOTAL STREAM AREA( ACRES) = 282.57  
 PEAK FLOW RATE( CFS) AT CONFLUENCE = 301.72

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	719.57	29.04	1.473	0.30( 0.24)	0.81	649.3	13200.00
2	301.72	28.78	1.483	0.30( 0.30)	0.99	282.6	13210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1020.09	28.78	1.483	0.30( 0.26)	0.86	926.0	13210.00
2	1018.98	29.04	1.473	0.30( 0.26)	0.86	931.8	13200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE( CFS) = 1020.09 Tc( MIN.) = 28.78  
 EFFECTIVE AREA( ACRES) = 926.04 AREA-AVERAGED Fm( INCH/HR) = 0.26  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA( ACRES) = 931.8  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13220.00 TO NODE 13221.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM( FEET) = 505.65 DOWNSTREAM( FEET) = 478.94  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 1949.14 CHANNEL SLOPE = 0.0137  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 4.69  
 \* 25 YEAR RAINFALL INTENSITY( INCH/HR) = 1.409

SUBAREA LOSS RATE DATA( AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	108.50	0.30	0.637	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp( INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.637  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW( CFS) = 1079.54  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 11.88  
 AVERAGE FLOW DEPTH( FEET) = 4.69 TRAVEL TIME( MIN.) = 2.73  
 Tc( MIN.) = 31.51

SUBAREA AREA( ACRES) = 108.50 SUBAREA RUNOFF( CFS) = 118.90  
 EFFECTIVE AREA( ACRES) = 1034.54 AREA-AVERAGED Fm( INCH/HR) = 0.25  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA( ACRES) = 1040.3 PEAK FLOW RATE( CFS) = 1077.44  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 4.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 4.68 FLOW VELOCITY( FEET/SEC.) = 11.89  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13221.00 = 14742.35 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1077.44	31.51	1.409	0.30( 0.25)	0.84	1034.5	13210.00
2	1078.47	31.78	1.403	0.30( 0.25)	0.84	1040.3	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE( CFS) = 1078.47 Tc( MIN.) = 31.78  
 AREA-AVERAGED Fm( INCH/HR) = 0.25 AREA-AVERAGED Fp( INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.84 EFFECTIVE AREA( ACRES) = 1040.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13221.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM( FEET) = 478.94 DOWNSTREAM( FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 2078.70 CHANNEL SLOPE = 0.0247  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 4.13  
 \* 25 YEAR RAINFALL INTENSITY( INCH/HR) = 1.355

SUBAREA LOSS RATE DATA( AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED - 87.26 0.30 0.699 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.699  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1123.45  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 14.93  
 AVERAGE FLOW DEPTH (FEET) = 4.12 TRAVEL TIME (MIN.) = 2.32  
 Tc (MIN.) = 34.10  
 SUBAREA AREA (ACRES) = 87.26 SUBAREA RUNOFF (CFS) = 89.97  
 EFFECTIVE AREA (ACRES) = 1127.61 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA (ACRES) = 1127.6 PEAK FLOW RATE (CFS) = 1123.47  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 4.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 4.12 FLOW VELOCITY (FEET/SEC.) = 14.93  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13222.00 = 16821.05 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1123.08	33.84	1.361	0.30 (0.25)	0.83	1121.8	13210.00
2	1123.47	34.10	1.355	0.30 (0.25)	0.83	1127.6	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1123.47 Tc (MIN.) = 34.10  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.83 EFFECTIVE AREA (ACRES) = 1127.61

=====  
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1127.6 TC (MIN.) = 34.10  
 EFFECTIVE AREA (ACRES) = 1127.61 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.828  
 PEAK FLOW RATE (CFS) = 1123.47

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1123.08	33.84	1.361	0.30 (0.25)	0.83	1121.8	13210.00
2	1123.47	34.10	1.355	0.30 (0.25)	0.83	1127.6	13200.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S35 \*  
\* Rational Method Hydrology Analysis - 25-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S35.DAT  
TIME/DATE OF STUDY: 16:10 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.080
- 2) 10.00; 2.729
- 3) 15.00; 2.163
- 4) 20.00; 1.834
- 5) 25.00; 1.614
- 6) 30.00; 1.440
- 7) 40.00; 1.233
- 8) 50.00; 1.085
- 9) 60.00; 0.950
- 10) 90.00; 0.775
- 11) 120.00; 0.657
- 12) 180.00; 0.530
- 13) 360.00; 0.367
- 14) 1440.00; 0.153

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.00 TO NODE 13500.50 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 548.43  
ELEVATION DATA: UPSTREAM(FEET) = 1183.47 DOWNSTREAM(FEET) = 1065.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.508  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	5.11	0.30	1.000	0	11.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 10.15  
TOTAL AREA(ACRES) = 5.11 PEAK FLOW RATE(CFS) = 10.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.50 TO NODE 13501.00 IS CODE = 56  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1033.15  
CHANNEL LENGTH THRU SUBAREA(FEET) = 431.71 CHANNEL SLOPE = 0.0738  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.46  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.288  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.87	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.10  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.71  
AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 1.94  
Tc(MIN.) = 13.89  
SUBAREA AREA(ACRES) = 8.87 SUBAREA RUNOFF(CFS) = 15.87  
EFFECTIVE AREA(ACRES) = 13.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 25.02  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.54 FLOW VELOCITY(FEET/SEC.) = 4.14  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13501.00 = 980.14 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13501.00 TO NODE 13502.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1033.15 DOWNSTREAM(FEET) = 990.26  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.63 CHANNEL SLOPE = 0.0452  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.83

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.981

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.82	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.78

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.08

AVERAGE FLOW DEPTH(FEET) = 0.80 TRAVEL TIME(MIN.) = 3.87

Tc(MIN.) = 17.77

SUBAREA AREA(ACRES) = 16.82 SUBAREA RUNOFF(CFS) = 25.45

EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 46.61

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.90 FLOW VELOCITY(FEET/SEC.) = 4.37

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13502.00 = 1928.77 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13502.00 TO NODE 13503.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.26 DOWNSTREAM(FEET) = 956.06

CHANNEL LENGTH THRU SUBAREA(FEET) = 940.98 CHANNEL SLOPE = 0.0363

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.32

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.789

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	46.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 77.48

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.80

AVERAGE FLOW DEPTH(FEET) = 1.28 TRAVEL TIME(MIN.) = 3.27

Tc(MIN.) = 21.03

SUBAREA AREA(ACRES) = 46.02 SUBAREA RUNOFF(CFS) = 61.67

EFFECTIVE AREA(ACRES) = 76.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 76.8 PEAK FLOW RATE(CFS) = 102.94

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.51 FLOW VELOCITY(FEET/SEC.) = 5.25

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13503.00 = 2869.75 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13503.00 TO NODE 13504.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 956.06 DOWNSTREAM(FEET) = 889.48

CHANNEL LENGTH THRU SUBAREA(FEET) = 2131.31 CHANNEL SLOPE = 0.0312

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.88

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.524

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	58.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 135.23

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.42

AVERAGE FLOW DEPTH(FEET) = 1.83 TRAVEL TIME(MIN.) = 6.56

Tc(MIN.) = 27.59

SUBAREA AREA(ACRES) = 58.46 SUBAREA RUNOFF(CFS) = 64.40

EFFECTIVE AREA(ACRES) = 135.28 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 135.3 PEAK FLOW RATE(CFS) = 149.02

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.93 FLOW VELOCITY(FEET/SEC.) = 5.58

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13504.00 = 5001.06 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13504.00 TO NODE 13505.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 889.48 DOWNSTREAM(FEET) = 848.10

CHANNEL LENGTH THRU SUBAREA(FEET) = 1661.97 CHANNEL SLOPE = 0.0249

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.25

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.383  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 49.30 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 173.07  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.38  
 AVERAGE FLOW DEPTH (FEET) = 2.22 TRAVEL TIME (MIN.) = 5.15  
 Tc (MIN.) = 32.74  
 SUBAREA AREA (ACRES) = 49.30 SUBAREA RUNOFF (CFS) = 48.07  
 EFFECTIVE AREA (ACRES) = 184.58 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 184.6 PEAK FLOW RATE (CFS) = 179.98  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.28  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.28 FLOW VELOCITY (FEET/SEC.) = 5.43  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.00 = 6663.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13505.00 TO NODE 13505.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 848.10 DOWNSTREAM (FEET) = 811.10  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1234.61 CHANNEL SLOPE = 0.0300  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.29  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.312  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 39.35 0.30 0.811 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.811  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 198.91  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.98  
 AVERAGE FLOW DEPTH (FEET) = 2.28 TRAVEL TIME (MIN.) = 3.44  
 Tc (MIN.) = 36.18  
 SUBAREA AREA (ACRES) = 39.35 SUBAREA RUNOFF (CFS) = 37.86  
 EFFECTIVE AREA (ACRES) = 223.93 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 223.9 PEAK FLOW RATE (CFS) = 206.01  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.33  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.33 FLOW VELOCITY (FEET/SEC.) = 6.03  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.50 = 7897.64 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13505.50 TO NODE 13506.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 811.10 DOWNSTREAM (FEET) = 781.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1415.98 CHANNEL SLOPE = 0.0213  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.71  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.226  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 54.33 0.30 0.738 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.738  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 230.58  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.51  
 AVERAGE FLOW DEPTH (FEET) = 2.71 TRAVEL TIME (MIN.) = 4.28  
 Tc (MIN.) = 40.46  
 SUBAREA AREA (ACRES) = 54.33 SUBAREA RUNOFF (CFS) = 49.14  
 EFFECTIVE AREA (ACRES) = 278.26 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
 TOTAL AREA (ACRES) = 278.3 PEAK FLOW RATE (CFS) = 237.85  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.76  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.76 FLOW VELOCITY (FEET/SEC.) = 5.56  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.00 = 9313.62 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13506.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 781.00 DOWNSTREAM (FEET) = 743.17  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1542.62 CHANNEL SLOPE = 0.0245  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.80  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.163  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 61.33 0.30 0.783 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 263.47  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.02  
 AVERAGE FLOW DEPTH (FEET) = 2.80 TRAVEL TIME (MIN.) = 4.27  
 Tc (MIN.) = 44.73  
 SUBAREA AREA (ACRES) = 61.33 SUBAREA RUNOFF (CFS) = 51.24  
 EFFECTIVE AREA (ACRES) = 339.59 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90



TOTAL AREA (ACRES) = 339.6 PEAK FLOW RATE (CFS) = 273.26  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.86  
  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.86 FLOW VELOCITY (FEET/SEC.) = 6.09  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.50 = 10856.24 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.50 TO NODE 13520.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 743.17 DOWNSTREAM (FEET) = 717.04  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1370.93 CHANNEL SLOPE = 0.0191  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.14  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.103  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.86	0.30	0.848	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.848  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 288.49  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.65  
 AVERAGE FLOW DEPTH (FEET) = 3.14 TRAVEL TIME (MIN.) = 4.05  
 Tc (MIN.) = 48.77  
 SUBAREA AREA (ACRES) = 39.86 SUBAREA RUNOFF (CFS) = 30.45  
 EFFECTIVE AREA (ACRES) = 379.45 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
 TOTAL AREA (ACRES) = 379.5 PEAK FLOW RATE (CFS) = 285.42  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.12 FLOW VELOCITY (FEET/SEC.) = 5.64  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 48.77  
 RAINFALL INTENSITY (INCH/HR) = 1.10  
 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.89  
 EFFECTIVE STREAM AREA (ACRES) = 379.45  
 TOTAL STREAM AREA (ACRES) = 379.45  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 285.42

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13510.00 TO NODE 13511.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

ELEVATION DATA: UPSTREAM (FEET) = 1216.90 DOWNSTREAM (FEET) = 1022.78

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.615  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.207  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	6.66	0.30	1.000	0	14.62

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 11.43  
 TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 11.43

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13511.00 TO NODE 13512.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1022.78 DOWNSTREAM (FEET) = 954.27  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1027.63 CHANNEL SLOPE = 0.0667  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.66  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.927  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.30	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 30.12  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.30  
 AVERAGE FLOW DEPTH (FEET) = 0.62 TRAVEL TIME (MIN.) = 3.98  
 Tc (MIN.) = 18.60  
 SUBAREA AREA (ACRES) = 25.40 SUBAREA RUNOFF (CFS) = 37.19  
 EFFECTIVE AREA (ACRES) = 32.06 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 46.94  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.81 FLOW VELOCITY (FEET/SEC.) = 4.98  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13512.00 = 1931.31 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13512.00 TO NODE 13513.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 954.27 DOWNSTREAM(FEET) = 872.45
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.42 CHANNEL SLOPE = 0.0425
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.52
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.640

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 90.23 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 101.67
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.52
AVERAGE FLOW DEPTH(FEET) = 1.43 TRAVEL TIME(MIN.) = 5.81
Tc(MIN.) = 24.41

SUBAREA AREA(ACRES) = 90.23 SUBAREA RUNOFF(CFS) = 108.83
EFFECTIVE AREA(ACRES) = 122.29 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 122.3 PEAK FLOW RATE(CFS) = 147.50
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.77

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.77 FLOW VELOCITY(FEET/SEC.) = 6.18
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13513.00 = 3857.73 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13513.00 TO NODE 13514.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 872.45 DOWNSTREAM(FEET) = 813.12
CHANNEL LENGTH THRU SUBAREA(FEET) = 1895.66 CHANNEL SLOPE = 0.0313
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.44
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.458

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 135.65 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 218.36
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.23
AVERAGE FLOW DEPTH(FEET) = 2.38 TRAVEL TIME(MIN.) = 5.07
Tc(MIN.) = 29.48

SUBAREA AREA(ACRES) = 135.65 SUBAREA RUNOFF(CFS) = 141.38
EFFECTIVE AREA(ACRES) = 257.94 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 257.9 PEAK FLOW RATE(CFS) = 268.84
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.65

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.65 FLOW VELOCITY(FEET/SEC.) = 6.62
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13514.00 = 5753.39 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13514.00 TO NODE 13515.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 813.12 DOWNSTREAM(FEET) = 773.74
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.15 CHANNEL SLOPE = 0.0204
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.28
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.339

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 109.30 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 319.99
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.96
AVERAGE FLOW DEPTH(FEET) = 3.25 TRAVEL TIME(MIN.) = 5.39
Tc(MIN.) = 34.87

SUBAREA AREA(ACRES) = 109.30 SUBAREA RUNOFF(CFS) = 102.24
EFFECTIVE AREA(ACRES) = 367.24 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 367.2 PEAK FLOW RATE(CFS) = 343.51
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 3.38 FLOW VELOCITY(FEET/SEC.) = 6.08
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13515.00 = 7679.54 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 773.74 DOWNSTREAM(FEET) = 717.04
CHANNEL LENGTH THRU SUBAREA(FEET) = 2279.49 CHANNEL SLOPE = 0.0249
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.69
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.229

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 231.44 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 440.30  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.99  
 AVERAGE FLOW DEPTH(FEET) = 3.64 TRAVEL TIME(MIN.) = 5.43  
 Tc(MIN.) = 40.30  
 SUBAREA AREA(ACRES) = 231.44 SUBAREA RUNOFF(CFS) = 193.45  
 EFFECTIVE AREA(ACRES) = 598.68 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 598.7 PEAK FLOW RATE(CFS) = 500.40  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.89 FLOW VELOCITY(FEET/SEC.) = 7.24  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13520.00 = 9959.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 40.30  
 RAINFALL INTENSITY(INCH/HR) = 1.23  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 598.68  
 TOTAL STREAM AREA(ACRES) = 598.68  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 500.40

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	285.42	48.77	1.103	0.30( 0.27)	0.89	379.5	13500.00
2	500.40	40.30	1.229	0.30( 0.30)	1.00	598.7	13510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	771.62	40.30	1.229	0.30( 0.29)	0.96	912.2	13510.00
2	718.25	48.77	1.103	0.30( 0.29)	0.96	978.1	13500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 771.62 Tc(MIN.) = 40.30  
 EFFECTIVE AREA(ACRES) = 912.21 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 978.1  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.00 TO NODE 13520.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 717.04 DOWNSTREAM(FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2019.22 CHANNEL SLOPE = 0.0084  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.31  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.151

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 846.61  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.43  
 AVERAGE FLOW DEPTH(FEET) = 3.30 TRAVEL TIME(MIN.) = 5.23  
 Tc(MIN.) = 45.53  
 SUBAREA AREA(ACRES) = 193.31 SUBAREA RUNOFF(CFS) = 149.93  
 EFFECTIVE AREA(ACRES) = 1105.52 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 1171.4 PEAK FLOW RATE(CFS) = 857.99  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.32

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.32 FLOW VELOCITY(FEET/SEC.) = 6.46  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.50 = 14246.39 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	857.99	45.53	1.151	0.30( 0.29)	0.96	1105.5	13510.00
2	781.89	54.13	1.029	0.30( 0.29)	0.96	1171.4	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 857.99 Tc(MIN.) = 45.53  
 AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 1105.52

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.50 TO NODE 13521.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 661.95  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1622.36 CHANNEL SLOPE = 0.0235  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.58  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.108

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 129.79 0.30 0.897 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 907.01  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.33  
 AVERAGE FLOW DEPTH(FEET) = 2.58 TRAVEL TIME(MIN.) = 2.90  
 Tc(MIN.) = 48.43  
 SUBAREA AREA(ACRES) = 129.79 SUBAREA RUNOFF(CFS) = 98.04  
 EFFECTIVE AREA(ACRES) = 1235.31 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 1301.2 PEAK FLOW RATE(CFS) = 913.37  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.59 FLOW VELOCITY(FEET/SEC.) = 9.34  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13521.00 = 15868.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	913.37	48.43	1.108	0.30( 0.29)	0.96	1235.3	13510.00
2	823.44	57.12	0.989	0.30( 0.29)	0.95	1301.2	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 913.37 Tc(MIN.) = 48.43  
 AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 1235.31

\*\*\*\*\*

FLOW PROCESS FROM NODE 13521.00 TO NODE 13522.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 661.95 DOWNSTREAM(FEET) = 632.19  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2746.01 CHANNEL SLOPE = 0.0108  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.41  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.023  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	278.60	0.30	0.905	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1007.59  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.40  
 AVERAGE FLOW DEPTH(FEET) = 3.39 TRAVEL TIME(MIN.) = 6.19  
 Tc(MIN.) = 54.62  
 SUBAREA AREA(ACRES) = 278.60 SUBAREA RUNOFF(CFS) = 188.38  
 EFFECTIVE AREA(ACRES) = 1513.91 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
 TOTAL AREA(ACRES) = 1579.8 PEAK FLOW RATE(CFS) = 1006.57  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.39 FLOW VELOCITY(FEET/SEC.) = 7.39  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13522.00 = 18614.76 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1006.57	54.62	1.023	0.30( 0.28)	0.95	1513.9	13510.00
2	918.88	63.50	0.930	0.30( 0.28)	0.94	1579.8	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1006.57 Tc(MIN.) = 54.62  
 AREA-AVERAGED Fm(INCH/HR) = 0.28 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.95 EFFECTIVE AREA(ACRES) = 1513.91

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1579.8 TC(MIN.) = 54.62  
 EFFECTIVE AREA(ACRES) = 1513.91 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.947  
 PEAK FLOW RATE(CFS) = 1006.57

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1006.57	54.62	1.023	0.30( 0.28)	0.95	1513.9	13510.00
2	918.88	63.50	0.930	0.30( 0.28)	0.94	1579.8	13500.00

=====

END OF RATIONAL METHOD ANALYSIS



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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 18.0 Release Date: 07/01/2011 License ID 1264

Analysis prepared by:

RBF Consulting

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 50-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P50EVAA.DAT  
TIME/DATE OF STUDY: 15:21 11/13/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.254
- 2) 10.00; 3.396
- 3) 15.00; 2.615
- 4) 20.00; 2.190
- 5) 25.00; 1.899
- 6) 30.00; 1.707
- 7) 40.00; 1.447
- 8) 50.00; 1.285
- 9) 60.00; 1.174
- 10) 90.00; 0.972
- 11) 120.00; 0.842
- 12) 180.00; 0.717
- 13) 360.00; 0.527
- 14) 1200.00; 0.230

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / PARK- / WAY		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 571.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.305  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.397

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56	7.31

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 3.12  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 3.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.397

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.170  
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 12.91  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 16.03

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.397

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.60 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 10.15  
 EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19  
 TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 26.18

\*\*\*\*\*

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 571.00 DOWNSTREAM ELEVATION(FEET) = 530.50  
 STREET LENGTH(FEET) = 1215.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.50

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.47  
 HALFSTREET FLOOD WIDTH(FEET) = 17.46  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.40  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.56  
 STREET FLOW TRAVEL TIME(MIN.) = 3.75 Tc(MIN.) = 11.05

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.231

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.20	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	2.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.135  
 SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 10.63  
 EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 29.77

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 17.07  
 FLOW VELOCITY(FEET/SEC.) = 5.32 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.49  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1542.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 11.05  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.231  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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APARTMENTS B 4.40 0.30 0.200 56  
 COMMERCIAL B 18.20 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.119  
 SUBAREA AREA(ACRES) = 22.60 SUBAREA RUNOFF(CFS) = 64.99  
 EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.13  
 TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 94.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 11.05  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.231  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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APARTMENTS B 6.20 0.30 0.200 56  
 COMMERCIAL B 0.10 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198  
 SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 17.98  
 EFFECTIVE AREA(ACRES) = 39.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA(ACRES) = 39.3 PEAK FLOW RATE(CFS) = 112.75

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.50 DOWNSTREAM(FEET) = 522.00  
 FLOW LENGTH(FEET) = 837.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.93  
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 112.75  
 PIPE TRAVEL TIME(MIN.) = 1.17 Tc(MIN.) = 12.22  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2379.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 12.22  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.049  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	15.30	0.30	0.100	56
PUBLIC PARK	B	0.70	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.133  
SUBAREA AREA(ACRES) = 16.00 SUBAREA RUNOFF(CFS) = 43.33  
EFFECTIVE AREA(ACRES) = 55.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
TOTAL AREA(ACRES) = 55.3 PEAK FLOW RATE(CFS) = 149.62

\*\*\*\*\*  
FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 522.00 DOWNSTREAM(FEET) = 473.00  
FLOW LENGTH(FEET) = 568.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.24  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 149.62  
PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 12.55  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2947.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 12.55  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.998

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	2.10	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
COMMERCIAL	B	0.50	0.30	0.100	56
PUBLIC PARK	B	13.00	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.820  
SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 39.38  
EFFECTIVE AREA(ACRES) = 71.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
TOTAL AREA(ACRES) = 71.2 PEAK FLOW RATE(CFS) = 186.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 104.00 TO NODE 127.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 435.00  
FLOW LENGTH(FEET) = 588.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.28

ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 186.48  
PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 12.91  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 10  
-----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 121.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 574.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.977

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56	8.44

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 2.11  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 2.11

\*\*\*\*\*  
FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 574.00 DOWNSTREAM ELEVATION(FEET) = 557.00  
STREET LENGTH(FEET) = 221.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 25.97

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.40  
HALFSTREET FLOOD WIDTH(FEET) = 13.55  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.08  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.86



STREET FLOW TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 8.96  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.783  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 7.90 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.10 0.30 0.400 56  
 APARTMENTS B 2.20 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.257  
 SUBAREA AREA(ACRES) = 14.30 SUBAREA RUNOFF(CFS) = 47.70  
 EFFECTIVE AREA(ACRES) = 14.90 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.26  
 TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 49.71

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 17.77  
 FLOW VELOCITY(FEET/SEC.) = 8.24 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.96  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 551.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 557.00 DOWNSTREAM ELEVATION(FEET) = 527.00  
 STREET LENGTH(FEET) = 317.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 64.23  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.50  
 HALFSTREET FLOOD WIDTH(FEET) = 18.87  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.52  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.76  
 STREET FLOW TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 9.51  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.577

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.50 0.30 0.400 56  
 APARTMENTS B 0.70 0.30 0.200 56

COMMERCIAL B 0.40 0.30 0.100 56  
 CONDOMINIUMS B 3.50 0.30 0.350 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.352  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 29.06  
 EFFECTIVE AREA(ACRES) = 24.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 24.2 PEAK FLOW RATE(CFS) = 76.00

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 20.20  
 FLOW VELOCITY(FEET/SEC.) = 9.91 DEPTH\*VELOCITY(FT\*FT/SEC.) = 5.18  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 123.00 = 868.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 527.00 DOWNSTREAM ELEVATION(FEET) = 496.00  
 STREET LENGTH(FEET) = 315.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 92.81  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.55  
 HALFSTREET FLOOD WIDTH(FEET) = 21.68  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.57  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 5.81  
 STREET FLOW TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 10.01  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.394

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 2.90 0.30 0.400 56  
 CONDOMINIUMS B 1.40 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.00 0.30 0.400 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 CONDOMINIUMS B 2.70 0.30 0.350 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387  
 SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 33.64  
 EFFECTIVE AREA(ACRES) = 35.60 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32

TOTAL AREA (ACRES) = 35.6 PEAK FLOW RATE (CFS) = 105.66

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.57 HALFSTREET FLOOD WIDTH (FEET) = 22.85
FLOW VELOCITY (FEET/SEC.) = 10.88 DEPTH\*VELOCITY (FT\*FT/SEC.) = 6.21
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 124.00 = 1183.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 10.01
RAINFALL INTENSITY (INCH/HR) = 3.39
AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA (ACRES) = 35.60
TOTAL STREAM AREA (ACRES) = 35.60
PEAK FLOW RATE (CFS) AT CONFLUENCE = 105.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 317.00
ELEVATION DATA: UPSTREAM (FEET) = 699.00 DOWNSTREAM (FEET) = 610.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.111

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.726

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER
"OPEN BRUSH" B 1.50 0.30 1.000 66 9.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 4.63

TOTAL AREA (ACRES) = 1.50 PEAK FLOW RATE (CFS) = 4.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 610.00 DOWNSTREAM (FEET) = 575.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 206.00 CHANNEL SLOPE = 0.1699

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.543

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 2.80 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.71

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.97

AVERAGE FLOW DEPTH (FEET) = 0.65 TRAVEL TIME (MIN.) = 0.49

Tc (MIN.) = 9.60

SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 8.17

EFFECTIVE AREA (ACRES) = 4.30 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 4.3 PEAK FLOW RATE (CFS) = 12.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.74 FLOW VELOCITY (FEET/SEC.) = 7.58

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 523.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 575.00 DOWNSTREAM (FEET) = 548.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.1350

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.389

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 3.30 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.14

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.60

AVERAGE FLOW DEPTH (FEET) = 0.87 TRAVEL TIME (MIN.) = 0.44

Tc (MIN.) = 10.04

SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 9.18

EFFECTIVE AREA (ACRES) = 7.60 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 7.6 PEAK FLOW RATE (CFS) = 21.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.94 FLOW VELOCITY (FEET/SEC.) = 7.95

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 723.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 548.00 DOWNSTREAM (FEET) = 524.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 318.00 CHANNEL SLOPE = 0.0755

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.264  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	2.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 24.20  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.63  
 AVERAGE FLOW DEPTH (FEET) = 1.10 TRAVEL TIME (MIN.) = 0.80  
 Tc (MIN.) = 10.84  
 SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 6.14  
 EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 26.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.14 FLOW VELOCITY (FEET/SEC.) = 6.78  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 1041.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	3.70	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.30  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.72  
 AVERAGE FLOW DEPTH (FEET) = 1.16 TRAVEL TIME (MIN.) = 0.20  
 Tc (MIN.) = 11.05  
 SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 9.77  
 EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 35.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.22 FLOW VELOCITY (FEET/SEC.) = 7.99  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 1135.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	8.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 46.52  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.08  
 AVERAGE FLOW DEPTH (FEET) = 1.60 TRAVEL TIME (MIN.) = 0.57  
 Tc (MIN.) = 11.61  
 SUBAREA AREA (ACRES) = 8.30 SUBAREA RUNOFF (CFS) = 21.25  
 EFFECTIVE AREA (ACRES) = 21.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 21.9 PEAK FLOW RATE (CFS) = 56.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.71 FLOW VELOCITY (FEET/SEC.) = 6.36  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 1342.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	0.60	0.30	1.000	66
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
NATURAL FAIR COVER "OPEN BRUSH"	B	13.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 73.09  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.39  
 AVERAGE FLOW DEPTH (FEET) = 2.13 TRAVEL TIME (MIN.) = 1.04  
 Tc (MIN.) = 12.66  
 SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 34.07  
 EFFECTIVE AREA (ACRES) = 36.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 36.0 PEAK FLOW RATE (CFS) = 86.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.27 FLOW VELOCITY(FEET/SEC.) = 5.62  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 1680.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 137.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 496.00  
FLOW LENGTH(FEET) = 726.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.05  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 86.91  
PIPE TRAVEL TIME(MIN.) = 1.34 Tc(MIN.) = 13.99  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 13.99  
RAINFALL INTENSITY(INCH/HR) = 2.77  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 36.00  
TOTAL STREAM AREA(ACRES) = 36.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 86.91

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	105.66	10.01	3.394	0.30( 0.10)	0.32	35.6	100.00
2	86.91	13.99	2.772	0.30( 0.30)	1.00	36.0	130.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	183.46	10.01	3.394	0.30( 0.18)	0.60	61.3	100.00
2	172.62	13.99	2.772	0.30( 0.20)	0.66	71.6	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 183.46 Tc(MIN.) = 10.01  
EFFECTIVE AREA(ACRES) = 61.35 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 71.6  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 444.00  
FLOW LENGTH(FEET) = 888.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 30.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.03  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 183.46  
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 10.58  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 125.00 = 3294.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.58  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.306  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	1.00	0.30	0.400	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	7.50	0.30	0.400	56
NATURAL FAIR COVER "OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.407  
SUBAREA AREA(ACRES) = 8.60 SUBAREA RUNOFF(CFS) = 24.64  
EFFECTIVE AREA(ACRES) = 69.95 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 197.14

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 444.00 DOWNSTREAM(FEET) = 438.00  
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 44.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.20  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 197.14  
PIPE TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 11.41  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.41

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.176  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	4.30	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.70	0.30	0.400	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.20	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 7.10 SUBAREA RUNOFF (CFS) = 19.86  
 EFFECTIVE AREA (ACRES) = 77.05 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 87.3 PEAK FLOW RATE (CFS) = 208.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 11.41  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.176  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.56  
 EFFECTIVE AREA (ACRES) = 77.25 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 87.5 PEAK FLOW RATE (CFS) = 209.37

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 11.41  
 RAINFALL INTENSITY (INCH/HR) = 3.18  
 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.55  
 EFFECTIVE STREAM AREA (ACRES) = 77.25  
 TOTAL STREAM AREA (ACRES) = 87.50  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 209.37

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21  
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 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 557.00 DOWNSTREAM (FEET) = 546.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.105  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.843  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.50	0.30	0.100	56	6.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 2.17  
 TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 2.17

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION (FEET) = 546.00 DOWNSTREAM ELEVATION (FEET) = 488.00  
 STREET LENGTH (FEET) = 671.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.97  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.33  
 HALfstREET FLOOD WIDTH (FEET) = 9.22  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.28  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.06  
 STREET FLOW TRAVEL TIME (MIN.) = 1.78 Tc (MIN.) = 7.89  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.182

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.50	0.30	0.200	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	3.90	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293  
 SUBAREA AREA (ACRES) = 5.30 SUBAREA RUNOFF (CFS) = 19.53  
 EFFECTIVE AREA (ACRES) = 5.80 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA (ACRES) = 5.8 PEAK FLOW RATE (CFS) = 21.40

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.15  
 FLOW VELOCITY(FEET/SEC.) = 7.08 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.69  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1001.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 7.89  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.182  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	14.60	0.30	0.200	56
COMMERCIAL	B	1.10	0.30	0.100	56
CONDOMINIUMS	B	4.30	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.227  
 SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 74.05  
 EFFECTIVE AREA(ACRES) = 25.80 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 25.8 PEAK FLOW RATE(CFS) = 95.44

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

-----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 488.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
 STREET LENGTH(FEET) = 371.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 119.45  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.61  
 HALFSTREET FLOOD WIDTH(FEET) = 25.27  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.13  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.22  
 STREET FLOW TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 8.50  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.955

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.50	0.30	0.200	56

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 10.00 0.30 0.200 56  
 APARTMENTS B 1.70 0.30 0.200 56  
 COMMERCIAL B 0.50 0.30 0.100 56  
 CONDOMINIUMS B 1.00 0.30 0.350 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.207  
 SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 48.00  
 EFFECTIVE AREA(ACRES) = 39.50 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA(ACRES) = 39.5 PEAK FLOW RATE(CFS) = 138.17

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.64 HALFSTREET FLOOD WIDTH(FEET) = 26.76  
 FLOW VELOCITY(FEET/SEC.) = 10.49 DEPTH\*VELOCITY(FT\*FT/SEC.) = 6.72  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1372.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 113.00 TO NODE 126.00 IS CODE = 31

-----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 438.00  
 FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.19  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 138.17  
 PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 8.87  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 1872.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 8.87  
 RAINFALL INTENSITY(INCH/HR) = 3.82  
 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.23  
 EFFECTIVE STREAM AREA(ACRES) = 39.50  
 TOTAL STREAM AREA(ACRES) = 39.50  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 138.17

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	209.37	11.41	3.176	0.30( 0.16)	0.55	77.2	100.00
1	189.04	15.41	2.580	0.30( 0.18)	0.60	87.5	130.00
2	138.17	8.87	3.815	0.30( 0.07)	0.23	39.5	110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	335.52	8.87	3.815	0.30 ( 0.13)	0.42	99.6	110.00
2	323.95	11.41	3.176	0.30 ( 0.13)	0.44	116.7	100.00
3	281.67	15.41	2.580	0.30 ( 0.15)	0.48	127.0	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 335.52 Tc(MIN.) = 8.87  
EFFECTIVE AREA(ACRES) = 99.56 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 127.0  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 435.00  
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 69.0 INCH PIPE IS 52.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.79  
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 335.52  
PIPE TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 9.18  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.18  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.699  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	5.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.366  
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 25.20  
EFFECTIVE AREA(ACRES) = 107.36 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 134.8 PEAK FLOW RATE(CFS) = 345.36

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.18  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.699  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	1.50	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 15.63  
EFFECTIVE AREA(ACRES) = 112.26 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 139.7 PEAK FLOW RATE(CFS) = 360.98

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	360.98	9.18	3.699	0.30 ( 0.13)	0.42	112.3	110.00
2	348.97	11.72	3.127	0.30 ( 0.13)	0.44	129.4	100.00
3	302.85	15.74	2.552	0.30 ( 0.14)	0.48	139.7	130.00

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	186.48	12.91	2.942	0.30 ( 0.09)	0.29	71.2	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	528.88	9.18	3.699	0.30 ( 0.11)	0.38	162.9	110.00
2	529.33	11.72	3.127	0.30 ( 0.12)	0.39	194.1	100.00
3	521.87	12.91	2.942	0.30 ( 0.12)	0.39	203.7	100.00
4	463.87	15.74	2.552	0.30 ( 0.12)	0.42	210.9	130.00

TOTAL AREA(ACRES) = 210.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 529.33 Tc(MIN.) = 11.725  
EFFECTIVE AREA(ACRES) = 194.13 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
TOTAL AREA(ACRES) = 210.9  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.10 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 500.20 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 46.16
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 529.33
PIPE TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 11.91
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.10 = 4750.20 FEET.

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FLOW PROCESS FROM NODE 127.10 TO NODE 127.20 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 353.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 595.30 CHANNEL SLOPE = 0.0218
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.908
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B       3.50    0.30    0.100    56
COMMERCIAL          B       0.10    0.30    0.100    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 533.99
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.16
AVERAGE FLOW DEPTH(FEET) = 1.25 TRAVEL TIME(MIN.) = 1.22
Tc(MIN.) = 13.12
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 9.33
EFFECTIVE AREA(ACRES) = 197.73 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 214.5 PEAK FLOW RATE(CFS) = 529.33
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.24 FLOW VELOCITY(FEET/SEC.) = 8.13
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.20 = 5345.50 FEET.

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FLOW PROCESS FROM NODE 127.20 TO NODE 127.30 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 340.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 476.00 CHANNEL SLOPE = 0.0273
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.767
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS

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LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B       3.10    0.30    0.100    56
COMMERCIAL          B       0.10    0.30    0.100    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 533.27
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.75
AVERAGE FLOW DEPTH(FEET) = 1.16 TRAVEL TIME(MIN.) = 0.91
Tc(MIN.) = 14.03
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 7.88
EFFECTIVE AREA(ACRES) = 200.93 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 217.7 PEAK FLOW RATE(CFS) = 529.33
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.16 FLOW VELOCITY(FEET/SEC.) = 8.70
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.30 = 5821.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.30 TO NODE 13569.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 338.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 506.00 CHANNEL SLOPE = 0.0040
CHANNEL BASE(FEET) = 150.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.477
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B       2.80    0.30    0.100    56
COMMERCIAL          B       0.60    0.30    0.100    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 533.07
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.24
AVERAGE FLOW DEPTH(FEET) = 1.08 TRAVEL TIME(MIN.) = 2.60
Tc(MIN.) = 16.63
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 7.49
EFFECTIVE AREA(ACRES) = 204.33 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 221.1 PEAK FLOW RATE(CFS) = 529.33
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.08 FLOW VELOCITY(FEET/SEC.) = 3.23
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 13569.00 = 6327.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 12
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>>>>CLEAR MEMORY BANK # 1 <<<<
=====
END OF STUDY SUMMARY:

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TOTAL AREA (ACRES) = 221.1 TC (MIN.) = 16.63  
 EFFECTIVE AREA (ACRES) = 204.33 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.375  
 PEAK FLOW RATE (CFS) = 529.33

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	528.88	14.09	2.758	0.30 ( 0.11)	0.36	173.1	110.00
2	529.33	16.63	2.477	0.30 ( 0.11)	0.37	204.3	100.00
3	521.87	17.83	2.374	0.30 ( 0.11)	0.38	213.9	100.00
4	463.87	20.89	2.138	0.30 ( 0.12)	0.40	221.1	130.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 50-YR ULTIMATE EV DECEMBER 2013 MCHANDOO/TMULI \*  
\*\*\*\*\*

FILE NAME: 2P50EVBB.DAT  
TIME/DATE OF STUDY: 16:36 12/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.305
- 2) 10.00; 3.420
- 3) 15.00; 2.629
- 4) 20.00; 2.200
- 5) 25.00; 1.906
- 6) 30.00; 1.714
- 7) 40.00; 1.452
- 8) 50.00; 1.290
- 9) 60.00; 1.181
- 10) 90.00; 0.979
- 11) 120.00; 0.849
- 12) 180.00; 0.725
- 13) 360.00; 0.534
- 14) 1200.00; 0.233

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312	0.167 0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312	0.167 0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312	0.125 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00  
ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 543.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.596  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.326  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.80	0.30	0.100	56	7.60

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 3.09  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 3.09

\*\*\*\*\*  
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 543.00 DOWNSTREAM ELEVATION(FEET) = 523.00  
STREET LENGTH(FEET) = 502.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.92  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.30  
HALFSTREET FLOOD WIDTH(FEET) = 7.30  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.10  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.25  
STREET FLOW TRAVEL TIME(MIN.) = 2.04 Tc(MIN.) = 9.64  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.557

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.20	0.30	0.200	56
COMMERCIAL	B	1.30	0.30	0.100	56

NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.261  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.63  
 EFFECTIVE AREA(ACRES) = 2.60 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 8.17

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.65  
 FLOW VELOCITY(FEET/SEC.) = 4.36 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.44  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 810.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.64  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.557  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 1.40 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 4.44  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 12.62

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 523.00 DOWNSTREAM ELEVATION(FEET) = 468.00  
 STREET LENGTH(FEET) = 987.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.13  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.39  
 HALFSTREET FLOOD WIDTH(FEET) = 11.58  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.92  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.31  
 STREET FLOW TRAVEL TIME(MIN.) = 2.78 Tc(MIN.) = 12.41  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.038  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56  
 COMMERCIAL B 2.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.426  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 11.00  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 21.75

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 12.52  
 FLOW VELOCITY(FEET/SEC.) = 6.19 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.53  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 1797.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 468.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 25.33  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.42  
 HALFSTREET FLOOD WIDTH(FEET) = 14.18  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.37  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.65  
 STREET FLOW TRAVEL TIME(MIN.) = 2.56 Tc(MIN.) = 14.97  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.633  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.10 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 COMMERCIAL B 1.90 0.30 0.100 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 7.15  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 25.92

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 14.34  
 FLOW VELOCITY(FEET/SEC.) = 6.39 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.67  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2774.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
 MAINLINE Tc(MIN.) = 14.97  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.633  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	1.30	0.30	1.000	66

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 2.73  
 EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
 TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 28.65

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 204.00 TO NODE 218.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

-----  
 UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 343.00  
 STREET LENGTH(FEET) = 1228.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 32.66  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.45  
 HALFSTREET FLOOD WIDTH(FEET) = 16.05  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.54  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.94  
 STREET FLOW TRAVEL TIME(MIN.) = 3.13 Tc(MIN.) = 18.10  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.363

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
COMMERCIAL	B	0.50	0.30	0.100	56
NATURAL FAIR COVER "OPEN BRUSH"	B	0.40	0.30	1.000	66
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	0.70	0.30	0.500	56
COMMERCIAL	B	1.50	0.30	0.100	56
NATURAL FAIR COVER "OPEN BRUSH"	B	0.80	0.30	1.000	66

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 8.02  
 EFFECTIVE AREA(ACRES) = 16.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 16.6 PEAK FLOW RATE(CFS) = 33.60

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.45 HALFSTREET FLOOD WIDTH(FEET) = 16.21  
 FLOW VELOCITY(FEET/SEC.) = 6.61 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.99  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
 MAINLINE Tc(MIN.) = 18.10  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.363  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	1.20	0.30	0.500	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
COMMERCIAL	B	0.10	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450  
 SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 3.21  
 EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 36.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

-----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 18.10  
 RAINFALL INTENSITY(INCH/HR) = 2.36  
 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.39  
EFFECTIVE STREAM AREA (ACRES) = 18.20  
TOTAL STREAM AREA (ACRES) = 18.20  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 36.81

\*\*\*\*\*  
FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----

INITIAL SUBAREA FLOW-LENGTH (FEET) = 268.00  
ELEVATION DATA: UPSTREAM (FEET) = 514.00 DOWNSTREAM (FEET) = 511.50

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.724  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.278

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	B	2.30	0.30	0.500	56	9.27
APARTMENTS	B	0.40	0.30	0.200	56	7.72

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456

SUBAREA RUNOFF (CFS) = 10.06

TOTAL AREA (ACRES) = 2.70 PEAK FLOW RATE (CFS) = 10.06

\*\*\*\*\*  
FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 511.50 DOWNSTREAM ELEVATION (FEET) = 503.00  
STREET LENGTH (FEET) = 503.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 20.81  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.47  
HALFSTREET FLOOD WIDTH (FEET) = 16.99  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.75  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.75  
STREET FLOW TRAVEL TIME (MIN.) = 2.23 Tc (MIN.) = 9.96  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.436  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.20	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.475  
SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 21.34  
EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.14  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47  
TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 29.36

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.51 HALFSTREET FLOOD WIDTH (FEET) = 19.49  
FLOW VELOCITY (FEET/SEC.) = 4.09 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.09  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 771.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc (MIN.) = 9.96

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.436

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.281

SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 3.92

EFFECTIVE AREA (ACRES) = 11.20 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45

TOTAL AREA (ACRES) = 11.2 PEAK FLOW RATE (CFS) = 33.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 503.00 DOWNSTREAM ELEVATION (FEET) = 476.00  
STREET LENGTH (FEET) = 423.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.97  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.45  
HALFSTREET FLOOD WIDTH(FEET) = 15.98  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.07  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.17  
STREET FLOW TRAVEL TIME(MIN.) = 1.00 Tc(MIN.) = 10.95  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.269

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 1.00 0.30 0.500 56  
COMMERCIAL B 0.10 0.30 0.100 56  
CONDOMINIUMS B 0.10 0.30 0.350 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.454  
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 3.38  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 34.98

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.45 HALFSTREET FLOOD WIDTH(FEET) = 15.98  
FLOW VELOCITY(FEET/SEC.) = 7.07 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.17  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.95  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.269  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.50 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
COMMERCIAL B 0.30 0.30 0.100 56  
CONDOMINIUMS B 3.30 0.30 0.350 56  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.332  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 13.98  
EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 48.96

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.95  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.269  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 3.40 0.30 0.100 56  
CONDOMINIUMS B 8.10 0.30 0.350 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.276  
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 32.98  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 81.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 476.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
STREET LENGTH(FEET) = 789.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 81.94  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.67  
HALFSTREET FLOOD WIDTH(FEET) = 28.16  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.63  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.75  
STREET FLOW TRAVEL TIME(MIN.) = 2.34 Tc(MIN.) = 13.29  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.899  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 81.94  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.67 HALFSTREET FLOOD WIDTH(FEET) = 28.16  
FLOW VELOCITY(FEET/SEC.) = 5.63 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.75  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1983.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.29  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.899  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	8.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.40	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 35.63  
 EFFECTIVE AREA(ACRES) = 43.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
 TOTAL AREA(ACRES) = 43.2 PEAK FLOW RATE(CFS) = 107.99

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 460.00 DOWNSTREAM ELEVATION(FEET) = 419.00  
STREET LENGTH(FEET) = 529.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 112.69  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.60  
 HALFSTREET FLOOD WIDTH(FEET) = 24.57  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.09  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.07  
 STREET FLOW TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 14.16  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.761  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 9.40  
 EFFECTIVE AREA(ACRES) = 47.20 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 47.2 PEAK FLOW RATE(CFS) = 112.02

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.60 HALFSTREET FLOOD WIDTH(FEET) = 24.49  
FLOW VELOCITY(FEET/SEC.) = 10.09 DEPTH\*VELOCITY(FT\*FT/SEC.) = 6.05  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 2512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.16  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.761  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.70	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 13.16  
 EFFECTIVE AREA(ACRES) = 52.80 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
 TOTAL AREA(ACRES) = 52.8 PEAK FLOW RATE(CFS) = 125.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.16  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.761  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.90	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.50	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 17.63  
 EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 142.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 419.00 DOWNSTREAM ELEVATION(FEET) = 405.00  
STREET LENGTH(FEET) = 174.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 142.80  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.64  
HALFSTREET FLOOD WIDTH(FEET) = 26.76  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.84  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.94  
STREET FLOW TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 14.43  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.719  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 142.80  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.64 HALFSTREET FLOOD WIDTH(FEET) = 26.76  
FLOW VELOCITY(FEET/SEC.) = 10.84 DEPTH\*VELOCITY(FT\*FT/SEC.) = 6.94  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 2686.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 372.00  
FLOW LENGTH(FEET) = 395.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.83  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 142.80  
PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 14.67  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 3081.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.67  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.681  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500					
SUBAREA AREA(ACRES) = 2.20		SUBAREA RUNOFF(CFS) = 5.01			
EFFECTIVE AREA(ACRES) = 62.50		AREA-AVERAGED Fm(INCH/HR) = 0.13			
AREA-AVERAGED Fp(INCH/HR) = 0.30		AREA-AVERAGED Ap = 0.44			
TOTAL AREA(ACRES) = 62.5		PEAK FLOW RATE(CFS) = 143.49			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.67  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.681  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	3.50	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.90	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500					
SUBAREA AREA(ACRES) = 10.60		SUBAREA RUNOFF(CFS) = 24.15			
EFFECTIVE AREA(ACRES) = 73.10		AREA-AVERAGED Fm(INCH/HR) = 0.13			
AREA-AVERAGED Fp(INCH/HR) = 0.30		AREA-AVERAGED Ap = 0.44			
TOTAL AREA(ACRES) = 73.1		PEAK FLOW RATE(CFS) = 167.64			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 343.00  
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.52  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 167.64  
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 15.10  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 3688.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.10



\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.621  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.443  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.57  
 EFFECTIVE AREA (ACRES) = 73.80 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 73.8 PEAK FLOW RATE (CFS) = 167.64  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
 -----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 15.10  
 RAINFALL INTENSITY (INCH/HR) = 2.62  
 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.44  
 EFFECTIVE STREAM AREA (ACRES) = 73.80  
 TOTAL STREAM AREA (ACRES) = 73.80  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 167.64

\*\* CONFLUENCE DATA \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	36.81	18.10	2.363	0.30 ( 0.12)	0.39	18.2	200.00
2	167.64	15.10	2.621	0.30 ( 0.13)	0.44	73.8	210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	201.86	15.10	2.621	0.30 ( 0.13)	0.43	89.0	210.00
2	187.09	18.10	2.363	0.30 ( 0.13)	0.43	92.0	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 201.86 Tc (MIN.) = 15.10  
 EFFECTIVE AREA (ACRES) = 88.98 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA (ACRES) = 92.0  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 343.00 DOWNSTREAM (FEET) = 326.50  
 FLOW LENGTH (FEET) = 734.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.8 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 18.53  
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 201.86  
 PIPE TRAVEL TIME (MIN.) = 0.66 Tc (MIN.) = 15.76  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 219.00 = 4736.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----

MAINLINE Tc (MIN.) = 15.76  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.564  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56  
 COMMERCIAL  
 B 0.60 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.70 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.90 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 6.26  
 EFFECTIVE AREA (ACRES) = 91.88 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 94.9 PEAK FLOW RATE (CFS) = 201.86  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----

MAINLINE Tc (MIN.) = 15.76  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.564  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL  
 B 0.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 1.32  
 EFFECTIVE AREA (ACRES) = 92.48 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA (ACRES) = 95.5 PEAK FLOW RATE (CFS) = 202.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 326.50 DOWNSTREAM(FEET) = 325.00  
FLOW LENGTH(FEET) = 161.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.38  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 202.47  
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 15.96  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 220.00 = 4897.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.96  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.547  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.90	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.60	0.30	0.400	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	18.40	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	4.30	0.30	0.400	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.50	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	6.90	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462  
SUBAREA AREA(ACRES) = 38.60 SUBAREA RUNOFF(CFS) = 83.66  
EFFECTIVE AREA(ACRES) = 131.08 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 134.1 PEAK FLOW RATE(CFS) = 284.70

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 245.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 315.00  
FLOW LENGTH(FEET) = 1019.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 66.0 INCH PIPE IS 49.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.04  
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 284.70  
PIPE TRAVEL TIME(MIN.) = 1.13 Tc(MIN.) = 17.09  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.09  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.450  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.30	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.00	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379  
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 6.10  
EFFECTIVE AREA(ACRES) = 133.98 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 137.0 PEAK FLOW RATE(CFS) = 284.70  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.09  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.450  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.264  
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 2.35  
EFFECTIVE AREA(ACRES) = 135.08 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 138.1 PEAK FLOW RATE(CFS) = 284.70  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.09  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.450  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.40	0.30	0.400	56

  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.434  
 SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 6.68  
 EFFECTIVE AREA(ACRES) = 138.28 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA(ACRES) = 141.3 PEAK FLOW RATE(CFS) = 288.39

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3<<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 220.50 TO NODE 221.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 251.00  
 ELEVATION DATA: UPSTREAM(FEET) = 551.00 DOWNSTREAM(FEET) = 547.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.785  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.501  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"1 DWELLING/ACRE"	B	3.10	0.30	0.800	56	9.79
RESIDENTIAL						
"1 DWELLING/ACRE"	B	3.10	0.30	0.800	56	9.79

  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA RUNOFF(CFS) = 18.20  
 TOTAL AREA(ACRES) = 6.20 PEAK FLOW RATE(CFS) = 18.20

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 542.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0130  
 CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.278  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56

  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.163  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 25.03  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.77  
 AVERAGE FLOW DEPTH(FEET) = 0.40 TRAVEL TIME(MIN.) = 1.11  
 Tc(MIN.) = 10.90  
 SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 13.66  
 EFFECTIVE AREA(ACRES) = 10.90 AREA-AVERAGED Fm(INCH/HR) = 0.16  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA(ACRES) = 10.9 PEAK FLOW RATE(CFS) = 30.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 6.20  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 222.00 = 637.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 542.00 DOWNSTREAM ELEVATION(FEET) = 531.00  
 STREET LENGTH(FEET) = 1146.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 50.26  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.64  
 HALFSTREET FLOOD WIDTH(FEET) = 26.91  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.77  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.43  
 STREET FLOW TRAVEL TIME(MIN.) = 5.06 Tc(MIN.) = 15.96  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.546

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					

"11+ DWELLINGS/ACRE" B 11.50 0.30 0.200 56  
 APARTMENTS B 2.90 0.30 0.200 56  
 COMMERCIAL B 0.70 0.30 0.100 56  
 PUBLIC PARK B 2.60 0.30 0.850 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.292  
 SUBAREA AREA(ACRES) = 17.70 SUBAREA RUNOFF(CFS) = 39.17  
 EFFECTIVE AREA(ACRES) = 28.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 28.6 PEAK FLOW RATE(CFS) = 62.60

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.69 HALFSTREET FLOOD WIDTH(FEET) = 30.33  
 FLOW VELOCITY(FEET/SEC.) = 3.97 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.72  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 223.00 = 1783.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 531.00 DOWNSTREAM ELEVATION(FEET) = 520.00  
 STREET LENGTH(FEET) = 702.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 74.99  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.67  
 HALFSTREET FLOOD WIDTH(FEET) = 29.00  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.99  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.36  
 STREET FLOW TRAVEL TIME(MIN.) = 2.35 Tc(MIN.) = 18.31  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.345

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.40	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
CONDOMINIUMS	B	0.70	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175  
 SUBAREA AREA(ACRES) = 12.00 SUBAREA RUNOFF(CFS) = 24.76  
 EFFECTIVE AREA(ACRES) = 40.60 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32

TOTAL AREA(ACRES) = 40.6 PEAK FLOW RATE(CFS) = 82.18

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.69 HALFSTREET FLOOD WIDTH(FEET) = 30.92  
 FLOW VELOCITY(FEET/SEC.) = 5.10 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.53  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 224.00 = 2485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 463.00  
 FLOW LENGTH(FEET) = 1760.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.23  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 82.18  
 PIPE TRAVEL TIME(MIN.) = 1.70 Tc(MIN.) = 20.01  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 225.00 = 4245.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.01  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.199  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.20	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	0.30	0.30	0.350	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	2.00	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.235  
 SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 22.03  
 EFFECTIVE AREA(ACRES) = 52.10 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 52.1 PEAK FLOW RATE(CFS) = 98.89

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.01  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.199  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.20	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	0.30	0.30	0.350	56

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      6.40     0.30      0.500     56
CONDOMINIUMS          B      0.90     0.30      0.350     56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      5.20     0.30      0.500     56
CONDOMINIUMS          B      0.80     0.30      0.350     56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.481
SUBAREA AREA(ACRES) = 13.30      SUBAREA RUNOFF(CFS) = 24.60
EFFECTIVE AREA(ACRES) = 65.40    AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 65.4        PEAK FLOW RATE(CFS) = 123.49

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FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 425.00
FLOW LENGTH(FEET) = 639.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.25
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 123.49
PIPE TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 20.45
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 226.00 = 4884.00 FEET.

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FLOW PROCESS FROM NODE 226.00 TO NODE 226.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.45
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.174
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B      2.90     0.30     0.200     56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      2.90     0.30     0.500     56
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B      6.30     0.30     0.200     56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      6.00     0.30     0.500     56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348
SUBAREA AREA(ACRES) = 18.10      SUBAREA RUNOFF(CFS) = 33.71
EFFECTIVE AREA(ACRES) = 83.50    AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 83.5        PEAK FLOW RATE(CFS) = 155.68

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FLOW PROCESS FROM NODE 226.00 TO NODE 243.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

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>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 653.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.32
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 155.68
PIPE TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 20.92
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 243.00 = 5537.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.92
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.146
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B      2.90     0.30     0.200     56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      1.60     0.30     0.500     56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307
SUBAREA AREA(ACRES) = 4.50      SUBAREA RUNOFF(CFS) = 8.32
EFFECTIVE AREA(ACRES) = 88.00    AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 88.0        PEAK FLOW RATE(CFS) = 161.93

```

```

*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1
-----

```

```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 20.92
RAINFALL INTENSITY(INCH/HR) = 2.15
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.34
EFFECTIVE STREAM AREA(ACRES) = 88.00
TOTAL STREAM AREA(ACRES) = 88.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 161.93

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```

*****
FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21
-----

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 547.50

```

$$Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20$$

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.751  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.891  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 APARTMENTS B 0.60 0.30 0.200 56 8.75  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 2.07  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 2.07

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 547.50 DOWNSTREAM(FEET) = 541.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 802.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 3.00  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.214  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 APARTMENTS B 0.20 0.30 0.200 56  
 COMMERCIAL B 5.90 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.85  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.24  
 AVERAGE FLOW DEPTH(FEET) = 1.02 TRAVEL TIME(MIN.) = 2.55  
 Tc(MIN.) = 11.30  
 SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 17.47  
 EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 19.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.26 FLOW VELOCITY(FEET/SEC.) = 6.08  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1132.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 541.00 DOWNSTREAM(FEET) = 533.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 849.00 CHANNEL SLOPE = 0.0094  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.921  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 14.90 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.59  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.64  
 AVERAGE FLOW DEPTH(FEET) = 1.59 TRAVEL TIME(MIN.) = 1.85  
 Tc(MIN.) = 13.16  
 SUBAREA AREA(ACRES) = 14.90 SUBAREA RUNOFF(CFS) = 38.77  
 EFFECTIVE AREA(ACRES) = 21.60 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 21.6 PEAK FLOW RATE(CFS) = 56.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.83 FLOW VELOCITY(FEET/SEC.) = 8.40  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1981.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.16  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.921  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 APARTMENTS B 0.20 0.30 0.200 56  
 COMMERCIAL B 1.80 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124  
 SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 5.45  
 EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 61.63

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.16  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.921  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.40 0.30 0.100 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 COMMERCIAL B 1.30 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.117  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.68  
 EFFECTIVE AREA(ACRES) = 25.50 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 25.5 PEAK FLOW RATE(CFS) = 66.30

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31

```

=====
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 537.00 DOWNSTREAM(FEET) = 510.00
FLOW LENGTH(FEET) = 513.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.33
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 66.30
PIPE TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 13.60
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2494.00 FEET.

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

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=====
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.60
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.851
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B        9.40    0.30    0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 23.10
EFFECTIVE AREA(ACRES) = 34.90 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 34.9 PEAK FLOW RATE(CFS) = 87.80

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

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=====
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.60
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.851
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        0.70    0.30    0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B        2.50    0.30    0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 7.90
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 95.70

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```

*****
FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31

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```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 478.00
FLOW LENGTH(FEET) = 474.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.43
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 95.70
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 13.93
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 2968.00 FEET.

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*****
FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81

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=====
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.93
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.798
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        1.70    0.30    0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B        1.60    0.30    0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 8.04
EFFECTIVE AREA(ACRES) = 41.40 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21
TOTAL AREA(ACRES) = 41.4 PEAK FLOW RATE(CFS) = 101.92

```

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*****
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31

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=====
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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```

ELEVATION DATA: UPSTREAM(FEET) = 478.00 DOWNSTREAM(FEET) = 471.00
FLOW LENGTH(FEET) = 473.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.61
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 101.92
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 14.51
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 3441.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

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```

=====
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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MAINLINE Tc(MIN.) = 14.51
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.706
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        1.40    0.30    0.200    56

```

RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 7.10 0.30 0.400 56  
 APARTMENTS B 2.70 0.30 0.200 56  
 COMMERCIAL B 1.10 0.30 0.100 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.307  
 SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 28.94  
 EFFECTIVE AREA(ACRES) = 53.70 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA(ACRES) = 53.7 PEAK FLOW RATE(CFS) = 127.44

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.51  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.706  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.90 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 5.40 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
 COMMERCIAL B 0.60 0.30 0.100 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.378  
 SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 23.10  
 EFFECTIVE AREA(ACRES) = 63.60 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 63.6 PEAK FLOW RATE(CFS) = 150.54

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 471.00 DOWNSTREAM(FEET) = 468.00  
 FLOW LENGTH(FEET) = 283.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.18  
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 150.54  
 PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 14.87  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 237.00 = 3724.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.87  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.649  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 6.10 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.60 0.30 0.400 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.218  
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 15.58  
 EFFECTIVE AREA(ACRES) = 70.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 70.3 PEAK FLOW RATE(CFS) = 162.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 468.00 DOWNSTREAM(FEET) = 461.00  
 FLOW LENGTH(FEET) = 698.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.24  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 162.88  
 PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 15.75  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 238.00 = 4422.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.75  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.565  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 8.40 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.220  
 SUBAREA AREA(ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 20.24  
 EFFECTIVE AREA(ACRES) = 79.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 79.3 PEAK FLOW RATE(CFS) = 177.76

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.75  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.565  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS



```

LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      2.10      0.30      0.200      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 2.10      SUBAREA RUNOFF (CFS) = 4.73
EFFECTIVE AREA (ACRES) = 81.40      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.25
TOTAL AREA (ACRES) = 81.4      PEAK FLOW RATE (CFS) = 182.49

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*****
FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----

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ELEVATION DATA: UPSTREAM(FEET) = 461.00 DOWNSTREAM(FEET) = 440.00
FLOW LENGTH( FEET) = 582.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 22.09
ESTIMATED PIPE DIAMETER (INCH) = 45.00      NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 182.49
PIPE TRAVEL TIME (MIN.) = 0.44      Tc (MIN.) = 16.19
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 5004.00 FEET.

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*****
FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.19
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.527
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      5.00      0.30      0.200      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 5.00      SUBAREA RUNOFF (CFS) = 11.10
EFFECTIVE AREA (ACRES) = 86.40      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 86.4      PEAK FLOW RATE (CFS) = 190.83

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FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM( FEET) = 440.00 DOWNSTREAM( FEET) = 418.00
FLOW LENGTH( FEET) = 650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 21.64
ESTIMATED PIPE DIAMETER (INCH) = 45.00      NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 190.83
PIPE TRAVEL TIME (MIN.) = 0.50      Tc (MIN.) = 16.69
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 5654.00 FEET.

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*****
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.69
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.484
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      5.30      0.30      0.200      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 5.30      SUBAREA RUNOFF (CFS) = 11.56
EFFECTIVE AREA (ACRES) = 91.70      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 91.7      PEAK FLOW RATE (CFS) = 199.06

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FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.69
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.484
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      1.20      0.30      0.200      56
COMMERCIAL              B      0.20      0.30      0.100      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186
SUBAREA AREA (ACRES) = 1.40      SUBAREA RUNOFF (CFS) = 3.06
EFFECTIVE AREA (ACRES) = 93.10      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 93.1      PEAK FLOW RATE (CFS) = 202.12

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FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.69
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.484
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      1.20      0.30      0.200      56
SCHOOL                  B      0.70      0.30      0.600      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA (ACRES) = 1.90      SUBAREA RUNOFF (CFS) = 4.07
EFFECTIVE AREA (ACRES) = 95.00      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24

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TOTAL AREA (ACRES) = 95.0 PEAK FLOW RATE (CFS) = 206.18

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FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 418.00 DOWNSTREAM(FEET) = 404.00
FLOW LENGTH(FEET) = 1279.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 42.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.43
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 206.18
PIPE TRAVEL TIME(MIN.) = 1.48 Tc(MIN.) = 18.17
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 241.00 = 6933.00 FEET.

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FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.17
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.357
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.10 0.30 0.200 56
COMMERCIAL B 1.20 0.30 0.100 56
PUBLIC PARK B 6.30 0.30 0.850 56
SCHOOL B 4.60 0.30 0.600 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.60 0.30 0.200 56
COMMERCIAL B 4.00 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 18.80 SUBAREA RUNOFF(CFS) = 37.41
EFFECTIVE AREA(ACRES) = 113.80 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 113.8 PEAK FLOW RATE(CFS) = 232.75

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FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.17
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.357
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK B 3.90 0.30 0.850 56
SCHOOL B 10.80 0.30 0.600 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.666
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 28.54
EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 261.29

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 403.00
FLOW LENGTH(FEET) = 66.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 46.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.06
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 261.29
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 18.23
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 6999.00 FEET.

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FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.23
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.352
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.40 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 16.40 0.30 0.200 56
COMMERCIAL B 1.30 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.193
SUBAREA AREA(ACRES) = 19.10 SUBAREA RUNOFF(CFS) = 39.43
EFFECTIVE AREA(ACRES) = 147.60 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 147.6 PEAK FLOW RATE(CFS) = 300.08

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 1270.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 56.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.26
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 300.08
PIPE TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 19.83
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

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FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN.) = 19.83  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.215  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.00	0.30	0.200	56
PUBLIC PARK	B	2.00	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.80	0.30	0.200	56
COMMERCIAL	B	1.50	0.30	0.100	56
CONDOMINIUMS	B	0.10	0.30	0.350	56
PUBLIC PARK	B	1.10	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.421  
 SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 15.98  
 EFFECTIVE AREA(ACRES) = 156.10 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32  
 TOTAL AREA(ACRES) = 156.1 PEAK FLOW RATE(CFS) = 300.08  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1

-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

-----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 19.83  
 RAINFALL INTENSITY(INCH/HR) = 2.21  
 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.32  
 EFFECTIVE STREAM AREA(ACRES) = 156.10  
 TOTAL STREAM AREA(ACRES) = 156.10  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 300.08

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	161.93	20.92	2.146	0.30( 0.10)	0.34	88.0	220.50
2	300.08	19.83	2.215	0.30( 0.09)	0.32	156.1	230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	458.74	19.83	2.215	0.30( 0.10)	0.32	239.5	230.00
2	452.31	20.92	2.146	0.30( 0.10)	0.32	244.1	220.50

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 458.74 Tc(MIN.) = 19.83  
 EFFECTIVE AREA(ACRES) = 239.52 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32  
 TOTAL AREA(ACRES) = 244.1  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 244.00 IS CODE = 31

-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 394.00 DOWNSTREAM(FEET) = 340.00  
 FLOW LENGTH(FEET) = 849.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 33.71  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 458.74  
 PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 20.25  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 244.00 = 9118.00 FEET.

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FLOW PROCESS FROM NODE 244.00 TO NODE 244.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN.) = 20.25  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.185  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.70	0.30	0.500	56
PUBLIC PARK	B	0.30	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
PUBLIC PARK	B	0.10	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.537  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.47  
 EFFECTIVE AREA(ACRES) = 242.52 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33  
 TOTAL AREA(ACRES) = 247.1 PEAK FLOW RATE(CFS) = 458.74  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 244.00 TO NODE 245.00 IS CODE = 31

-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 315.00  
 FLOW LENGTH(FEET) = 777.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.42  
 ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 458.74  
 PIPE TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 20.74

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

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FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.74

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.157

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56

PUBLIC PARK B 0.20 0.30 0.850 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56

PUBLIC PARK B 0.10 0.30 0.850 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631

SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 1.42

EFFECTIVE AREA(ACRES) = 243.32 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33

TOTAL AREA(ACRES) = 247.9 PEAK FLOW RATE(CFS) = 458.74

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	458.74	20.74	2.157	0.30( 0.10)	0.33	243.3	230.00
2	452.31	21.83	2.092	0.30( 0.10)	0.33	247.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	288.39	17.09	2.450	0.30( 0.13)	0.44	138.3	210.00
2	262.02	20.13	2.193	0.30( 0.13)	0.44	141.3	200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	720.23	17.09	2.450	0.30( 0.11)	0.37	338.8	210.00
2	714.99	20.13	2.193	0.30( 0.11)	0.37	377.4	200.00
3	716.17	20.74	2.157	0.30( 0.11)	0.37	384.6	230.00
4	701.60	21.83	2.092	0.30( 0.11)	0.37	389.2	220.50

TOTAL AREA(ACRES) = 389.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 720.23 Tc(MIN.) = 17.088

EFFECTIVE AREA(ACRES) = 338.77 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 389.2

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 3 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 246.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 306.00

FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 84.0 INCH PIPE IS 67.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.65

ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 720.23

PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 17.57

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 246.00 = 10514.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.57

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.409

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.90 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.50 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56

CONDOMINIUMS B 9.10 0.30 0.350 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.80 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.410

SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 33.53

EFFECTIVE AREA(ACRES) = 355.07 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38

TOTAL AREA(ACRES) = 405.5 PEAK FLOW RATE(CFS) = 733.81

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.57  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.409  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.60	0.30	0.400	56
CONDOMINIUMS	B	7.40	0.30	0.350	56
PUBLIC PARK	B	0.30	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.375  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 19.22  
 EFFECTIVE AREA(ACRES) = 364.37 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 414.8 PEAK FLOW RATE(CFS) = 753.03

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 246.00 TO NODE 247.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 306.00 DOWNSTREAM(FEET) = 300.00  
 FLOW LENGTH(FEET) = 185.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 75.0 INCH PIPE IS 57.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 29.88  
 ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 753.03  
 PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 17.67  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 247.00 = 10699.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 17.67  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.400  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.30	0.30	0.400	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.413  
 SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 4.10  
 EFFECTIVE AREA(ACRES) = 366.37 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 416.8 PEAK FLOW RATE(CFS) = 754.23

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 17.67  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.400  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.40	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.80	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.365  
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 5.36  
 EFFECTIVE AREA(ACRES) = 368.97 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 419.4 PEAK FLOW RATE(CFS) = 759.59

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 271.00  
 FLOW LENGTH(FEET) = 859.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 75.0 INCH PIPE IS 56.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 30.45  
 ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 759.59  
 PIPE TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 18.14  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 18.14  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.60	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.60	0.30	0.400	56
COMMERCIAL	B	1.00	0.30	0.100	56

NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356  
 SUBAREA AREA(ACRES) = 4.80 SUBAREA RUNOFF(CFS) = 9.73  
 EFFECTIVE AREA(ACRES) = 373.77 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 424.2 PEAK FLOW RATE(CFS) = 759.59  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
 MAINLINE Tc(MIN.) = 18.14  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.50 0.30 0.400 56  
 COMMERCIAL B 0.30 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367  
 SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.82  
 EFFECTIVE AREA(ACRES) = 374.67 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 425.1 PEAK FLOW RATE(CFS) = 759.59  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
 MAINLINE Tc(MIN.) = 18.14  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 2.20 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.80 0.30 0.400 56  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 3.20 0.30 0.500 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.466  
 SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 16.38  
 EFFECTIVE AREA(ACRES) = 382.87 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 433.3 PEAK FLOW RATE(CFS) = 774.13

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
 MAINLINE Tc(MIN.) = 18.14  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 5.70 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 11.49  
 EFFECTIVE AREA(ACRES) = 388.57 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 439.0 PEAK FLOW RATE(CFS) = 785.62

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
 MAINLINE Tc(MIN.) = 18.14  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 6.40 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.40 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.60 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 8.40 SUBAREA RUNOFF(CFS) = 15.57  
 EFFECTIVE AREA(ACRES) = 396.97 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA(ACRES) = 447.4 PEAK FLOW RATE(CFS) = 801.19

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00

ELEVATION DATA: UPSTREAM(FEET) = 413.04 DOWNSTREAM(FEET) = 405.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.928

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.578

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
CONDOMINIUMS RESIDENTIAL	B	0.20	0.30	0.350	56	7.70
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56	6.93
CONDOMINIUMS	B	0.10	0.30	0.350	56	7.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.312

SUBAREA RUNOFF(CFS) = 1.61

TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.61

\*\*\*\*\*

FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 405.00 DOWNSTREAM ELEVATION(FEET) = 385.00

STREET LENGTH(FEET) = 587.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.94

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.31

HALFSTREET FLOOD WIDTH(FEET) = 8.16

AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.77

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.16

STREET FLOW TRAVEL TIME(MIN.) = 2.60 Tc(MIN.) = 9.52

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.599

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.20	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.224

SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 8.58

EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.07

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24

TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 9.85

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.51

FLOW VELOCITY(FEET/SEC.) = 4.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.46

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 917.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 385.00 DOWNSTREAM(FEET) = 378.50

FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.9 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.26

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 9.85

PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 9.76

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1079.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.76

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.509

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56
COMMERCIAL	B	1.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 7.51

EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.05

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18

TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 17.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 378.50 DOWNSTREAM(FEET) = 348.50

FLOW LENGTH(FEET) = 637.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 13.57

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 17.11

PIPE TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 10.55

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 1716.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.55

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.334

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.60	0.30	0.500	56
COMMERCIAL	B	1.70	0.30	0.100	56
CONDOMINIUMS	B	1.00	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
COMMERCIAL	B	0.70	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.240					
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 13.21					
EFFECTIVE AREA(ACRES) = 10.00 AREA-AVERAGED Fm(INCH/HR) = 0.06					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21					
TOTAL AREA(ACRES) = 10.0 PEAK FLOW RATE(CFS) = 29.45					

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 348.50 DOWNSTREAM(FEET) = 306.00  
 FLOW LENGTH(FEET) = 944.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.05  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 29.45  
 PIPE TRAVEL TIME(MIN.) = 1.05 Tc(MIN.) = 11.59  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.59

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.168

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.20	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.50	0.30	0.500	56
RESIDENTIAL					

"8-10 DWELLINGS/ACRE" B 1.90 0.30 0.400 56  
 COMMERCIAL B 2.00 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
 SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 20.13  
 EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.27  
 TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 48.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.59

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.168

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	4.40	0.30	0.200	56
COMMERCIAL	B	0.10	0.30	0.100	56
APARTMENTS	B	6.70	0.30	0.200	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.199					
SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 31.33					
EFFECTIVE AREA(ACRES) = 28.50 AREA-AVERAGED Fm(INCH/HR) = 0.07					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24					
TOTAL AREA(ACRES) = 28.5 PEAK FLOW RATE(CFS) = 79.42					

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.59

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.168

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.10	0.30	1.000	66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 8.00					
EFFECTIVE AREA(ACRES) = 31.60 AREA-AVERAGED Fm(INCH/HR) = 0.09					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31					
TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 87.42					

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 11.59  
 RAINFALL INTENSITY(INCH/HR) = 3.17  
 AREA-AVERAGED Fm(INCH/HR) = 0.09



AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.31  
EFFECTIVE STREAM AREA(ACRES) = 31.60  
TOTAL STREAM AREA(ACRES) = 31.60  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 87.42

\*\*\*\*\*  
FLOW PROCESS FROM NODE 400.00 TO NODE 420.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----

INITIAL SUBAREA FLOW-LENGTH(FEET) = 300.40  
ELEVATION DATA: UPSTREAM(FEET) = 312.80 DOWNSTREAM(FEET) = 310.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.115  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.131  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL B 0.50 0.30 0.100 56 8.11  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 1.85  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<  
-----

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 307.00  
STREET LENGTH(FEET) = 266.50 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 67.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 62.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.78  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 10.18  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.58  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.87  
STREET FLOW TRAVEL TIME(MIN.) = 1.72 Tc(MIN.) = 9.83  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.483

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.60 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.86  
EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 3.42

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 11.21  
FLOW VELOCITY(FEET/SEC.) = 2.71 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.96  
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.00 = 566.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.00 TO NODE 421.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 307.00 DOWNSTREAM(FEET) = 305.50  
FLOW LENGTH(FEET) = 105.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.82  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 3.42  
PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 10.13  
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.10 = 671.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
-----

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 10.13  
RAINFALL INTENSITY(INCH/HR) = 3.40  
AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 1.10  
TOTAL STREAM AREA(ACRES) = 1.10  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.42

\*\* CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 87.42 11.59 3.168 0.30( 0.09) 0.31 31.6 300.00  
2 3.42 10.13 3.399 0.30( 0.03) 0.10 1.1 400.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 85.59 10.13 3.399 0.30( 0.09) 0.31 28.7 400.00

2 90.61 11.59 3.168 0.30( 0.09) 0.31 32.7 300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 90.61 Tc(MIN.) = 11.59
EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.7
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 426.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 305.50 DOWNSTREAM(FEET) = 301.00
FLOW LENGTH(FEET) = 261.40 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.98
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.61
PIPE TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 11.90
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.10 = 2921.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.90
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.119
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.54
EFFECTIVE AREA(ACRES) = 32.90 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.9 PEAK FLOW RATE(CFS) = 90.61
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.20 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 289.00
FLOW LENGTH(FEET) = 448.56 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.51
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.61
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 12.36
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.20 = 3369.96 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.20 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.36
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.047
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.32
EFFECTIVE AREA(ACRES) = 33.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 33.4 PEAK FLOW RATE(CFS) = 90.61
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.30 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 289.00 DOWNSTREAM(FEET) = 282.00
FLOW LENGTH(FEET) = 260.45 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.54
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.61
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 12.62
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.30 = 3630.41 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.30 TO NODE 426.30 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.62
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.006
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.80 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 2.86
EFFECTIVE AREA(ACRES) = 34.50 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 34.5 PEAK FLOW RATE(CFS) = 90.61

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 426.30 TO NODE 248.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 271.00
FLOW LENGTH(FEET) = 411.44 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.50
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.61
PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 13.03
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.
*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.03
RAINFALL INTENSITY(INCH/HR) = 2.94
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 34.50
TOTAL STREAM AREA(ACRES) = 34.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 90.61
*****
FLOW PROCESS FROM NODE 425.00 TO NODE 246.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----
INITIAL SUBAREA FLOW-LENGTH(FEET) = 233.60
ELEVATION DATA: UPSTREAM(FEET) = 306.50 DOWNSTREAM(FEET) = 301.80

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.882
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.972
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.20 0.30 0.100 56 5.88
COMMERCIAL B 0.20 0.30 0.100 56 5.88
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 1.78
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.78
*****
FLOW PROCESS FROM NODE 426.00 TO NODE 247.00 IS CODE = 61
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 301.80 DOWNSTREAM ELEVATION(FEET) = 294.00
STREET LENGTH(FEET) = 478.70 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.00
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.34
HALFSTREET FLOOD WIDTH(FEET) = 10.23
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.77
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.94
STREET FLOW TRAVEL TIME(MIN.) = 2.88 Tc(MIN.) = 8.76
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.886
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.20 0.30 0.100 56
COMMERCIAL B 0.50 0.30 0.100 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 2.43
EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 3.82

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.42
FLOW VELOCITY(FEET/SEC.) = 2.93 DEPTH*VELOCITY(FT*FT/SEC.) = 1.05
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 427.00 = 712.30 FEET.
*****
FLOW PROCESS FROM NODE 427.00 TO NODE 248.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 294.00 DOWNSTREAM ELEVATION(FEET) = 286.00
STREET LENGTH(FEET) = 300.80 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
```

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.58

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.35

HALFSTREET FLOOD WIDTH(FEET) = 11.07

AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.70

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.30

STREET FLOW TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 10.12

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.401

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.52

EFFECTIVE AREA(ACRES) = 1.60 AREA-AVERAGED Fm(INCH/HR) = 0.03

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 4.85

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.39

FLOW VELOCITY(FEET/SEC.) = 3.74 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.34

LONGEST FLOWPATH FROM NODE 425.00 TO NODE 428.00 = 1013.10 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 428.00 TO NODE 429.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 286.00 DOWNSTREAM ELEVATION(FEET) = 276.00

STREET LENGTH(FEET) = 242.40 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.44

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.35

HALFSTREET FLOOD WIDTH(FEET) = 10.85

AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.54

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.58

STREET FLOW TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 11.01

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.16

EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.03

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 5.81

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 11.18

FLOW VELOCITY(FEET/SEC.) = 4.62 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.64

LONGEST FLOWPATH FROM NODE 425.00 TO NODE 429.00 = 1255.50 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 429.00 TO NODE 429.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.01

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL	B	0.50	0.30	0.400	56
RESIDENTIAL	B	1.50	0.30	0.400	56

"8-10 DWELLINGS/ACRE"

RESIDENTIAL

"8-10 DWELLINGS/ACRE"

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 5.65

EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.08

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25

TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 11.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 429.00 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 273.00

FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.45

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 11.47

PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 11.17

LONGEST FLOWPATH FROM NODE 425.00 TO NODE 248.00 = 1355.50 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 11.17

RAINFALL INTENSITY(INCH/HR) = 3.23

AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.25  
 EFFECTIVE STREAM AREA(ACRES) = 4.00  
 TOTAL STREAM AREA(ACRES) = 4.00  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.47

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	86.31	11.59	3.169	0.30( 0.09)	0.31	30.5	400.00
1	90.61	13.03	2.940	0.30( 0.09)	0.31	34.5	300.00
2	11.47	11.17	3.235	0.30( 0.08)	0.25	4.0	425.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	96.45	11.17	3.235	0.30( 0.09)	0.30	33.4	425.00
2	97.54	11.59	3.169	0.30( 0.09)	0.30	34.5	400.00
3	101.01	13.03	2.940	0.30( 0.09)	0.31	38.5	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 101.01 Tc(MIN.) = 13.03  
 EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 38.5  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 11  
 -----  
 >>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<  
 =====

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	96.45	11.17	3.235	0.30( 0.09)	0.30	33.4	425.00
2	97.54	11.59	3.169	0.30( 0.09)	0.30	34.5	400.00
3	101.01	13.03	2.940	0.30( 0.09)	0.31	38.5	300.00

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	801.19	18.14	2.360	0.30( 0.12)	0.39	397.0	210.00
2	790.08	21.18	2.131	0.30( 0.12)	0.39	435.6	200.00
3	788.87	21.79	2.095	0.30( 0.12)	0.38	442.8	230.00
4	771.04	22.89	2.030	0.30( 0.12)	0.38	447.4	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	782.38	11.17	3.235	0.30( 0.11)	0.38	277.9	425.00

2	794.10	11.59	3.169	0.30( 0.11)	0.38	288.2	400.00
3	825.71	13.03	2.940	0.30( 0.11)	0.38	323.8	300.00
4	881.62	18.14	2.360	0.30( 0.11)	0.38	435.5	210.00
5	862.39	21.18	2.131	0.30( 0.11)	0.38	474.1	200.00
6	859.90	21.79	2.095	0.30( 0.11)	0.38	481.3	230.00
7	839.78	22.89	2.030	0.30( 0.11)	0.38	485.9	220.50
TOTAL AREA(ACRES) =		485.9					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 881.62 Tc(MIN.) = 18.138  
 EFFECTIVE AREA(ACRES) = 435.47 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 485.9  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 12  
 -----

>>>>CLEAR MEMORY BANK # 1<<<<  
 =====

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 249.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 261.00  
 FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 81.0 INCH PIPE IS 62.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 29.76  
 ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 881.62  
 PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 18.33  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<  
 =====

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 429.00 TO NODE 430.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 262.70

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.459  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.755  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 COMMERCIAL B 0.20 0.30 0.100 56 6.46

COMMERCIAL B 0.40 0.30 0.100 56 6.46  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF (CFS) = 2.55  
TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 2.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 61

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
>>>> (STANDARD CURB SECTION USED) <<<<<

UPSTREAM ELEVATION (FEET) = 262.70 DOWNSTREAM ELEVATION (FEET) = 258.98  
STREET LENGTH (FEET) = 345.60 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 51.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.59

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.37  
HALFSTREET FLOOD WIDTH (FEET) = 12.22  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.45  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.91  
STREET FLOW TRAVEL TIME (MIN.) = 2.35 Tc (MIN.) = 8.81  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.869

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 2.07  
EFFECTIVE AREA (ACRES) = 1.20 AREA-AVERAGED Fm (INCH/HR) = 0.03  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA (ACRES) = 1.2 PEAK FLOW RATE (CFS) = 4.15

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.39 HALFSTREET FLOOD WIDTH (FEET) = 13.02  
FLOW VELOCITY (FEET/SEC.) = 2.53 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.98  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.00 = 675.60 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.00 TO NODE 431.10 IS CODE = 31

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<  
>>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<

ELEVATION DATA: UPSTREAM (FEET) = 258.98 DOWNSTREAM (FEET) = 258.00  
FLOW LENGTH (FEET) = 91.03 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.9 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.53  
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 4.15  
PIPE TRAVEL TIME (MIN.) = 0.27 Tc (MIN.) = 9.08  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.10 = 766.63 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1

>>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE <<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 9.08  
RAINFALL INTENSITY (INCH/HR) = 3.77  
AREA-AVERAGED Fm (INCH/HR) = 0.03  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA (ACRES) = 1.20  
TOTAL STREAM AREA (ACRES) = 1.20  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 4.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 410.00 TO NODE 440.00 IS CODE = 21

>>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS <<<<<  
>> USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA <<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 299.70  
ELEVATION DATA: UPSTREAM (FEET) = 312.69 DOWNSTREAM (FEET) = 310.80

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.196  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.100  
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.40	0.30	0.100	56	8.20

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF (CFS) = 1.47  
TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 1.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 61

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
>>>> (STANDARD CURB SECTION USED) <<<<<

UPSTREAM ELEVATION (FEET) = 310.80 DOWNSTREAM ELEVATION (FEET) = 306.50  
STREET LENGTH (FEET) = 299.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 55.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.07  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 8.81  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.42  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.76  
STREET FLOW TRAVEL TIME(MIN.) = 2.06 Tc(MIN.) = 10.26  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.379

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.10 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.21  
EFFECTIVE AREA(ACRES) = 0.80 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 2.41

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 9.46  
FLOW VELOCITY(FEET/SEC.) = 2.52 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.82  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 441.00 = 598.70 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 306.50 DOWNSTREAM ELEVATION(FEET) = 299.00  
STREET LENGTH(FEET) = 341.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.24  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.33  
HALFSTREET FLOOD WIDTH(FEET) = 9.83  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.18  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.06  
STREET FLOW TRAVEL TIME(MIN.) = 1.79 Tc(MIN.) = 12.04  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.097

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.20 0.30 0.100 56  
COMMERCIAL B 0.40 0.30 0.100 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.66  
EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 3.86

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.73  
FLOW VELOCITY(FEET/SEC.) = 3.29 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.14  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 442.00 = 940.30 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 299.00 DOWNSTREAM ELEVATION(FEET) = 288.50  
STREET LENGTH(FEET) = 390.10 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.62  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 11.13  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.70  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.31  
STREET FLOW TRAVEL TIME(MIN.) = 1.76 Tc(MIN.) = 13.80  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.819

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.30 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.51  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 5.02

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.52

FLOW VELOCITY(FEET/SEC.) = 3.79 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.37  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 443.00 = 1330.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 443.00 TO NODE 444.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 288.50 DOWNSTREAM ELEVATION(FEET) = 281.00  
STREET LENGTH(FEET) = 272.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.49  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 12.02  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.85  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.42  
STREET FLOW TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 14.98  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.632

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.40 0.30 0.100 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.94  
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 5.62

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 12.12  
FLOW VELOCITY(FEET/SEC.) = 3.89 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.44  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 444.00 = 1603.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 444.00 TO NODE 445.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 281.00 DOWNSTREAM ELEVATION(FEET) = 268.10  
STREET LENGTH(FEET) = 462.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.39  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 12.82  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.01  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.53  
STREET FLOW TRAVEL TIME(MIN.) = 1.92 Tc(MIN.) = 16.90  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.466

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.70 0.30 0.100 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.53  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 6.80

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 13.12  
FLOW VELOCITY(FEET/SEC.) = 4.10 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.59  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 445.00 = 2065.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 445.00 TO NODE 446.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 268.10 DOWNSTREAM ELEVATION(FEET) = 257.00  
STREET LENGTH(FEET) = 532.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.80  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.42  
HALFSTREET FLOOD WIDTH(FEET) = 14.83  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.78  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.57  
STREET FLOW TRAVEL TIME(MIN.) = 2.35 Tc(MIN.) = 19.25  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.264



SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.60	0.30	0.100	56
COMMERCIAL	B	0.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 2.01  
 EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 8.24

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 15.15  
 FLOW VELOCITY(FEET/SEC.) = 3.84 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.62  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 446.00 = 2598.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 446.00 TO NODE 431.10 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 257.00 DOWNSTREAM(FEET) = 256.50  
 FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.88  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 8.24  
 PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 19.60  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 19.60  
 RAINFALL INTENSITY(INCH/HR) = 2.23  
 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.10  
 EFFECTIVE STREAM AREA(ACRES) = 4.10  
 TOTAL STREAM AREA(ACRES) = 4.10  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.24

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	4.15	9.08	3.765	0.30( 0.03)	0.10	1.2	429.00
2	8.24	19.60	2.235	0.30( 0.03)	0.10	4.1	410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	10.62	9.08	3.765	0.30( 0.03)	0.10	3.1	429.00
2	10.69	19.60	2.235	0.30( 0.03)	0.10	5.3	410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 10.69 Tc(MIN.) = 19.60  
 EFFECTIVE AREA(ACRES) = 5.30 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 5.3  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 249.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 258.00 DOWNSTREAM(FEET) = 257.00  
 FLOW LENGTH(FEET) = 230.42 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.95  
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 10.69  
 PIPE TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 20.37  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	10.62	9.86	3.472	0.30( 0.03)	0.10	3.1	429.00
2	10.69	20.37	2.178	0.30( 0.03)	0.10	5.3	410.00

LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	782.38	11.37	3.204	0.30( 0.11)	0.38	277.9	425.00
2	794.10	11.79	3.137	0.30( 0.11)	0.38	288.2	400.00
3	825.71	13.23	2.909	0.30( 0.11)	0.38	323.8	300.00
4	881.62	18.33	2.343	0.30( 0.11)	0.38	435.5	210.00
5	862.39	21.37	2.119	0.30( 0.11)	0.38	474.1	200.00
6	859.90	21.98	2.083	0.30( 0.11)	0.38	481.3	230.00
7	839.78	23.09	2.018	0.30( 0.11)	0.38	485.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	748.33	9.86	3.472	0.30( 0.11)	0.38	244.2	429.00

2	793.01	11.37	3.204	0.30	( 0.11)	0.38	281.3	425.00		
3	804.73	11.79	3.137	0.30	( 0.11)	0.38	291.7	400.00		
4	836.36	13.23	2.909	0.30	( 0.11)	0.38	327.6	300.00		
5	892.30	18.33	2.343	0.30	( 0.11)	0.38	440.3	210.00		
6	879.40	20.37	2.178	0.30	( 0.11)	0.38	466.7	410.00		
7	872.79	21.37	2.119	0.30	( 0.11)	0.38	479.4	200.00		
8	870.12	21.98	2.083	0.30	( 0.11)	0.38	486.6	230.00		
9	849.67	23.09	2.018	0.30	( 0.11)	0.37	491.2	220.50		
TOTAL AREA (ACRES) =			491.2							

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 892.30 Tc (MIN.) = 18.332  
EFFECTIVE AREA (ACRES) = 440.34 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA (ACRES) = 491.2  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<<

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 491.2 TC (MIN.) = 18.33  
EFFECTIVE AREA (ACRES) = 440.34 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.380  
PEAK FLOW RATE (CFS) = 892.30

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	748.33	9.86	3.472	0.30 ( 0.11)	0.38	244.2	429.00
2	793.01	11.37	3.204	0.30 ( 0.11)	0.38	281.3	425.00
3	804.73	11.79	3.137	0.30 ( 0.11)	0.38	291.7	400.00
4	836.36	13.23	2.909	0.30 ( 0.11)	0.38	327.6	300.00
5	892.30	18.33	2.343	0.30 ( 0.11)	0.38	440.3	210.00
6	879.40	20.37	2.178	0.30 ( 0.11)	0.38	466.7	410.00
7	872.79	21.37	2.119	0.30 ( 0.11)	0.38	479.4	200.00
8	870.12	21.98	2.083	0.30 ( 0.11)	0.38	486.6	230.00
9	849.67	23.09	2.018	0.30 ( 0.11)	0.37	491.2	220.50

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506101C.DAT  
TIME/DATE OF STUDY: 12:41 04/15/2013  
=====

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:  
=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.310
- 2) 6.00; 3.880
- 3) 7.00; 3.560
- 4) 8.00; 3.300
- 5) 9.00; 3.080
- 6) 10.00; 2.900
- 7) 11.00; 2.750
- 8) 12.00; 2.610
- 9) 13.00; 2.500
- 10) 14.00; 2.390
- 11) 15.00; 2.300
- 12) 20.00; 1.950
- 13) 25.00; 1.720
- 14) 30.00; 1.550
- 15) 40.00; 1.310
- 16) 50.00; 1.160
- 17) 60.00; 1.040
- 18) 90.00; 0.830
- 19) 120.00; 0.700
- 20) 180.00; 0.560

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE (FT)	FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10100.00 TO NODE 10101.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 820.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.606  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.971  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.10	0.30	1.000	98	9.61
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.30	1.000	98	9.61

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.96  
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 0.96

\*\*\*\*\*

FLOW PROCESS FROM NODE 10101.00 TO NODE 10102.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 790.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 152.00 CHANNEL SLOPE = 0.1974  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.96  
FLOW VELOCITY(FEET/SEC.) = 4.16 FLOW DEPTH(FEET) = 0.28  
TRAVEL TIME(MIN.) = 0.61  $T_c$ (MIN.) = 10.21  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10102.00 = 479.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10102.00 TO NODE 10102.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 10.21  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.868  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.50      0.30      1.000      -
USER-DEFINED  -        0.30      0.30      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.80  SUBAREA RUNOFF (CFS) = 1.85
EFFECTIVE AREA (ACRES) = 1.20  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.2  PEAK FLOW RATE (CFS) = 2.77

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FLOW PROCESS FROM NODE 10102.00 TO NODE 10103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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ELEVATION DATA: UPSTREAM(FEET) = 790.00  DOWNSTREAM(FEET) = 762.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00  CHANNEL SLOPE = 0.1400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.77
FLOW VELOCITY(FEET/SEC.) = 4.82  FLOW DEPTH(FEET) = 0.44
TRAVEL TIME(MIN.) = 0.69  Tc(MIN.) = 10.91
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10103.00 = 679.00 FEET.

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 10.91
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.764
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.40  0.30  1.000  -
USER-DEFINED      -        0.80  0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.20  SUBAREA RUNOFF (CFS) = 2.66
EFFECTIVE AREA (ACRES) = 2.40  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 2.4  PEAK FLOW RATE (CFS) = 5.32

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10104.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 762.00  DOWNSTREAM(FEET) = 754.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 124.00  CHANNEL SLOPE = 0.0645
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.32
FLOW VELOCITY(FEET/SEC.) = 4.28  FLOW DEPTH(FEET) = 0.64
TRAVEL TIME(MIN.) = 0.48  Tc(MIN.) = 11.39
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10104.00 = 803.00 FEET.

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10104.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.39
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.696
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.70  0.30  1.000  -
USER-DEFINED      -        1.10  0.30  1.000  -
USER-DEFINED      -        0.10  0.30  1.000  -
USER-DEFINED      -        0.40  0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 4.96
EFFECTIVE AREA (ACRES) = 4.70  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.7  PEAK FLOW RATE (CFS) = 10.13

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10105.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 754.00  DOWNSTREAM(FEET) = 740.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00  CHANNEL SLOPE = 0.0255
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.13
FLOW VELOCITY(FEET/SEC.) = 3.56  FLOW DEPTH(FEET) = 0.97
TRAVEL TIME(MIN.) = 2.57  Tc(MIN.) = 13.96
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10105.00 = 1353.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.96
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.394
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        3.40  0.30  1.000  -
USER-DEFINED      -        0.60  0.30  1.000  -
USER-DEFINED      -        6.00  0.30  1.000  -
USER-DEFINED      -        0.60  0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 10.60  SUBAREA RUNOFF (CFS) = 19.98
EFFECTIVE AREA (ACRES) = 15.30  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 15.3  PEAK FLOW RATE (CFS) = 28.84

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10106.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 740.00 DOWNSTREAM(FEET) = 623.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 929.00 CHANNEL SLOPE = 0.1259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 28.84
FLOW VELOCITY(FEET/SEC.) = 8.38 FLOW DEPTH(FEET) = 1.07
TRAVEL TIME(MIN.) = 1.85 Tc(MIN.) = 15.81
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10106.00 = 2282.00 FEET.
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10106.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.81
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.243
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 10.40 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 4.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 27.11
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 53.87
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 592.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 417.00 CHANNEL SLOPE = 0.0743
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 53.87
FLOW VELOCITY(FEET/SEC.) = 8.06 FLOW DEPTH(FEET) = 1.49
TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 16.67
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10107.00 = 2699.00 FEET.
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10107.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.67

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* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.183
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 5.10 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 2.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 16.10
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 68.30
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 592.00 DOWNSTREAM(FEET) = 590.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0333
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.000
CHANNEL FLOW THRU SUBAREA(CFS) = 68.30
FLOW VELOCITY(FEET/SEC.) = 6.33 FLOW DEPTH(FEET) = 1.90
TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 16.83
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10108.00 = 2759.00 FEET.
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.83
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.172
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 7.00 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 7.50 0.30 1.000 -
USER-DEFINED - 1.80 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 30.50
EFFECTIVE AREA(ACRES) = 58.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.4 PEAK FLOW RATE(CFS) = 98.40
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 16.83
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.172
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.20     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20     SUBAREA RUNOFF(CFS) = 0.34
EFFECTIVE AREA(ACRES) = 58.60   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.6     PEAK FLOW RATE(CFS) = 98.73

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*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10109.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 526.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 973.00 CHANNEL SLOPE = 0.0658
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 98.73
FLOW VELOCITY(FEET/SEC.) = 8.95 FLOW DEPTH(FEET) = 1.92
TRAVEL TIME(MIN.) = 1.81 Tc(MIN.) = 18.64
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10109.00 = 3732.00 FEET.

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*****
FLOW PROCESS FROM NODE 10109.00 TO NODE 10109.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 18.64
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.045
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -       16.40    0.30     1.000    -
USER-DEFINED        -        0.60    0.30     1.000    -
USER-DEFINED        -        3.00    0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.00     SUBAREA RUNOFF(CFS) = 31.41
EFFECTIVE AREA(ACRES) = 78.60   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.6     PEAK FLOW RATE(CFS) = 123.46

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*****
FLOW PROCESS FROM NODE 10109.00 TO NODE 10110.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 526.00 DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1045.00 CHANNEL SLOPE = 0.0679

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CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 123.46
FLOW VELOCITY(FEET/SEC.) = 9.58 FLOW DEPTH(FEET) = 2.07
TRAVEL TIME(MIN.) = 1.82 Tc(MIN.) = 20.46
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10110.00 = 4777.00 FEET.

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*****
FLOW PROCESS FROM NODE 10110.00 TO NODE 10110.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 20.46
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.929
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        1.00    0.30     1.000    -
USER-DEFINED        -        0.50    0.30     1.000    -
USER-DEFINED        -       31.60    0.30     1.000    -
USER-DEFINED        -        1.60    0.30     1.000    -
USER-DEFINED        -        0.40    0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.10     SUBAREA RUNOFF(CFS) = 51.46
EFFECTIVE AREA(ACRES) = 113.70  AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.7     PEAK FLOW RATE(CFS) = 166.70

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*****
FLOW PROCESS FROM NODE 10110.00 TO NODE 10111.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 675.00 CHANNEL SLOPE = 0.0667
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 166.70
FLOW VELOCITY(FEET/SEC.) = 10.24 FLOW DEPTH(FEET) = 2.33
TRAVEL TIME(MIN.) = 1.10 Tc(MIN.) = 21.56
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10111.00 = 5452.00 FEET.

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*****
FLOW PROCESS FROM NODE 10111.00 TO NODE 10111.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 21.56
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.878
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        7.40    0.30     1.000    -
USER-DEFINED        -        6.00    0.30     1.000    -
USER-DEFINED        -       24.80    0.30     1.000    -
USER-DEFINED        -        0.90    0.30     1.000    -

```

USER-DEFINED - 4.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 43.20 SUBAREA RUNOFF (CFS) = 61.37  
EFFECTIVE AREA (ACRES) = 156.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 156.9 PEAK FLOW RATE (CFS) = 222.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10111.00 TO NODE 10112.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 410.00 DOWNSTREAM (FEET) = 405.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 143.00 CHANNEL SLOPE = 0.0350  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 222.89  
FLOW VELOCITY (FEET/SEC.) = 8.64 FLOW DEPTH (FEET) = 2.93  
TRAVEL TIME (MIN.) = 0.28 Tc (MIN.) = 21.83  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10112.00 = 5595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 21.83  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.866

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	7.90	0.30	1.000	-
USER-DEFINED	-	25.90	0.30	1.000	-
USER-DEFINED	-	19.30	0.30	1.000	-
USER-DEFINED	-	2.10	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 56.20 SUBAREA RUNOFF (CFS) = 79.20  
EFFECTIVE AREA (ACRES) = 213.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 213.1 PEAK FLOW RATE (CFS) = 300.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10113.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 363.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1642.00 CHANNEL SLOPE = 0.0256  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 300.30  
FLOW VELOCITY (FEET/SEC.) = 8.29 FLOW DEPTH (FEET) = 3.47

TRAVEL TIME (MIN.) = 3.30 Tc (MIN.) = 25.13  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10113.00 = 7237.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 25.13  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.715

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	33.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 35.40 SUBAREA RUNOFF (CFS) = 45.10  
EFFECTIVE AREA (ACRES) = 248.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 248.5 PEAK FLOW RATE (CFS) = 316.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10114.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 363.00 DOWNSTREAM (FEET) = 340.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 918.00 CHANNEL SLOPE = 0.0251  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 316.59  
FLOW VELOCITY (FEET/SEC.) = 8.34 FLOW DEPTH (FEET) = 3.56  
TRAVEL TIME (MIN.) = 1.84 Tc (MIN.) = 26.97  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10114.00 = 8155.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 26.97  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.653

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	10.10	0.30	1.000	-
USER-DEFINED	-	17.70	0.30	1.000	-
USER-DEFINED	-	52.90	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 83.10 SUBAREA RUNOFF (CFS) = 101.20

EFFECTIVE AREA(ACRES) = 331.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 331.6 PEAK FLOW RATE(CFS) = 403.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 26.97  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.653  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 1.83  
EFFECTIVE AREA(ACRES) = 333.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 333.1 PEAK FLOW RATE(CFS) = 405.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10115.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 301.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1467.00 CHANNEL SLOPE = 0.0266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 405.66  
FLOW VELOCITY(FEET/SEC.) = 9.06 FLOW DEPTH(FEET) = 3.86  
TRAVEL TIME(MIN.) = 2.70 Tc(MIN.) = 29.67  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10115.00 = 9622.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10115.00 TO NODE 10115.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 29.67  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.561  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.60 0.30 1.000 -  
USER-DEFINED - 24.30 0.30 1.000 -  
USER-DEFINED - 47.70 0.30 1.000 -  
USER-DEFINED - 9.80 0.30 1.000 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 94.00 SUBAREA RUNOFF(CFS) = 106.71  
EFFECTIVE AREA(ACRES) = 427.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 427.1 PEAK FLOW RATE(CFS) = 484.87

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10115.00 TO NODE 10116.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 272.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1696.00 CHANNEL SLOPE = 0.0171  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 484.87  
FLOW VELOCITY(FEET/SEC.) = 8.04 FLOW DEPTH(FEET) = 4.48  
TRAVEL TIME(MIN.) = 3.52 Tc(MIN.) = 33.18  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10116.00 = 11318.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 33.18  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.474  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.90 0.30 1.000 -  
USER-DEFINED - 4.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 32.00 0.30 1.000 -  
USER-DEFINED - 3.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 45.60 SUBAREA RUNOFF(CFS) = 48.17  
EFFECTIVE AREA(ACRES) = 472.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 472.7 PEAK FLOW RATE(CFS) = 499.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 33.18  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.474  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 1.000 -  
USER-DEFINED - 7.70 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.70 SUBAREA RUNOFF(CFS) = 10.25  
EFFECTIVE AREA(ACRES) = 482.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 482.4 PEAK FLOW RATE(CFS) = 509.57



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*****
FLOW PROCESS FROM NODE 10116.00 TO NODE 10117.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 272.00 DOWNSTREAM(FEET) = 252.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 878.00 CHANNEL SLOPE = 0.0228
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 509.57
FLOW VELOCITY(FEET/SEC.) = 9.06 FLOW DEPTH(FEET) = 4.33
TRAVEL TIME(MIN.) = 1.62 Tc(MIN.) = 34.80
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10117.00 = 12196.00 FEET.
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 34.80
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.435
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 8.20 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 12.59
EFFECTIVE AREA(ACRES) = 494.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 494.7 PEAK FLOW RATE(CFS) = 509.57
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 34.80
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.435
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 14.60 0.30 1.000 -
USER-DEFINED - 6.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 3.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996
SUBAREA AREA(ACRES) = 25.00 SUBAREA RUNOFF(CFS) = 25.56
EFFECTIVE AREA(ACRES) = 519.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

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AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 519.7 PEAK FLOW RATE(CFS) = 530.88
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10118.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 252.00 DOWNSTREAM(FEET) = 249.00
FLOW LENGTH(FEET) = 280.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 81.0 INCH PIPE IS 62.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.08
ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 530.88
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 35.06
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10118.00 = 12476.00 FEET.
*****
FLOW PROCESS FROM NODE 10118.00 TO NODE 10119.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 249.00 DOWNSTREAM(FEET) = 240.00
FLOW LENGTH(FEET) = 892.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 81.0 INCH PIPE IS 63.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.58
ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 530.88
PIPE TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 35.90
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10119.00 = 13368.00 FEET.
*****
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 35.90
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.408
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.100 -
USER-DEFINED - 1.00 0.30 0.600 -
USER-DEFINED - 0.80 0.30 0.850 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.706
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 3.88
EFFECTIVE AREA(ACRES) = 523.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 523.3 PEAK FLOW RATE(CFS) = 530.88
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****

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FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 35.90  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.408  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	9.60	0.30	0.600	-
USER-DEFINED	-	1.00	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.627  
 SUBAREA AREA (ACRES) = 13.60 SUBAREA RUNOFF (CFS) = 14.94  
 EFFECTIVE AREA (ACRES) = 536.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 536.9 PEAK FLOW RATE (CFS) = 537.31

FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 35.90  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.408  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.10  
 EFFECTIVE AREA (ACRES) = 537.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 537.0 PEAK FLOW RATE (CFS) = 537.41

FLOW PROCESS FROM NODE 10119.00 TO NODE 10120.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 240.00 DOWNSTREAM(FEET) = 239.00  
 FLOW LENGTH(FEET) = 120.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 66.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.38  
 ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 537.41  
 PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 36.02  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10120.00 = 13488.00 FEET.

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.02  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.405  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.657  
 SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 6.09  
 EFFECTIVE AREA (ACRES) = 542.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA (ACRES) = 542.6 PEAK FLOW RATE (CFS) = 542.08

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.02  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.405  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.717  
 SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 5.46  
 EFFECTIVE AREA (ACRES) = 547.70 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA (ACRES) = 547.7 PEAK FLOW RATE (CFS) = 547.54

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.02  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.405  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	2.70	0.30	1.000	-
USER-DEFINED	-	11.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 15.72  
EFFECTIVE AREA(ACRES) = 563.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 563.5 PEAK FLOW RATE(CFS) = 563.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10121.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 239.00 DOWNSTREAM(FEET) = 213.00  
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 47.07  
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 563.26  
PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 36.09  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10121.00 = 13682.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10121.00 TO NODE 10122.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 213.00 DOWNSTREAM(FEET) = 176.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 995.00 CHANNEL SLOPE = 0.0372  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 563.26  
FLOW VELOCITY(FEET/SEC.) = 11.16 FLOW DEPTH(FEET) = 4.10  
TRAVEL TIME(MIN.) = 1.49 Tc(MIN.) = 37.58  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10122.00 = 14677.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 37.58  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.368  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.80 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 7.02  
EFFECTIVE AREA(ACRES) = 570.80 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98

TOTAL AREA(ACRES) = 570.8 PEAK FLOW RATE(CFS) = 563.26  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 37.58  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.368  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 3.30 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 3.00 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 10.09  
EFFECTIVE AREA(ACRES) = 581.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 581.3 PEAK FLOW RATE(CFS) = 563.26  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 37.58  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.368  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 3.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 3.50 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 7.59  
EFFECTIVE AREA(ACRES) = 589.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 589.2 PEAK FLOW RATE(CFS) = 569.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 37.58  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.368  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 1.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$  (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 1.73  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.98  
TOTAL AREA (ACRES) = 591.0 PEAK FLOW RATE (CFS) = 570.78

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 591.0 TC (MIN.) = 37.58  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.984  
PEAK FLOW RATE (CFS) = 570.78

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.4 Release Date: 01/25/2007 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506102C.DAT  
TIME/DATE OF STUDY: 14:26 01/08/2009  
=====

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:  
=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.440
- 2) 10.00; 3.011
- 3) 15.00; 2.390
- 4) 20.00; 2.029
- 5) 25.00; 1.787
- 6) 30.00; 1.600
- 7) 40.00; 1.368
- 8) 50.00; 1.205
- 9) 60.00; 1.060
- 10) 90.00; 0.862
- 11) 120.00; 0.732
- 12) 180.00; 0.593
- 13) 360.00; 0.412
- 14) 1440.00; 0.172

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:	CURB	GUTTER-GEOMETRIES:			MANNING
	WIDTH	CROSSFALL	IN- / OUT-/PARK-		HEIGHT	WIDTH	LIP	
====	(FT)	(FT)	SIDE / SIDE/ WAY	(FT)	(FT)	(FT)	(FT)	(n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10200.00 TO NODE 10201.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 293.00  
ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 617.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.991  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.014

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	-	0.73	0.30	0.600	0	9.99

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA RUNOFF(CFS) = 1.87  
TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 1.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 10201.00 TO NODE 10202.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 617.00 DOWNSTREAM ELEVATION(FEET) = 613.00  
STREET LENGTH(FEET) = 323.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.89  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 9.68  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.56  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.90  
STREET FLOW TRAVEL TIME(MIN.) = 2.10 Tc(MIN.) = 12.09  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.751

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.88	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 2.05  
EFFECTIVE AREA(ACRES) = 1.62 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 3.74

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 10.89  
FLOW VELOCITY(FEET/SEC.) = 2.72 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.02  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10202.00 = 616.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10202.00 TO NODE 10203.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 613.00 DOWNSTREAM ELEVATION(FEET) = 594.00  
STREET LENGTH(FEET) = 613.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.60  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 10.67  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.22  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.57  
STREET FLOW TRAVEL TIME(MIN.) = 2.42 Tc(MIN.) = 14.51  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.451

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.82 0.30 0.614 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.614  
SUBAREA AREA(ACRES) = 1.82 SUBAREA RUNOFF(CFS) = 3.72  
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 7.02

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.76  
FLOW VELOCITY(FEET/SEC.) = 4.46 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.76  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10203.00 = 1229.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10203.00 TO NODE 10204.00 IS CODE = 63  
-----

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 594.00 DOWNSTREAM ELEVATION(FEET) = 578.00  
STREET LENGTH(FEET) = 433.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.17  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.40  
HALFSTREET FLOOD WIDTH(FEET) = 12.09  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.95  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.98  
STREET FLOW TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 15.97  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.320

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.21 0.30 0.655 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.655  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 2.31  
EFFECTIVE AREA(ACRES) = 4.64 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 8.92

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 12.58  
FLOW VELOCITY(FEET/SEC.) = 5.03 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.06  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10204.00 = 1662.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 578.00 DOWNSTREAM(FEET) = 575.00  
FLOW LENGTH(FEET) = 147.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.50  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 8.92  
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 16.26  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10205.00 = 1809.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.26  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.299  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.61	0.30	0.917	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.917  
 SUBAREA AREA(ACRES) = 3.61 SUBAREA RUNOFF(CFS) = 6.57  
 EFFECTIVE AREA(ACRES) = 8.25 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
 TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 15.40

FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 563.00  
 FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.86  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 15.40  
 PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 17.21  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10206.00 = 2374.00 FEET.

FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.21  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.230  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.75	0.30	0.669	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.669  
 SUBAREA AREA(ACRES) = 4.75 SUBAREA RUNOFF(CFS) = 8.67  
 EFFECTIVE AREA(ACRES) = 13.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA(ACRES) = 13.0 PEAK FLOW RATE(CFS) = 23.56

FLOW PROCESS FROM NODE 10206.00 TO NODE 10207.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 563.00 DOWNSTREAM(FEET) = 547.00  
 FLOW LENGTH(FEET) = 599.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.63  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 23.56  
 PIPE TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 18.07  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10207.00 = 2973.00 FEET.

FLOW PROCESS FROM NODE 10206.10 TO NODE 10207.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.07  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.168  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.59	0.30	0.664	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.664  
 SUBAREA AREA(ACRES) = 4.59 SUBAREA RUNOFF(CFS) = 8.13  
 EFFECTIVE AREA(ACRES) = 17.58 AREA-AVERAGED Fm(INCH/HR) = 0.21  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71  
 TOTAL AREA(ACRES) = 17.6 PEAK FLOW RATE(CFS) = 30.97

FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 516.00  
 FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.09  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 30.97  
 PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 18.69  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10208.00 = 3573.00 FEET.

FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.69  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.123  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.60	0.30	0.697	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.697  
 SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 6.20  
 EFFECTIVE AREA(ACRES) = 21.18 AREA-AVERAGED Fm(INCH/HR) = 0.21  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
 TOTAL AREA(ACRES) = 21.2 PEAK FLOW RATE(CFS) = 36.46

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*****
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 516.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 604.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 17.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.40
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 36.46
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 19.27
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10209.00 = 4177.00 FEET.

*****
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.27
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.082
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 8.21 0.30 0.645 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645
SUBAREA AREA(ACRES) = 8.21 SUBAREA RUNOFF(CFS) = 13.96
EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 49.62

*****
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 678.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.31
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 49.62
PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 19.86
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10210.00 = 4855.00 FEET.

*****
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.86
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.039
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

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USER-DEFINED - 10.49 0.30 0.986 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 10.49 SUBAREA RUNOFF(CFS) = 16.47
EFFECTIVE AREA(ACRES) = 39.89 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 39.9 PEAK FLOW RATE(CFS) = 64.97

*****
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 280.00
FLOW LENGTH(FEET) = 2662.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.39
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 64.97
PIPE TRAVEL TIME(MIN.) = 2.18 Tc(MIN.) = 22.03
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10211.00 = 7517.00 FEET.

*****
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.03
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.931
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 10.00 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 14.68
EFFECTIVE AREA(ACRES) = 49.89 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 49.9 PEAK FLOW RATE(CFS) = 75.75

*****
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 280.00 DOWNSTREAM(FEET) = 176.00
FLOW LENGTH(FEET) = 935.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.21
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 75.75
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 22.60
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10212.00 = 8452.00 FEET.

*****
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 81

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=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 22.60  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.903  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.37 0.30 0.926 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.926  
SUBAREA AREA(ACRES) = 18.37 SUBAREA RUNOFF(CFS) = 26.87  
EFFECTIVE AREA(ACRES) = 68.26 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 68.3 PEAK FLOW RATE(CFS) = 101.37

\*\*\*\*\*

FLOW PROCESS FROM NODE 10212.00 TO NODE 10242.00 IS CODE = 51

=====  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
=====

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 176.00 DOWNSTREAM(FEET) = 169.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00 CHANNEL SLOPE = 0.0211  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.858  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.97 0.30 0.970 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 102.76  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.91  
AVERAGE FLOW DEPTH(FEET) = 2.41 TRAVEL TIME(MIN.) = 0.94  
Tc(MIN.) = 23.54  
SUBAREA AREA(ACRES) = 1.97 SUBAREA RUNOFF(CFS) = 2.78  
EFFECTIVE AREA(ACRES) = 70.23 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 101.37  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.40 FLOW VELOCITY(FEET/SEC.) = 5.87  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 10

=====  
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<  
=====

\*\*\*\*\*

FLOW PROCESS FROM NODE 10220.00 TO NODE 10221.00 IS CODE = 21

=====  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
=====

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 308.00 DOWNSTREAM(FEET) = 300.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.111  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.382  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"GRASS" - 1.03 0.30 1.000 0 15.11  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.93  
TOTAL AREA(ACRES) = 1.03 PEAK FLOW RATE(CFS) = 1.93

\*\*\*\*\*

FLOW PROCESS FROM NODE 10221.10 TO NODE 10222.00 IS CODE = 63

=====  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
=====

>>>>(STREET TABLE SECTION # 4 USED)<<<<  
=====

UPSTREAM ELEVATION(FEET) = 300.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.40

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.22  
HALFSTREET FLOOD WIDTH(FEET) = 3.29  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.70  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.28  
STREET FLOW TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 16.38

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.290

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.64 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 2.93  
EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 4.78

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 4.87

FLOW VELOCITY(FEET/SEC.) = 5.60 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.43  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10222.00 = 764.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10221.20 TO NODE 10222.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 16.38  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.290  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.12 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.12 SUBAREA RUNOFF(CFS) = 5.58  
EFFECTIVE AREA(ACRES) = 5.78 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 10.36

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10222.10 TO NODE 10223.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<

-----  
UPSTREAM ELEVATION(FEET) = 261.00 DOWNSTREAM ELEVATION(FEET) = 208.00  
STREET LENGTH(FEET) = 622.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.84  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.33  
HALFSTREET FLOOD WIDTH(FEET) = 8.58  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.40  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.11  
STREET FLOW TRAVEL TIME(MIN.) = 1.62 Tc(MIN.) = 18.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.173

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.75 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 2.96  
EFFECTIVE AREA(ACRES) = 7.54 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 7.5 PEAK FLOW RATE(CFS) = 12.71

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 8.88  
FLOW VELOCITY(FEET/SEC.) = 6.50 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.18  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10223.00 = 1386.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10222.20 TO NODE 10223.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 18.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.173  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.91 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.91 SUBAREA RUNOFF(CFS) = 13.34  
EFFECTIVE AREA(ACRES) = 15.45 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 26.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.10 TO NODE 10224.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<

-----  
UPSTREAM ELEVATION(FEET) = 208.00 DOWNSTREAM ELEVATION(FEET) = 204.00  
STREET LENGTH(FEET) = 758.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.44  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.62  
HALFSTREET FLOOD WIDTH(FEET) = 22.88  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.71  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.67  
STREET FLOW TRAVEL TIME(MIN.) = 4.66 Tc(MIN.) = 22.66  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.900

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.70 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.70 SUBAREA RUNOFF (CFS) = 6.77  
EFFECTIVE AREA (ACRES) = 20.15 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.1 PEAK FLOW RATE (CFS) = 29.02

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.61 HALFSTREET FLOOD WIDTH (FEET) = 22.76  
FLOW VELOCITY (FEET/SEC.) = 2.70 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.66  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10224.00 = 2144.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.20 TO NODE 10224.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 22.66  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.900  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.21 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.21 SUBAREA RUNOFF (CFS) = 1.74  
EFFECTIVE AREA (ACRES) = 21.35 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 21.4 PEAK FLOW RATE (CFS) = 30.76

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 204.00 DOWNSTREAM (FEET) = 201.00  
FLOW LENGTH (FEET) = 422.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.1 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 7.60  
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 30.76  
PIPE TRAVEL TIME (MIN.) = 0.93 Tc (MIN.) = 23.58  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10225.00 = 2566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 23.58  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.856  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.81 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.81 SUBAREA RUNOFF (CFS) = 6.74

EFFECTIVE AREA (ACRES) = 26.17 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.2 PEAK FLOW RATE (CFS) = 36.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 201.00 DOWNSTREAM (FEET) = 197.00  
FLOW LENGTH (FEET) = 799.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 7.06  
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 36.64  
PIPE TRAVEL TIME (MIN.) = 1.88 Tc (MIN.) = 25.47  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10238.00 = 3365.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 25.47  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.770  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.24 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.24 SUBAREA RUNOFF (CFS) = 5.61  
EFFECTIVE AREA (ACRES) = 30.41 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 30.4 PEAK FLOW RATE (CFS) = 40.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 25.47  
RAINFALL INTENSITY (INCH/HR) = 1.77  
AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA (ACRES) = 30.41  
TOTAL STREAM AREA (ACRES) = 30.41  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 40.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10230.00 TO NODE 10231.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 276.00
ELEVATION DATA: UPSTREAM (FEET) = 503.00 DOWNSTREAM (FEET) = 390.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.944
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.170
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
AGRICULTURAL POOR COVER
"FALLOW" - 0.95 0.30 1.000 0 5.94
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 3.31
TOTAL AREA (ACRES) = 0.95 PEAK FLOW RATE (CFS) = 3.31

\*\*\*\*\*
FLOW PROCESS FROM NODE 10231.10 TO NODE 10232.00 IS CODE = 51
-----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<
>>>> TRAVEL TIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====
ELEVATION DATA: UPSTREAM (FEET) = 390.00 DOWNSTREAM (FEET) = 301.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 394.00 CHANNEL SLOPE = 0.2259
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.959
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.68 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.08
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.88
AVERAGE FLOW DEPTH (FEET) = 0.48 TRAVEL TIME (MIN.) = 0.74
Tc (MIN.) = 6.68
SUBAREA AREA (ACRES) = 1.68 SUBAREA RUNOFF (CFS) = 5.55
EFFECTIVE AREA (ACRES) = 2.63 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 2.6 PEAK FLOW RATE (CFS) = 8.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.55 FLOW VELOCITY (FEET/SEC.) = 9.69
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10232.00 = 670.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10231.20 TO NODE 10232.00 IS CODE = 81
-----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<<

=====
MAINLINE Tc (MIN.) = 6.68
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.959
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.38 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 6.38 SUBAREA RUNOFF (CFS) = 21.00
EFFECTIVE AREA (ACRES) = 9.01 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 9.0 PEAK FLOW RATE (CFS) = 29.68

\*\*\*\*\*
FLOW PROCESS FROM NODE 10232.00 TO NODE 10233.00 IS CODE = 63
-----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<
>>>> (STREET TABLE SECTION # 4 USED) <<<<<

=====
UPSTREAM ELEVATION (FEET) = 301.00 DOWNSTREAM ELEVATION (FEET) = 277.00
STREET LENGTH (FEET) = 341.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.61

\*\* TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 35.11
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.45
HALFSTREET FLOOD WIDTH (FEET) = 14.62
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.54
PRODUCT OF DEPTH & VELOCITY (FT\*FT/SEC.) = 3.40
STREET FLOW TRAVEL TIME (MIN.) = 0.75 Tc (MIN.) = 7.44
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.744

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 3.50 SUBAREA RUNOFF (CFS) = 10.86
EFFECTIVE AREA (ACRES) = 12.52 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 12.5 PEAK FLOW RATE (CFS) = 38.79

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.46 HALFSTREET FLOOD WIDTH (FEET) = 15.21
FLOW VELOCITY (FEET/SEC.) = 7.75 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.58
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10233.00 = 1011.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10233.10 TO NODE 10234.00 IS CODE = 63
-----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<
>>>> (STREET TABLE SECTION # 4 USED) <<<<<

=====
UPSTREAM ELEVATION (FEET) = 277.00 DOWNSTREAM ELEVATION (FEET) = 226.00

STREET LENGTH(FEET) = 682.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 44.65  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.48  
HALFSTREET FLOOD WIDTH(FEET) = 15.97  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.15  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.89  
STREET FLOW TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 8.83  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.345  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.27 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.27 SUBAREA RUNOFF(CFS) = 11.70  
EFFECTIVE AREA(ACRES) = 16.78 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 46.00

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 16.14  
FLOW VELOCITY(FEET/SEC.) = 8.23 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.96  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10234.00 = 1693.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10233.20 TO NODE 10234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 8.83  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.345  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 15.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 42.75  
EFFECTIVE AREA(ACRES) = 32.38 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 88.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10234.10 TO NODE 10235.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 3 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 226.00 DOWNSTREAM ELEVATION(FEET) = 205.00  
STREET LENGTH(FEET) = 759.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 94.35  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.68  
HALFSTREET FLOOD WIDTH(FEET) = 26.85  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.72  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.57  
STREET FLOW TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 10.71  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.922  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.74 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 11.20  
EFFECTIVE AREA(ACRES) = 37.13 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 88.75  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.67 HALFSTREET FLOOD WIDTH(FEET) = 25.60  
FLOW VELOCITY(FEET/SEC.) = 6.63 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.43

\*NOTE: ESTIMATED STREET FLOW DEPTH IS GREATER THAN  
THE MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67  
SIZE PIPE(S) TO SATISFY THE STREET CONSTRAINT AS FOLLOWS:  
\*\* PIPE SIZED TO MAXIMIZE STREETFLOW AT DOWNSTREAM NODE \*\*  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
ASSUME FULL-FLOWING PIPELINE  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.37  
PIPE-FLOW(CFS) = 16.57  
PIPEFLOW TRAVEL TIME(MIN.) = 1.35 Tc(MIN.) = 10.18  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.988  
SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 11.48  
TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 89.84  
STREETFLOW HYDRAULICS BASED ON MAINLINE Tc :  
STREET HYDRAULICS COMPUTED USING ESTIMATED FLOW(CFS) = 73.27  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.63  
HALFSTREET FLOOD WIDTH(FEET) = 23.63

AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.34  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 4.00  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10235.00 = 2452.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.20 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.18  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.988  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.02 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 8.02 SUBAREA RUNOFF (CFS) = 19.40  
EFFECTIVE AREA (ACRES) = 45.15 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.1 PEAK FLOW RATE (CFS) = 109.24

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.30 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.18  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.988  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.62 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.62 SUBAREA RUNOFF (CFS) = 6.33  
EFFECTIVE AREA (ACRES) = 47.76 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 115.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.00 TO NODE 10236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 205.00 DOWNSTREAM (FEET) = 201.00  
FLOW LENGTH (FEET) = 489.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.9 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.15  
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 115.57  
PIPE TRAVEL TIME (MIN.) = 0.73 Tc (MIN.) = 10.91  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10236.00 = 2941.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.10 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.91  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.898  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.89 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.89 SUBAREA RUNOFF (CFS) = 6.76  
EFFECTIVE AREA (ACRES) = 50.65 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 50.7 PEAK FLOW RATE (CFS) = 118.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.20 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.91  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.898  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.84 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.84 SUBAREA RUNOFF (CFS) = 11.31  
EFFECTIVE AREA (ACRES) = 55.49 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 129.74

\*\*\*\*\*

FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 201.00 DOWNSTREAM (FEET) = 199.00  
FLOW LENGTH (FEET) = 278.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 39.9 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.90  
ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 129.74  
PIPE TRAVEL TIME (MIN.) = 0.42 Tc (MIN.) = 11.34  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10237.00 = 3219.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.34  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.845  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 1.62 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.62 SUBAREA RUNOFF (CFS) = 3.71  
 EFFECTIVE AREA (ACRES) = 57.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 57.1 PEAK FLOW RATE (CFS) = 130.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 199.00 DOWNSTREAM (FEET) = 197.00  
 FLOW LENGTH (FEET) = 345.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.9 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.13  
 ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 130.81  
 PIPE TRAVEL TIME (MIN.) = 0.57 Tc (MIN.) = 11.90  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 11.90  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.774  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.38 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.38 SUBAREA RUNOFF (CFS) = 3.07  
 EFFECTIVE AREA (ACRES) = 58.49 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 58.5 PEAK FLOW RATE (CFS) = 130.81  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
 =====  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 11.90  
 RAINFALL INTENSITY (INCH/HR) = 2.77  
 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 58.49  
 TOTAL STREAM AREA (ACRES) = 58.49  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 130.81

\*\* CONFLUENCE DATA \*\*  
 STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 40.22 25.47 1.770 0.30 ( 0.30) 1.00 30.4 10220.00  
 2 130.81 11.90 2.774 0.30 ( 0.30) 1.00 58.5 10230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 162.47 11.90 2.774 0.30 ( 0.30) 1.00 72.7 10230.00  
 2 117.91 25.47 1.770 0.30 ( 0.30) 1.00 88.9 10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 162.47 Tc (MIN.) = 11.90  
 EFFECTIVE AREA (ACRES) = 72.71 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 88.9  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.00 TO NODE 10239.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 197.00 DOWNSTREAM (FEET) = 193.00  
 FLOW LENGTH (FEET) = 753.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 60.0 INCH PIPE IS 44.6 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.38  
 ESTIMATED PIPE DIAMETER (INCH) = 60.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 162.47  
 PIPE TRAVEL TIME (MIN.) = 1.21 Tc (MIN.) = 13.11  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10239.00 = 4317.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.10 TO NODE 10239.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 13.11  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.624  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.72 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.72 SUBAREA RUNOFF (CFS) = 5.69  
 EFFECTIVE AREA (ACRES) = 75.43 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 91.6 PEAK FLOW RATE (CFS) = 162.47  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.20 TO NODE 10239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.11  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.624  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	34.37	0.30	0.991	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.991  
 SUBAREA AREA(ACRES) = 34.37 SUBAREA RUNOFF(CFS) = 71.98  
 EFFECTIVE AREA(ACRES) = 109.79 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 126.0 PEAK FLOW RATE(CFS) = 229.77

FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 193.00 DOWNSTREAM(FEET) = 191.00  
 FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 66.0 INCH PIPE IS 48.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.34  
 ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 229.77  
 PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 13.52  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10240.00 = 4618.00 FEET.

FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.52  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.574  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.22	0.30	0.916	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.916  
 SUBAREA AREA(ACRES) = 2.22 SUBAREA RUNOFF(CFS) = 4.60  
 EFFECTIVE AREA(ACRES) = 112.02 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 128.2 PEAK FLOW RATE(CFS) = 229.77  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 10240.00 TO NODE 10241.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 191.00 DOWNSTREAM(FEET) = 180.00

FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 30.35  
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 229.77  
 PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 13.60  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10241.00 = 4768.00 FEET.

FLOW PROCESS FROM NODE 10241.00 TO NODE 10242.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 169.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 267.00 CHANNEL SLOPE = 0.0412  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.516  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.16	0.30	0.958	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.958  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 231.93  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.53  
 AVERAGE FLOW DEPTH(FEET) = 2.59 TRAVEL TIME(MIN.) = 0.39  
 Tc(MIN.) = 13.99  
 SUBAREA AREA(ACRES) = 2.16 SUBAREA RUNOFF(CFS) = 4.33  
 EFFECTIVE AREA(ACRES) = 114.18 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 130.4 PEAK FLOW RATE(CFS) = 229.77  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.58 FLOW VELOCITY(FEET/SEC.) = 11.49  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	229.77	13.99	2.516	0.30( 0.30)	0.99	114.2	10230.00
2	162.67	27.73	1.685	0.30( 0.30)	1.00	130.4	10220.00

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	101.37	23.54	1.858	0.30( 0.25)	0.85	70.2	10200.00

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.



\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	314.72	13.99	2.516	0.30 ( 0.29)	0.96	155.9	10230.00
2	284.49	23.54	1.858	0.30 ( 0.28)	0.94	195.7	10200.00
3	253.13	27.73	1.685	0.30 ( 0.28)	0.94	200.6	10220.00
TOTAL AREA (ACRES) =			200.6				

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 314.72 Tc(MIN.) = 13.988  
EFFECTIVE AREA (ACRES) = 155.91 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
TOTAL AREA (ACRES) = 200.6  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10242.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 169.00 DOWNSTREAM(FEET) = 163.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 315.00 CHANNEL SLOPE = 0.0190  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.446

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.10	0.30	0.995	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =			0.30		
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =			0.995		
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =			323.52		
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =			9.38		
AVERAGE FLOW DEPTH(FEET) = 3.39		TRAVEL TIME(MIN.) =		0.56	
Tc(MIN.) = 14.55		SUBAREA AREA(ACRES) =		9.10	
		SUBAREA RUNOFF(CFS) =		17.60	
EFFECTIVE AREA(ACRES) =		AREA-AVERAGED Fm(INCH/HR) =		0.29	
AREA-AVERAGED Fp(INCH/HR) =		AREA-AVERAGED Ap =		0.96	
TOTAL AREA(ACRES) =		PEAK FLOW RATE(CFS) =		320.64	

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.38 FLOW VELOCITY(FEET/SEC.) = 9.37  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10243.00 TO NODE 10256.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.55  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.446

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.01	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =			0.30		
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =			1.000		
SUBAREA AREA(ACRES) =			7.01		
SUBAREA RUNOFF(CFS) =			13.53		
EFFECTIVE AREA(ACRES) =		AREA-AVERAGED Fm(INCH/HR) =		0.29	
AREA-AVERAGED Fp(INCH/HR) =		AREA-AVERAGED Ap =		0.96	
TOTAL AREA(ACRES) =		PEAK FLOW RATE(CFS) =		334.17	

\*\*\*\*\*

FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 14.55

RAINFALL INTENSITY (INCH/HR) = 2.45

AREA-AVERAGED Fm (INCH/HR) = 0.29

AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.96

EFFECTIVE STREAM AREA(ACRES) = 172.02

TOTAL STREAM AREA(ACRES) = 216.71

PEAK FLOW RATE(CFS) AT CONFLUENCE = 334.17

\*\*\*\*\*

FLOW PROCESS FROM NODE 10250.00 TO NODE 10251.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 284.00

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 243.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.802

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.260

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "WOODLAND,GRASS"	-	1.04	0.30	1.000	0	16.80
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =			0.30			
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =			1.000			
SUBAREA RUNOFF(CFS) =			1.84			
TOTAL AREA(ACRES) =			1.04		PEAK FLOW RATE(CFS) = 1.84	

\*\*\*\*\*

FLOW PROCESS FROM NODE 10251.00 TO NODE 10252.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 243.00 DOWNSTREAM ELEVATION(FEET) = 240.00

STREET LENGTH(FEET) = 301.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.02  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.34  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.07  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.63  
STREET FLOW TRAVEL TIME(MIN.) = 2.42 Tc(MIN.) = 19.23  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.085  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.47	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 2.36  
EFFECTIVE AREA(ACRES) = 2.51 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 4.03

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.59  
FLOW VELOCITY(FEET/SEC.) = 2.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.72  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10252.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10252.00 TO NODE 10253.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 240.00 DOWNSTREAM ELEVATION(FEET) = 234.00  
STREET LENGTH(FEET) = 544.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.35  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38

HALFSTREET FLOOD WIDTH(FEET) = 11.13  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.57  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.98  
STREET FLOW TRAVEL TIME(MIN.) = 3.53 Tc(MIN.) = 22.75  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.896

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.60 SUBAREA RUNOFF(CFS) = 6.61  
EFFECTIVE AREA(ACRES) = 7.12 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 10.22

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 12.85  
FLOW VELOCITY(FEET/SEC.) = 2.78 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.15  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10253.00 = 1129.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 234.00 DOWNSTREAM(FEET) = 219.00  
FLOW LENGTH(FEET) = 362.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.50  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 10.22  
PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 23.28  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10254.00 = 1491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc(MIN.) = 23.28  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.870  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.55	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 12.08  
EFFECTIVE AREA(ACRES) = 15.66 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.7 PEAK FLOW RATE(CFS) = 22.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10254.00 TO NODE 10255.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 219.00 DOWNSTREAM(FEET) = 182.00
FLOW LENGTH(FEET) = 716.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.61
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 22.14
PIPE TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 24.09
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10255.00 = 2207.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 10255.00 TO NODE 10256.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 182.00 DOWNSTREAM(FEET) = 163.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.0833
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.811
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 13.88 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.57
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.14
AVERAGE FLOW DEPTH(FEET) = 1.07 TRAVEL TIME(MIN.) = 0.42
Tc(MIN.) = 24.51
SUBAREA AREA(ACRES) = 13.88 SUBAREA RUNOFF(CFS) = 18.87
EFFECTIVE AREA(ACRES) = 29.54 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 29.5 PEAK FLOW RATE(CFS) = 40.17

```

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.18 FLOW VELOCITY(FEET/SEC.) = 9.65
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10256.00 = 2435.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1
-----

```

```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====

```

```

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 24.51
RAINFALL INTENSITY(INCH/HR) = 1.81
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 29.54
TOTAL STREAM AREA(ACRES) = 29.54
PEAK FLOW RATE(CFS) AT CONFLUENCE = 40.17

```

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	334.17	14.55	2.446	0.30 ( 0.29)	0.96	172.0	10230.00
1	294.68	24.11	1.830	0.30 ( 0.28)	0.95	211.8	10200.00
1	268.89	28.32	1.663	0.30 ( 0.28)	0.95	216.7	10220.00
2	40.17	24.51	1.811	0.30 ( 0.30)	1.00	29.5	10250.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	368.04	14.55	2.446	0.30 ( 0.29)	0.96	189.6	10230.00
2	334.70	24.11	1.830	0.30 ( 0.29)	0.95	240.8	10200.00
3	332.42	24.51	1.811	0.30 ( 0.29)	0.95	241.8	10250.00
4	305.13	28.32	1.663	0.30 ( 0.29)	0.95	246.3	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

```

PEAK FLOW RATE(CFS) = 368.04 Tc(MIN.) = 14.55
EFFECTIVE AREA(ACRES) = 189.56 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 246.3
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

```

END OF STUDY SUMMARY:

```

TOTAL AREA(ACRES) = 246.3 TC(MIN.) = 14.55
EFFECTIVE AREA(ACRES) = 189.56 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.963
PEAK FLOW RATE(CFS) = 368.04

```

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	368.04	14.55	2.446	0.30 ( 0.29)	0.96	189.6	10230.00
2	334.70	24.11	1.830	0.30 ( 0.29)	0.95	240.8	10200.00
3	332.42	24.51	1.811	0.30 ( 0.29)	0.95	241.8	10250.00
4	305.13	28.32	1.663	0.30 ( 0.29)	0.95	246.3	10220.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506103C.DAT  
TIME/DATE OF STUDY: 12:44 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.310
- 2) 6.00; 3.880
- 3) 7.00; 3.560
- 4) 8.00; 3.300
- 5) 9.00; 3.080
- 6) 10.00; 2.900
- 7) 11.00; 2.750
- 8) 12.00; 2.610
- 9) 13.00; 2.500
- 10) 14.00; 2.390
- 11) 15.00; 2.300
- 12) 20.00; 1.950
- 13) 25.00; 1.720
- 14) 30.00; 1.550
- 15) 40.00; 1.310
- 16) 50.00; 1.160
- 17) 60.00; 1.040
- 18) 90.00; 0.830
- 19) 120.00; 0.700
- 20) 180.00; 0.560

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10300.00 TO NODE 10301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 627.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 5.147  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.247  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "5-7 DWELLINGS/ACRE"	-	1.20	0.30	0.500	95	5.15

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.500  
 SUBAREA RUNOFF(CFS) = 4.42  
 TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 4.42

\*\*\*\*\*

FLOW PROCESS FROM NODE 10301.00 TO NODE 10302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 510.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.2609  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.42  
 FLOW VELOCITY(FEET/SEC.) = 6.89 FLOW DEPTH(FEET) = 0.46  
 TRAVEL TIME(MIN.) = 0.28  $T_c$ (MIN.) = 5.43  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10302.00 = 443.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10302.00 TO NODE 10302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 5.43  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.127  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 5.37  
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 9.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10302.00 TO NODE 10303.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 467.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.2575  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.66  
FLOW VELOCITY(FEET/SEC.) = 8.36 FLOW DEPTH(FEET) = 0.62  
TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 5.76  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10303.00 = 610.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10303.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.76  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.984  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 7.59  
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 16.91

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10304.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 467.00 DOWNSTREAM(FEET) = 446.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 16.91  
FLOW VELOCITY(FEET/SEC.) = 8.40 FLOW DEPTH(FEET) = 0.82  
TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 5.99  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10304.00 = 725.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10304.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.99  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.886  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.500 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 8.02  
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 24.49

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10305.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 446.00 DOWNSTREAM(FEET) = 366.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 423.00 CHANNEL SLOPE = 0.1891  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 24.49  
FLOW VELOCITY(FEET/SEC.) = 9.37 FLOW DEPTH(FEET) = 0.93  
TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 6.74  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10305.00 = 1148.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10305.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.74  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.643  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.912  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 10.31  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.65  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 33.21

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10306.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 300.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 574.00 CHANNEL SLOPE = 0.1150  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 33.21  
FLOW VELOCITY (FEET/SEC.) = 8.41 FLOW DEPTH (FEET) = 1.15  
TRAVEL TIME (MIN.) = 1.14 Tc (MIN.) = 7.88  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10306.00 = 1722.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10306.00 TO NODE 10306.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 7.88  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.332  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 9.84  
EFFECTIVE AREA (ACRES) = 14.30 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA (ACRES) = 14.3 PEAK FLOW RATE (CFS) = 40.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10306.00 TO NODE 10307.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 300.00 DOWNSTREAM (FEET) = 293.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0350  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 40.05  
FLOW VELOCITY (FEET/SEC.) = 5.64 FLOW DEPTH (FEET) = 1.54  
TRAVEL TIME (MIN.) = 0.59 Tc (MIN.) = 8.47  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10307.00 = 1922.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10307.00 TO NODE 10307.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 8.47  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.197  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.83  
EFFECTIVE AREA (ACRES) = 15.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 15.0 PEAK FLOW RATE (CFS) = 40.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10307.00 TO NODE 10308.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 293.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0850  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 40.14  
FLOW VELOCITY (FEET/SEC.) = 9.77 FLOW DEPTH (FEET) = 1.17  
TRAVEL TIME (MIN.) = 0.34 Tc (MIN.) = 8.81  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10308.00 = 2122.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10308.00 TO NODE 10308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 8.81  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.122  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	8.50	0.30	0.500	-
USER-DEFINED	-	3.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.696  
SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 36.71  
EFFECTIVE AREA (ACRES) = 29.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA (ACRES) = 29.0 PEAK FLOW RATE (CFS) = 75.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10308.00 TO NODE 10309.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 250.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 600.00 CHANNEL SLOPE = 0.0433  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 75.83  
FLOW VELOCITY (FEET/SEC.) = 8.86 FLOW DEPTH (FEET) = 1.69  
TRAVEL TIME (MIN.) = 1.13 Tc (MIN.) = 9.94  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10309.00 = 2722.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.94  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.911  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.00	0.30	0.600	-
USER-DEFINED	-	1.80	0.30	0.850	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	0.500	-
USER-DEFINED	-	2.10	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.662  
 SUBAREA AREA(ACRES) = 15.40 SUBAREA RUNOFF(CFS) = 37.60  
 EFFECTIVE AREA(ACRES) = 44.40 AREA-AVERAGED Fm(INCH/HR) = 0.21  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
 TOTAL AREA(ACRES) = 44.4 PEAK FLOW RATE(CFS) = 107.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.94  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.911  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.30	0.850	-
USER-DEFINED	-	8.80	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.967  
 SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 37.28  
 EFFECTIVE AREA(ACRES) = 60.20 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA(ACRES) = 60.2 PEAK FLOW RATE(CFS) = 145.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10309.00 TO NODE 10310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 250.00 DOWNSTREAM(FEET) = 208.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1021.00 CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 145.20  
 FLOW VELOCITY(FEET/SEC.) = 10.26 FLOW DEPTH(FEET) = 2.17  
 TRAVEL TIME(MIN.) = 1.66 Tc(MIN.) = 11.60  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10310.00 = 3743.00 FEET.

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.60  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.667  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	1.80	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.668  
 SUBAREA AREA(ACRES) = 6.60 SUBAREA RUNOFF(CFS) = 14.65  
 EFFECTIVE AREA(ACRES) = 66.80 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA(ACRES) = 66.8 PEAK FLOW RATE(CFS) = 146.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.60  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.667  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	8.00	0.30	0.600	-
USER-DEFINED	-	7.10	0.30	0.850	-
USER-DEFINED	-	8.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814  
 SUBAREA AREA(ACRES) = 23.50 SUBAREA RUNOFF(CFS) = 51.24  
 EFFECTIVE AREA(ACRES) = 90.30 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA(ACRES) = 90.3 PEAK FLOW RATE(CFS) = 197.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10310.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 208.00 DOWNSTREAM(FEET) = 189.00  
 FLOW LENGTH(FEET) = 1595.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 42.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.59  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 197.84  
 PIPE TRAVEL TIME(MIN.) = 1.82 Tc(MIN.) = 13.42  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10335.00 = 5338.00 FEET.



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*****
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.42
RAINFALL INTENSITY(INCH/HR) = 2.45
AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.77
EFFECTIVE STREAM AREA(ACRES) = 90.30
TOTAL STREAM AREA(ACRES) = 90.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 197.84

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FLOW PROCESS FROM NODE 10320.00 TO NODE 10321.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 671.00 DOWNSTREAM(FEET) = 622.00

Tc = K*(LENGTH** 3.00)/(ELEVATION CHANGE)**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.795
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.968
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.00 0.30 0.500 95 5.79
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 3.44
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 3.44

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*****
FLOW PROCESS FROM NODE 10321.00 TO NODE 10322.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 622.00 DOWNSTREAM(FEET) = 599.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 227.00 CHANNEL SLOPE = 0.1013
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.44
FLOW VELOCITY(FEET/SEC.) = 5.58 FLOW DEPTH(FEET) = 0.45
TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 6.47
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10322.00 = 557.00 FEET.

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*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10322.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 6.47
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.729
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.30 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 4.51
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 7.73

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*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10323.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 599.00 DOWNSTREAM(FEET) = 539.00
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.55
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.73
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 6.59
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10323.00 = 719.00 FEET.

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*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10323.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 6.59
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.692
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.30 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.59
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 9.25

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*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10324.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 539.00 DOWNSTREAM(FEET) = 530.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 97.00 CHANNEL SLOPE = 0.0928
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 9.25

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FLOW VELOCITY(FEET/SEC.) = 5.67 FLOW DEPTH(FEET) = 0.74  
TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 6.87  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10324.00 = 816.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10324.00 TO NODE 10324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.87  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.601

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.59  
EFFECTIVE AREA(ACRES) = 4.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.7 PEAK FLOW RATE(CFS) = 14.60

\*\*\*\*\*

FLOW PROCESS FROM NODE 10324.00 TO NODE 10325.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 210.00 CHANNEL SLOPE = 0.1429  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 14.60  
FLOW VELOCITY(FEET/SEC.) = 7.39 FLOW DEPTH(FEET) = 0.81  
TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 7.35  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10325.00 = 1026.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.35  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.470

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 5.08  
EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 19.12

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10326.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 460.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 345.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 19.12  
FLOW VELOCITY(FEET/SEC.) = 7.31 FLOW DEPTH(FEET) = 0.93  
TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 8.13  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10326.00 = 1371.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10326.00 TO NODE 10326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.13  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.271

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 5.34  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 23.31

\*\*\*\*\*

FLOW PROCESS FROM NODE 10326.00 TO NODE 10327.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 430.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 263.00 CHANNEL SLOPE = 0.1141  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 23.31  
FLOW VELOCITY(FEET/SEC.) = 7.71 FLOW DEPTH(FEET) = 1.00  
TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 8.70  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10327.00 = 1634.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10327.00 TO NODE 10327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.70  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.146

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.10	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500

SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 11.05  
EFFECTIVE AREA (ACRES) = 12.40 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 12.4 PEAK FLOW RATE (CFS) = 33.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10327.00 TO NODE 10328.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 430.00 DOWNSTREAM (FEET) = 375.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 437.00 CHANNEL SLOPE = 0.1259  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 33.43  
FLOW VELOCITY (FEET/SEC.) = 10.76 FLOW DEPTH (FEET) = 1.02  
TRAVEL TIME (MIN.) = 0.68 Tc (MIN.) = 9.38  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10328.00 = 2071.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10328.00 TO NODE 10328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.38  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.012  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.500 -  
USER-DEFINED - 1.20 0.30 0.850 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.772  
SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 8.01  
EFFECTIVE AREA (ACRES) = 15.60 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 15.6 PEAK FLOW RATE (CFS) = 39.95

\*\*\*\*\*

FLOW PROCESS FROM NODE 10328.00 TO NODE 10329.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 375.00 DOWNSTREAM (FEET) = 372.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 224.00 CHANNEL SLOPE = 0.0134  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 39.95  
FLOW VELOCITY (FEET/SEC.) = 4.88 FLOW DEPTH (FEET) = 1.65  
TRAVEL TIME (MIN.) = 0.77 Tc (MIN.) = 10.14  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10329.00 = 2295.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10329.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.14  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.878  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.20 0.30 0.500 -  
USER-DEFINED - 1.40 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.571  
SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 27.29  
EFFECTIVE AREA (ACRES) = 26.80 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 26.8 PEAK FLOW RATE (CFS) = 65.36

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10330.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 372.00 DOWNSTREAM (FEET) = 300.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 452.00 CHANNEL SLOPE = 0.1593  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 65.36  
FLOW VELOCITY (FEET/SEC.) = 13.98 FLOW DEPTH (FEET) = 1.25  
TRAVEL TIME (MIN.) = 0.54 Tc (MIN.) = 10.68  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10330.00 = 2747.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10330.00 TO NODE 10330.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.68  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.798  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 4.20 0.30 0.500 -  
USER-DEFINED - 2.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.673  
SUBAREA AREA (ACRES) = 7.80 SUBAREA RUNOFF (CFS) = 18.22  
EFFECTIVE AREA (ACRES) = 34.60 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 34.6 PEAK FLOW RATE (CFS) = 81.64

\*\*\*\*\*

FLOW PROCESS FROM NODE 10330.00 TO NODE 10331.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 295.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 182.00 CHANNEL SLOPE = 0.0275  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 81.64  
FLOW VELOCITY(FEET/SEC.) = 7.62 FLOW DEPTH(FEET) = 1.89  
TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 11.08  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10331.00 = 2929.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10331.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 11.08  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.739  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 11.30 0.30 0.500 -  
USER-DEFINED - 0.20 0.30 0.600 -  
USER-DEFINED - 4.20 0.30 0.850 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.652  
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 43.49  
EFFECTIVE AREA(ACRES) = 53.60 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 53.6 PEAK FLOW RATE(CFS) = 123.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10332.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 295.00 DOWNSTREAM(FEET) = 245.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.00 CHANNEL SLOPE = 0.0542  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 123.29  
FLOW VELOCITY(FEET/SEC.) = 10.91 FLOW DEPTH(FEET) = 1.94  
TRAVEL TIME(MIN.) = 1.41 Tc(MIN.) = 12.49  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10332.00 = 3851.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10332.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 12.49  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.556  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.850 -

USER-DEFINED - 1.40 0.30 0.500 -  
USER-DEFINED - 15.40 0.30 0.850 -  
USER-DEFINED - 8.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.881  
SUBAREA AREA(ACRES) = 25.60 SUBAREA RUNOFF(CFS) = 52.81  
EFFECTIVE AREA(ACRES) = 79.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 79.2 PEAK FLOW RATE(CFS) = 167.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10333.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 199.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 564.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 167.30  
FLOW VELOCITY(FEET/SEC.) = 13.71 FLOW DEPTH(FEET) = 2.02  
TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 13.17  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10333.00 = 4415.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10333.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 13.17  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.481  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 0.500 -  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 5.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.761  
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 16.83  
EFFECTIVE AREA(ACRES) = 87.50 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 87.5 PEAK FLOW RATE(CFS) = 178.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10334.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 195.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 454.00 CHANNEL SLOPE = 0.0088  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 178.75  
FLOW VELOCITY(FEET/SEC.) = 6.05 FLOW DEPTH(FEET) = 3.14

TRAVEL TIME(MIN.) = 1.25 Tc(MIN.) = 14.43  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10334.00 = 4869.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10334.00 TO NODE 10334.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 14.43

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.352

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN

USER-DEFINED	-	1.10	0.30	0.800	-
USER-DEFINED	-	2.60	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835

SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 7.00

EFFECTIVE AREA(ACRES) = 91.20 AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71

TOTAL AREA(ACRES) = 91.2 PEAK FLOW RATE(CFS) = 178.75

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10334.00 TO NODE 10335.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 195.00 DOWNSTREAM(FEET) = 189.00

FLOW LENGTH(FEET) = 1291.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 63.0 INCH PIPE IS 48.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.07

ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 178.75

PIPE TRAVEL TIME(MIN.) = 2.14 Tc(MIN.) = 16.56

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 16.56

RAINFALL INTENSITY(INCH/HR) = 2.19

AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.71

EFFECTIVE STREAM AREA(ACRES) = 91.20

TOTAL STREAM AREA(ACRES) = 91.20

PEAK FLOW RATE(CFS) AT CONFLUENCE = 178.75

\*\* CONFLUENCE DATA \*\*

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE

--	--	--	--	--	--	--	--

1	197.84	13.42	2.454	0.30( 0.23)	0.77	90.3	10300.00
2	178.75	16.56	2.191	0.30( 0.21)	0.71	91.2	10320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	361.93	13.42	2.454	0.30( 0.22)	0.75	164.2	10300.00
2	353.12	16.56	2.191	0.30( 0.22)	0.74	181.5	10320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 361.93 Tc(MIN.) = 13.42

EFFECTIVE AREA(ACRES) = 164.18 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75

TOTAL AREA(ACRES) = 181.5

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10336.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 189.00 DOWNSTREAM(FEET) = 188.00

FLOW LENGTH(FEET) = 103.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.87

ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 361.93

PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 13.53

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10336.00 = 6263.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10336.00 TO NODE 10337.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 180.00

FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 54.0 INCH PIPE IS 44.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 25.97

ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 361.93

PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 13.66

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10337.00 = 6475.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10337.00 TO NODE 10338.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 161.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0218

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 361.93  
FLOW VELOCITY (FEET/SEC.) = 10.16 FLOW DEPTH (FEET) = 3.45  
TRAVEL TIME (MIN.) = 1.43 Tc (MIN.) = 15.09  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10338.00 = 7347.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.09  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.294  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.850 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.943  
SUBAREA AREA (ACRES) = 4.20 SUBAREA RUNOFF (CFS) = 7.60  
EFFECTIVE AREA (ACRES) = 168.38 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 185.7 PEAK FLOW RATE (CFS) = 361.93  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.09  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.294  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 8.97  
EFFECTIVE AREA (ACRES) = 173.38 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 190.7 PEAK FLOW RATE (CFS) = 361.93  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10339.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 161.00 DOWNSTREAM (FEET) = 159.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 328.00 CHANNEL SLOPE = 0.0061

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 361.93  
FLOW VELOCITY (FEET/SEC.) = 6.30 FLOW DEPTH (FEET) = 4.38  
TRAVEL TIME (MIN.) = 0.87 Tc (MIN.) = 15.96  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10339.00 = 7675.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.96  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.233  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 2.30 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.767  
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 12.44  
EFFECTIVE AREA (ACRES) = 180.28 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 361.93  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.96  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.233  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 6.30 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 2.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.876  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 16.31  
EFFECTIVE AREA (ACRES) = 189.48 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 206.8 PEAK FLOW RATE (CFS) = 361.93  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10390.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 159.00 DOWNSTREAM(FEET) = 155.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 782.00 CHANNEL SLOPE = 0.0051
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 361.93
FLOW VELOCITY(FEET/SEC.) = 5.90 FLOW DEPTH(FEET) = 4.52
TRAVEL TIME(MIN.) = 2.21 Tc(MIN.) = 18.17
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

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FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 18.17
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.078
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.30    0.30    0.800  -
USER-DEFINED        -        3.70    0.30    0.850  -
USER-DEFINED        -        0.10    0.30    1.000  -
USER-DEFINED        -        2.10    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.901
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 10.09
EFFECTIVE AREA(ACRES) = 195.68 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 213.0 PEAK FLOW RATE(CFS) = 361.93
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
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*****
FLOW PROCESS FROM NODE 10340.00 TO NODE 10341.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 585.00

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Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.581
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.813

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SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS  Tc
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE"  -        0.10    0.30    0.800  95  10.58
PUBLIC PARK        -        0.50    0.30    0.850  95  10.90
AGRICULTURAL GOOD COVER

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"ROW CROPS, STRAIGHT ROW" - 0.40 0.30 1.000 95 21.09
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA RUNOFF(CFS) = 2.29
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.29

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*****
FLOW PROCESS FROM NODE 10341.00 TO NODE 10342.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====

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UPSTREAM ELEVATION(FEET) = 585.00 DOWNSTREAM ELEVATION(FEET) = 570.00
STREET LENGTH(FEET) = 250.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.56

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STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.27
HALFSTREET FLOOD WIDTH(FEET) = 5.48
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.66
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.25
STREET FLOW TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 11.48
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.683

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.70    0.30    0.800  -
USER-DEFINED        -        1.40    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 4.54
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 6.71

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```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.00
FLOW VELOCITY(FEET/SEC.) = 4.94 DEPTH*VELOCITY(FT*FT/SEC.) = 1.47
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10342.00 = 558.00 FEET.

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*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
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UPSTREAM ELEVATION(FEET) = 570.00 DOWNSTREAM ELEVATION(FEET) = 560.00

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STREET LENGTH(FEET) = 415.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.10  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.36  
 HALfstREET FLOOD WIDTH(FEET) = 10.25  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.67  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.33  
 STREET FLOW TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 13.36  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.460  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.800	-
USER-DEFINED	-	1.20	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.825  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.78  
 EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
 TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 10.87

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.38 HALfstREET FLOOD WIDTH(FEET) = 11.12  
 FLOW VELOCITY(FEET/SEC.) = 3.81 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.45  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10343.00 = 973.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10343.00 TO NODE 10344.00 IS CODE = 63  
 -----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 4 USED)<<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 560.00 DOWNSTREAM ELEVATION(FEET) = 550.00  
 STREET LENGTH(FEET) = 616.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.43  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.42  
 HALfstREET FLOOD WIDTH(FEET) = 13.30  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.43  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.46  
 STREET FLOW TRAVEL TIME(MIN.) = 2.99 Tc(MIN.) = 16.35  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.205  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.30	0.800	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814  
 SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 5.12  
 EFFECTIVE AREA(ACRES) = 8.40 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 14.73

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.43 HALfstREET FLOOD WIDTH(FEET) = 13.81  
 FLOW VELOCITY(FEET/SEC.) = 3.51 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.53  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10344.00 = 1589.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10344.00 TO NODE 10345.00 IS CODE = 63  
 -----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 4 USED)<<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 550.00 DOWNSTREAM ELEVATION(FEET) = 510.00  
 STREET LENGTH(FEET) = 474.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.27  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.36  
 HALfstREET FLOOD WIDTH(FEET) = 10.30  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.90  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.51  
 STREET FLOW TRAVEL TIME(MIN.) = 1.14 Tc(MIN.) = 17.50  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.125  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.80	0.30	0.800	-
USER-DEFINED	-	0.20	0.30	0.850	-



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.09  
EFFECTIVE AREA(ACRES) = 11.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 11.4 PEAK FLOW RATE(CFS) = 19.21

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.81  
FLOW VELOCITY(FEET/SEC.) = 7.07 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.65  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10345.00 = 2063.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10345.00 TO NODE 10346.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 510.00 DOWNSTREAM ELEVATION(FEET) = 484.00  
STREET LENGTH(FEET) = 231.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.54

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.21  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 10.61  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.07  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.99  
STREET FLOW TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 17.98  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.092

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.40 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.00  
EFFECTIVE AREA(ACRES) = 13.80 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 13.8 PEAK FLOW RATE(CFS) = 22.87

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 10.96  
FLOW VELOCITY(FEET/SEC.) = 8.22 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.10  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10346.00 = 2294.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10346.00 TO NODE 10347.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 484.00 DOWNSTREAM ELEVATION(FEET) = 378.00  
STREET LENGTH(FEET) = 995.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.55

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.02  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.78  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.26  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.25  
STREET FLOW TRAVEL TIME(MIN.) = 2.01 Tc(MIN.) = 19.98  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.951

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 6.31  
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 27.43

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 12.03  
FLOW VELOCITY(FEET/SEC.) = 8.38 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.34  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10347.00 = 3289.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10347.00 TO NODE 10348.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 378.00 DOWNSTREAM ELEVATION(FEET) = 303.00  
STREET LENGTH(FEET) = 751.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.56

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.50  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.42  
HALFSTREET FLOOD WIDTH(FEET) = 13.30  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.55  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.63  
STREET FLOW TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 21.45  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.883

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.20 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 12.13  
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 38.47

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 14.11  
FLOW VELOCITY(FEET/SEC.) = 8.82 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.89  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10348.00 = 4040.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10348.00 TO NODE 10349.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 303.00 DOWNSTREAM ELEVATION(FEET) = 252.00  
STREET LENGTH(FEET) = 607.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.82  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.47  
HALFSTREET FLOOD WIDTH(FEET) = 15.73  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.60  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.07  
STREET FLOW TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 22.62  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.829  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.30 0.30 0.800 -  
USER-DEFINED - 3.00 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.815  
SUBAREA AREA(ACRES) = 10.30 SUBAREA RUNOFF(CFS) = 14.69  
EFFECTIVE AREA(ACRES) = 36.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 36.4 PEAK FLOW RATE(CFS) = 51.89

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 16.55  
FLOW VELOCITY(FEET/SEC.) = 8.86 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.33  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10349.00 = 4647.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10349.00 TO NODE 10350.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 252.00 DOWNSTREAM ELEVATION(FEET) = 246.00  
STREET LENGTH(FEET) = 224.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 61.09  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.60  
HALFSTREET FLOOD WIDTH(FEET) = 22.18  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.98  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.60  
STREET FLOW TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 23.25  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.801  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 12.60 0.30 0.800 -  
USER-DEFINED - 0.50 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.802  
SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 18.39  
EFFECTIVE AREA(ACRES) = 49.50 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 49.5 PEAK FLOW RATE(CFS) = 69.34

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 23.29  
FLOW VELOCITY(FEET/SEC.) = 6.18 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.85

LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10350.00 = 4871.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10350.00 TO NODE 10351.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 237.00  
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.19  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 69.34  
PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 23.90  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10351.00 = 5390.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10351.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.90  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.770  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 5.60 0.30 0.800 -  
USER-DEFINED - 0.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.784  
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 8.98  
EFFECTIVE AREA(ACRES) = 56.00 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 56.0 PEAK FLOW RATE(CFS) = 76.98

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10352.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 237.00 DOWNSTREAM(FEET) = 230.00  
FLOW LENGTH(FEET) = 675.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 30.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.95  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 76.98  
PIPE TRAVEL TIME(MIN.) = 1.03 Tc(MIN.) = 24.93  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10352.00 = 6065.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.93

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.723

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.00 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.300  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.06  
EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 76.98  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.93  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.723  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 0.100 -  
USER-DEFINED - 9.40 0.30 0.800 -  
USER-DEFINED - 1.10 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755  
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 15.22  
EFFECTIVE AREA(ACRES) = 68.70 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
TOTAL AREA(ACRES) = 68.7 PEAK FLOW RATE(CFS) = 91.88

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10353.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 230.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 33.20  
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 91.88  
PIPE TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 25.08  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10353.00 = 6366.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10353.00 TO NODE 10353.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 25.08  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.717  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 6.00 0.30 0.800 -  
 USER-DEFINED - 1.30 0.30 0.850 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.799  
 SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 9.84  
 EFFECTIVE AREA(ACRES) = 76.10 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 76.1 PEAK FLOW RATE(CFS) = 101.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10353.00 TO NODE 10354.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 172.00  
 FLOW LENGTH(FEET) = 458.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.22  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 101.35  
 PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 25.62  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10354.00 = 6824.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10354.00 TO NODE 10390.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 172.00 DOWNSTREAM(FEET) = 155.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00 CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 101.35  
 FLOW VELOCITY(FEET/SEC.) = 9.39 FLOW DEPTH(FEET) = 1.90  
 TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 26.35  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 26.35  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.674  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 0.100 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.100 -  
 USER-DEFINED - 0.90 0.30 0.850 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 2.73  
 EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
 TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 101.35  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 26.35  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.674  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 2.10 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.964  
 SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 4.74  
 EFFECTIVE AREA(ACRES) = 81.90 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 81.9 PEAK FLOW RATE(CFS) = 105.86

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 26.35  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.674  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.50 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 3.09  
 EFFECTIVE AREA(ACRES) = 84.40 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 84.4 PEAK FLOW RATE(CFS) = 108.95

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
 =====  
 \*\* MAIN STREAM CONFLUENCE DATA \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 108.95 26.35 1.674 0.30( 0.24) 0.80 84.4 10340.00  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	361.93	18.17	2.078	0.30 ( 0.23)	0.77	195.7	10300.00
2	353.12	21.35	1.888	0.30 ( 0.23)	0.76	213.0	10320.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	458.20	18.17	2.078	0.30 ( 0.23)	0.77	253.9	10300.00
2	454.55	21.35	1.888	0.30 ( 0.23)	0.77	281.4	10320.00
3	416.52	26.35	1.674	0.30 ( 0.23)	0.77	297.4	10340.00

TOTAL AREA (ACRES) = 297.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 458.20 Tc (MIN.) = 18.168  
EFFECTIVE AREA (ACRES) = 253.87 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
TOTAL AREA (ACRES) = 297.4  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10360.00 TO NODE 10361.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
ELEVATION DATA: UPSTREAM (FEET) = 337.00 DOWNSTREAM (FEET) = 292.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.697

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.795

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.30	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"GRASS"	-	0.50	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.10	0.30	1.000	95	10.70

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 2.02  
TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 2.02

\*\*\*\*\*

FLOW PROCESS FROM NODE 10361.00 TO NODE 10362.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 292.00 DOWNSTREAM (FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 199.00 CHANNEL SLOPE = 0.0101  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.02  
FLOW VELOCITY (FEET/SEC.) = 2.08 FLOW DEPTH (FEET) = 0.57  
TRAVEL TIME (MIN.) = 1.60 Tc (MIN.) = 12.29  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10362.00 = 529.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.29

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.578

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.26  
EFFECTIVE AREA (ACRES) = 2.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 4.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10363.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 290.00 DOWNSTREAM (FEET) = 288.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.10  
FLOW VELOCITY (FEET/SEC.) = 2.75 FLOW DEPTH (FEET) = 0.70  
TRAVEL TIME (MIN.) = 0.89 Tc (MIN.) = 13.18  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10363.00 = 676.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10363.00 TO NODE 10363.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.18  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.480  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.40 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 0.850 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.72  
 EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 8.64

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10363.00 TO NODE 10364.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 288.00 DOWNSTREAM(FEET) = 286.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.64  
 FLOW VELOCITY(FEET/SEC.) = 3.35 FLOW DEPTH(FEET) = 0.93  
 TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 13.91  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10364.00 = 823.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10364.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.91  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.399  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.40 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
 SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 3.60  
 EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 11.92

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10365.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 286.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 11.92  
 FLOW VELOCITY(FEET/SEC.) = 2.98 FLOW DEPTH(FEET) = 1.15  
 TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 15.30  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10365.00 = 1071.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10365.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.30  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.279  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.90 0.30 1.000 -  
 USER-DEFINED - 1.80 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.850 -  
 USER-DEFINED - 0.50 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 6.25  
 EFFECTIVE AREA(ACRES) = 9.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 17.49

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10366.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 17.49  
 FLOW VELOCITY(FEET/SEC.) = 3.28 FLOW DEPTH(FEET) = 1.33  
 TRAVEL TIME(MIN.) = 1.26 Tc(MIN.) = 16.56  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10366.00 = 1319.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10366.00 TO NODE 10366.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.56  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.191  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.20 0.30 1.000 -  
 USER-DEFINED - 2.30 0.30 1.000 -

USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 2.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995  
SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 14.48  
EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 31.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 10366.00 TO NODE 10367.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 279.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 292.00 CHANNEL SLOPE = 0.0103  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.19  
FLOW VELOCITY (FEET/SEC.) = 4.14 FLOW DEPTH (FEET) = 1.58  
TRAVEL TIME (MIN.) = 1.17 Tc (MIN.) = 17.73  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10367.00 = 1611.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10367.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.73

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.109

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972

SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 2.62

EFFECTIVE AREA (ACRES) = 19.90 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 19.9 PEAK FLOW RATE (CFS) = 32.45

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10368.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 279.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 378.00 CHANNEL SLOPE = 0.0079  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 32.45  
FLOW VELOCITY (FEET/SEC.) = 3.79 FLOW DEPTH (FEET) = 1.69

TRAVEL TIME (MIN.) = 1.66 Tc (MIN.) = 19.40  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10368.00 = 1989.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10368.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 19.40

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.992

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.973

SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 3.37

EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 33.73

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10369.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 247.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 229.00 CHANNEL SLOPE = 0.1266  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 33.73  
FLOW VELOCITY (FEET/SEC.) = 10.86 FLOW DEPTH (FEET) = 1.02  
TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 19.75  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10369.00 = 2218.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10369.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 19.75

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.968

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	9.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996

SUBAREA AREA (ACRES) = 11.60 SUBAREA RUNOFF (CFS) = 17.42

EFFECTIVE AREA (ACRES) = 33.70 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 33.7 PEAK FLOW RATE (CFS) = 50.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10369.00 TO NODE 10370.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	247.00	DOWNSTREAM(FEET) =	226.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	179.00	CHANNEL SLOPE =	0.1173
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH(FEET) =	2.00
CHANNEL FLOW THRU SUBAREA(CFS) =	50.67		
FLOW VELOCITY(FEET/SEC.) =	11.68	FLOW DEPTH(FEET) =	1.20
TRAVEL TIME(MIN.) =	0.26	Tc(MIN.) =	20.00
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10370.00 =	2397.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10370.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) =	20.00				
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	1.950				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	3.60	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	5.60	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.997				
SUBAREA AREA(ACRES) =	11.10	SUBAREA RUNOFF(CFS) =	16.49		
EFFECTIVE AREA(ACRES) =	44.80	AREA-AVERAGED Fm(INCH/HR) =	0.30		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.99		
TOTAL AREA(ACRES) =	44.8	PEAK FLOW RATE(CFS) =	66.62		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10371.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	226.00	DOWNSTREAM(FEET) =	188.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	434.00	CHANNEL SLOPE =	0.0876
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH(FEET) =	2.00
CHANNEL FLOW THRU SUBAREA(CFS) =	66.62		
FLOW VELOCITY(FEET/SEC.) =	11.19	FLOW DEPTH(FEET) =	1.41
TRAVEL TIME(MIN.) =	0.65	Tc(MIN.) =	20.65
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10371.00 =	2831.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10371.00 TO NODE 10371.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.65  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.920  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.20	0.30	0.850	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	7.20	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.958				
SUBAREA AREA(ACRES) =	10.70	SUBAREA RUNOFF(CFS) =	15.72		
EFFECTIVE AREA(ACRES) =	55.50	AREA-AVERAGED Fm(INCH/HR) =	0.30		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.99		
TOTAL AREA(ACRES) =	55.5	PEAK FLOW RATE(CFS) =	81.14		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10371.00 TO NODE 10389.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	188.00	DOWNSTREAM(FEET) =	157.00
FLOW LENGTH(FEET) =	1918.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	39.0 INCH PIPE IS	26.7 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) =	13.38		
ESTIMATED PIPE DIAMETER(INCH) =	39.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	81.14		
PIPE TRAVEL TIME(MIN.) =	2.39	Tc(MIN.) =	23.04
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 =	4749.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS =	2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:	
TIME OF CONCENTRATION(MIN.) =	23.04
RAINFALL INTENSITY(INCH/HR) =	1.81
AREA-AVERAGED Fm(INCH/HR) =	0.30
AREA-AVERAGED Fp(INCH/HR) =	0.30
AREA-AVERAGED Ap =	0.99
EFFECTIVE STREAM AREA(ACRES) =	55.50
TOTAL STREAM AREA(ACRES) =	55.50
PEAK FLOW RATE(CFS) AT CONFLUENCE =	81.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10380.00 TO NODE 10381.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) =	241.00		
ELEVATION DATA: UPSTREAM(FEET) =	275.00	DOWNSTREAM(FEET) =	273.00



Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.110  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.531  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.30	0.100	95	7.11
PUBLIC PARK	-	1.10	0.30	0.850	95	11.30

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.735  
 SUBAREA RUNOFF(CFS) = 3.87  
 TOTAL AREA(ACRES) = 1.30 PEAK FLOW RATE(CFS) = 3.87

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10381.00 TO NODE 10382.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 273.00 DOWNSTREAM ELEVATION(FEET) = 271.00  
 STREET LENGTH(FEET) = 238.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.09  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.37  
 HALFSTREET FLOOD WIDTH(FEET) = 10.82  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.24  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.84  
 STREET FLOW TRAVEL TIME(MIN.) = 1.77 Tc(MIN.) = 8.88

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.106  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	1.40	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.718  
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 4.42  
 EFFECTIVE AREA(ACRES) = 3.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 7.80

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 12.15  
 FLOW VELOCITY(FEET/SEC.) = 2.34 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.94  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10382.00 = 479.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10382.00 TO NODE 10383.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 271.00 DOWNSTREAM ELEVATION(FEET) = 268.00  
 STREET LENGTH(FEET) = 357.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.29  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.44  
 HALFSTREET FLOOD WIDTH(FEET) = 14.18  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.57  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.13  
 STREET FLOW TRAVEL TIME(MIN.) = 2.32 Tc(MIN.) = 11.20  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.722

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	1.30	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.452  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 6.98  
 EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 13.74

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 15.35  
 FLOW VELOCITY(FEET/SEC.) = 2.70 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.26  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10383.00 = 836.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10383.00 TO NODE 10384.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 268.00 DOWNSTREAM ELEVATION(FEET) = 264.00  
 STREET LENGTH(FEET) = 473.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.07  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.50  
 HALFSTREET FLOOD WIDTH(FEET) = 17.15  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.89  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.45  
 STREET FLOW TRAVEL TIME(MIN.) = 2.73 Tc(MIN.) = 13.93  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.397

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.60	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 8.64  
 EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.57  
 TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 20.63

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 18.16  
 FLOW VELOCITY(FEET/SEC.) = 2.96 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.54  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10384.00 = 1309.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10384.00 TO NODE 10385.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 264.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
 STREET LENGTH(FEET) = 463.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.38  
 \*\*\*STREET FLOWING FULL\*\*\*

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.58  
 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.90  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.67  
 STREET FLOW TRAVEL TIME(MIN.) = 2.66 Tc(MIN.) = 16.59  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.189  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.600	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.650  
 SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 11.48  
 EFFECTIVE AREA(ACRES) = 16.70 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.7 PEAK FLOW RATE(CFS) = 30.18

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
 FLOW VELOCITY(FEET/SEC.) = 3.07 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.83  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10385.00 = 1772.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10385.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 16.59  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.189  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.37  
 EFFECTIVE AREA(ACRES) = 16.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.9 PEAK FLOW RATE(CFS) = 30.55

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10386.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 261.00 DOWNSTREAM(FEET) = 200.00  
 FLOW LENGTH(FEET) = 712.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.76  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 30.55

PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 17.19  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10386.00 = 2484.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.19

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.561

SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.49

EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60

TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 32.40

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.19

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	1.70	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.544

SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 7.32

EFFECTIVE AREA(ACRES) = 22.40 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59

TOTAL AREA(ACRES) = 22.4 PEAK FLOW RATE(CFS) = 39.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.19

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	2.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223

SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 6.55

EFFECTIVE AREA(ACRES) = 25.90 AREA-AVERAGED Fm(INCH/HR) = 0.16

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54

TOTAL AREA(ACRES) = 25.9 PEAK FLOW RATE(CFS) = 46.27

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.19

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.228

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 3.74

EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52

TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 50.01

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.19

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	0.850	-
USER-DEFINED	-	2.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225

SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.61

EFFECTIVE AREA(ACRES) = 30.90 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49

TOTAL AREA(ACRES) = 30.9 PEAK FLOW RATE(CFS) = 55.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.19  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.100 -  
USER-DEFINED - 1.50 0.30 0.600 -  
USER-DEFINED - 1.70 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.204  
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 13.51  
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 69.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10387.00 IS CODE = 31  
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 200.00 DOWNSTREAM(FEET) = 163.00  
FLOW LENGTH(FEET) = 1145.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.25  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 69.14  
PIPE TRAVEL TIME(MIN.) = 1.17 Tc(MIN.) = 18.37  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10387.00 = 3629.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.37  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.064  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.100 -  
USER-DEFINED - 23.80 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 0.100 -  
USER-DEFINED - 6.90 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.830  
SUBAREA AREA(ACRES) = 32.90 SUBAREA RUNOFF(CFS) = 53.75  
EFFECTIVE AREA(ACRES) = 71.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 71.0 PEAK FLOW RATE(CFS) = 120.08

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81  
=====

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.37  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.064  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 1.20 0.30 0.100 -  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.641  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 6.40  
EFFECTIVE AREA(ACRES) = 74.80 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 74.8 PEAK FLOW RATE(CFS) = 126.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10388.00 IS CODE = 31  
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 163.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.46  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 126.48  
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 18.50  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10388.00 = 3779.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.50  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.055  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.80 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.400 -  
USER-DEFINED - 0.60 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 10.92  
EFFECTIVE AREA(ACRES) = 80.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 80.9 PEAK FLOW RATE(CFS) = 136.79

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*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.055
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
    LAND USE         GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.10     0.30     0.100    -
USER-DEFINED         -        10.70     0.30     0.400    -
USER-DEFINED         -         2.30     0.30     0.850    -
USER-DEFINED         -         0.50     0.30     1.000    -
USER-DEFINED         -         0.30     0.30     1.000    -
USER-DEFINED         -         0.70     0.30     0.400    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.502
SUBAREA AREA(ACRES) = 14.60   SUBAREA RUNOFF(CFS) = 25.03
EFFECTIVE AREA(ACRES) = 95.50   AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 95.5     PEAK FLOW RATE(CFS) = 161.82

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.055
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
    LAND USE         GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.70     0.30     0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.70   SUBAREA RUNOFF(CFS) = 1.13
EFFECTIVE AREA(ACRES) = 96.20   AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 96.2     PEAK FLOW RATE(CFS) = 162.95

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10389.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 158.00   DOWNSTREAM(FEET) = 157.00
FLOW LENGTH(FEET) = 51.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.06
ESTIMATED PIPE DIAMETER(INCH) = 48.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 162.95
PIPE TRAVEL TIME(MIN.) = 0.05   Tc(MIN.) = 18.55
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10389.00 = 3830.00 FEET.

*****

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FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 18.55
RAINFALL INTENSITY(INCH/HR) = 2.05
AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.58
EFFECTIVE STREAM AREA(ACRES) = 96.20
TOTAL STREAM AREA(ACRES) = 96.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 162.95

** CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)    Ap    Ae    HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1          81.14 23.04  1.810 0.30( 0.30) 0.99  55.5 10360.00
2         162.95 18.55  2.052 0.30( 0.17) 0.58  96.2 10380.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)    Ap    Ae    HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1         238.69 18.55  2.052 0.30( 0.21) 0.71  140.9 10380.00
2         223.14 23.04  1.810 0.30( 0.22) 0.73  151.7 10360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 238.69   Tc(MIN.) = 18.55
EFFECTIVE AREA(ACRES) = 140.88   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 151.7
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

*****
FLOW PROCESS FROM NODE 10389.00 TO NODE 10390.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 157.00   DOWNSTREAM(FEET) = 155.00
FLOW LENGTH(FEET) = 312.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 50.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.20
ESTIMATED PIPE DIAMETER(INCH) = 66.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 238.69
PIPE TRAVEL TIME(MIN.) = 0.43   Tc(MIN.) = 18.97
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

MAINLINE Tc(MIN.) = 18.97  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.022  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 5.70 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 14.73  
 EFFECTIVE AREA(ACRES) = 150.38 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 161.2 PEAK FLOW RATE(CFS) = 244.21

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.97  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.022  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 3.41  
 EFFECTIVE AREA(ACRES) = 152.58 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 163.4 PEAK FLOW RATE(CFS) = 247.62

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	247.62	18.97	2.022	0.30( 0.22)	0.73	152.6	10380.00
2	230.33	23.48	1.790	0.30( 0.22)	0.75	163.4	10360.00

LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	458.20	18.17	2.078	0.30( 0.23)	0.77	253.9	10300.00
2	454.55	21.35	1.888	0.30( 0.23)	0.77	281.4	10320.00
3	416.52	26.35	1.674	0.30( 0.23)	0.77	297.4	10340.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	702.74	18.17	2.078	0.30( 0.23)	0.76	400.0	10300.00
2	704.90	18.97	2.022	0.30( 0.23)	0.76	413.4	10380.00
3	693.05	21.35	1.888	0.30( 0.23)	0.76	439.7	10320.00
4	668.71	23.48	1.790	0.30( 0.23)	0.76	451.6	10360.00
5	629.78	26.35	1.674	0.30( 0.23)	0.76	460.8	10340.00

TOTAL AREA(ACRES) = 460.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 704.90 Tc(MIN.) = 18.971  
 EFFECTIVE AREA(ACRES) = 413.39 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA(ACRES) = 460.8  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12  
 -----

>>>>CLEAR MEMORY BANK # 1 <<<<<

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 460.8 TC(MIN.) = 18.97  
 EFFECTIVE AREA(ACRES) = 413.39 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.758  
 PEAK FLOW RATE(CFS) = 704.90

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	702.74	18.17	2.078	0.30( 0.23)	0.76	400.0	10300.00
2	704.90	18.97	2.022	0.30( 0.23)	0.76	413.4	10380.00
3	693.05	21.35	1.888	0.30( 0.23)	0.76	439.7	10320.00
4	668.71	23.48	1.790	0.30( 0.23)	0.76	451.6	10360.00
5	629.78	26.35	1.674	0.30( 0.23)	0.76	460.8	10340.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506104C.DAT  
TIME/DATE OF STUDY: 12:47 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.310
- 2) 6.00; 3.880
- 3) 7.00; 3.560
- 4) 8.00; 3.300
- 5) 9.00; 3.080
- 6) 10.00; 2.900
- 7) 11.00; 2.750
- 8) 12.00; 2.610
- 9) 13.00; 2.500
- 10) 14.00; 2.390
- 11) 15.00; 2.300
- 12) 20.00; 1.950
- 13) 25.00; 1.720
- 14) 30.00; 1.550
- 15) 40.00; 1.310
- 16) 50.00; 1.160
- 17) 60.00; 1.040
- 18) 90.00; 0.830
- 19) 120.00; 0.700
- 20) 180.00; 0.560

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10400.00 TO NODE 10401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00  
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.434  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.741  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
PUBLIC PARK	-	0.50	0.30	0.850	95	6.43

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.850  
 SUBAREA RUNOFF(CFS) = 1.57  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 10401.00 TO NODE 10402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.3419  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.57  
 FLOW VELOCITY(FEET/SEC.) = 5.79 FLOW DEPTH(FEET) = 0.30  
 TRAVEL TIME(MIN.) = 0.34  $T_c$ (MIN.) = 6.77  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10402.00 = 424.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 6.77  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.634  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.940  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.51  
EFFECTIVE AREA(ACRES) = 1.00 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 3.03

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10402.00 TO NODE 10403.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.2439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.03  
FLOW VELOCITY(FEET/SEC.) = 6.09 FLOW DEPTH(FEET) = 0.41  
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 7.11  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10403.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10403.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.11  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.532  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 2.64  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 5.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10404.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 420.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 266.00 CHANNEL SLOPE = 0.1880  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 5.58  
FLOW VELOCITY(FEET/SEC.) = 6.45 FLOW DEPTH(FEET) = 0.54  
TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 7.79  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10404.00 = 813.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.79  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.532  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.863  
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 6.41  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 11.68

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10405.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 370.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 289.00 CHANNEL SLOPE = 0.1730  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 11.68  
FLOW VELOCITY(FEET/SEC.) = 7.51 FLOW DEPTH(FEET) = 0.72  
TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 8.44  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10405.00 = 1102.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.44  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.204  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 10.62  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 21.73

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10406.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 367.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 23.00 CHANNEL SLOPE = 0.1304

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 21.73  
FLOW VELOCITY (FEET/SEC.) = 7.92 FLOW DEPTH (FEET) = 0.96  
TRAVEL TIME (MIN.) = 0.05 Tc (MIN.) = 8.48  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10406.00 = 1125.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.48  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.193  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 5.55  
EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 27.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 367.00 DOWNSTREAM (FEET) = 344.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 214.00 CHANNEL SLOPE = 0.1075  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 27.20  
FLOW VELOCITY (FEET/SEC.) = 7.79 FLOW DEPTH (FEET) = 1.08  
TRAVEL TIME (MIN.) = 0.46 Tc (MIN.) = 8.94  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10407.00 = 1339.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.94  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.093  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 5.11  
EFFECTIVE AREA (ACRES) = 12.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 31.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 344.00 DOWNSTREAM (FEET) = 327.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 919.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.38  
FLOW VELOCITY (FEET/SEC.) = 5.17 FLOW DEPTH (FEET) = 1.42  
TRAVEL TIME (MIN.) = 2.96 Tc (MIN.) = 11.90  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10408.00 = 2258.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10408.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.90  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.624  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.800 -  
USER-DEFINED - 7.90 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.849  
SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 17.06  
EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 43.24

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 327.00 DOWNSTREAM (FEET) = 314.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 807.00 CHANNEL SLOPE = 0.0161  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 43.24  
FLOW VELOCITY (FEET/SEC.) = 5.33 FLOW DEPTH (FEET) = 1.65  
TRAVEL TIME (MIN.) = 2.53 Tc (MIN.) = 14.43  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10409.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10409.00 TO NODE 10409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 14.43  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.351  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.90 0.30 0.800 -  
 USER-DEFINED - 5.70 0.30 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.823  
 SUBAREA AREA (ACRES) = 12.60 SUBAREA RUNOFF (CFS) = 23.87  
 EFFECTIVE AREA (ACRES) = 32.90 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA (ACRES) = 32.9 PEAK FLOW RATE (CFS) = 62.14

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10409.00 TO NODE 10410.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 314.00 DOWNSTREAM(FEET) = 266.00  
 FLOW LENGTH(FEET) = 213.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 33.42  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 62.14  
 PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 14.53  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10410.00 = 3278.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10410.00 TO NODE 10411.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 266.00 DOWNSTREAM(FEET) = 170.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1470.00 CHANNEL SLOPE = 0.0653  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 62.14  
 FLOW VELOCITY(FEET/SEC.) = 9.90 FLOW DEPTH(FEET) = 1.45  
 TRAVEL TIME(MIN.) = 2.48 Tc(MIN.) = 17.01  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10411.00 = 4748.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10411.00 TO NODE 10411.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc(MIN.) = 17.01  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.159  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	6.60	0.30	0.800	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.723  
 SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 14.86

EFFECTIVE AREA (ACRES) = 41.40 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 41.4 PEAK FLOW RATE (CFS) = 71.30

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10411.00 TO NODE 10412.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 170.00 DOWNSTREAM(FEET) = 161.00  
 FLOW LENGTH(FEET) = 1129.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.92  
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 71.30  
 PIPE TRAVEL TIME(MIN.) = 1.90 Tc(MIN.) = 18.91  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10412.00 = 5877.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10412.00 TO NODE 10413.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 161.00 DOWNSTREAM(FEET) = 141.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 360.00 CHANNEL SLOPE = 0.0556  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 71.30  
 FLOW VELOCITY(FEET/SEC.) = 9.59 FLOW DEPTH(FEET) = 1.57  
 TRAVEL TIME(MIN.) = 0.63 Tc(MIN.) = 19.53  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10413.00 = 6237.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10413.00 TO NODE 10413.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc(MIN.) = 19.53  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.983  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.509  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 4.78  
 EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA (ACRES) = 44.3 PEAK FLOW RATE (CFS) = 71.30  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 44.3 TC (MIN.) = 19.53  
EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.798  
PEAK FLOW RATE (CFS) = 71.30

=====  
=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506105J.DAT  
TIME/DATE OF STUDY: 12:50 04/15/2013  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.310
- 2) 6.00; 3.880
- 3) 7.00; 3.560
- 4) 8.00; 3.300
- 5) 9.00; 3.080
- 6) 10.00; 2.900
- 7) 11.00; 2.750
- 8) 12.00; 2.610
- 9) 13.00; 2.500
- 10) 14.00; 2.390
- 11) 15.00; 2.300
- 12) 20.00; 1.950
- 13) 25.00; 1.720
- 14) 30.00; 1.550
- 15) 40.00; 1.310
- 16) 50.00; 1.160
- 17) 60.00; 1.040
- 18) 90.00; 0.830
- 19) 120.00; 0.700
- 20) 180.00; 0.560

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10500.00 TO NODE 10501.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 1123.00 DOWNSTREAM(FEET) = 1085.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.984  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.752  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.20	0.30	1.000	95	10.98
NATURAL FAIR COVER "GRASS"	-	0.30	0.30	1.000	95	10.98

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
 SUBAREA RUNOFF(CFS) = 1.10  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 10501.00 TO NODE 10502.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 1085.00 DOWNSTREAM(FEET) = 1050.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 181.00 CHANNEL SLOPE = 0.1934  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.10  
 FLOW VELOCITY(FEET/SEC.) = 4.29 FLOW DEPTH(FEET) = 0.29  
 TRAVEL TIME(MIN.) = 0.70  $T_c$ (MIN.) = 11.69  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10502.00 = 507.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10502.00 TO NODE 10502.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 11.69  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.654  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.10     0.30      1.000     -
USER-DEFINED  -        0.80     0.30      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90    SUBAREA RUNOFF (CFS) = 1.91
EFFECTIVE AREA (ACRES) = 1.40  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.4      PEAK FLOW RATE (CFS) = 2.97

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*****
FLOW PROCESS FROM NODE 10502.00 TO NODE 10503.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1025.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 193.00  CHANNEL SLOPE = 0.1295
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.97
FLOW VELOCITY(FEET/SEC.) = 4.82  FLOW DEPTH(FEET) = 0.45
TRAVEL TIME(MIN.) = 0.67  Tc(MIN.) = 12.36
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10503.00 = 700.00 FEET.

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10503.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.36
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.571
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.50   0.30  1.000  -
USER-DEFINED      -        1.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30    SUBAREA RUNOFF (CFS) = 4.70
EFFECTIVE AREA (ACRES) = 3.70  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 3.7      PEAK FLOW RATE (CFS) = 7.56

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10504.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 1025.00  DOWNSTREAM(FEET) = 1020.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00  CHANNEL SLOPE = 0.0151
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.56
FLOW VELOCITY(FEET/SEC.) = 3.35  FLOW DEPTH(FEET) = 0.87
TRAVEL TIME(MIN.) = 1.65  Tc(MIN.) = 14.00
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10504.00 = 1032.00 FEET.

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10504.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.390
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.10   0.30  1.000  -
USER-DEFINED      -        0.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90    SUBAREA RUNOFF (CFS) = 1.69
EFFECTIVE AREA (ACRES) = 4.60  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.6      PEAK FLOW RATE (CFS) = 8.65

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10505.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 1020.00  DOWNSTREAM(FEET) = 975.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 397.00  CHANNEL SLOPE = 0.1134
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 8.65
FLOW VELOCITY(FEET/SEC.) = 7.44  FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 0.89  Tc(MIN.) = 14.89
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10505.00 = 1429.00 FEET.

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10505.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.89
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.309
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.20   0.30  1.000  -
USER-DEFINED      -        1.20   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.40    SUBAREA RUNOFF (CFS) = 2.53
EFFECTIVE AREA (ACRES) = 6.00  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.0      PEAK FLOW RATE (CFS) = 10.85

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10506.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 905.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 334.00 CHANNEL SLOPE = 0.2096
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.85
FLOW VELOCITY(FEET/SEC.) = 9.86 FLOW DEPTH(FEET) = 0.61
TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 15.46
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10506.00 = 1763.00 FEET.

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10506.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.46
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.268
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap   SCS
LAND USE           GROUP  (ACRES)  (INCH/HR)  (DECIMAL) CN
USER-DEFINED       -        6.10    0.30    1.000    -
USER-DEFINED       -        3.70    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 17.36
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 27.98

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10507.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 790.00 CHANNEL SLOPE = 0.0380
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 27.98
FLOW VELOCITY(FEET/SEC.) = 5.32 FLOW DEPTH(FEET) = 1.32
TRAVEL TIME(MIN.) = 2.48 Tc(MIN.) = 17.94
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10507.00 = 2553.00 FEET.

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10507.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 17.94
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.095
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap   SCS
LAND USE           GROUP  (ACRES)  (INCH/HR)  (DECIMAL) CN
USER-DEFINED       -        2.70    0.30    1.000    -
USER-DEFINED       -        6.30    0.30    1.000    -
USER-DEFINED       -        0.30    0.30    1.000    -

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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 15.02
EFFECTIVE AREA(ACRES) = 25.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 40.54

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10508.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 755.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 40.54
FLOW VELOCITY(FEET/SEC.) = 8.59 FLOW DEPTH(FEET) = 1.25
TRAVEL TIME(MIN.) = 2.17 Tc(MIN.) = 20.11
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10508.00 = 3673.00 FEET.

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10508.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 20.11
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.945
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap   SCS
LAND USE           GROUP  (ACRES)  (INCH/HR)  (DECIMAL) CN
USER-DEFINED       -        0.80    0.30    1.000    -
USER-DEFINED       -       11.10    0.30    1.000    -
USER-DEFINED       -        3.10    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 22.21
EFFECTIVE AREA(ACRES) = 40.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 59.37

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10509.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 755.00 DOWNSTREAM(FEET) = 533.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1578.00 CHANNEL SLOPE = 0.1407
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 59.37
FLOW VELOCITY(FEET/SEC.) = 10.45 FLOW DEPTH(FEET) = 1.38
TRAVEL TIME(MIN.) = 2.52 Tc(MIN.) = 22.62
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10509.00 = 5251.00 FEET.

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FLOW PROCESS FROM NODE 10509.00 TO NODE 10509.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.62

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.829

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.80	0.30	1.000	-
USER-DEFINED	-	11.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	8.30	0.30	1.000	-
USER-DEFINED	-	38.10	0.30	1.000	-
USER-DEFINED	-	8.70	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 77.40 SUBAREA RUNOFF (CFS) = 106.53

EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 161.73

\*\*\*\*\*

FLOW PROCESS FROM NODE 10509.00 TO NODE 10510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 415.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1236.00 CHANNEL SLOPE = 0.0955  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 161.73  
 FLOW VELOCITY (FEET/SEC.) = 11.62 FLOW DEPTH (FEET) = 2.15  
 TRAVEL TIME (MIN.) = 1.77 Tc (MIN.) = 24.40  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10510.00 = 6487.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 24.40

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.748

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	30.10	0.30	1.000	-
USER-DEFINED	-	15.30	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	11.30	0.30	1.000	-
USER-DEFINED	-	5.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 64.90 SUBAREA RUNOFF (CFS) = 84.56

EFFECTIVE AREA (ACRES) = 182.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 182.4 PEAK FLOW RATE (CFS) = 237.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10511.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1161.00 CHANNEL SLOPE = 0.0973  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 237.66  
 FLOW VELOCITY (FEET/SEC.) = 12.91 FLOW DEPTH (FEET) = 2.48  
 TRAVEL TIME (MIN.) = 1.50 Tc (MIN.) = 25.90  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10511.00 = 7648.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10511.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 25.90

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.690

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.50	0.30	1.000	-
USER-DEFINED	-	10.80	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	22.10	0.30	1.000	-
USER-DEFINED	-	4.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 54.80 SUBAREA RUNOFF (CFS) = 68.53

EFFECTIVE AREA (ACRES) = 237.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 237.2 PEAK FLOW RATE (CFS) = 296.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 302.00 DOWNSTREAM (FEET) = 190.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1644.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 296.65  
 FLOW VELOCITY (FEET/SEC.) = 11.93 FLOW DEPTH (FEET) = 2.88  
 TRAVEL TIME (MIN.) = 2.30 Tc (MIN.) = 28.19  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10512.00 = 9292.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10512.00 TO NODE 10512.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<



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=====
MAINLINE Tc(MIN.) = 28.19
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.611
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        0.50     0.30     1.000     -
USER-DEFINED          -        0.20     0.30     1.000     -
USER-DEFINED          -        1.70     0.30     1.000     -
USER-DEFINED          -        0.10     0.30     1.000     -
USER-DEFINED          -       14.20     0.30     1.000     -
USER-DEFINED          -        2.80     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 19.50      SUBAREA RUNOFF(CFS) = 23.02
EFFECTIVE AREA(ACRES) = 256.70   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 256.7        PEAK FLOW RATE(CFS) = 302.99

*****
FLOW PROCESS FROM NODE 10512.00 TO NODE 10513.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 190.00  DOWNSTREAM(FEET) = 183.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 86.00  CHANNEL SLOPE = 0.0814
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 4.00
CHANNEL FLOW THRU SUBAREA(CFS) = 302.99
FLOW VELOCITY(FEET/SEC.) = 12.84  FLOW DEPTH(FEET) = 2.80
TRAVEL TIME(MIN.) = 0.11  Tc(MIN.) = 28.31
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10513.00 = 9378.00 FEET.

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 28.31
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.608
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        0.10     0.30     0.100     -
USER-DEFINED          -        1.30     0.30     1.000     -
USER-DEFINED          -       29.90     0.30     1.000     -
USER-DEFINED          -       11.90     0.30     1.000     -
USER-DEFINED          -        1.70     0.30     1.000     -
USER-DEFINED          -        0.60     0.30     0.100     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 45.50      SUBAREA RUNOFF(CFS) = 53.72
EFFECTIVE AREA(ACRES) = 302.20   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 302.2        PEAK FLOW RATE(CFS) = 355.84

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FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 28.31
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.608
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        9.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30      SUBAREA RUNOFF(CFS) = 10.95
EFFECTIVE AREA(ACRES) = 311.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 311.5        PEAK FLOW RATE(CFS) = 366.78

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10514.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 183.00  DOWNSTREAM(FEET) = 171.00
FLOW LENGTH(FEET) = 1209.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.05
ESTIMATED PIPE DIAMETER(INCH) = 72.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 366.78
PIPE TRAVEL TIME(MIN.) = 1.26  Tc(MIN.) = 29.56
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10514.00 = 10587.00 FEET.

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10514.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 29.56
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.565
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        0.20     0.30     0.100     -
USER-DEFINED          -        0.40     0.30     1.000     -
USER-DEFINED          -        1.70     0.30     0.100     -
USER-DEFINED          -       31.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 33.60      SUBAREA RUNOFF(CFS) = 38.72
EFFECTIVE AREA(ACRES) = 345.10   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 345.1        PEAK FLOW RATE(CFS) = 393.53

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10515.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

ELEVATION DATA: UPSTREAM(FEET) = 171.00 DOWNSTREAM(FEET) = 165.00  
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 72.0 INCH PIPE IS 56.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.66  
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 393.53  
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 30.13  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10515.00 = 11152.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10515.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 30.13  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.547  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 1.30 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 15.30 0.30 0.100 -  
USER-DEFINED - 1.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.202  
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 25.68  
EFFECTIVE AREA(ACRES) = 364.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 364.3 PEAK FLOW RATE(CFS) = 413.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10525.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 709.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 75.0 INCH PIPE IS 57.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.48  
ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 413.64  
PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 30.84  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 30.84  
RAINFALL INTENSITY(INCH/HR) = 1.53  
AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.95  
EFFECTIVE STREAM AREA(ACRES) = 364.30  
TOTAL STREAM AREA(ACRES) = 364.30  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 413.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10520.00 TO NODE 10521.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 289.00  
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 180.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.311  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.479  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL - 0.30 0.30 0.100 95 7.31  
PUBLIC PARK - 1.20 0.30 0.850 95 11.62  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.700  
SUBAREA RUNOFF(CFS) = 4.41  
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 4.41

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10521.00 TO NODE 10522.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 180.00 DOWNSTREAM ELEVATION(FEET) = 176.00  
STREET LENGTH(FEET) = 408.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.50  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.52  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.47  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.96  
STREET FLOW TRAVEL TIME(MIN.) = 2.75 Tc(MIN.) = 10.06  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.890

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.60	0.30	0.100	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520  
SUBAREA AREA (ACRES) = 2.50 SUBAREA RUNOFF (CFS) = 6.15  
EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 9.77

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 12.93  
FLOW VELOCITY (FEET/SEC.) = 2.62 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.09  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10522.00 = 697.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10522.00 TO NODE 10523.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 176.00 DOWNSTREAM ELEVATION (FEET) = 173.00  
STREET LENGTH (FEET) = 333.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 16.04  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.48  
HALFSTREET FLOOD WIDTH (FEET) = 16.13  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.87  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.38  
STREET FLOW TRAVEL TIME (MIN.) = 1.93 Tc (MIN.) = 12.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.611

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.100 -  
USER-DEFINED - 4.70 0.30 0.100 -  
USER-DEFINED - 0.10 0.30 0.600 -  
USER-DEFINED - 0.10 0.30 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.109  
SUBAREA AREA (ACRES) = 5.40 SUBAREA RUNOFF (CFS) = 12.53  
EFFECTIVE AREA (ACRES) = 9.40 AREA-AVERAGED Fm (INCH/HR) = 0.09  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
TOTAL AREA (ACRES) = 9.4 PEAK FLOW RATE (CFS) = 21.29

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.52 HALFSTREET FLOOD WIDTH (FEET) = 18.16  
FLOW VELOCITY (FEET/SEC.) = 3.05 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.59  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10523.00 = 1030.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10523.00 TO NODE 10523.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 12.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.611  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.100 -  
USER-DEFINED - 1.90 0.30 0.850 -  
USER-DEFINED - 0.80 0.30 0.100 -  
USER-DEFINED - 4.80 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 4.90 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.785  
SUBAREA AREA (ACRES) = 12.70 SUBAREA RUNOFF (CFS) = 27.15  
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 48.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10523.00 TO NODE 10524.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 173.00 DOWNSTREAM (FEET) = 165.00  
FLOW LENGTH (FEET) = 736.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.1 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.00  
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 48.44  
PIPE TRAVEL TIME (MIN.) = 1.23 Tc (MIN.) = 13.22  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10524.00 = 1766.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10524.00 TO NODE 10524.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 13.22  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.475  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 0.100 -  
USER-DEFINED - 0.10 0.30 0.850 -  
USER-DEFINED - 0.90 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.850 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.308  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 3.86  
EFFECTIVE AREA(ACRES) = 23.90 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 23.9 PEAK FLOW RATE(CFS) = 49.61

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10524.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 623.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.17  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 49.61  
PIPE TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 14.24  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10525.00 = 2389.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.24  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.368  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 6.80 0.30 0.850 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 17.30  
EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64  
TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 64.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.24  
RAINFALL INTENSITY(INCH/HR) = 2.37  
AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.64  
EFFECTIVE STREAM AREA(ACRES) = 33.00

TOTAL STREAM AREA(ACRES) = 33.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 64.60

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	413.64	30.84	1.530	0.30( 0.29)	0.95	364.3	10500.00
2	64.60	14.24	2.368	0.30( 0.19)	0.64	33.0	10520.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	384.31	14.24	2.368	0.30( 0.27)	0.90	201.2	10520.00
2	453.34	30.84	1.530	0.30( 0.28)	0.93	397.3	10500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 453.34 Tc(MIN.) = 30.84  
EFFECTIVE AREA(ACRES) = 397.30 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
TOTAL AREA(ACRES) = 397.3  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10526.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 158.00 DOWNSTREAM(FEET) = 148.00  
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 63.95  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 453.34  
PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 30.85  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10526.00 = 11891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10526.00 TO NODE 10527.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 148.00 DOWNSTREAM(FEET) = 135.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 296.00 CHANNEL SLOPE = 0.0439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 453.34  
FLOW VELOCITY(FEET/SEC.) = 13.95 FLOW DEPTH(FEET) = 3.29  
TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 31.20  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10527.00 = 12187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 31.20  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.521  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.54  
 EFFECTIVE AREA(ACRES) = 398.70 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 398.7 PEAK FLOW RATE(CFS) = 453.34  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 31.20  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.521  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
 SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 5.41  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 403.6 PEAK FLOW RATE(CFS) = 453.34  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 403.6 TC(MIN.) = 31.20  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.927  
 PEAK FLOW RATE(CFS) = 453.34

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	385.37	14.62	2.334	0.30( 0.27)	0.90	207.5	10520.00
2	453.34	31.20	1.521	0.30( 0.28)	0.93	403.6	10500.00

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506106C.DAT  
TIME/DATE OF STUDY: 12:51 04/15/2013  
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--\*TIME-OF-CONCENTRATION MODEL\*--  
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Table with 10 columns: NO., HALF WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN- / OUT- / SIDE / SIDE / WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), LIP (FT), GEOMETRIES HIKE (FT), MANNING FACTOR (n). Rows 1-4.

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10600.00 TO NODE 10601.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 311.00  
ELEVATION DATA: UPSTREAM (FEET) = 166.00 DOWNSTREAM (FEET) = 164.00  
  
Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.602  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.810  
SUBAREA Tc AND LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" - 0.50 0.30 0.500 95 10.60  
PUBLIC PARK - 0.60 0.30 0.850 95 13.16  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.691  
SUBAREA RUNOFF (CFS) = 2.58  
TOTAL AREA (ACRES) = 1.10 PEAK FLOW RATE (CFS) = 2.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 10601.00 TO NODE 10602.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

=====

UPSTREAM ELEVATION (FEET) = 164.00 DOWNSTREAM ELEVATION (FEET) = 162.00  
STREET LENGTH (FEET) = 220.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00  
  
DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.87  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.35  
HALFSTREET FLOOD WIDTH (FEET) = 9.59  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.19

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.77  
 STREET FLOW TRAVEL TIME (MIN.) = 1.67 Tc (MIN.) = 12.27  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.580  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.517  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 4.58  
 EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.17  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 6.93

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.38 HALFSTREET FLOOD WIDTH (FEET) = 11.29  
 FLOW VELOCITY (FEET/SEC.) = 2.37 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.91  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10602.00 = 531.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10602.00 TO NODE 10603.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 162.00 DOWNSTREAM ELEVATION (FEET) = 159.00  
 STREET LENGTH (FEET) = 328.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.79  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.43  
 HALFSTREET FLOOD WIDTH (FEET) = 13.71  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.61  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.13  
 STREET FLOW TRAVEL TIME (MIN.) = 2.10 Tc (MIN.) = 14.37  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.357

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.500	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	2.40	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527  
 SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 7.72

EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 14.01

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.46 HALFSTREET FLOOD WIDTH (FEET) = 15.27  
 FLOW VELOCITY (FEET/SEC.) = 2.78 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.29  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10603.00 = 859.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10603.00 TO NODE 10604.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 159.00 DOWNSTREAM ELEVATION (FEET) = 155.00  
 STREET LENGTH (FEET) = 465.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 20.79  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.52  
 HALFSTREET FLOOD WIDTH (FEET) = 18.09  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.00  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.56  
 STREET FLOW TRAVEL TIME (MIN.) = 2.58 Tc (MIN.) = 16.95  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.163

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.30	0.500	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.513  
 SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 13.57  
 EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 26.34

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.56 HALFSTREET FLOOD WIDTH (FEET) = 19.88  
 FLOW VELOCITY (FEET/SEC.) = 3.18 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.77  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10604.00 = 1324.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10604.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.95
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.163
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.30    0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.10    SUBAREA RUNOFF(CFS) = 0.17
EFFECTIVE AREA(ACRES) = 14.70  AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 14.7    PEAK FLOW RATE(CFS) = 26.51

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10605.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 155.00  DOWNSTREAM(FEET) = 140.00
FLOW LENGTH(FEET) = 214.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.71
ESTIMATED PIPE DIAMETER(INCH) = 21.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 26.51
PIPE TRAVEL TIME(MIN.) = 0.20  Tc(MIN.) = 17.15
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10605.00 = 1538.00 FEET.

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10605.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.15
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.149
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20    0.30    0.100    -
USER-DEFINED        -         1.70    0.30    0.100    -
USER-DEFINED        -        10.20    0.30    0.800    -
USER-DEFINED        -         2.90    0.30    0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.682
SUBAREA AREA(ACRES) = 16.00  SUBAREA RUNOFF(CFS) = 28.00
EFFECTIVE AREA(ACRES) = 30.70  AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 30.7    PEAK FLOW RATE(CFS) = 54.33

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10606.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 140.00  DOWNSTREAM(FEET) = 133.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00  CHANNEL SLOPE = 0.0400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 54.33
FLOW VELOCITY(FEET/SEC.) = 7.91  FLOW DEPTH(FEET) = 1.51
TRAVEL TIME(MIN.) = 0.37  Tc(MIN.) = 17.52
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10606.00 = 1713.00 FEET.

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.52
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.124
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.30    0.500    -
USER-DEFINED        -         0.30    0.30    0.850    -
USER-DEFINED        -         0.10    0.30    1.000    -
USER-DEFINED        -         1.10    0.30    1.000    -
USER-DEFINED        -         0.10    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 1.80  SUBAREA RUNOFF(CFS) = 2.99
EFFECTIVE AREA(ACRES) = 32.50  AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 32.5    PEAK FLOW RATE(CFS) = 56.61

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.52
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.124
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.30    0.850    -
USER-DEFINED        -         1.20    0.30    1.000    -
USER-DEFINED        -         0.10    0.30    1.000    -
USER-DEFINED        -         1.80    0.30    1.000    -
USER-DEFINED        -         0.10    0.30    0.850    -
USER-DEFINED        -         0.20    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980
SUBAREA AREA(ACRES) = 3.80  SUBAREA RUNOFF(CFS) = 6.26
EFFECTIVE AREA(ACRES) = 36.30  AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.66
TOTAL AREA(ACRES) = 36.3    PEAK FLOW RATE(CFS) = 62.86

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81

```



-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.52

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.124

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.98

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.67

TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 63.85  
=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 36.9 TC(MIN.) = 17.52

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.670

PEAK FLOW RATE(CFS) = 63.85  
=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
 RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
 (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
 \* Rancho Mission Viejo ROMP Study \*  
 \* Storm Event: 50 Yr \*  
 \* From Node: 40300 To Node: 40313 \*  
 \*\*\*\*\*

FILE NAME: 0610403X.DAT  
 TIME/DATE OF STUDY: 09:33 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
 \*USER-DEFINED TABLED RAINFALL USED\*  
 NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.513
- 2) 10.00; 3.519
- 3) 15.00; 2.687
- 4) 20.00; 2.241
- 5) 25.00; 1.935
- 6) 30.00; 1.741
- 7) 40.00; 1.472
- 8) 50.00; 1.311
- 9) 60.00; 1.211
- 10) 90.00; 1.007
- 11) 120.00; 0.877
- 12) 180.00; 0.756
- 13) 360.00; 0.563
- 14) 1440.00; 0.248

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
- \*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40300.00 TO NODE 40301.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 316.00  
 ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 720.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.541  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.702  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.39	0.30	1.000	0	9.54

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 1.21  
 TOTAL AREA(ACRES) = 0.39 PEAK FLOW RATE(CFS) = 1.21

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40301.00 TO NODE 40302.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 675.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 191.00 CHANNEL SLOPE = 0.2356  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.503  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.88	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.48  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.77  
 AVERAGE FLOW DEPTH(FEET) = 0.38 TRAVEL TIME(MIN.) = 0.55  
 Tc(MIN.) = 10.09  
 SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 2.55  
 EFFECTIVE AREA(ACRES) = 1.28 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 1.3 PEAK FLOW RATE(CFS) = 3.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.44 FLOW VELOCITY(FEET/SEC.) = 6.35  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40302.00 = 507.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40302.00 TO NODE 40303.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 625.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 179.00 CHANNEL SLOPE = 0.2793  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.435

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.84	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.86

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.34

AVERAGE FLOW DEPTH(FEET) = 0.47 TRAVEL TIME(MIN.) = 0.41

Tc(MIN.) = 10.50

SUBAREA AREA(ACRES) = 0.84 SUBAREA RUNOFF(CFS) = 2.36

EFFECTIVE AREA(ACRES) = 2.12 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.1 PEAK FLOW RATE(CFS) = 5.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.51 FLOW VELOCITY(FEET/SEC.) = 7.70

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40303.00 = 686.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40303.00 TO NODE 40304.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 625.00 DOWNSTREAM(FEET) = 557.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.4224  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.391

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.94	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.06

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.14

AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 0.26

Tc(MIN.) = 10.76

SUBAREA AREA(ACRES) = 2.94 SUBAREA RUNOFF(CFS) = 8.18

EFFECTIVE AREA(ACRES) = 5.06 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.1 PEAK FLOW RATE(CFS) = 14.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.65 FLOW VELOCITY(FEET/SEC.) = 11.05

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40304.00 = 847.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40304.00 TO NODE 40305.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 557.00 DOWNSTREAM(FEET) = 548.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 42.00 CHANNEL SLOPE = 0.2143  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.378

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.68	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.39

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.91

AVERAGE FLOW DEPTH(FEET) = 0.78 TRAVEL TIME(MIN.) = 0.08

Tc(MIN.) = 10.84

SUBAREA AREA(ACRES) = 1.68 SUBAREA RUNOFF(CFS) = 4.65

EFFECTIVE AREA(ACRES) = 6.73 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 18.65

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.82 FLOW VELOCITY(FEET/SEC.) = 9.22

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40305.00 = 889.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40305.00 TO NODE 40306.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 548.00 DOWNSTREAM(FEET) = 515.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 217.00 CHANNEL SLOPE = 0.1521  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.309

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.67	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.98

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.68

AVERAGE FLOW DEPTH(FEET) = 0.98 TRAVEL TIME(MIN.) = 0.42

Tc(MIN.) = 11.26

SUBAREA AREA(ACRES) = 4.67 SUBAREA RUNOFF(CFS) = 12.66

EFFECTIVE AREA(ACRES) = 11.41 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.4 PEAK FLOW RATE (CFS) = 30.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.06 FLOW VELOCITY (FEET/SEC.) = 9.21  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40306.00 = 1106.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40306.00 TO NODE 40307.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 502.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 180.00 CHANNEL SLOPE = 0.0722  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.242

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.44	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 42.07  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.49  
AVERAGE FLOW DEPTH (FEET) = 1.37 TRAVEL TIME (MIN.) = 0.40  
Tc (MIN.) = 11.66  
SUBAREA AREA (ACRES) = 8.44 SUBAREA RUNOFF (CFS) = 22.35  
EFFECTIVE AREA (ACRES) = 19.84 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 19.8 PEAK FLOW RATE (CFS) = 52.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.49 FLOW VELOCITY (FEET/SEC.) = 7.88  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40307.00 = 1286.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40307.00 TO NODE 40308.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 502.00 DOWNSTREAM (FEET) = 469.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 553.00 CHANNEL SLOPE = 0.0597  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.045

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.07	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 65.00  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.79  
AVERAGE FLOW DEPTH (FEET) = 1.67 TRAVEL TIME (MIN.) = 1.18  
Tc (MIN.) = 12.84

SUBAREA AREA (ACRES) = 10.07 SUBAREA RUNOFF (CFS) = 24.89  
EFFECTIVE AREA (ACRES) = 29.92 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 29.9 PEAK FLOW RATE (CFS) = 73.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.75 FLOW VELOCITY (FEET/SEC.) = 8.03  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40308.00 = 1839.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40308.00 TO NODE 40309.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 469.00 DOWNSTREAM (FEET) = 433.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 631.00 CHANNEL SLOPE = 0.0571  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.831

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.09	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 84.28  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.15  
AVERAGE FLOW DEPTH (FEET) = 1.86 TRAVEL TIME (MIN.) = 1.29  
Tc (MIN.) = 14.13  
SUBAREA AREA (ACRES) = 9.09 SUBAREA RUNOFF (CFS) = 20.70  
EFFECTIVE AREA (ACRES) = 39.01 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 39.0 PEAK FLOW RATE (CFS) = 88.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.89 FLOW VELOCITY (FEET/SEC.) = 8.25  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40309.00 = 2470.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40309.00 TO NODE 40310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 433.00 DOWNSTREAM (FEET) = 406.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 595.00 CHANNEL SLOPE = 0.0454  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.651

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.61	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 101.13  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.85

AVERAGE FLOW DEPTH (FEET) = 2.07 TRAVEL TIME (MIN.) = 1.26  
Tc (MIN.) = 15.40  
SUBAREA AREA (ACRES) = 11.61 SUBAREA RUNOFF (CFS) = 24.57  
EFFECTIVE AREA (ACRES) = 50.62 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 50.6 PEAK FLOW RATE (CFS) = 107.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.12 FLOW VELOCITY (FEET/SEC.) = 7.96  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40310.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40310.00 TO NODE 40311.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 406.00 DOWNSTREAM (FEET) = 353.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1122.00 CHANNEL SLOPE = 0.0472  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.490  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 15.32 0.30 0.897 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 122.43  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.34  
AVERAGE FLOW DEPTH (FEET) = 1.99 TRAVEL TIME (MIN.) = 1.81  
Tc (MIN.) = 17.21  
SUBAREA AREA (ACRES) = 15.32 SUBAREA RUNOFF (CFS) = 30.63  
EFFECTIVE AREA (ACRES) = 65.94 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 65.9 PEAK FLOW RATE (CFS) = 130.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.03 FLOW VELOCITY (FEET/SEC.) = 10.51  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40311.00 = 4187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40311.00 TO NODE 40312.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 353.00 DOWNSTREAM (FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 843.00 CHANNEL SLOPE = 0.0451  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.375  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 26.00 0.30 0.886 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.886

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 155.08  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.81  
AVERAGE FLOW DEPTH (FEET) = 2.19 TRAVEL TIME (MIN.) = 1.30  
Tc (MIN.) = 18.51  
SUBAREA AREA (ACRES) = 26.00 SUBAREA RUNOFF (CFS) = 49.35  
EFFECTIVE AREA (ACRES) = 91.94 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA (ACRES) = 91.9 PEAK FLOW RATE (CFS) = 172.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.28 FLOW VELOCITY (FEET/SEC.) = 11.10  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40312.00 = 5030.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40312.00 TO NODE 40313.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 315.00 DOWNSTREAM (FEET) = 310.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 226.00 CHANNEL SLOPE = 0.0221  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.335  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.53 0.30 0.896 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.896  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 175.25  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.51  
AVERAGE FLOW DEPTH (FEET) = 2.62 TRAVEL TIME (MIN.) = 0.44  
Tc (MIN.) = 18.95  
SUBAREA AREA (ACRES) = 2.53 SUBAREA RUNOFF (CFS) = 4.71  
EFFECTIVE AREA (ACRES) = 94.47 AREA-AVERAGED Fm (INCH/HR) = 0.28  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA (ACRES) = 94.5 PEAK FLOW RATE (CFS) = 174.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.61 FLOW VELOCITY (FEET/SEC.) = 8.50  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40313.00 = 5256.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40313.00 TO NODE 40313.00 IS CODE = 81

-----  
>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 18.95  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.335  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 80.58 0.30 0.984 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
SUBAREA AREA (ACRES) = 80.58 SUBAREA RUNOFF (CFS) = 147.94  
EFFECTIVE AREA (ACRES) = 175.05 AREA-AVERAGED Fm (INCH/HR) = 0.29

AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.97  
TOTAL AREA (ACRES) = 175.0 PEAK FLOW RATE (CFS) = 322.28

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 175.0 TC (MIN.) = 18.95  
EFFECTIVE AREA (ACRES) = 175.05 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.29  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.965  
PEAK FLOW RATE (CFS) = 322.28

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 50 Yr \*  
\* From Node: 40400 To Node: 40453 \*  
\*\*\*\*\*

FILE NAME: 0610404X.DAT  
TIME/DATE OF STUDY: 09:33 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.513
- 2) 10.00; 3.519
- 3) 15.00; 2.687
- 4) 20.00; 2.241
- 5) 25.00; 1.935
- 6) 30.00; 1.741
- 7) 40.00; 1.472
- 8) 50.00; 1.311
- 9) 60.00; 1.211
- 10) 90.00; 1.007
- 11) 120.00; 0.877
- 12) 180.00; 0.756
- 13) 360.00; 0.563
- 14) 1440.00; 0.248

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40400.00 TO NODE 40401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 928.00 DOWNSTREAM(FEET) = 750.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.081  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.284  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.75	0.30	1.000	0	8.08

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.70  
TOTAL AREA(ACRES) = 0.75 PEAK FLOW RATE(CFS) = 2.70

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40401.00 TO NODE 40402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 710.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 107.00 CHANNEL SLOPE = 0.3738  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.195  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.17	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.76  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.99  
AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.22  
Tc(MIN.) = 8.30  
SUBAREA AREA(ACRES) = 1.17 SUBAREA RUNOFF(CFS) = 4.12  
EFFECTIVE AREA(ACRES) = 1.93 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 6.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.51 FLOW VELOCITY(FEET/SEC.) = 8.78  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40402.00 = 434.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40402.00 TO NODE 40403.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	710.00	DOWNSTREAM(FEET) =	675.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	127.00	CHANNEL SLOPE =	0.2756
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	4.094		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.05	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.54

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.33

AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 0.25

Tc(MIN.) = 8.56

SUBAREA AREA(ACRES) = 1.05 SUBAREA RUNOFF(CFS) = 3.57

EFFECTIVE AREA(ACRES) = 2.97 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 10.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 8.73

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40403.00 = 561.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40403.00 TO NODE 40404.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	675.00	DOWNSTREAM(FEET) =	650.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	113.00	CHANNEL SLOPE =	0.2212
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	4.006		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.95	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.41

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.57

AVERAGE FLOW DEPTH(FEET) = 0.72 TRAVEL TIME(MIN.) = 0.22

Tc(MIN.) = 8.78

SUBAREA AREA(ACRES) = 1.95 SUBAREA RUNOFF(CFS) = 6.50

EFFECTIVE AREA(ACRES) = 4.92 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 16.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.78 FLOW VELOCITY(FEET/SEC.) = 8.97

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40404.00 = 674.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40404.00 TO NODE 40405.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	650.00	DOWNSTREAM(FEET) =	610.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	219.00	CHANNEL SLOPE =	0.1826
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	3.841		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.15	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.84

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.80

AVERAGE FLOW DEPTH(FEET) = 0.87 TRAVEL TIME(MIN.) = 0.41

Tc(MIN.) = 9.19

SUBAREA AREA(ACRES) = 2.15 SUBAREA RUNOFF(CFS) = 6.84

EFFECTIVE AREA(ACRES) = 7.07 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 22.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.91 FLOW VELOCITY(FEET/SEC.) = 9.05

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40405.00 = 893.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40405.00 TO NODE 40406.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	610.00	DOWNSTREAM(FEET) =	605.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	43.00	CHANNEL SLOPE =	0.1163
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	3.805		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.10

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.99

AVERAGE FLOW DEPTH(FEET) = 1.06 TRAVEL TIME(MIN.) = 0.09

Tc(MIN.) = 9.28

SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 9.15

EFFECTIVE AREA(ACRES) = 9.97 AREA-AVERAGED Fm(INCH/HR) = 0.30



AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 10.0 PEAK FLOW RATE (CFS) = 31.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.12 FLOW VELOCITY (FEET/SEC.) = 8.29  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40406.00 = 936.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40406.00 TO NODE 40407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 605.00 DOWNSTREAM (FEET) = 602.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 52.00 CHANNEL SLOPE = 0.0577  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.754

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 38.46  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.75  
AVERAGE FLOW DEPTH (FEET) = 1.38 TRAVEL TIME (MIN.) = 0.13  
Tc (MIN.) = 9.41

SUBAREA AREA (ACRES) = 4.51 SUBAREA RUNOFF (CFS) = 14.02  
EFFECTIVE AREA (ACRES) = 14.48 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 14.5 PEAK FLOW RATE (CFS) = 45.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.46 FLOW VELOCITY (FEET/SEC.) = 7.02  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40407.00 = 988.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40407.00 TO NODE 40408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 602.00 DOWNSTREAM (FEET) = 559.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 533.00 CHANNEL SLOPE = 0.0807  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.438

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.99	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 53.46  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.27  
AVERAGE FLOW DEPTH (FEET) = 1.47 TRAVEL TIME (MIN.) = 1.07  
Tc (MIN.) = 10.48

SUBAREA AREA (ACRES) = 5.99 SUBAREA RUNOFF (CFS) = 16.90  
EFFECTIVE AREA (ACRES) = 20.47 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.5 PEAK FLOW RATE (CFS) = 57.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.51 FLOW VELOCITY (FEET/SEC.) = 8.47  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40408.00 = 1521.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40408.00 TO NODE 40409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 559.00 DOWNSTREAM (FEET) = 509.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 702.00 CHANNEL SLOPE = 0.0712  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.204

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.05	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 65.71  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.32  
AVERAGE FLOW DEPTH (FEET) = 1.62 TRAVEL TIME (MIN.) = 1.41  
Tc (MIN.) = 11.89

SUBAREA AREA (ACRES) = 6.05 SUBAREA RUNOFF (CFS) = 15.81  
EFFECTIVE AREA (ACRES) = 26.51 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.5 PEAK FLOW RATE (CFS) = 69.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.65 FLOW VELOCITY (FEET/SEC.) = 8.46  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40409.00 = 2223.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40409.00 TO NODE 40447.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 509.00 DOWNSTREAM (FEET) = 482.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 440.00 CHANNEL SLOPE = 0.0614  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.055

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.09	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 76.85  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.20

AVERAGE FLOW DEPTH(FEET) = 1.77 TRAVEL TIME(MIN.) = 0.89  
Tc(MIN.) = 12.78  
SUBAREA AREA(ACRES) = 6.09 SUBAREA RUNOFF(CFS) = 15.09  
EFFECTIVE AREA(ACRES) = 32.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 32.6 PEAK FLOW RATE(CFS) = 80.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.80 FLOW VELOCITY(FEET/SEC.) = 8.29  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 12.78  
RAINFALL INTENSITY(INCH/HR) = 3.06  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 32.60  
TOTAL STREAM AREA(ACRES) = 32.60  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 80.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40410.00 TO NODE 40411.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00  
ELEVATION DATA: UPSTREAM(FEET) = 878.00 DOWNSTREAM(FEET) = 726.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.371  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.168  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.69	0.30	1.000	0	8.37

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.39  
TOTAL AREA(ACRES) = 0.69 PEAK FLOW RATE(CFS) = 2.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40411.00 TO NODE 40412.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 726.00 DOWNSTREAM(FEET) = 687.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 101.00 CHANNEL SLOPE = 0.3861  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.083  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.91	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.94  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.84  
AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 0.21  
Tc(MIN.) = 8.59  
SUBAREA AREA(ACRES) = 0.91 SUBAREA RUNOFF(CFS) = 3.10  
EFFECTIVE AREA(ACRES) = 1.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 5.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.46 FLOW VELOCITY(FEET/SEC.) = 8.47  
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40412.00 = 430.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40412.00 TO NODE 40413.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 687.00 DOWNSTREAM(FEET) = 658.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 153.00 CHANNEL SLOPE = 0.1895  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.935  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.96	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.00  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.87  
AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 0.37  
Tc(MIN.) = 8.96  
SUBAREA AREA(ACRES) = 0.96 SUBAREA RUNOFF(CFS) = 3.13  
EFFECTIVE AREA(ACRES) = 2.55 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 8.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 7.18  
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40413.00 = 583.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40413.00 TO NODE 40414.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 658.00 DOWNSTREAM(FEET) = 615.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 247.00 CHANNEL SLOPE = 0.1741  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.720  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.51 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.21  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.65  
AVERAGE FLOW DEPTH(FEET) = 0.73 TRAVEL TIME(MIN.) = 0.54  
Tc(MIN.) = 9.49  
SUBAREA AREA(ACRES) = 2.51 SUBAREA RUNOFF(CFS) = 7.72  
EFFECTIVE AREA(ACRES) = 5.06 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.1 PEAK FLOW RATE(CFS) = 15.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.80 FLOW VELOCITY(FEET/SEC.) = 8.15  
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40414.00 = 830.00 FEET.

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FLOW PROCESS FROM NODE 40414.00 TO NODE 40415.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 615.00 DOWNSTREAM(FEET) = 567.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.451  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.38 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.79  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.57  
AVERAGE FLOW DEPTH(FEET) = 0.98 TRAVEL TIME(MIN.) = 0.91  
Tc(MIN.) = 10.41  
SUBAREA AREA(ACRES) = 4.38 SUBAREA RUNOFF(CFS) = 12.42  
EFFECTIVE AREA(ACRES) = 9.44 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 9.4 PEAK FLOW RATE(CFS) = 26.77

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.06 FLOW VELOCITY(FEET/SEC.) = 7.98  
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40415.00 = 1244.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40415.00 TO NODE 40416.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 567.00 DOWNSTREAM(FEET) = 538.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 301.00 CHANNEL SLOPE = 0.0963  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.348  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.77 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.42  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.10  
AVERAGE FLOW DEPTH(FEET) = 1.24 TRAVEL TIME(MIN.) = 0.62  
Tc(MIN.) = 11.03  
SUBAREA AREA(ACRES) = 7.77 SUBAREA RUNOFF(CFS) = 21.31  
EFFECTIVE AREA(ACRES) = 17.21 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 17.2 PEAK FLOW RATE(CFS) = 47.20

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.35 FLOW VELOCITY(FEET/SEC.) = 8.59  
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40416.00 = 1545.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40416.00 TO NODE 40417.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 538.00 DOWNSTREAM(FEET) = 529.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.0776  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.311  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 16.20 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 69.16  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.70  
AVERAGE FLOW DEPTH(FEET) = 1.63 TRAVEL TIME(MIN.) = 0.22  
Tc(MIN.) = 11.25  
SUBAREA AREA(ACRES) = 16.20 SUBAREA RUNOFF(CFS) = 43.91  
EFFECTIVE AREA(ACRES) = 33.41 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 33.4 PEAK FLOW RATE(CFS) = 90.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.80 FLOW VELOCITY(FEET/SEC.) = 9.34  
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40417.00 = 1661.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40417.00 TO NODE 40447.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 529.00 DOWNSTREAM(FEET) = 482.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 891.00 CHANNEL SLOPE = 0.0527  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.018

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	14.55	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 108.34  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.42  
AVERAGE FLOW DEPTH(FEET) = 2.07 TRAVEL TIME(MIN.) = 1.76  
Tc(MIN.) = 13.01  
SUBAREA AREA(ACRES) = 14.55 SUBAREA RUNOFF(CFS) = 35.58  
EFFECTIVE AREA(ACRES) = 47.96 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 48.0 PEAK FLOW RATE(CFS) = 117.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.13 FLOW VELOCITY(FEET/SEC.) = 8.59  
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40447.00 = 2552.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 1  
\*\*\*\*\*

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 13.01  
RAINFALL INTENSITY(INCH/HR) = 3.02  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 47.96  
TOTAL STREAM AREA(ACRES) = 47.96  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 117.30

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	80.84	12.78	3.055	0.30( 0.30)	1.00	32.6	40400.00
2	117.30	13.01	3.018	0.30( 0.30)	1.00	48.0	40410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	197.70	12.78	3.055	0.30( 0.30)	1.00	79.7	40400.00
2	197.04	13.01	3.018	0.30( 0.30)	1.00	80.6	40410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 197.70 Tc(MIN.) = 12.78  
EFFECTIVE AREA(ACRES) = 79.72 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 80.6  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 10  
\*\*\*\*\*

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40420.00 TO NODE 40421.00 IS CODE = 21  
\*\*\*\*\*

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00  
ELEVATION DATA: UPSTREAM(FEET) = 925.00 DOWNSTREAM(FEET) = 815.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.799  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.998  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.31	0.30	1.000	0	8.80

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.02  
TOTAL AREA(ACRES) = 0.31 PEAK FLOW RATE(CFS) = 1.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40421.00 TO NODE 40422.00 IS CODE = 51  
\*\*\*\*\*

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 815.00 DOWNSTREAM(FEET) = 743.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.5854  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.884

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.50  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.18  
AVERAGE FLOW DEPTH(FEET) = 0.26 TRAVEL TIME(MIN.) = 0.29  
Tc(MIN.) = 9.08  
SUBAREA AREA(ACRES) = 0.30 SUBAREA RUNOFF(CFS) = 0.95

EFFECTIVE AREA(ACRES) = 0.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 1.95

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.29 FLOW VELOCITY(FEET/SEC.) = 7.58  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40422.00 = 444.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40422.00 TO NODE 40423.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 743.00 DOWNSTREAM(FEET) = 665.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 142.00 CHANNEL SLOPE = 0.5493  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.772

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.20  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.43  
AVERAGE FLOW DEPTH(FEET) = 0.36 TRAVEL TIME(MIN.) = 0.28  
Tc(MIN.) = 9.37

SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 2.50  
EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 4.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 FLOW VELOCITY(FEET/SEC.) = 9.08  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40423.00 = 586.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40423.00 TO NODE 40424.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 665.00 DOWNSTREAM(FEET) = 630.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 99.00 CHANNEL SLOPE = 0.3535  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.689

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.32	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.88  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.92  
AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.21

Tc(MIN.) = 9.57  
SUBAREA AREA(ACRES) = 0.32 SUBAREA RUNOFF(CFS) = 0.97  
EFFECTIVE AREA(ACRES) = 1.72 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 5.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.47 FLOW VELOCITY(FEET/SEC.) = 7.99  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40424.00 = 685.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40424.00 TO NODE 40425.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 615.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 35.00 CHANNEL SLOPE = 0.4286  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.664

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.87	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.08  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.62  
AVERAGE FLOW DEPTH(FEET) = 0.53 TRAVEL TIME(MIN.) = 0.06  
Tc(MIN.) = 9.63

SUBAREA AREA(ACRES) = 1.87 SUBAREA RUNOFF(CFS) = 5.65  
EFFECTIVE AREA(ACRES) = 3.59 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 3.6 PEAK FLOW RATE(CFS) = 10.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 FLOW VELOCITY(FEET/SEC.) = 10.40  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40425.00 = 720.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40425.00 TO NODE 40426.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 615.00 DOWNSTREAM(FEET) = 574.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 260.00 CHANNEL SLOPE = 0.1577  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.482

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.19	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.58

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.41  
AVERAGE FLOW DEPTH (FEET) = 0.75 TRAVEL TIME (MIN.) = 0.59  
Tc (MIN.) = 10.22  
SUBAREA AREA (ACRES) = 1.19 SUBAREA RUNOFF (CFS) = 3.41  
EFFECTIVE AREA (ACRES) = 4.78 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 4.8 PEAK FLOW RATE (CFS) = 13.69

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.78 FLOW VELOCITY (FEET/SEC.) = 7.59  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40426.00 = 980.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40426.00 TO NODE 40427.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 574.00 DOWNSTREAM (FEET) = 533.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 322.00 CHANNEL SLOPE = 0.1273  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.360

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.82	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 16.19  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.31  
AVERAGE FLOW DEPTH (FEET) = 0.86 TRAVEL TIME (MIN.) = 0.73  
Tc (MIN.) = 10.95  
SUBAREA AREA (ACRES) = 1.82 SUBAREA RUNOFF (CFS) = 5.01  
EFFECTIVE AREA (ACRES) = 6.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 6.6 PEAK FLOW RATE (CFS) = 18.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.90 FLOW VELOCITY (FEET/SEC.) = 7.52  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40427.00 = 1302.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40427.00 TO NODE 40428.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 521.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 160.00 CHANNEL SLOPE = 0.0750  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.295

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.79	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.33  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.81  
AVERAGE FLOW DEPTH (FEET) = 1.16 TRAVEL TIME (MIN.) = 0.39  
Tc (MIN.) = 11.35  
SUBAREA AREA (ACRES) = 6.79 SUBAREA RUNOFF (CFS) = 18.30  
EFFECTIVE AREA (ACRES) = 13.39 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 13.4 PEAK FLOW RATE (CFS) = 36.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.28 FLOW VELOCITY (FEET/SEC.) = 7.29  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40428.00 = 1462.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40428.00 TO NODE 40429.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 521.00 DOWNSTREAM (FEET) = 508.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 221.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.206

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.74	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 40.98  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.89  
AVERAGE FLOW DEPTH (FEET) = 1.41 TRAVEL TIME (MIN.) = 0.53  
Tc (MIN.) = 11.88  
SUBAREA AREA (ACRES) = 3.74 SUBAREA RUNOFF (CFS) = 9.79  
EFFECTIVE AREA (ACRES) = 17.13 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.1 PEAK FLOW RATE (CFS) = 44.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.45 FLOW VELOCITY (FEET/SEC.) = 7.06  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40429.00 = 1683.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40429.00 TO NODE 40446.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 508.00 DOWNSTREAM (FEET) = 489.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 306.00 CHANNEL SLOPE = 0.0621  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.089

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.79	0.30	1.000	-

USER-DEFINED - 0.99 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 46.04  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.26  
AVERAGE FLOW DEPTH (FEET) = 1.45 TRAVEL TIME (MIN.) = 0.70  
Tc (MIN.) = 12.58  
SUBAREA AREA (ACRES) = 0.99 SUBAREA RUNOFF (CFS) = 2.48  
EFFECTIVE AREA (ACRES) = 18.12 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 18.1 PEAK FLOW RATE (CFS) = 45.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.45 FLOW VELOCITY (FEET/SEC.) = 7.19  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40446.00 = 1989.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40446.00 TO NODE 40446.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40430.00 TO NODE 40431.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 302.00  
ELEVATION DATA: UPSTREAM (FEET) = 1035.00 DOWNSTREAM (FEET) = 875.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.870  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.368

SUBAREA Tc AND LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"CHAPARRAL, BROADLEAF" - 0.40 0.30 1.000 0 7.87  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF (CFS) = 1.48  
TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 1.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40431.00 TO NODE 40432.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 875.00 DOWNSTREAM (FEET) = 800.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 160.00 CHANNEL SLOPE = 0.4688  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.227  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 0.65 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.62  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.55  
AVERAGE FLOW DEPTH (FEET) = 0.34 TRAVEL TIME (MIN.) = 0.35  
Tc (MIN.) = 8.22  
SUBAREA AREA (ACRES) = 0.65 SUBAREA RUNOFF (CFS) = 2.29  
EFFECTIVE AREA (ACRES) = 1.05 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 3.72

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.39 FLOW VELOCITY (FEET/SEC.) = 8.31  
LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40432.00 = 462.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40432.00 TO NODE 40433.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 800.00 DOWNSTREAM (FEET) = 712.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 150.00 CHANNEL SLOPE = 0.5867  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.127  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.08 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.58  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.97  
AVERAGE FLOW DEPTH (FEET) = 0.43 TRAVEL TIME (MIN.) = 0.25  
Tc (MIN.) = 8.47  
SUBAREA AREA (ACRES) = 1.08 SUBAREA RUNOFF (CFS) = 3.73  
EFFECTIVE AREA (ACRES) = 2.13 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 2.1 PEAK FLOW RATE (CFS) = 7.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.48 FLOW VELOCITY (FEET/SEC.) = 10.73  
LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40433.00 = 612.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40433.00 TO NODE 40434.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 657.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 120.00 CHANNEL SLOPE = 0.4583  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.053  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.98 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.69  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.71  
 AVERAGE FLOW DEPTH (FEET) = 0.58 TRAVEL TIME (MIN.) = 0.19  
 Tc (MIN.) = 8.66  
 SUBAREA AREA (ACRES) = 1.98 SUBAREA RUNOFF (CFS) = 6.69  
 EFFECTIVE AREA (ACRES) = 4.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 4.1 PEAK FLOW RATE (CFS) = 13.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.64 FLOW VELOCITY (FEET/SEC.) = 11.38  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40434.00 = 732.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40434.00 TO NODE 40435.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 657.00 DOWNSTREAM (FEET) = 620.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 161.00 CHANNEL SLOPE = 0.2298  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.938  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.34 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.73  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.32  
 AVERAGE FLOW DEPTH (FEET) = 0.80 TRAVEL TIME (MIN.) = 0.29  
 Tc (MIN.) = 8.95  
 SUBAREA AREA (ACRES) = 2.34 SUBAREA RUNOFF (CFS) = 7.66  
 EFFECTIVE AREA (ACRES) = 6.46 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 6.5 PEAK FLOW RATE (CFS) = 21.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.85 FLOW VELOCITY (FEET/SEC.) = 9.71  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40435.00 = 893.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40435.00 TO NODE 40445.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 620.00 DOWNSTREAM (FEET) = 579.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 358.00 CHANNEL SLOPE = 0.1145  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.630  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.75 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.77  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.74  
 AVERAGE FLOW DEPTH (FEET) = 1.01 TRAVEL TIME (MIN.) = 0.77  
 Tc (MIN.) = 9.72  
 SUBAREA AREA (ACRES) = 1.75 SUBAREA RUNOFF (CFS) = 5.26  
 EFFECTIVE AREA (ACRES) = 8.21 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 8.2 PEAK FLOW RATE (CFS) = 24.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.03 FLOW VELOCITY (FEET/SEC.) = 7.78  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40445.00 = 1251.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40445.00 TO NODE 40445.00 IS CODE = 1

-----  
 >>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 9.72  
 RAINFALL INTENSITY (INCH/HR) = 3.63  
 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 8.21  
 TOTAL STREAM AREA (ACRES) = 8.21  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 24.61

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40440.00 TO NODE 40441.00 IS CODE = 21

-----  
 >>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >> USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 319.00  
 ELEVATION DATA: UPSTREAM (FEET) = 1020.00 DOWNSTREAM (FEET) = 898.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.586  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.082  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 NATURAL FAIR COVER  
 "CHAPARRAL, BROADLEAF" - 0.75 0.30 1.000 0 8.59  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 2.55  
 TOTAL AREA (ACRES) = 0.75 PEAK FLOW RATE (CFS) = 2.55



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FLOW PROCESS FROM NODE 40441.00 TO NODE 40442.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 898.00 DOWNSTREAM(FEET) = 760.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 253.00 CHANNEL SLOPE = 0.5455
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.894
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.89 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.99
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.91
AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 0.47
Tc(MIN.) = 9.06
SUBAREA AREA(ACRES) = 0.89 SUBAREA RUNOFF(CFS) = 2.87
EFFECTIVE AREA(ACRES) = 1.64 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 5.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.43 FLOW VELOCITY(FEET/SEC.) = 9.55
LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40442.00 = 572.00 FEET.

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*****
FLOW PROCESS FROM NODE 40442.00 TO NODE 40443.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 760.00 DOWNSTREAM(FEET) = 653.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 188.00 CHANNEL SLOPE = 0.5691
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.778
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.80 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.12
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.80
AVERAGE FLOW DEPTH(FEET) = 0.50 TRAVEL TIME(MIN.) = 0.29
Tc(MIN.) = 9.35
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.65
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 10.77

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.56 FLOW VELOCITY(FEET/SEC.) = 11.46

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LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40443.00 = 760.00 FEET.
*****
FLOW PROCESS FROM NODE 40443.00 TO NODE 40444.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 653.00 DOWNSTREAM(FEET) = 605.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 198.00 CHANNEL SLOPE = 0.2424
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.635
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.16 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.51
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.18
AVERAGE FLOW DEPTH(FEET) = 0.75 TRAVEL TIME(MIN.) = 0.36
Tc(MIN.) = 9.71
SUBAREA AREA(ACRES) = 3.16 SUBAREA RUNOFF(CFS) = 9.47
EFFECTIVE AREA(ACRES) = 6.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.6 PEAK FLOW RATE(CFS) = 19.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.82 FLOW VELOCITY(FEET/SEC.) = 9.79
LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40444.00 = 958.00 FEET.

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*****
FLOW PROCESS FROM NODE 40444.00 TO NODE 40445.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 605.00 DOWNSTREAM(FEET) = 579.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 243.00 CHANNEL SLOPE = 0.1070
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.475
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.67 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.20
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.37
AVERAGE FLOW DEPTH(FEET) = 1.00 TRAVEL TIME(MIN.) = 0.55
Tc(MIN.) = 10.26
SUBAREA AREA(ACRES) = 1.67 SUBAREA RUNOFF(CFS) = 4.79
EFFECTIVE AREA(ACRES) = 8.27 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 23.65

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.03 FLOW VELOCITY(FEET/SEC.) = 7.50  
 LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40445.00 = 1201.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40445.00 TO NODE 40445.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 10.26  
 RAINFALL INTENSITY(INCH/HR) = 3.48  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 8.27  
 TOTAL STREAM AREA(ACRES) = 8.27  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 23.65

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	24.61	9.72	3.630	0.30( 0.30)	1.00	8.2	40430.00
2	23.65	10.26	3.475	0.30( 0.30)	1.00	8.3	40440.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	48.10	9.72	3.630	0.30( 0.30)	1.00	16.0	40430.00
2	47.11	10.26	3.475	0.30( 0.30)	1.00	16.5	40440.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 48.10 Tc(MIN.) = 9.72  
 EFFECTIVE AREA(ACRES) = 16.05 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 16.5  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40445.00 = 1251.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40445.00 TO NODE 40446.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 579.00 DOWNSTREAM(FEET) = 489.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 636.00 CHANNEL SLOPE = 0.1415  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.393

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE USER-DEFINED	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
		3.79	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 53.37  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.26  
 AVERAGE FLOW DEPTH(FEET) = 1.32 TRAVEL TIME(MIN.) = 1.03  
 Tc(MIN.) = 10.75  
 SUBAREA AREA(ACRES) = 3.79 SUBAREA RUNOFF(CFS) = 10.54  
 EFFECTIVE AREA(ACRES) = 19.83 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 20.3 PEAK FLOW RATE(CFS) = 55.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.34 FLOW VELOCITY(FEET/SEC.) = 10.28  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40446.00 = 1887.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	55.22	10.75	3.393	0.30( 0.30)	1.00	19.8	40430.00
2	54.76	11.30	3.302	0.30( 0.30)	1.00	20.3	40440.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 55.22 Tc(MIN.) = 10.75  
 AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 19.83

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40446.00 TO NODE 40446.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	55.22	10.75	3.393	0.30( 0.30)	1.00	19.8	40430.00
2	54.76	11.30	3.302	0.30( 0.30)	1.00	20.3	40440.00

LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40446.00 = 1887.00 FEET.

\*\* MEMORY BANK # 2 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	45.48	12.58	3.089	0.30( 0.30)	1.00	18.1	40420.00

LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40446.00 = 1989.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	98.33	10.75	3.393	0.30( 0.30)	1.00	35.3	40430.00
2	98.73	11.30	3.302	0.30( 0.30)	1.00	36.5	40440.00
3	96.36	12.58	3.089	0.30( 0.30)	1.00	38.4	40420.00

TOTAL AREA(ACRES) = 38.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 98.73 Tc(MIN.) = 11.303  
 EFFECTIVE AREA(ACRES) = 36.55 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 38.4  
 LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40446.00 = 1989.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40446.00 TO NODE 40446.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40446.00 TO NODE 40447.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 489.00 DOWNSTREAM(FEET) = 482.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.0419  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.241

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 99.52

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.57

AVERAGE FLOW DEPTH(FEET) = 2.09 TRAVEL TIME(MIN.) = 0.37

Tc(MIN.) = 11.67

SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 1.56

EFFECTIVE AREA(ACRES) = 37.14 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 39.0 PEAK FLOW RATE(CFS) = 98.73

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.09 FLOW VELOCITY(FEET/SEC.) = 7.55

LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40447.00 = 2156.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	98.33	11.12	3.332	0.30( 0.30)	1.00	35.9	40430.00
2	98.73	11.67	3.241	0.30( 0.30)	1.00	37.1	40440.00
3	96.36	12.95	3.027	0.30( 0.30)	1.00	39.0	40420.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 98.73 Tc(MIN.) = 11.67

AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 37.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	98.33	11.12	3.332	0.30( 0.30)	1.00	35.9	40430.00
2	98.73	11.67	3.241	0.30( 0.30)	1.00	37.1	40440.00
3	96.36	12.95	3.027	0.30( 0.30)	1.00	39.0	40420.00

LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40447.00 = 2156.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	197.70	12.78	3.055	0.30( 0.30)	1.00	79.7	40400.00
2	197.04	13.01	3.018	0.30( 0.30)	1.00	80.6	40410.00

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	287.58	11.12	3.332	0.30( 0.30)	1.00	105.3	40430.00
2	291.35	11.67	3.241	0.30( 0.30)	1.00	109.9	40440.00
3	294.37	12.78	3.055	0.30( 0.30)	1.00	118.5	40400.00
4	293.57	12.95	3.027	0.30( 0.30)	1.00	119.3	40420.00
5	293.06	13.01	3.018	0.30( 0.30)	1.00	119.5	40410.00
TOTAL AREA(ACRES) =		119.5					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 294.37 Tc(MIN.) = 12.784

EFFECTIVE AREA(ACRES) = 118.46 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 119.5

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40448.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 482.00 DOWNSTREAM(FEET) = 447.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 926.00 CHANNEL SLOPE = 0.0378  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.792

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	24.32	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 321.66

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.76

AVERAGE FLOW DEPTH(FEET) = 3.31 TRAVEL TIME(MIN.) = 1.58

Tc(MIN.) = 14.36

SUBAREA AREA(ACRES) = 24.32 SUBAREA RUNOFF(CFS) = 54.55

EFFECTIVE AREA(ACRES) = 142.78 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 143.9 PEAK FLOW RATE (CFS) = 320.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 3.31 FLOW VELOCITY (FEET/SEC.) = 9.75  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40448.00 = 3589.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	322.86	12.71	3.068	0.30 ( 0.30)	1.00	129.6	40430.00
2	323.50	13.25	2.978	0.30 ( 0.30)	1.00	134.2	40440.00
3	320.27	14.36	2.792	0.30 ( 0.30)	1.00	142.8	40400.00
4	318.58	14.53	2.764	0.30 ( 0.30)	1.00	143.6	40420.00
5	317.79	14.59	2.754	0.30 ( 0.30)	1.00	143.9	40410.00

NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE (CFS) = 323.50 Tc (MIN.) = 13.25  
AREA-AVERAGED Fm (INCH/HR) = 0.30 AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA (ACRES) = 134.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40448.00 TO NODE 40449.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 447.00 DOWNSTREAM (FEET) = 433.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 443.00 CHANNEL SLOPE = 0.0316  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.854

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) CN  
USER-DEFINED - 108.49 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 448.20  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.92  
AVERAGE FLOW DEPTH (FEET) = 3.88 TRAVEL TIME (MIN.) = 0.74  
Tc (MIN.) = 14.00  
SUBAREA AREA (ACRES) = 108.49 SUBAREA RUNOFF (CFS) = 249.37  
EFFECTIVE AREA (ACRES) = 242.72 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 252.3 PEAK FLOW RATE (CFS) = 557.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 4.21 FLOW VELOCITY (FEET/SEC.) = 10.47  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40449.00 = 4032.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	566.69	13.45	2.945	0.30 ( 0.30)	1.00	238.1	40430.00
2	557.90	14.00	2.854	0.30 ( 0.30)	1.00	242.7	40440.00
3	537.43	15.11	2.676	0.30 ( 0.30)	1.00	251.3	40400.00
4	535.85	15.28	2.661	0.30 ( 0.30)	1.00	252.1	40420.00
5	535.09	15.34	2.656	0.30 ( 0.30)	1.00	252.3	40410.00

NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE (CFS) = 566.69 Tc (MIN.) = 13.45  
AREA-AVERAGED Fm (INCH/HR) = 0.30 AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA (ACRES) = 238.07

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40449.00 TO NODE 40450.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 433.00 DOWNSTREAM (FEET) = 398.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1065.00 CHANNEL SLOPE = 0.0329  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.679

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) CN  
USER-DEFINED - 36.85 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 606.14  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.86  
AVERAGE FLOW DEPTH (FEET) = 4.31 TRAVEL TIME (MIN.) = 1.63  
Tc (MIN.) = 15.08  
SUBAREA AREA (ACRES) = 36.85 SUBAREA RUNOFF (CFS) = 78.90  
EFFECTIVE AREA (ACRES) = 274.91 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 289.2 PEAK FLOW RATE (CFS) = 588.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 4.27 FLOW VELOCITY (FEET/SEC.) = 10.77  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40450.00 = 5097.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	588.70	15.08	2.679	0.30 ( 0.30)	1.00	274.9	40430.00
2	586.23	15.64	2.630	0.30 ( 0.30)	1.00	279.6	40440.00
3	577.96	16.77	2.529	0.30 ( 0.30)	1.00	288.1	40400.00
4	575.74	16.94	2.514	0.30 ( 0.30)	1.00	289.0	40420.00
5	574.75	17.00	2.508	0.30 ( 0.30)	1.00	289.2	40410.00

NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE (CFS) = 588.70 Tc (MIN.) = 15.08  
AREA-AVERAGED Fm (INCH/HR) = 0.30 AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA (ACRES) = 274.91

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40450.00 TO NODE 40451.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 398.00 DOWNSTREAM (FEET) = 386.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 401.00 CHANNEL SLOPE = 0.0299  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.624  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 71.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 663.78  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.72  
 AVERAGE FLOW DEPTH (FEET) = 4.54 TRAVEL TIME (MIN.) = 0.62  
 Tc (MIN.) = 15.71  
 SUBAREA AREA (ACRES) = 71.80 SUBAREA RUNOFF (CFS) = 150.17  
 EFFECTIVE AREA (ACRES) = 346.72 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 361.0 PEAK FLOW RATE (CFS) = 725.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 4.70 FLOW VELOCITY (FEET/SEC.) = 10.96  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40451.00 = 5498.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	725.14	15.71	2.624	0.30 ( 0.30)	1.00	346.7	40430.00
2	719.19	16.26	2.574	0.30 ( 0.30)	1.00	351.4	40440.00
3	703.89	17.40	2.473	0.30 ( 0.30)	1.00	359.9	40400.00
4	700.63	17.57	2.458	0.30 ( 0.30)	1.00	360.8	40420.00
5	699.29	17.63	2.452	0.30 ( 0.30)	1.00	361.0	40410.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 725.14 Tc (MIN.) = 15.71  
 AREA-AVERAGED Fm (INCH/HR) = 0.30 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA (ACRES) = 346.72

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40451.00 TO NODE 40452.00 IS CODE = 51  
 -----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 386.00 DOWNSTREAM (FEET) = 358.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 957.00 CHANNEL SLOPE = 0.0293  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.519  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 12.07 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 737.19  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.54  
 AVERAGE FLOW DEPTH (FEET) = 4.26 TRAVEL TIME (MIN.) = 1.18  
 Tc (MIN.) = 16.88  
 SUBAREA AREA (ACRES) = 12.07 SUBAREA RUNOFF (CFS) = 24.11  
 EFFECTIVE AREA (ACRES) = 358.79 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 373.1 PEAK FLOW RATE (CFS) = 725.14

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 4.23 FLOW VELOCITY (FEET/SEC.) = 13.50  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40452.00 = 6455.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	725.14	16.88	2.519	0.30 ( 0.30)	1.00	358.8	40430.00
2	719.19	17.44	2.469	0.30 ( 0.30)	1.00	363.4	40440.00
3	703.89	18.59	2.367	0.30 ( 0.30)	1.00	372.0	40400.00
4	700.63	18.76	2.352	0.30 ( 0.30)	1.00	372.9	40420.00
5	699.29	18.82	2.346	0.30 ( 0.30)	1.00	373.1	40410.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 725.14 Tc (MIN.) = 16.88  
 AREA-AVERAGED Fm (INCH/HR) = 0.30 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA (ACRES) = 358.79

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40452.00 TO NODE 40453.00 IS CODE = 51  
 -----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 358.00 DOWNSTREAM (FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 973.00 CHANNEL SLOPE = 0.0576  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.436  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 9.14 0.30 0.970 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 733.96  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 17.41  
 AVERAGE FLOW DEPTH (FEET) = 3.75 TRAVEL TIME (MIN.) = 0.93  
 Tc (MIN.) = 17.82  
 SUBAREA AREA (ACRES) = 9.14 SUBAREA RUNOFF (CFS) = 17.64  
 EFFECTIVE AREA (ACRES) = 367.92 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 382.2 PEAK FLOW RATE (CFS) = 725.14  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.73 FLOW VELOCITY (FEET/SEC.) = 17.39  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40453.00 = 7428.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	725.14	17.82	2.436	0.30 ( 0.30)	1.00	367.9	40430.00
2	719.19	18.38	2.386	0.30 ( 0.30)	1.00	372.6	40440.00
3	703.89	19.53	2.284	0.30 ( 0.30)	1.00	381.1	40400.00
4	700.63	19.70	2.268	0.30 ( 0.30)	1.00	382.0	40420.00
5	699.29	19.76	2.263	0.30 ( 0.30)	1.00	382.2	40410.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 725.14 Tc(MIN.) = 17.82  
AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 367.92

\*\*\*\*\*

FLOW PROCESS FROM NODE 40453.00 TO NODE 40453.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.82  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.436  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 28.26 0.30 0.882 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.882  
SUBAREA AREA(ACRES) = 28.26 SUBAREA RUNOFF(CFS) = 55.23  
EFFECTIVE AREA(ACRES) = 396.19 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 410.5 PEAK FLOW RATE(CFS) = 762.60

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 410.5 TC(MIN.) = 17.82  
EFFECTIVE AREA(ACRES) = 396.19 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.991  
PEAK FLOW RATE(CFS) = 762.60

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	762.60	17.82	2.436	0.30 ( 0.30)	0.99	396.2	40430.00
2	753.57	18.38	2.386	0.30 ( 0.30)	0.99	400.8	40440.00
3	731.89	19.53	2.284	0.30 ( 0.30)	0.99	409.4	40400.00
4	727.71	19.70	2.268	0.30 ( 0.30)	0.99	410.2	40420.00
5	726.10	19.76	2.263	0.30 ( 0.30)	0.99	410.5	40410.00

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 50 Yr \*  
\* From Node: 40500 To Node: 40519 \*  
\*\*\*\*\*

FILE NAME: 0610405X.DAT  
TIME/DATE OF STUDY: 09:34 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.513
- 2) 10.00; 3.519
- 3) 15.00; 2.687
- 4) 20.00; 2.241
- 5) 25.00; 1.935
- 6) 30.00; 1.741
- 7) 40.00; 1.472
- 8) 50.00; 1.311
- 9) 60.00; 1.211
- 10) 90.00; 1.007
- 11) 120.00; 0.877
- 12) 180.00; 0.756
- 13) 360.00; 0.563
- 14) 1440.00; 0.248

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40500.00 TO NODE 40501.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 961.00 DOWNSTREAM(FEET) = 845.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.819  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.989  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.63	0.30	1.000	0	8.82

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.09  
TOTAL AREA(ACRES) = 0.63 PEAK FLOW RATE(CFS) = 2.09

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40501.00 TO NODE 40502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 845.00 DOWNSTREAM(FEET) = 788.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 141.00 CHANNEL SLOPE = 0.4043  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.869  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.11	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.88  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.79  
AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 0.30  
Tc(MIN.) = 9.12  
SUBAREA AREA(ACRES) = 1.11 SUBAREA RUNOFF(CFS) = 3.57  
EFFECTIVE AREA(ACRES) = 1.74 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 5.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.46 FLOW VELOCITY(FEET/SEC.) = 8.71  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40502.00 = 469.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40502.00 TO NODE 40503.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 788.00 DOWNSTREAM(FEET) = 719.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 187.00 CHANNEL SLOPE = 0.3690  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.732

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.44	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.82

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.04

AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 0.34

Tc(MIN.) = 9.47

SUBAREA AREA(ACRES) = 1.44 SUBAREA RUNOFF(CFS) = 4.44

EFFECTIVE AREA(ACRES) = 3.18 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 9.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.58 FLOW VELOCITY(FEET/SEC.) = 9.58

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40503.00 = 656.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40503.00 TO NODE 40504.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 719.00 DOWNSTREAM(FEET) = 545.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 302.00 CHANNEL SLOPE = 0.5762  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.571

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.36	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.77

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.46

AVERAGE FLOW DEPTH(FEET) = 0.63 TRAVEL TIME(MIN.) = 0.40

Tc(MIN.) = 9.87

SUBAREA AREA(ACRES) = 3.36 SUBAREA RUNOFF(CFS) = 9.89

EFFECTIVE AREA(ACRES) = 6.54 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 6.5 PEAK FLOW RATE(CFS) = 19.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.69 FLOW VELOCITY(FEET/SEC.) = 13.42

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40504.00 = 958.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40504.00 TO NODE 40505.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 545.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 328.00 CHANNEL SLOPE = 0.2287  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.457

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.58	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 32.86

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.86

AVERAGE FLOW DEPTH(FEET) = 1.00 TRAVEL TIME(MIN.) = 0.50

Tc(MIN.) = 10.37

SUBAREA AREA(ACRES) = 9.58 SUBAREA RUNOFF(CFS) = 27.22

EFFECTIVE AREA(ACRES) = 16.12 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 45.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.14 FLOW VELOCITY(FEET/SEC.) = 11.75

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40505.00 = 1286.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40505.00 TO NODE 40506.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 410.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 507.00 CHANNEL SLOPE = 0.1183  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.314

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.98	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 60.70

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.87

AVERAGE FLOW DEPTH(FEET) = 1.43 TRAVEL TIME(MIN.) = 0.86

Tc(MIN.) = 11.23

SUBAREA AREA(ACRES) = 10.98 SUBAREA RUNOFF(CFS) = 29.80

EFFECTIVE AREA(ACRES) = 27.10 AREA-AVERAGED Fm(INCH/HR) = 0.30



AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 27.1 PEAK FLOW RATE (CFS) = 73.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.54 FLOW VELOCITY (FEET/SEC.) = 10.36  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40506.00 = 1793.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40506.00 TO NODE 40507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 410.00 DOWNSTREAM (FEET) = 355.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 698.00 CHANNEL SLOPE = 0.0788  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.101

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.53	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 79.24

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.07

AVERAGE FLOW DEPTH (FEET) = 1.71 TRAVEL TIME (MIN.) = 1.28

Tc (MIN.) = 12.51

SUBAREA AREA (ACRES) = 4.53 SUBAREA RUNOFF (CFS) = 11.42

EFFECTIVE AREA (ACRES) = 31.63 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 31.6 PEAK FLOW RATE (CFS) = 79.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.71 FLOW VELOCITY (FEET/SEC.) = 9.07

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40507.00 = 2491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40507.00 TO NODE 40518.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 355.00 DOWNSTREAM (FEET) = 341.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 604.00 CHANNEL SLOPE = 0.0232  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.872

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.02	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 90.19

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.33

AVERAGE FLOW DEPTH (FEET) = 2.02 TRAVEL TIME (MIN.) = 1.37

Tc (MIN.) = 13.88

SUBAREA AREA (ACRES) = 9.02 SUBAREA RUNOFF (CFS) = 20.90  
EFFECTIVE AREA (ACRES) = 40.66 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 40.7 PEAK FLOW RATE (CFS) = 94.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.06 FLOW VELOCITY (FEET/SEC.) = 7.42

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40518.00 = 3095.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40518.00 TO NODE 40518.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 13.88

RAINFALL INTENSITY (INCH/HR) = 2.87

AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00

EFFECTIVE STREAM AREA (ACRES) = 40.66

TOTAL STREAM AREA (ACRES) = 40.66

PEAK FLOW RATE (CFS) AT CONFLUENCE = 94.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40510.00 TO NODE 40511.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 329.00

ELEVATION DATA: UPSTREAM (FEET) = 851.00 DOWNSTREAM (FEET) = 735.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.835

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.983

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	-	0.48	0.30	1.000	0	8.84

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 1.58

TOTAL AREA (ACRES) = 0.48 PEAK FLOW RATE (CFS) = 1.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40511.00 TO NODE 40512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 735.00 DOWNSTREAM (FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 116.00 CHANNEL SLOPE = 0.7328

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.898

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.73	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.76  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.11  
AVERAGE FLOW DEPTH(FEET) = 0.32 TRAVEL TIME(MIN.) = 0.21  
Tc(MIN.) = 9.05  
SUBAREA AREA(ACRES) = 0.73 SUBAREA RUNOFF(CFS) = 2.35  
EFFECTIVE AREA(ACRES) = 1.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 3.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 FLOW VELOCITY(FEET/SEC.) = 9.83  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40512.00 = 445.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40512.00 TO NODE 40513.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 650.00 DOWNSTREAM(FEET) = 581.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 152.00 CHANNEL SLOPE = 0.4539  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.788

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.36	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.02  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.16  
AVERAGE FLOW DEPTH(FEET) = 0.47 TRAVEL TIME(MIN.) = 0.28  
Tc(MIN.) = 9.32  
SUBAREA AREA(ACRES) = 1.36 SUBAREA RUNOFF(CFS) = 4.26  
EFFECTIVE AREA(ACRES) = 2.56 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 8.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.52 FLOW VELOCITY(FEET/SEC.) = 9.84  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40513.00 = 597.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40513.00 TO NODE 40514.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 581.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00 CHANNEL SLOPE = 0.4629  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.680

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.32	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.56  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.78  
AVERAGE FLOW DEPTH(FEET) = 0.60 TRAVEL TIME(MIN.) = 0.27  
Tc(MIN.) = 9.59  
SUBAREA AREA(ACRES) = 2.32 SUBAREA RUNOFF(CFS) = 7.05  
EFFECTIVE AREA(ACRES) = 4.88 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 14.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.65 FLOW VELOCITY(FEET/SEC.) = 11.59  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40514.00 = 772.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40514.00 TO NODE 40515.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 440.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 206.00 CHANNEL SLOPE = 0.2913  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.546

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.15	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.98  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.22  
AVERAGE FLOW DEPTH(FEET) = 0.77 TRAVEL TIME(MIN.) = 0.34  
Tc(MIN.) = 9.93  
SUBAREA AREA(ACRES) = 2.15 SUBAREA RUNOFF(CFS) = 6.28  
EFFECTIVE AREA(ACRES) = 7.03 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.0 PEAK FLOW RATE(CFS) = 20.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.81 FLOW VELOCITY(FEET/SEC.) = 10.54  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40515.00 = 978.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40515.00 TO NODE 40516.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 390.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 269.00 CHANNEL SLOPE = 0.1859  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.453  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.24	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.97  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.68  
 AVERAGE FLOW DEPTH (FEET) = 0.98 TRAVEL TIME (MIN.) = 0.46  
 Tc (MIN.) = 10.39  
 SUBAREA AREA (ACRES) = 5.24 SUBAREA RUNOFF (CFS) = 14.88  
 EFFECTIVE AREA (ACRES) = 12.27 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 34.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.07 FLOW VELOCITY (FEET/SEC.) = 10.23  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40516.00 = 1247.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40516.00 TO NODE 40517.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 390.00 DOWNSTREAM (FEET) = 355.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 384.00 CHANNEL SLOPE = 0.0911  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.322  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.01	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 40.28  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.11  
 AVERAGE FLOW DEPTH (FEET) = 1.29 TRAVEL TIME (MIN.) = 0.79  
 Tc (MIN.) = 11.18  
 SUBAREA AREA (ACRES) = 4.01 SUBAREA RUNOFF (CFS) = 10.91  
 EFFECTIVE AREA (ACRES) = 16.28 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 16.3 PEAK FLOW RATE (CFS) = 44.28

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.34 FLOW VELOCITY (FEET/SEC.) = 8.24  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40517.00 = 1631.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40517.00 TO NODE 40518.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 355.00 DOWNSTREAM (FEET) = 341.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 512.00 CHANNEL SLOPE = 0.0273  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.117  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.89	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 55.55  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.92  
 AVERAGE FLOW DEPTH (FEET) = 1.64 TRAVEL TIME (MIN.) = 1.23  
 Tc (MIN.) = 12.42  
 SUBAREA AREA (ACRES) = 8.89 SUBAREA RUNOFF (CFS) = 22.54  
 EFFECTIVE AREA (ACRES) = 25.17 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 25.2 PEAK FLOW RATE (CFS) = 63.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.72 FLOW VELOCITY (FEET/SEC.) = 7.18  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40518.00 = 2143.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40518.00 TO NODE 40518.00 IS CODE = 1

-----  
 >>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE <<<<<  
 >>>> AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES <<<<<

-----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 12.42  
 RAINFALL INTENSITY (INCH/HR) = 3.12  
 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 25.17  
 TOTAL STREAM AREA (ACRES) = 25.17  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 63.81

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	94.14	13.88	2.872	0.30 ( 0.30)	1.00	40.7	40500.00
2	63.81	12.42	3.117	0.30 ( 0.30)	1.00	25.2	40510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	155.99	12.42	3.117	0.30 ( 0.30)	1.00	61.5	40510.00
2	152.42	13.88	2.872	0.30 ( 0.30)	1.00	65.8	40500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 155.99 Tc(MIN.) = 12.42  
 EFFECTIVE AREA(ACRES) = 61.53 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 65.8  
 LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40518.00 = 3095.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40518.00 TO NODE 40519.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 341.00 DOWNSTREAM(FEET) = 295.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 996.00 CHANNEL SLOPE = 0.0462

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.865

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.05	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 162.97

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.99

AVERAGE FLOW DEPTH(FEET) = 2.22 TRAVEL TIME(MIN.) = 1.51

Tc(MIN.) = 13.93

SUBAREA AREA(ACRES) = 6.05 SUBAREA RUNOFF(CFS) = 13.96

EFFECTIVE AREA(ACRES) = 67.58 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 71.9 PEAK FLOW RATE(CFS) = 156.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.18 FLOW VELOCITY(FEET/SEC.) = 10.90

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40519.00 = 4091.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	156.03	13.93	2.865	0.30( 0.30)	1.00	67.6	40510.00
2	152.42	15.40	2.651	0.30( 0.30)	1.00	71.9	40500.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 156.03 Tc(MIN.) = 13.93

AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 67.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 40519.00 TO NODE 40519.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.93

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.865

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.50	0.30	0.982	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 21.98  
 EFFECTIVE AREA(ACRES) = 77.08 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 81.4 PEAK FLOW RATE(CFS) = 178.01

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 81.4 TC(MIN.) = 13.93

EFFECTIVE AREA(ACRES) = 77.08 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.998

PEAK FLOW RATE(CFS) = 178.01

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	178.01	13.93	2.865	0.30( 0.30)	1.00	77.1	40510.00
2	172.23	15.40	2.651	0.30( 0.30)	1.00	81.4	40500.00

END OF RATIONAL METHOD ANALYSIS



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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 50 Yr \*  
\* From Node: 40600 To Node: 40615 \*  
\*\*\*\*\*

FILE NAME: 0610406X.DAT  
TIME/DATE OF STUDY: 09:34 01/21/2013

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.513
- 2) 10.00; 3.519
- 3) 15.00; 2.687
- 4) 20.00; 2.241
- 5) 25.00; 1.935
- 6) 30.00; 1.741
- 7) 40.00; 1.472
- 8) 50.00; 1.311
- 9) 60.00; 1.211
- 10) 90.00; 1.007
- 11) 120.00; 0.877
- 12) 180.00; 0.756
- 13) 360.00; 0.563
- 14) 1440.00; 0.248

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40600.00 TO NODE 40601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 279.00  
ELEVATION DATA: UPSTREAM(FEET) = 1054.00 DOWNSTREAM(FEET) = 1000.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.326  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.787  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.54	0.30	1.000	0	9.33

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.70  
TOTAL AREA(ACRES) = 0.54 PEAK FLOW RATE(CFS) = 1.70

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40601.00 TO NODE 40602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 985.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 199.00 CHANNEL SLOPE = 0.0754  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.488  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.76	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.79  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.86  
AVERAGE FLOW DEPTH(FEET) = 0.49 TRAVEL TIME(MIN.) = 0.86  
Tc(MIN.) = 10.19  
SUBAREA AREA(ACRES) = 0.76 SUBAREA RUNOFF(CFS) = 2.18  
EFFECTIVE AREA(ACRES) = 1.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.3 PEAK FLOW RATE(CFS) = 3.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.55 FLOW VELOCITY(FEET/SEC.) = 4.17  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40602.00 = 478.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40602.00 TO NODE 40603.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	985.00	DOWNSTREAM(FEET) =	958.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	282.00	CHANNEL SLOPE =	0.0957
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	3.331		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.11	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.25

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.99

AVERAGE FLOW DEPTH(FEET) = 0.59 TRAVEL TIME(MIN.) = 0.94

Tc(MIN.) = 11.13

SUBAREA AREA(ACRES) = 1.11 SUBAREA RUNOFF(CFS) = 3.03

EFFECTIVE AREA(ACRES) = 2.41 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 6.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.65 FLOW VELOCITY(FEET/SEC.) = 5.26

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40603.00 = 760.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40603.00 TO NODE 40604.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	958.00	DOWNSTREAM(FEET) =	940.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	219.00	CHANNEL SLOPE =	0.0822
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	3.210		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.36	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.05

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.03

AVERAGE FLOW DEPTH(FEET) = 0.68 TRAVEL TIME(MIN.) = 0.73

Tc(MIN.) = 11.85

SUBAREA AREA(ACRES) = 0.36 SUBAREA RUNOFF(CFS) = 0.94

EFFECTIVE AREA(ACRES) = 2.77 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.8 PEAK FLOW RATE(CFS) = 7.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.69 FLOW VELOCITY(FEET/SEC.) = 5.06

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40604.00 = 979.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40604.00 TO NODE 40605.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	940.00	DOWNSTREAM(FEET) =	800.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	547.00	CHANNEL SLOPE =	0.2559
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	3.034		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.00	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.94

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.60

AVERAGE FLOW DEPTH(FEET) = 0.65 TRAVEL TIME(MIN.) = 1.06

Tc(MIN.) = 12.91

SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 7.38

EFFECTIVE AREA(ACRES) = 5.77 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 14.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.72 FLOW VELOCITY(FEET/SEC.) = 9.12

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40605.00 = 1526.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40605.00 TO NODE 40606.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	800.00	DOWNSTREAM(FEET) =	680.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	277.00	CHANNEL SLOPE =	0.4332
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	2.968		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.22	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.86

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.76

AVERAGE FLOW DEPTH(FEET) = 0.69 TRAVEL TIME(MIN.) = 0.39

Tc(MIN.) = 13.31

SUBAREA AREA(ACRES) = 2.22 SUBAREA RUNOFF(CFS) = 5.34

EFFECTIVE AREA(ACRES) = 7.99 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.0 PEAK FLOW RATE (CFS) = 19.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.73 FLOW VELOCITY (FEET/SEC.) = 12.02  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40606.00 = 1803.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40606.00 TO NODE 40607.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 680.00 DOWNSTREAM (FEET) = 670.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 59.00 CHANNEL SLOPE = 0.1695  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.951

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.34	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 30.33  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.48  
AVERAGE FLOW DEPTH (FEET) = 1.03 TRAVEL TIME (MIN.) = 0.10  
Tc (MIN.) = 13.41  
SUBAREA AREA (ACRES) = 9.34 SUBAREA RUNOFF (CFS) = 22.28  
EFFECTIVE AREA (ACRES) = 17.33 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.3 PEAK FLOW RATE (CFS) = 41.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.16 FLOW VELOCITY (FEET/SEC.) = 10.30  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40607.00 = 1862.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40607.00 TO NODE 40608.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 670.00 DOWNSTREAM (FEET) = 585.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 246.00 CHANNEL SLOPE = 0.3455  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.902

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.64	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 46.77  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.79  
AVERAGE FLOW DEPTH (FEET) = 1.06 TRAVEL TIME (MIN.) = 0.30  
Tc (MIN.) = 13.71

SUBAREA AREA (ACRES) = 4.64 SUBAREA RUNOFF (CFS) = 10.85  
EFFECTIVE AREA (ACRES) = 21.96 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 51.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.10 FLOW VELOCITY (FEET/SEC.) = 14.13  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40608.00 = 2108.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40608.00 TO NODE 40609.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 585.00 DOWNSTREAM (FEET) = 494.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 482.00 CHANNEL SLOPE = 0.1888  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.788

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.61	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 61.07  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.77  
AVERAGE FLOW DEPTH (FEET) = 1.32 TRAVEL TIME (MIN.) = 0.68  
Tc (MIN.) = 14.39  
SUBAREA AREA (ACRES) = 8.61 SUBAREA RUNOFF (CFS) = 19.29  
EFFECTIVE AREA (ACRES) = 30.57 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 30.6 PEAK FLOW RATE (CFS) = 68.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.37 FLOW VELOCITY (FEET/SEC.) = 12.15  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40609.00 = 2590.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40609.00 TO NODE 40610.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 494.00 DOWNSTREAM (FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 236.00 CHANNEL SLOPE = 0.1017  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.724

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	18.33	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 88.47  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.24



AVERAGE FLOW DEPTH (FEET) = 1.70 TRAVEL TIME (MIN.) = 0.38  
Tc (MIN.) = 14.77  
SUBAREA AREA (ACRES) = 18.33 SUBAREA RUNOFF (CFS) = 39.99  
EFFECTIVE AREA (ACRES) = 48.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 48.9 PEAK FLOW RATE (CFS) = 106.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.82 FLOW VELOCITY (FEET/SEC.) = 10.73  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40610.00 = 2826.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40610.00 TO NODE 40611.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 425.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 560.00 CHANNEL SLOPE = 0.0804  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.624  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.11 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 117.28  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.06  
AVERAGE FLOW DEPTH (FEET) = 1.97 TRAVEL TIME (MIN.) = 0.93  
Tc (MIN.) = 15.70  
SUBAREA AREA (ACRES) = 10.11 SUBAREA RUNOFF (CFS) = 21.14  
EFFECTIVE AREA (ACRES) = 59.01 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 59.0 PEAK FLOW RATE (CFS) = 123.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.01 FLOW VELOCITY (FEET/SEC.) = 10.19  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40611.00 = 3386.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40611.00 TO NODE 40612.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 425.00 DOWNSTREAM (FEET) = 373.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 906.00 CHANNEL SLOPE = 0.0574  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.480  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 20.87 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 143.92  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.32  
AVERAGE FLOW DEPTH (FEET) = 2.27 TRAVEL TIME (MIN.) = 1.62  
Tc (MIN.) = 17.32  
SUBAREA AREA (ACRES) = 20.87 SUBAREA RUNOFF (CFS) = 40.95  
EFFECTIVE AREA (ACRES) = 79.89 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 79.9 PEAK FLOW RATE (CFS) = 156.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.34 FLOW VELOCITY (FEET/SEC.) = 9.55  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40612.00 = 4292.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40612.00 TO NODE 40613.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 373.00 DOWNSTREAM (FEET) = 326.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1220.00 CHANNEL SLOPE = 0.0385  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.306  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 13.07 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 168.53  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.40  
AVERAGE FLOW DEPTH (FEET) = 2.32 TRAVEL TIME (MIN.) = 1.96  
Tc (MIN.) = 19.28  
SUBAREA AREA (ACRES) = 13.07 SUBAREA RUNOFF (CFS) = 23.59  
EFFECTIVE AREA (ACRES) = 92.95 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 93.0 PEAK FLOW RATE (CFS) = 167.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.32 FLOW VELOCITY (FEET/SEC.) = 10.37  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40613.00 = 5512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40613.00 TO NODE 40614.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 326.00 DOWNSTREAM (FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 209.00 CHANNEL SLOPE = 0.1722  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.289  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 14.71 0.30 0.999 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 180.99  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 18.55  
 AVERAGE FLOW DEPTH(FEET) = 1.80 TRAVEL TIME(MIN.) = 0.19  
 Tc(MIN.) = 19.46  
 SUBAREA AREA(ACRES) = 14.71 SUBAREA RUNOFF(CFS) = 26.34  
 EFFECTIVE AREA(ACRES) = 107.67 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 107.7 PEAK FLOW RATE(CFS) = 192.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.85 FLOW VELOCITY(FEET/SEC.) = 18.79  
 LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40614.00 = 5721.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40614.00 TO NODE 40615.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 290.00 DOWNSTREAM(FEET) = 286.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0104  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.216

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	23.56	0.30	0.971	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.971  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 213.16  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.74  
 AVERAGE FLOW DEPTH(FEET) = 3.25 TRAVEL TIME(MIN.) = 0.95  
 Tc(MIN.) = 20.42  
 SUBAREA AREA(ACRES) = 23.56 SUBAREA RUNOFF(CFS) = 40.81  
 EFFECTIVE AREA(ACRES) = 131.23 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 131.2 PEAK FLOW RATE(CFS) = 226.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.32 FLOW VELOCITY(FEET/SEC.) = 6.83  
 LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40615.00 = 6107.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40615.00 TO NODE 40615.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.42  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.216  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.74	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 3.74 SUBAREA RUNOFF(CFS) = 6.46  
 EFFECTIVE AREA(ACRES) = 134.97 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 135.0 PEAK FLOW RATE(CFS) = 232.91

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 135.0 TC(MIN.) = 20.42  
 EFFECTIVE AREA(ACRES) = 134.97 AREA-AVERAGED Fm(INCH/HR)= 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.995  
 PEAK FLOW RATE(CFS) = 232.91

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 50 Yr \*  
\* From Node: 50100 To Node: 50167 \*  
\*\*\*\*\*

FILE NAME: 0610501X.DAT  
TIME/DATE OF STUDY: 09:34 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.479
- 2) 10.00; 3.503
- 3) 15.00; 2.677
- 4) 20.00; 2.235
- 5) 25.00; 1.930
- 6) 30.00; 1.737
- 7) 40.00; 1.469
- 8) 50.00; 1.307
- 9) 60.00; 1.206
- 10) 90.00; 1.003
- 11) 120.00; 0.872
- 12) 180.00; 0.751
- 13) 360.00; 0.558
- 14) 1440.00; 0.246

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50100.00 TO NODE 50101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00  
ELEVATION DATA: UPSTREAM(FEET) = 1072.00 DOWNSTREAM(FEET) = 1063.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.598  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.744  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.30	1.000	0	14.60

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.33  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50101.00 TO NODE 50102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 1063.00 DOWNSTREAM(FEET) = 975.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 273.00 CHANNEL SLOPE = 0.3223  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.643  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.29	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.64  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.76  
AVERAGE FLOW DEPTH(FEET) = 0.31 TRAVEL TIME(MIN.) = 0.79  
Tc(MIN.) = 15.39  
SUBAREA AREA(ACRES) = 0.29 SUBAREA RUNOFF(CFS) = 0.62  
EFFECTIVE AREA(ACRES) = 0.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 1.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 6.05  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50102.00 = 597.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50102.00 TO NODE 50103.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 948.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 111.00 CHANNEL SLOPE = 0.2432  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.614

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.22	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.13

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.60

AVERAGE FLOW DEPTH(FEET) = 0.36 TRAVEL TIME(MIN.) = 0.33

Tc(MIN.) = 15.72

SUBAREA AREA(ACRES) = 0.22 SUBAREA RUNOFF(CFS) = 0.46

EFFECTIVE AREA(ACRES) = 1.12 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 2.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 FLOW VELOCITY(FEET/SEC.) = 5.71

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50103.00 = 708.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50103.00 TO NODE 50104.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 948.00 DOWNSTREAM(FEET) = 914.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 136.00 CHANNEL SLOPE = 0.2500  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.581

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.94

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.14

AVERAGE FLOW DEPTH(FEET) = 0.40 TRAVEL TIME(MIN.) = 0.37

Tc(MIN.) = 16.09

SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 1.22

EFFECTIVE AREA(ACRES) = 1.71 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 3.51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.43 FLOW VELOCITY(FEET/SEC.) = 6.33

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50104.00 = 844.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50104.00 TO NODE 50105.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 914.00 DOWNSTREAM(FEET) = 895.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 52.00 CHANNEL SLOPE = 0.3654  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.572

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.73	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.28

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.23

AVERAGE FLOW DEPTH(FEET) = 0.46 TRAVEL TIME(MIN.) = 0.11

Tc(MIN.) = 16.19

SUBAREA AREA(ACRES) = 1.73 SUBAREA RUNOFF(CFS) = 3.53

EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 7.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.52 FLOW VELOCITY(FEET/SEC.) = 8.81

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50105.00 = 896.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50106.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 835.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00 CHANNEL SLOPE = 0.2143  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.521

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.84

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.08

AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 0.58

Tc(MIN.) = 16.77

SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 7.60

EFFECTIVE AREA(ACRES) = 7.24 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 7.2 PEAK FLOW RATE (CFS) = 14.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.75 FLOW VELOCITY (FEET/SEC.) = 8.57  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50106.00 = 1176.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50106.00 TO NODE 50107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 835.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 413.00 CHANNEL SLOPE = 0.2179  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.455

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.53	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.87  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.33  
AVERAGE FLOW DEPTH (FEET) = 0.82 TRAVEL TIME (MIN.) = 0.74  
Tc (MIN.) = 17.51  
SUBAREA AREA (ACRES) = 4.53 SUBAREA RUNOFF (CFS) = 8.79  
EFFECTIVE AREA (ACRES) = 11.77 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.8 PEAK FLOW RATE (CFS) = 22.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.88 FLOW VELOCITY (FEET/SEC.) = 9.78  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50107.00 = 1589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50107.00 TO NODE 50108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 302.00 CHANNEL SLOPE = 0.2318  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.413

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.76	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 28.32  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.49  
AVERAGE FLOW DEPTH (FEET) = 0.95 TRAVEL TIME (MIN.) = 0.48  
Tc (MIN.) = 17.99

SUBAREA AREA (ACRES) = 5.76 SUBAREA RUNOFF (CFS) = 10.96  
EFFECTIVE AREA (ACRES) = 17.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.5 PEAK FLOW RATE (CFS) = 33.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.01 FLOW VELOCITY (FEET/SEC.) = 10.90  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50108.00 = 1891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50108.00 TO NODE 50109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 655.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 81.00 CHANNEL SLOPE = 0.2469  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.403

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.77	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 48.28  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.23  
AVERAGE FLOW DEPTH (FEET) = 1.15 TRAVEL TIME (MIN.) = 0.11  
Tc (MIN.) = 18.10  
SUBAREA AREA (ACRES) = 15.77 SUBAREA RUNOFF (CFS) = 29.85  
EFFECTIVE AREA (ACRES) = 33.31 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 33.3 PEAK FLOW RATE (CFS) = 63.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.26 FLOW VELOCITY (FEET/SEC.) = 13.16  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50109.00 = 1972.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 655.00 DOWNSTREAM (FEET) = 590.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 379.00 CHANNEL SLOPE = 0.1715  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.356

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.53	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 73.72  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.90

AVERAGE FLOW DEPTH (FEET) = 1.44 TRAVEL TIME (MIN.) = 0.53  
Tc (MIN.) = 18.63  
SUBAREA AREA (ACRES) = 11.53 SUBAREA RUNOFF (CFS) = 21.35  
EFFECTIVE AREA (ACRES) = 44.84 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 44.8 PEAK FLOW RATE (CFS) = 82.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.50 FLOW VELOCITY (FEET/SEC.) = 12.29  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50110.00 = 2351.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50110.00 TO NODE 50111.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 590.00 DOWNSTREAM (FEET) = 570.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 340.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.299

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 27.15 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 107.41  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.78  
AVERAGE FLOW DEPTH (FEET) = 2.02 TRAVEL TIME (MIN.) = 0.65  
Tc (MIN.) = 19.27  
SUBAREA AREA (ACRES) = 27.15 SUBAREA RUNOFF (CFS) = 48.85  
EFFECTIVE AREA (ACRES) = 71.99 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 72.0 PEAK FLOW RATE (CFS) = 129.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.17 FLOW VELOCITY (FEET/SEC.) = 9.17  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50111.00 = 2691.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50111.00 TO NODE 50112.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 570.00 DOWNSTREAM (FEET) = 567.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 403.00 CHANNEL SLOPE = 0.0074  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.191

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 66.68 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 186.28  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.64  
AVERAGE FLOW DEPTH (FEET) = 3.66 TRAVEL TIME (MIN.) = 1.45  
Tc (MIN.) = 20.72  
SUBAREA AREA (ACRES) = 66.68 SUBAREA RUNOFF (CFS) = 113.48  
EFFECTIVE AREA (ACRES) = 138.68 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 138.7 PEAK FLOW RATE (CFS) = 236.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 4.00 FLOW VELOCITY (FEET/SEC.) = 4.91  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50112.00 = 3094.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50112.00 TO NODE 50140.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 20.72  
RAINFALL INTENSITY (INCH/HR) = 2.19  
AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA (ACRES) = 138.68  
TOTAL STREAM AREA (ACRES) = 138.68  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 236.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50120.00 TO NODE 50121.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH (FEET) = 324.00  
ELEVATION DATA: UPSTREAM (FEET) = 1068.00 DOWNSTREAM (FEET) = 968.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.018  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.891

SUBAREA Tc AND LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER  
"CHAPARRAL, BROADLEAF" - 0.29 0.30 1.000 0 9.02  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF (CFS) = 0.93  
TOTAL AREA (ACRES) = 0.29 PEAK FLOW RATE (CFS) = 0.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50121.00 TO NODE 50122.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 968.00 DOWNSTREAM (FEET) = 916.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 242.00 CHANNEL SLOPE = 0.2149  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.575  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.55 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.74  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.06  
AVERAGE FLOW DEPTH (FEET) = 0.34 TRAVEL TIME (MIN.) = 0.80  
Tc (MIN.) = 9.82  
SUBAREA AREA (ACRES) = 0.55 SUBAREA RUNOFF (CFS) = 1.61  
EFFECTIVE AREA (ACRES) = 0.83 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 0.8 PEAK FLOW RATE (CFS) = 2.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.38 FLOW VELOCITY (FEET/SEC.) = 5.55  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50122.00 = 566.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50122.00 TO NODE 50123.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 916.00 DOWNSTREAM (FEET) = 906.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 111.00 CHANNEL SLOPE = 0.0901  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.462  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.68 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.43  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.32  
AVERAGE FLOW DEPTH (FEET) = 0.51 TRAVEL TIME (MIN.) = 0.43  
Tc (MIN.) = 10.24  
SUBAREA AREA (ACRES) = 0.68 SUBAREA RUNOFF (CFS) = 1.93  
EFFECTIVE AREA (ACRES) = 1.51 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 1.5 PEAK FLOW RATE (CFS) = 4.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.56 FLOW VELOCITY (FEET/SEC.) = 4.58  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50123.00 = 677.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50123.00 TO NODE 50124.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 906.00 DOWNSTREAM (FEET) = 903.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 60.00 CHANNEL SLOPE = 0.0500  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.419  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.59 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.13  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.85  
AVERAGE FLOW DEPTH (FEET) = 0.67 TRAVEL TIME (MIN.) = 0.26  
Tc (MIN.) = 10.50  
SUBAREA AREA (ACRES) = 0.59 SUBAREA RUNOFF (CFS) = 1.65  
EFFECTIVE AREA (ACRES) = 2.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 2.1 PEAK FLOW RATE (CFS) = 5.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.70 FLOW VELOCITY (FEET/SEC.) = 3.96  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50124.00 = 737.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50124.00 TO NODE 50125.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 903.00 DOWNSTREAM (FEET) = 901.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 29.00 CHANNEL SLOPE = 0.0690  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.403  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.44 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.91  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.85  
AVERAGE FLOW DEPTH (FEET) = 0.74 TRAVEL TIME (MIN.) = 0.10  
Tc (MIN.) = 10.60  
SUBAREA AREA (ACRES) = 1.44 SUBAREA RUNOFF (CFS) = 4.02  
EFFECTIVE AREA (ACRES) = 3.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 3.5 PEAK FLOW RATE (CFS) = 9.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.80 FLOW VELOCITY (FEET/SEC.) = 5.10  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50125.00 = 766.00 FEET.

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FLOW PROCESS FROM NODE 50125.00 TO NODE 50126.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 901.00 DOWNSTREAM(FEET) = 889.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 130.00 CHANNEL SLOPE = 0.0923
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.345
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.69 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.58
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.16
AVERAGE FLOW DEPTH(FEET) = 0.86 TRAVEL TIME(MIN.) = 0.35
Tc(MIN.) = 10.96
SUBAREA AREA(ACRES) = 2.69 SUBAREA RUNOFF(CFS) = 7.38
EFFECTIVE AREA(ACRES) = 6.23 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.2 PEAK FLOW RATE(CFS) = 17.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.93 FLOW VELOCITY(FEET/SEC.) = 6.53
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50126.00 = 896.00 FEET.

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FLOW PROCESS FROM NODE 50126.00 TO NODE 50127.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 889.00 DOWNSTREAM(FEET) = 855.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 231.00 CHANNEL SLOPE = 0.1472
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.267
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.18 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.00
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.14
AVERAGE FLOW DEPTH(FEET) = 0.91 TRAVEL TIME(MIN.) = 0.47
Tc(MIN.) = 11.43
SUBAREA AREA(ACRES) = 2.18 SUBAREA RUNOFF(CFS) = 5.82
EFFECTIVE AREA(ACRES) = 8.41 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 22.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.95 FLOW VELOCITY(FEET/SEC.) = 8.32
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50127.00 = 1127.00 FEET.

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FLOW PROCESS FROM NODE 50127.00 TO NODE 50128.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 855.00 DOWNSTREAM(FEET) = 793.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 211.00 CHANNEL SLOPE = 0.2938
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.217
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 5.70 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.95
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.64
AVERAGE FLOW DEPTH(FEET) = 0.93 TRAVEL TIME(MIN.) = 0.30
Tc(MIN.) = 11.73
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 14.95
EFFECTIVE AREA(ACRES) = 14.11 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.1 PEAK FLOW RATE(CFS) = 37.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.00 FLOW VELOCITY(FEET/SEC.) = 12.29
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50128.00 = 1338.00 FEET.

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FLOW PROCESS FROM NODE 50128.00 TO NODE 50129.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 793.00 DOWNSTREAM(FEET) = 708.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 353.00 CHANNEL SLOPE = 0.2408
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.138
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 9.99 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 49.81
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.28
AVERAGE FLOW DEPTH(FEET) = 1.16 TRAVEL TIME(MIN.) = 0.48
Tc(MIN.) = 12.21
SUBAREA AREA(ACRES) = 9.99 SUBAREA RUNOFF(CFS) = 25.52
EFFECTIVE AREA(ACRES) = 24.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 61.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.26 FLOW VELOCITY(FEET/SEC.) = 12.89
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50129.00 = 1691.00 FEET.

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FLOW PROCESS FROM NODE 50129.00 TO NODE 50130.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 708.00 DOWNSTREAM(FEET) = 571.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 735.00 CHANNEL SLOPE = 0.1864

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.976

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 13.71 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 78.08

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.47

AVERAGE FLOW DEPTH(FEET) = 1.44 TRAVEL TIME(MIN.) = 0.98

Tc(MIN.) = 13.19

SUBAREA AREA(ACRES) = 13.71 SUBAREA RUNOFF(CFS) = 33.02

EFFECTIVE AREA(ACRES) = 37.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 91.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.53 FLOW VELOCITY(FEET/SEC.) = 12.96

LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50130.00 = 2426.00 FEET.

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FLOW PROCESS FROM NODE 50130.00 TO NODE 50131.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 571.00 DOWNSTREAM(FEET) = 566.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 709.00 CHANNEL SLOPE = 0.0071

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.575

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 20.71 0.30 0.986 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.986

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 112.34

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.99

AVERAGE FLOW DEPTH(FEET) = 3.06 TRAVEL TIME(MIN.) = 2.96

Tc(MIN.) = 16.15

SUBAREA AREA(ACRES) = 20.71 SUBAREA RUNOFF(CFS) = 42.48

EFFECTIVE AREA(ACRES) = 58.52 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 119.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.14 FLOW VELOCITY(FEET/SEC.) = 4.06

LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50131.00 = 3135.00 FEET.

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FLOW PROCESS FROM NODE 50132.00 TO NODE 50131.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.15

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.575

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 154.02 0.30 0.949 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.949

SUBAREA AREA(ACRES) = 154.02 SUBAREA RUNOFF(CFS) = 317.55

EFFECTIVE AREA(ACRES) = 212.54 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96

TOTAL AREA(ACRES) = 212.5 PEAK FLOW RATE(CFS) = 437.48

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FLOW PROCESS FROM NODE 50131.00 TO NODE 50140.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 16.15

RAINFALL INTENSITY(INCH/HR) = 2.58

AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.96

EFFECTIVE STREAM AREA(ACRES) = 212.54

TOTAL STREAM AREA(ACRES) = 212.54

PEAK FLOW RATE(CFS) AT CONFLUENCE = 437.48

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	236.00	20.72	2.191	0.30( 0.30)	1.00	138.7	50100.00
2	437.48	16.15	2.575	0.30( 0.29)	0.96	212.5	50120.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	658.84	16.15	2.575	0.30( 0.29)	0.97	320.6	50120.00
2	599.88	20.72	2.191	0.30( 0.29)	0.98	351.2	50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 658.84 Tc(MIN.) = 16.15

EFFECTIVE AREA(ACRES) = 320.63 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97

TOTAL AREA(ACRES) = 351.2

LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50140.00 = 3135.00 FEET.

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FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 566.00 DOWNSTREAM(FEET) = 416.00
FLOW LENGTH(FEET) = 376.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 74.34
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 658.84
PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 16.24
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50141.00 = 3511.00 FEET.

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FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.24
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.568
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 48.73 0.30 0.922 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.922
SUBAREA AREA(ACRES) = 48.73 SUBAREA RUNOFF(CFS) = 100.50
EFFECTIVE AREA(ACRES) = 369.36 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 400.0 PEAK FLOW RATE(CFS) = 757.19

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FLOW PROCESS FROM NODE 50141.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 416.00 DOWNSTREAM(FEET) = 404.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 972.00 CHANNEL SLOPE = 0.0123
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.388
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.56 0.30 0.610 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.610
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 764.69
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.97
AVERAGE FLOW DEPTH(FEET) = 5.66 TRAVEL TIME(MIN.) = 2.03
Tc(MIN.) = 18.27
SUBAREA AREA(ACRES) = 7.56 SUBAREA RUNOFF(CFS) = 15.01
EFFECTIVE AREA(ACRES) = 376.92 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 407.5 PEAK FLOW RATE(CFS) = 757.19
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 5.64 FLOW VELOCITY(FEET/SEC.) = 7.95
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50162.00 = 4483.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 757.19 18.27 2.388 0.30( 0.29) 0.96 376.9 50120.00
2 681.91 22.90 2.058 0.30( 0.29) 0.96 407.5 50100.00
NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 757.19 Tc(MIN.) = 18.27
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 376.92

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FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 18.27
RAINFALL INTENSITY(INCH/HR) = 2.39
AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 376.92
TOTAL STREAM AREA(ACRES) = 407.52
PEAK FLOW RATE(CFS) AT CONFLUENCE = 757.19

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FLOW PROCESS FROM NODE 50150.00 TO NODE 50151.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00
ELEVATION DATA: UPSTREAM(FEET) = 1076.00 DOWNSTREAM(FEET) = 988.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.235
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.805
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" - 0.46 0.30 1.000 0 9.23
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.44
TOTAL AREA(ACRES) = 0.46 PEAK FLOW RATE(CFS) = 1.44

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FLOW PROCESS FROM NODE 50151.00 TO NODE 50152.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 988.00 DOWNSTREAM(FEET) = 938.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 220.00 CHANNEL SLOPE = 0.2273
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.545
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.59 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.30
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.56
AVERAGE FLOW DEPTH(FEET) = 0.37 TRAVEL TIME(MIN.) = 0.66
Tc(MIN.) = 9.89
SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 1.72
EFFECTIVE AREA(ACRES) = 1.04 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 3.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.41 FLOW VELOCITY(FEET/SEC.) = 5.90
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50152.00 = 543.00 FEET.

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FLOW PROCESS FROM NODE 50152.00 TO NODE 50153.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 938.00 DOWNSTREAM(FEET) = 904.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 218.00 CHANNEL SLOPE = 0.1560
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.417
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.13 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.64
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.81
AVERAGE FLOW DEPTH(FEET) = 0.52 TRAVEL TIME(MIN.) = 0.63
Tc(MIN.) = 10.52
SUBAREA AREA(ACRES) = 1.13 SUBAREA RUNOFF(CFS) = 3.18
EFFECTIVE AREA(ACRES) = 2.18 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.2 PEAK FLOW RATE(CFS) = 6.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.58 FLOW VELOCITY(FEET/SEC.) = 6.16
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50153.00 = 761.00 FEET.

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FLOW PROCESS FROM NODE 50153.00 TO NODE 50154.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 904.00 DOWNSTREAM(FEET) = 881.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 212.00 CHANNEL SLOPE = 0.1085
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.322
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.00 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.18
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.12
AVERAGE FLOW DEPTH(FEET) = 0.74 TRAVEL TIME(MIN.) = 0.58
Tc(MIN.) = 11.10
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 8.16
EFFECTIVE AREA(ACRES) = 5.18 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 5.2 PEAK FLOW RATE(CFS) = 14.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.84 FLOW VELOCITY(FEET/SEC.) = 6.62
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50154.00 = 973.00 FEET.

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FLOW PROCESS FROM NODE 50154.00 TO NODE 50155.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 881.00 DOWNSTREAM(FEET) = 877.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0253
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.217
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.81 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.08
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.14
AVERAGE FLOW DEPTH(FEET) = 1.24 TRAVEL TIME(MIN.) = 0.64
Tc(MIN.) = 11.73
SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 10.01
EFFECTIVE AREA(ACRES) = 8.99 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 9.0 PEAK FLOW RATE(CFS) = 23.60

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.34 FLOW VELOCITY(FEET/SEC.) = 4.38

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LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50155.00 = 1131.00 FEET.

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FLOW PROCESS FROM NODE 50155.00 TO NODE 50156.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 877.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 195.00 CHANNEL SLOPE = 0.0103
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.051

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.32 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.71
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.24
AVERAGE FLOW DEPTH(FEET) = 1.69 TRAVEL TIME(MIN.) = 1.00
Tc(MIN.) = 12.74
SUBAREA AREA(ACRES) = 3.32 SUBAREA RUNOFF(CFS) = 8.22
EFFECTIVE AREA(ACRES) = 12.31 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 30.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.75 FLOW VELOCITY(FEET/SEC.) = 3.32
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50156.00 = 1326.00 FEET.

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FLOW PROCESS FROM NODE 50156.00 TO NODE 50157.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 850.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 424.00 CHANNEL SLOPE = 0.0590
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.875

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.78 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.86
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.62
AVERAGE FLOW DEPTH(FEET) = 1.32 TRAVEL TIME(MIN.) = 1.07
Tc(MIN.) = 13.80
SUBAREA AREA(ACRES) = 3.78 SUBAREA RUNOFF(CFS) = 8.76
EFFECTIVE AREA(ACRES) = 16.09 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 37.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.36 FLOW VELOCITY(FEET/SEC.) = 6.71
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50157.00 = 1750.00 FEET.

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FLOW PROCESS FROM NODE 50157.00 TO NODE 50158.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 835.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0949
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.825

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 11.22 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 50.03
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.69
AVERAGE FLOW DEPTH(FEET) = 1.39 TRAVEL TIME(MIN.) = 0.30
Tc(MIN.) = 14.11
SUBAREA AREA(ACRES) = 11.22 SUBAREA RUNOFF(CFS) = 25.49
EFFECTIVE AREA(ACRES) = 27.31 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 27.3 PEAK FLOW RATE(CFS) = 62.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.51 FLOW VELOCITY(FEET/SEC.) = 9.12
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50158.00 = 1908.00 FEET.

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FLOW PROCESS FROM NODE 50158.00 TO NODE 50159.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 835.00 DOWNSTREAM(FEET) = 680.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 721.00 CHANNEL SLOPE = 0.2150
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.677

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.87 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 84.39
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.44
AVERAGE FLOW DEPTH(FEET) = 1.45 TRAVEL TIME(MIN.) = 0.89
Tc(MIN.) = 15.00
SUBAREA AREA(ACRES) = 20.87 SUBAREA RUNOFF(CFS) = 44.66
EFFECTIVE AREA(ACRES) = 48.18 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 48.2 PEAK FLOW RATE (CFS) = 103.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.56 FLOW VELOCITY (FEET/SEC.) = 14.10  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50159.00 = 2629.00 FEET.

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FLOW PROCESS FROM NODE 50159.00 TO NODE 50160.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 680.00 DOWNSTREAM (FEET) = 558.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 874.00 CHANNEL SLOPE = 0.1396

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.577

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	32.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 135.89

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.82

AVERAGE FLOW DEPTH (FEET) = 1.88 TRAVEL TIME (MIN.) = 1.14

Tc (MIN.) = 16.14

SUBAREA AREA (ACRES) = 32.02 SUBAREA RUNOFF (CFS) = 65.61

EFFECTIVE AREA (ACRES) = 80.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 80.2 PEAK FLOW RATE (CFS) = 164.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.02 FLOW VELOCITY (FEET/SEC.) = 13.46  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50160.00 = 3503.00 FEET.

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FLOW PROCESS FROM NODE 50160.00 TO NODE 50161.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 558.00 DOWNSTREAM (FEET) = 463.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 1013.00 CHANNEL SLOPE = 0.0938

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.450

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	13.52	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 177.42

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.80

AVERAGE FLOW DEPTH (FEET) = 2.24 TRAVEL TIME (MIN.) = 1.43

Tc (MIN.) = 17.57

SUBAREA AREA (ACRES) = 13.52 SUBAREA RUNOFF (CFS) = 26.17

EFFECTIVE AREA (ACRES) = 93.72 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 93.7 PEAK FLOW RATE (CFS) = 181.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.25 FLOW VELOCITY (FEET/SEC.) = 11.90

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50161.00 = 4516.00 FEET.

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FLOW PROCESS FROM NODE 50161.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 463.00 DOWNSTREAM (FEET) = 404.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 1126.00 CHANNEL SLOPE = 0.0524

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.281

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	19.35	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 198.61

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.80

AVERAGE FLOW DEPTH (FEET) = 2.60 TRAVEL TIME (MIN.) = 1.91

Tc (MIN.) = 19.48

SUBAREA AREA (ACRES) = 19.35 SUBAREA RUNOFF (CFS) = 34.49

EFFECTIVE AREA (ACRES) = 113.07 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 113.1 PEAK FLOW RATE (CFS) = 201.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.61 FLOW VELOCITY (FEET/SEC.) = 9.83

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

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FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

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TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION (MIN.) = 19.48

RAINFALL INTENSITY (INCH/HR) = 2.28

AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00

EFFECTIVE STREAM AREA (ACRES) = 113.07

TOTAL STREAM AREA (ACRES) = 113.07

PEAK FLOW RATE (CFS) AT CONFLUENCE = 201.56

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	757.19	18.27	2.388	0.30 ( 0.29)	0.96	376.9	50120.00
1	681.91	22.90	2.058	0.30 ( 0.29)	0.96	407.5	50100.00
2	201.56	19.48	2.281	0.30 ( 0.30)	1.00	113.1	50150.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	956.45	18.27	2.388	0.30 ( 0.29)	0.97	483.0	50120.00
2	939.03	19.48	2.281	0.30 ( 0.29)	0.97	498.0	50150.00
3	860.82	22.90	2.058	0.30 ( 0.29)	0.97	520.6	50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 956.45 Tc(MIN.) = 18.27  
EFFECTIVE AREA(ACRES) = 482.95 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 520.6  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

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FLOW PROCESS FROM NODE 50162.00 TO NODE 50163.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 378.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1158.00 CHANNEL SLOPE = 0.0225  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.232

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	151.93	0.30	0.990	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1088.79  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.89  
AVERAGE FLOW DEPTH(FEET) = 5.77 TRAVEL TIME(MIN.) = 1.77  
Tc(MIN.) = 20.04  
SUBAREA AREA(ACRES) = 151.93 SUBAREA RUNOFF(CFS) = 264.63  
EFFECTIVE AREA(ACRES) = 634.88 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 672.5 PEAK FLOW RATE(CFS) = 1108.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 5.81 FLOW VELOCITY(FEET/SEC.) = 10.94  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50163.00 = 6800.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1108.57	20.04	2.232	0.30 ( 0.29)	0.97	634.9	50120.00
2	1091.19	21.26	2.158	0.30 ( 0.29)	0.97	649.9	50150.00
3	1001.36	24.72	1.947	0.30 ( 0.29)	0.98	672.5	50100.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1108.57 Tc(MIN.) = 20.04  
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.97 EFFECTIVE AREA(ACRES) = 634.88

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FLOW PROCESS FROM NODE 50163.00 TO NODE 50164.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 378.00 DOWNSTREAM(FEET) = 356.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 886.00 CHANNEL SLOPE = 0.0248  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.156

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	177.01	0.30	0.989	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.989  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1256.65  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.73  
AVERAGE FLOW DEPTH(FEET) = 5.98 TRAVEL TIME(MIN.) = 1.26  
Tc(MIN.) = 21.30  
SUBAREA AREA(ACRES) = 177.01 SUBAREA RUNOFF(CFS) = 296.14  
EFFECTIVE AREA(ACRES) = 811.89 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 849.5 PEAK FLOW RATE(CFS) = 1360.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 6.16 FLOW VELOCITY(FEET/SEC.) = 11.96  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50164.00 = 7686.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1360.83	21.30	2.156	0.30 ( 0.29)	0.98	811.9	50120.00
2	1330.32	22.53	2.081	0.30 ( 0.29)	0.98	826.9	50150.00
3	1221.27	26.01	1.891	0.30 ( 0.29)	0.98	849.5	50100.00

NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 1360.83 Tc(MIN.) = 21.30  
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 811.89

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FLOW PROCESS FROM NODE 50164.00 TO NODE 50165.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 356.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1762.00 CHANNEL SLOPE = 0.0233  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.005

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	177.01	0.30	0.989	-

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 155.27 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1480.02  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.92  
 AVERAGE FLOW DEPTH(FEET) = 6.43 TRAVEL TIME(MIN.) = 2.46  
 Tc(MIN.) = 23.76  
 SUBAREA AREA(ACRES) = 155.27 SUBAREA RUNOFF(CFS) = 238.31  
 EFFECTIVE AREA(ACRES) = 967.16 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1004.8 PEAK FLOW RATE(CFS) = 1489.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 6.45 FLOW VELOCITY(FEET/SEC.) = 11.93  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50165.00 = 9448.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1489.33	23.76	2.005	0.30( 0.29)	0.98	967.2	50120.00
2	1445.69	25.00	1.930	0.30( 0.29)	0.98	982.2	50150.00
3	1355.05	28.55	1.793	0.30( 0.29)	0.98	1004.8	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1489.33 Tc(MIN.) = 23.76  
 AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 967.16

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 FLOW PROCESS FROM NODE 50165.00 TO NODE 50166.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 893.00 CHANNEL SLOPE = 0.0347  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.940

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	50.24	0.30	0.997	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1526.43  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.96  
 AVERAGE FLOW DEPTH(FEET) = 6.04 TRAVEL TIME(MIN.) = 1.07  
 Tc(MIN.) = 24.83  
 SUBAREA AREA(ACRES) = 50.24 SUBAREA RUNOFF(CFS) = 74.20  
 EFFECTIVE AREA(ACRES) = 1017.39 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1055.0 PEAK FLOW RATE(CFS) = 1506.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 6.01 FLOW VELOCITY(FEET/SEC.) = 13.91  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50166.00 = 10341.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1506.93	24.83	1.940	0.30( 0.29)	0.98	1017.4	50120.00
2	1480.85	26.08	1.888	0.30( 0.29)	0.98	1032.4	50150.00
3	1382.53	29.64	1.751	0.30( 0.29)	0.98	1055.0	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1506.93 Tc(MIN.) = 24.83  
 AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 1017.39

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 FLOW PROCESS FROM NODE 50166.00 TO NODE 50167.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 240.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00 CHANNEL SLOPE = 0.0437  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.894

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.36	0.30	0.892	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.892  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1513.05  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 15.18  
 AVERAGE FLOW DEPTH(FEET) = 5.76 TRAVEL TIME(MIN.) = 1.11  
 Tc(MIN.) = 25.94  
 SUBAREA AREA(ACRES) = 8.36 SUBAREA RUNOFF(CFS) = 12.24  
 EFFECTIVE AREA(ACRES) = 1025.75 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1063.4 PEAK FLOW RATE(CFS) = 1506.93  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 5.76 FLOW VELOCITY(FEET/SEC.) = 15.16  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50167.00 = 11349.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1506.93	25.94	1.894	0.30( 0.29)	0.98	1025.8	50120.00
2	1480.85	27.19	1.845	0.30( 0.29)	0.98	1040.8	50150.00
3	1382.53	30.77	1.716	0.30( 0.29)	0.98	1063.4	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1506.93 Tc(MIN.) = 25.94  
 AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 1025.75

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1063.4 TC(MIN.) = 25.94  
 EFFECTIVE AREA(ACRES) = 1025.75 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.981  
 PEAK FLOW RATE(CFS) = 1506.93



\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1506.93	25.94	1.894	0.30 ( 0.29)	0.98	1025.8	50120.00
2	1480.85	27.19	1.845	0.30 ( 0.29)	0.98	1040.8	50150.00
3	1382.53	30.77	1.716	0.30 ( 0.29)	0.98	1063.4	50100.00

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END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 50 Yr \*  
\* From Node: 50500 To Node: 50513 \*  
\*\*\*\*\*

FILE NAME: 0610505X.DAT  
TIME/DATE OF STUDY: 09:35 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

1) 5.00; 5.307  
2) 10.00; 3.421  
3) 15.00; 2.630  
4) 20.00; 2.201  
5) 25.00; 1.906  
6) 30.00; 1.714  
7) 40.00; 1.452  
8) 50.00; 1.291  
9) 60.00; 1.182  
10) 90.00; 0.979  
11) 120.00; 0.849  
12) 180.00; 0.725  
13) 360.00; 0.534  
14) 1440.00; 0.233

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50500.00 TO NODE 50501.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 1122.00 DOWNSTREAM(FEET) = 980.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.501  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.987  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.67	0.30	1.000	0	8.50

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 2.22  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 2.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50501.00 TO NODE 50502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 832.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 500.00 CHANNEL SLOPE = 0.2960  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.527  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.83	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.43  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.83  
AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 1.22  
 $T_c$ (MIN.) = 9.72  
SUBAREA AREA(ACRES) = 0.83 SUBAREA RUNOFF(CFS) = 2.43  
EFFECTIVE AREA(ACRES) = 1.50 AREA-AVERAGED  $F_m$ (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$ (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 1.00  
TOTAL AREA(ACRES) = 1.5 PEAK FLOW RATE(CFS) = 4.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 7.27  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50502.00 = 830.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50502.00 TO NODE 50503.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 832.00 DOWNSTREAM(FEET) = 779.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 255.00 CHANNEL SLOPE = 0.2078  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.378  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.76	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.70  
AVERAGE FLOW DEPTH(FEET) = 0.64 TRAVEL TIME(MIN.) = 0.55  
Tc(MIN.) = 10.27  
SUBAREA AREA(ACRES) = 3.76 SUBAREA RUNOFF(CFS) = 10.41  
EFFECTIVE AREA(ACRES) = 5.26 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.3 PEAK FLOW RATE(CFS) = 14.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.75 FLOW VELOCITY(FEET/SEC.) = 8.58  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50503.00 = 1085.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50503.00 TO NODE 50504.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 779.00 DOWNSTREAM(FEET) = 765.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 382.00 CHANNEL SLOPE = 0.0366  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.171  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.56	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.46  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.85  
AVERAGE FLOW DEPTH(FEET) = 1.19 TRAVEL TIME(MIN.) = 1.31  
Tc(MIN.) = 11.58  
SUBAREA AREA(ACRES) = 4.56 SUBAREA RUNOFF(CFS) = 11.78  
EFFECTIVE AREA(ACRES) = 9.82 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 25.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.29 FLOW VELOCITY(FEET/SEC.) = 5.11  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50504.00 = 1467.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50504.00 TO NODE 50505.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 355.00 CHANNEL SLOPE = 0.0423  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.004  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.79	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.98  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.63  
AVERAGE FLOW DEPTH(FEET) = 1.33 TRAVEL TIME(MIN.) = 1.05  
Tc(MIN.) = 12.64  
SUBAREA AREA(ACRES) = 3.79 SUBAREA RUNOFF(CFS) = 9.22  
EFFECTIVE AREA(ACRES) = 13.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 13.6 PEAK FLOW RATE(CFS) = 33.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.38 FLOW VELOCITY(FEET/SEC.) = 5.77  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50505.00 = 1822.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50505.00 TO NODE 50506.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 712.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 261.00 CHANNEL SLOPE = 0.1456  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.933  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.43	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 40.74  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.66  
AVERAGE FLOW DEPTH(FEET) = 1.19 TRAVEL TIME(MIN.) = 0.45  
Tc(MIN.) = 13.09  
SUBAREA AREA(ACRES) = 6.43 SUBAREA RUNOFF(CFS) = 15.23  
EFFECTIVE AREA(ACRES) = 20.03 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.0 PEAK FLOW RATE (CFS) = 47.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.26 FLOW VELOCITY (FEET/SEC.) = 10.03  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50506.00 = 2083.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50506.00 TO NODE 50507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 464.00 CHANNEL SLOPE = 0.2414  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.833

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.57	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 50.41  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.27  
AVERAGE FLOW DEPTH (FEET) = 1.17 TRAVEL TIME (MIN.) = 0.63  
Tc (MIN.) = 13.72

SUBAREA AREA (ACRES) = 2.57 SUBAREA RUNOFF (CFS) = 5.85  
EFFECTIVE AREA (ACRES) = 22.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.6 PEAK FLOW RATE (CFS) = 51.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.18 FLOW VELOCITY (FEET/SEC.) = 12.38  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50507.00 = 2547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50507.00 TO NODE 50508.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 535.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 310.00 CHANNEL SLOPE = 0.2097  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.765

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.09	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 58.29  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.06  
AVERAGE FLOW DEPTH (FEET) = 1.27 TRAVEL TIME (MIN.) = 0.43  
Tc (MIN.) = 14.14

SUBAREA AREA (ACRES) = 6.09 SUBAREA RUNOFF (CFS) = 13.52  
EFFECTIVE AREA (ACRES) = 28.69 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 28.7 PEAK FLOW RATE (CFS) = 63.67

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.31 FLOW VELOCITY (FEET/SEC.) = 12.38  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50508.00 = 2857.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50508.00 TO NODE 50509.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 405.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.2658  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.674

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 74.38  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 14.13  
AVERAGE FLOW DEPTH (FEET) = 1.32 TRAVEL TIME (MIN.) = 0.58  
Tc (MIN.) = 14.72

SUBAREA AREA (ACRES) = 10.02 SUBAREA RUNOFF (CFS) = 21.42  
EFFECTIVE AREA (ACRES) = 38.72 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.7 PEAK FLOW RATE (CFS) = 82.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.38 FLOW VELOCITY (FEET/SEC.) = 14.40  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50509.00 = 3346.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50509.00 TO NODE 50510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 285.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 706.00 CHANNEL SLOPE = 0.1700  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.573

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 89.48  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.48

AVERAGE FLOW DEPTH (FEET) = 1.55 TRAVEL TIME (MIN.) = 0.94  
Tc (MIN.) = 15.66  
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 13.49  
EFFECTIVE AREA (ACRES) = 45.32 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 92.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.57 FLOW VELOCITY (FEET/SEC.) = 12.59  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50510.00 = 4052.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50510.00 TO NODE 50511.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 285.00 DOWNSTREAM (FEET) = 238.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1169.00 CHANNEL SLOPE = 0.0402  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.398  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 22.45 0.30 0.991 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 113.94  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.55  
AVERAGE FLOW DEPTH (FEET) = 1.99 TRAVEL TIME (MIN.) = 2.04  
Tc (MIN.) = 17.70  
SUBAREA AREA (ACRES) = 22.45 SUBAREA RUNOFF (CFS) = 42.45  
EFFECTIVE AREA (ACRES) = 67.77 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 67.8 PEAK FLOW RATE (CFS) = 128.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.08 FLOW VELOCITY (FEET/SEC.) = 9.86  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50511.00 = 5221.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50511.00 TO NODE 50512.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 238.00 DOWNSTREAM (FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.0102  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.286  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 39.83 0.30 0.990 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 163.67  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.27  
AVERAGE FLOW DEPTH (FEET) = 2.95 TRAVEL TIME (MIN.) = 1.30  
Tc (MIN.) = 19.00  
SUBAREA AREA (ACRES) = 39.83 SUBAREA RUNOFF (CFS) = 71.31  
EFFECTIVE AREA (ACRES) = 107.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 107.6 PEAK FLOW RATE (CFS) = 192.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 3.14 FLOW VELOCITY (FEET/SEC.) = 6.51  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50512.00 = 5710.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50512.00 TO NODE 50513.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 233.00 DOWNSTREAM (FEET) = 209.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 537.00 CHANNEL SLOPE = 0.0447  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.219  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 198.91  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.43  
AVERAGE FLOW DEPTH (FEET) = 2.41 TRAVEL TIME (MIN.) = 0.78  
Tc (MIN.) = 19.79  
SUBAREA AREA (ACRES) = 7.40 SUBAREA RUNOFF (CFS) = 12.78  
EFFECTIVE AREA (ACRES) = 114.99 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 115.0 PEAK FLOW RATE (CFS) = 198.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.41 FLOW VELOCITY (FEET/SEC.) = 11.45  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50513.00 = 6247.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50513.00 TO NODE 50513.00 IS CODE = 81

-----  
>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 19.79  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.219  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.19 0.30 0.961 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.961  
SUBAREA AREA (ACRES) = 38.19 SUBAREA RUNOFF (CFS) = 66.37  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.99  
TOTAL AREA (ACRES) = 153.2 PEAK FLOW RATE (CFS) = 265.16

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 153.2 TC (MIN.) = 19.79  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.986  
PEAK FLOW RATE (CFS) = 265.16  
=====

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 50 Yr \*  
\* From Node: 50600 To Node: 50610 \*  
\*\*\*\*\*

FILE NAME: 0610506X.DAT  
TIME/DATE OF STUDY: 09:35 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.307
- 2) 10.00; 3.421
- 3) 15.00; 2.630
- 4) 20.00; 2.201
- 5) 25.00; 1.906
- 6) 30.00; 1.714
- 7) 40.00; 1.452
- 8) 50.00; 1.291
- 9) 60.00; 1.182
- 10) 90.00; 0.979
- 11) 120.00; 0.849
- 12) 180.00; 0.725
- 13) 360.00; 0.534
- 14) 1440.00; 0.233

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50600.00 TO NODE 50601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00  
ELEVATION DATA: UPSTREAM(FEET) = 780.00 DOWNSTREAM(FEET) = 730.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.166  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.395  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	1.44	0.30	1.000	0	10.17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 4.00  
TOTAL AREA(ACRES) = 1.44 PEAK FLOW RATE(CFS) = 4.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50601.00 TO NODE 50602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.1541  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.239  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.27	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.68  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.05  
AVERAGE FLOW DEPTH(FEET) = 0.56 TRAVEL TIME(MIN.) = 0.98  
Tc(MIN.) = 11.15  
SUBAREA AREA(ACRES) = 1.27 SUBAREA RUNOFF(CFS) = 3.36  
EFFECTIVE AREA(ACRES) = 2.71 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 7.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.61 FLOW VELOCITY(FEET/SEC.) = 6.35  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50602.00 = 671.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50602.00 TO NODE 50603.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 258.00 CHANNEL SLOPE = 0.2907  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.159

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.31	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.85

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.47

AVERAGE FLOW DEPTH(FEET) = 0.59 TRAVEL TIME(MIN.) = 0.51

Tc(MIN.) = 11.66

SUBAREA AREA(ACRES) = 1.31 SUBAREA RUNOFF(CFS) = 3.37

EFFECTIVE AREA(ACRES) = 4.02 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 10.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 8.89

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50603.00 = 929.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50603.00 TO NODE 50604.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 585.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.1293  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.114

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.58	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.34

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.84

AVERAGE FLOW DEPTH(FEET) = 0.78 TRAVEL TIME(MIN.) = 0.28

Tc(MIN.) = 11.94

SUBAREA AREA(ACRES) = 1.58 SUBAREA RUNOFF(CFS) = 4.01

EFFECTIVE AREA(ACRES) = 5.60 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.6 PEAK FLOW RATE(CFS) = 14.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.81 FLOW VELOCITY(FEET/SEC.) = 7.15

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50604.00 = 1045.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50604.00 TO NODE 50605.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 584.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 16.00 CHANNEL SLOPE = 0.0625  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.107

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.98	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.48

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.93

AVERAGE FLOW DEPTH(FEET) = 1.07 TRAVEL TIME(MIN.) = 0.04

Tc(MIN.) = 11.99

SUBAREA AREA(ACRES) = 4.98 SUBAREA RUNOFF(CFS) = 12.58

EFFECTIVE AREA(ACRES) = 10.58 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 10.6 PEAK FLOW RATE(CFS) = 26.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.19 FLOW VELOCITY(FEET/SEC.) = 6.32

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50605.00 = 1061.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50605.00 TO NODE 50606.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 584.00 DOWNSTREAM(FEET) = 579.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 122.00 CHANNEL SLOPE = 0.0410  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.051

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.18	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.15

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.71

AVERAGE FLOW DEPTH(FEET) = 1.39 TRAVEL TIME(MIN.) = 0.36

Tc(MIN.) = 12.34

SUBAREA AREA(ACRES) = 5.18 SUBAREA RUNOFF(CFS) = 12.83

EFFECTIVE AREA(ACRES) = 15.76 AREA-AVERAGED Fm(INCH/HR) = 0.30



AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 15.8 PEAK FLOW RATE (CFS) = 39.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.48 FLOW VELOCITY (FEET/SEC.) = 5.96  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50606.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50606.00 TO NODE 50607.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 579.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 637.00 CHANNEL SLOPE = 0.0801  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.840

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.34	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 47.42  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.99  
AVERAGE FLOW DEPTH (FEET) = 1.41 TRAVEL TIME (MIN.) = 1.33  
Tc (MIN.) = 13.67

SUBAREA AREA (ACRES) = 7.34 SUBAREA RUNOFF (CFS) = 16.79  
EFFECTIVE AREA (ACRES) = 23.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 23.1 PEAK FLOW RATE (CFS) = 52.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.46 FLOW VELOCITY (FEET/SEC.) = 8.24  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50607.00 = 1820.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50607.00 TO NODE 50608.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 422.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 529.00 CHANNEL SLOPE = 0.2004  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.721

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.99	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 56.09  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.74  
AVERAGE FLOW DEPTH (FEET) = 1.26 TRAVEL TIME (MIN.) = 0.75  
Tc (MIN.) = 14.42

SUBAREA AREA (ACRES) = 2.99 SUBAREA RUNOFF (CFS) = 6.52  
EFFECTIVE AREA (ACRES) = 26.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.1 PEAK FLOW RATE (CFS) = 56.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.26 FLOW VELOCITY (FEET/SEC.) = 11.87  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50608.00 = 2349.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50608.00 TO NODE 50609.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 422.00 DOWNSTREAM (FEET) = 297.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 708.00 CHANNEL SLOPE = 0.1766  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.594

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.94	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 69.21  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.88  
AVERAGE FLOW DEPTH (FEET) = 1.39 TRAVEL TIME (MIN.) = 0.99  
Tc (MIN.) = 15.41

SUBAREA AREA (ACRES) = 11.94 SUBAREA RUNOFF (CFS) = 24.66  
EFFECTIVE AREA (ACRES) = 38.04 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.0 PEAK FLOW RATE (CFS) = 78.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.46 FLOW VELOCITY (FEET/SEC.) = 12.25  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50609.00 = 3057.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50609.00 TO NODE 50610.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 297.00 DOWNSTREAM (FEET) = 207.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1321.00 CHANNEL SLOPE = 0.0681  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.421

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.38	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 88.47  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.92

AVERAGE FLOW DEPTH (FEET) = 1.64 TRAVEL TIME (MIN.) = 2.02  
Tc (MIN.) = 17.43  
SUBAREA AREA (ACRES) = 10.38 SUBAREA RUNOFF (CFS) = 19.82  
EFFECTIVE AREA (ACRES) = 48.42 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 92.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.67 FLOW VELOCITY (FEET/SEC.) = 11.08  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50610.00 = 4378.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 17.43  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.421  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.17 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.17 SUBAREA RUNOFF (CFS) = 2.24  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 49.6 PEAK FLOW RATE (CFS) = 94.69

=====

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 49.6 TC (MIN.) = 17.43  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.000  
PEAK FLOW RATE (CFS) = 94.69

=====

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 50 Yr \*  
\* From Node: 50700 To Node: 50716 \*  
\*\*\*\*\*

FILE NAME: 0610507X.DAT  
TIME/DATE OF STUDY: 09:35 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.307
- 2) 10.00; 3.421
- 3) 15.00; 2.630
- 4) 20.00; 2.201
- 5) 25.00; 1.906
- 6) 30.00; 1.714
- 7) 40.00; 1.452
- 8) 50.00; 1.291
- 9) 60.00; 1.182
- 10) 90.00; 0.979
- 11) 120.00; 0.849
- 12) 180.00; 0.725
- 13) 360.00; 0.534
- 14) 1440.00; 0.233

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50700.00 TO NODE 50701.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00  
ELEVATION DATA: UPSTREAM(FEET) = 1121.00 DOWNSTREAM(FEET) = 870.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.572  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.337  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.18	0.30	1.000	0	7.57

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.67  
TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 0.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50701.00 TO NODE 50702.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 827.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.3386  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.197  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.41  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.70  
AVERAGE FLOW DEPTH(FEET) = 0.29 TRAVEL TIME(MIN.) = 0.37  
Tc(MIN.) = 7.94  
SUBAREA AREA(ACRES) = 0.42 SUBAREA RUNOFF(CFS) = 1.48  
EFFECTIVE AREA(ACRES) = 0.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 2.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.33 FLOW VELOCITY(FEET/SEC.) = 6.40  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50702.00 = 456.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50703.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	827.00	DOWNSTREAM(FEET) =	815.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	94.00	CHANNEL SLOPE =	0.1277
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	4.070		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.34	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.70

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.66

AVERAGE FLOW DEPTH(FEET) = 0.44 TRAVEL TIME(MIN.) = 0.34

Tc(MIN.) = 8.28

SUBAREA AREA(ACRES) = 0.34 SUBAREA RUNOFF(CFS) = 1.15

EFFECTIVE AREA(ACRES) = 0.94 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 3.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.47 FLOW VELOCITY(FEET/SEC.) = 4.88

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50703.00 = 550.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50704.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	815.00	DOWNSTREAM(FEET) =	800.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	169.00	CHANNEL SLOPE =	0.0888
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	3.858		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.72	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.96

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.00

AVERAGE FLOW DEPTH(FEET) = 0.63 TRAVEL TIME(MIN.) = 0.56

Tc(MIN.) = 8.84

SUBAREA AREA(ACRES) = 1.72 SUBAREA RUNOFF(CFS) = 5.51

EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 8.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.72 FLOW VELOCITY(FEET/SEC.) = 5.46

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50704.00 = 719.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50705.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	800.00	DOWNSTREAM(FEET) =	785.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	128.00	CHANNEL SLOPE =	0.1172
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	3.735		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.12	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.82

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.55

AVERAGE FLOW DEPTH(FEET) = 0.78 TRAVEL TIME(MIN.) = 0.33

Tc(MIN.) = 9.17

SUBAREA AREA(ACRES) = 2.12 SUBAREA RUNOFF(CFS) = 6.56

EFFECTIVE AREA(ACRES) = 4.79 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 14.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.84 FLOW VELOCITY(FEET/SEC.) = 6.93

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50705.00 = 847.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50705.00 TO NODE 50706.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	785.00	DOWNSTREAM(FEET) =	775.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	170.00	CHANNEL SLOPE =	0.0588
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	3.550		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.64	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.12

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.77

AVERAGE FLOW DEPTH(FEET) = 1.08 TRAVEL TIME(MIN.) = 0.49

Tc(MIN.) = 9.66

SUBAREA AREA(ACRES) = 3.64 SUBAREA RUNOFF(CFS) = 10.63

EFFECTIVE AREA(ACRES) = 8.42 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.4 PEAK FLOW RATE (CFS) = 24.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.16 FLOW VELOCITY (FEET/SEC.) = 6.06  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50706.00 = 1017.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50706.00 TO NODE 50707.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 775.00 DOWNSTREAM (FEET) = 772.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 162.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.373

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.65	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.07  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.17  
AVERAGE FLOW DEPTH (FEET) = 1.58 TRAVEL TIME (MIN.) = 0.65  
Tc (MIN.) = 10.31  
SUBAREA AREA (ACRES) = 4.65 SUBAREA RUNOFF (CFS) = 12.85  
EFFECTIVE AREA (ACRES) = 13.07 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 13.1 PEAK FLOW RATE (CFS) = 36.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.67 FLOW VELOCITY (FEET/SEC.) = 4.33  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50707.00 = 1179.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50707.00 TO NODE 50708.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 772.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 357.00 CHANNEL SLOPE = 0.0756  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.249

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.55	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 40.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.59  
AVERAGE FLOW DEPTH (FEET) = 1.34 TRAVEL TIME (MIN.) = 0.78  
Tc (MIN.) = 11.09

SUBAREA AREA (ACRES) = 3.55 SUBAREA RUNOFF (CFS) = 9.42  
EFFECTIVE AREA (ACRES) = 16.62 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 16.6 PEAK FLOW RATE (CFS) = 44.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.38 FLOW VELOCITY (FEET/SEC.) = 7.68  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50708.00 = 1536.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50708.00 TO NODE 50709.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 733.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 444.00 CHANNEL SLOPE = 0.0270  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.033

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.58	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 50.98  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.44  
AVERAGE FLOW DEPTH (FEET) = 1.77 TRAVEL TIME (MIN.) = 1.36  
Tc (MIN.) = 12.45  
SUBAREA AREA (ACRES) = 5.58 SUBAREA RUNOFF (CFS) = 13.73  
EFFECTIVE AREA (ACRES) = 22.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.2 PEAK FLOW RATE (CFS) = 54.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.81 FLOW VELOCITY (FEET/SEC.) = 5.54  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50709.00 = 1980.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50709.00 TO NODE 50710.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 733.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 467.00 CHANNEL SLOPE = 0.1242  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.910

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.17	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 59.52  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.00

AVERAGE FLOW DEPTH (FEET) = 1.41 TRAVEL TIME (MIN.) = 0.78  
Tc (MIN.) = 13.23  
SUBAREA AREA (ACRES) = 4.17 SUBAREA RUNOFF (CFS) = 9.80  
EFFECTIVE AREA (ACRES) = 26.38 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.4 PEAK FLOW RATE (CFS) = 61.96

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.43 FLOW VELOCITY (FEET/SEC.) = 10.11  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50710.00 = 2447.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50710.00 TO NODE 50711.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 619.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 516.00 CHANNEL SLOPE = 0.1085  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.779

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 21.41 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 85.85  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.40  
AVERAGE FLOW DEPTH (FEET) = 1.66 TRAVEL TIME (MIN.) = 0.83  
Tc (MIN.) = 14.06  
SUBAREA AREA (ACRES) = 21.41 SUBAREA RUNOFF (CFS) = 47.77  
EFFECTIVE AREA (ACRES) = 47.78 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 106.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.80 FLOW VELOCITY (FEET/SEC.) = 11.00  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50711.00 = 2963.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50711.00 TO NODE 50712.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 619.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 650.00 CHANNEL SLOPE = 0.0292  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.601

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.43 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 114.32  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.49  
AVERAGE FLOW DEPTH (FEET) = 2.12 TRAVEL TIME (MIN.) = 1.28  
Tc (MIN.) = 15.33  
SUBAREA AREA (ACRES) = 7.43 SUBAREA RUNOFF (CFS) = 15.38  
EFFECTIVE AREA (ACRES) = 55.21 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.2 PEAK FLOW RATE (CFS) = 114.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.12 FLOW VELOCITY (FEET/SEC.) = 8.50  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50712.00 = 3613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50713.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 794.00 CHANNEL SLOPE = 0.0907  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.520

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 36.47 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 150.80  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.89  
AVERAGE FLOW DEPTH (FEET) = 1.90 TRAVEL TIME (MIN.) = 0.95  
Tc (MIN.) = 16.28  
SUBAREA AREA (ACRES) = 36.47 SUBAREA RUNOFF (CFS) = 72.87  
EFFECTIVE AREA (ACRES) = 91.68 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 183.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.04 FLOW VELOCITY (FEET/SEC.) = 14.65  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50713.00 = 4407.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50713.00 TO NODE 50714.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 423.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1215.00 CHANNEL SLOPE = 0.0864  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.401

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.52 0.30 0.998 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.998  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 200.69  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 14.70  
AVERAGE FLOW DEPTH(FEET) = 2.13 TRAVEL TIME(MIN.) = 1.38  
Tc(MIN.) = 17.66  
SUBAREA AREA(ACRES) = 18.52 SUBAREA RUNOFF(CFS) = 35.04  
EFFECTIVE AREA(ACRES) = 110.21 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 110.2 PEAK FLOW RATE(CFS) = 208.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.16 FLOW VELOCITY(FEET/SEC.) = 14.84  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50714.00 = 5622.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50714.00 TO NODE 50715.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 319.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 768.00 CHANNEL SLOPE = 0.1354  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.339  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 5.31 0.30 0.993 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 213.33  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 17.61  
AVERAGE FLOW DEPTH(FEET) = 2.01 TRAVEL TIME(MIN.) = 0.73  
Tc(MIN.) = 18.39  
SUBAREA AREA(ACRES) = 5.31 SUBAREA RUNOFF(CFS) = 9.76  
EFFECTIVE AREA(ACRES) = 115.52 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 115.5 PEAK FLOW RATE(CFS) = 212.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.00 FLOW VELOCITY(FEET/SEC.) = 17.60  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50715.00 = 6390.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50715.00 TO NODE 50716.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 319.00 DOWNSTREAM(FEET) = 182.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1513.00 CHANNEL SLOPE = 0.0905  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.206  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 79.09 0.30 0.979 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 280.09  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 16.23  
AVERAGE FLOW DEPTH(FEET) = 2.40 TRAVEL TIME(MIN.) = 1.55  
Tc(MIN.) = 19.94  
SUBAREA AREA(ACRES) = 79.09 SUBAREA RUNOFF(CFS) = 136.10  
EFFECTIVE AREA(ACRES) = 194.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 194.6 PEAK FLOW RATE(CFS) = 334.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.56 FLOW VELOCITY(FEET/SEC.) = 16.99  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50716.00 = 7903.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50716.00 TO NODE 50716.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.94  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.206  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 42.18 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 42.18 SUBAREA RUNOFF(CFS) = 72.35  
EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 236.8 PEAK FLOW RATE(CFS) = 406.61

END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 236.8 TC(MIN.) = 19.94  
EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.993  
PEAK FLOW RATE(CFS) = 406.61

END OF RATIONAL METHOD ANALYSIS





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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 50 Yr \*  
\* From Node: 50800 To Node: 50811 \*  
\*\*\*\*\*

FILE NAME: 0610508X.DAT  
TIME/DATE OF STUDY: 09:35 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.307
- 2) 10.00; 3.421
- 3) 15.00; 2.630
- 4) 20.00; 2.201
- 5) 25.00; 1.906
- 6) 30.00; 1.714
- 7) 40.00; 1.452
- 8) 50.00; 1.291
- 9) 60.00; 1.182
- 10) 90.00; 0.979
- 11) 120.00; 0.849
- 12) 180.00; 0.725
- 13) 360.00; 0.534
- 14) 1440.00; 0.233

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50800.00 TO NODE 50801.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00  
ELEVATION DATA: UPSTREAM(FEET) = 795.00 DOWNSTREAM(FEET) = 745.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.302  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.374  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.60	0.30	1.000	0	10.30

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.65  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50801.00 TO NODE 50802.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 725.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 245.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.241  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.35	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.08  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.86  
AVERAGE FLOW DEPTH(FEET) = 0.65 TRAVEL TIME(MIN.) = 0.84  
Tc(MIN.) = 11.14  
SUBAREA AREA(ACRES) = 3.35 SUBAREA RUNOFF(CFS) = 8.86  
EFFECTIVE AREA(ACRES) = 3.94 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 3.9 PEAK FLOW RATE(CFS) = 10.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.79 FLOW VELOCITY(FEET/SEC.) = 5.57  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50802.00 = 566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50802.00 TO NODE 50803.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	725.00	DOWNSTREAM(FEET) =	700.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	325.00	CHANNEL SLOPE =	0.0769
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	3.090		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.52	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.35  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.68  
AVERAGE FLOW DEPTH(FEET) = 0.85 TRAVEL TIME(MIN.) = 0.95  
Tc(MIN.) = 12.10  
SUBAREA AREA(ACRES) = 1.52 SUBAREA RUNOFF(CFS) = 3.83  
EFFECTIVE AREA(ACRES) = 5.47 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 13.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.89 FLOW VELOCITY(FEET/SEC.) = 5.78  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50803.00 = 891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50803.00 TO NODE 50804.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	700.00	DOWNSTREAM(FEET) =	652.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	594.00	CHANNEL SLOPE =	0.0808
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	2.851		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.12	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.76  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.56  
AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 1.51  
Tc(MIN.) = 13.60  
SUBAREA AREA(ACRES) = 6.12 SUBAREA RUNOFF(CFS) = 14.06  
EFFECTIVE AREA(ACRES) = 11.59 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 11.6 PEAK FLOW RATE(CFS) = 26.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.13 FLOW VELOCITY(FEET/SEC.) = 6.99  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50804.00 = 1485.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50804.00 TO NODE 50805.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	652.00	DOWNSTREAM(FEET) =	542.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	499.00	CHANNEL SLOPE =	0.2204
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	2.727		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.17	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 32.26  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.66  
AVERAGE FLOW DEPTH(FEET) = 1.00 TRAVEL TIME(MIN.) = 0.78  
Tc(MIN.) = 14.38  
SUBAREA AREA(ACRES) = 5.17 SUBAREA RUNOFF(CFS) = 11.30  
EFFECTIVE AREA(ACRES) = 16.76 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 36.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.06 FLOW VELOCITY(FEET/SEC.) = 10.95  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50805.00 = 1984.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50805.00 TO NODE 50806.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	542.00	DOWNSTREAM(FEET) =	450.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	650.00	CHANNEL SLOPE =	0.1415
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	2.586		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.22	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.00  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.59  
AVERAGE FLOW DEPTH(FEET) = 1.21 TRAVEL TIME(MIN.) = 1.13  
Tc(MIN.) = 15.51  
SUBAREA AREA(ACRES) = 5.22 SUBAREA RUNOFF(CFS) = 10.75  
EFFECTIVE AREA(ACRES) = 21.99 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 45.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.24 FLOW VELOCITY (FEET/SEC.) = 9.82  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50806.00 = 2634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50806.00 TO NODE 50807.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 450.00 DOWNSTREAM (FEET) = 400.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 639.00 CHANNEL SLOPE = 0.0782  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.478

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.83	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 60.76  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.47  
AVERAGE FLOW DEPTH (FEET) = 1.55 TRAVEL TIME (MIN.) = 1.26  
Tc (MIN.) = 16.77

SUBAREA AREA (ACRES) = 15.83 SUBAREA RUNOFF (CFS) = 31.04  
EFFECTIVE AREA (ACRES) = 37.82 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 37.8 PEAK FLOW RATE (CFS) = 74.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.67 FLOW VELOCITY (FEET/SEC.) = 8.88  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50807.00 = 3273.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50807.00 TO NODE 50808.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 400.00 DOWNSTREAM (FEET) = 350.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 448.00 CHANNEL SLOPE = 0.1116  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.416

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 81.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.39  
AVERAGE FLOW DEPTH (FEET) = 1.61 TRAVEL TIME (MIN.) = 0.72  
Tc (MIN.) = 17.49

SUBAREA AREA (ACRES) = 7.46 SUBAREA RUNOFF (CFS) = 14.20  
EFFECTIVE AREA (ACRES) = 45.28 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 86.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.65 FLOW VELOCITY (FEET/SEC.) = 10.55  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50808.00 = 3721.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50808.00 TO NODE 50809.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 350.00 DOWNSTREAM (FEET) = 283.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 438.00 CHANNEL SLOPE = 0.1530  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.365

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.20	0.30	0.972	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 92.96  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.11  
AVERAGE FLOW DEPTH (FEET) = 1.60 TRAVEL TIME (MIN.) = 0.60  
Tc (MIN.) = 18.09

SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 13.43  
EFFECTIVE AREA (ACRES) = 52.48 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 52.5 PEAK FLOW RATE (CFS) = 97.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.63 FLOW VELOCITY (FEET/SEC.) = 12.24  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50809.00 = 4159.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50809.00 TO NODE 50810.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 283.00 DOWNSTREAM (FEET) = 243.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 665.00 CHANNEL SLOPE = 0.0602  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.285

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	63.52	0.30	0.983	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.983  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 154.47  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.01

AVERAGE FLOW DEPTH(FEET) = 2.07 TRAVEL TIME(MIN.) = 0.92  
Tc(MIN.) = 19.01  
SUBAREA AREA(ACRES) = 63.52 SUBAREA RUNOFF(CFS) = 113.79  
EFFECTIVE AREA(ACRES) = 116.00 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 116.0 PEAK FLOW RATE(CFS) = 207.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.31 FLOW VELOCITY(FEET/SEC.) = 12.92  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50810.00 = 4824.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50810.00 TO NODE 50811.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 243.00 DOWNSTREAM(FEET) = 173.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1122.00 CHANNEL SLOPE = 0.0624  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.156

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 11.57 0.30 0.980 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 217.32  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.68  
AVERAGE FLOW DEPTH(FEET) = 2.60 TRAVEL TIME(MIN.) = 1.75  
Tc(MIN.) = 20.77  
SUBAREA AREA(ACRES) = 11.57 SUBAREA RUNOFF(CFS) = 19.39  
EFFECTIVE AREA(ACRES) = 127.57 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 127.6 PEAK FLOW RATE(CFS) = 213.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.59 FLOW VELOCITY(FEET/SEC.) = 10.61  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50811.00 = 5946.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 20.77  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.156  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 3.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 6.18  
EFFECTIVE AREA(ACRES) = 131.27 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 131.3 PEAK FLOW RATE(CFS) = 219.66

=====

END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 131.3 TC(MIN.) = 20.77  
EFFECTIVE AREA(ACRES) = 131.27 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.988  
PEAK FLOW RATE(CFS) = 219.66

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 2 \*  
\* HYDROLOGIC ANALYSIS - 50-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E502XX50.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.470
2)	6.000;	4.030
3)	7.000;	3.690
4)	8.000;	3.420
5)	9.000;	3.200
6)	10.000;	3.010
7)	11.000;	2.850
8)	12.000;	2.710
9)	13.000;	2.590
10)	14.000;	2.490
11)	15.000;	2.390
12)	20.000;	2.030
13)	25.000;	1.790
14)	30.000;	1.610
15)	40.000;	1.370
16)	50.000;	1.200
17)	60.000;	1.090
18)	90.000;	0.860
19)	120.000;	0.730
20)	180.000;	0.580

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50200.00 TO NODE 50201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 497.00 DOWNSTREAM(FEET) = 365.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.563  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.296  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.30	1.000	95	8.56
NATURAL FAIR COVER "OPEN BRUSH"	-	0.60	0.30	1.000	95	8.56
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.20	0.30	1.000	95	8.56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 3.78  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 3.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50201.00 TO NODE 50202.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 365.00 DOWNSTREAM(FEET) = 335.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 259.00 CHANNEL SLOPE = 0.1158  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.78  
FLOW VELOCITY(FEET/SEC.) = 4.91 FLOW DEPTH(FEET) = 0.51  
TRAVEL TIME(MIN.) = 0.88  $T_c$ (MIN.) = 9.44  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50202.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50202.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.44  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.116  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 6.84  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 10.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50203.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 335.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.1020  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.39  
FLOW VELOCITY(FEET/SEC.) = 6.00 FLOW DEPTH(FEET) = 0.76  
TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 9.99  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50203.00 = 781.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50203.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.99  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.012  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 10.25  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 20.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50204.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 304.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0696  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 20.26  
FLOW VELOCITY(FEET/SEC.) = 6.15 FLOW DEPTH(FEET) = 1.05  
TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 10.42  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50204.00 = 939.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50204.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.42  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.943  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 10.40  
EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 30.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50205.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 304.00 DOWNSTREAM(FEET) = 234.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 487.00 CHANNEL SLOPE = 0.1437  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 30.15  
FLOW VELOCITY(FEET/SEC.) = 11.12 FLOW DEPTH(FEET) = 0.95  
TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 11.15  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50205.00 = 1426.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 11.15  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.830  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.100 -

USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.90 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 8.09  
 EFFECTIVE AREA(ACRES) = 16.10 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 36.95

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 11.15  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.830  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	4.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.850	-
USER-DEFINED	-	3.70	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.882  
 SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 29.09  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
 TOTAL AREA(ACRES) = 28.7 PEAK FLOW RATE(CFS) = 66.04

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 28.7 TC(MIN.) = 11.15  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.910  
 PEAK FLOW RATE(CFS) = 66.04

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 3 \*  
\* HYDROLOGIC ANALYSIS - 50-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E503XX50.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.470
2)	6.000;	4.030
3)	7.000;	3.690
4)	8.000;	3.420
5)	9.000;	3.200
6)	10.000;	3.010
7)	11.000;	2.850
8)	12.000;	2.710
9)	13.000;	2.590
10)	14.000;	2.490
11)	15.000;	2.390
12)	20.000;	2.030
13)	25.000;	1.790
14)	30.000;	1.610
15)	40.000;	1.370
16)	50.000;	1.200
17)	60.000;	1.090
18)	90.000;	0.860
19)	120.000;	0.730
20)	180.000;	0.580

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50300.00 TO NODE 50301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00  
ELEVATION DATA: UPSTREAM(FEET) = 1110.00 DOWNSTREAM(FEET) = 1035.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.517  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.102  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.60	0.30	1.000	95	9.52
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.52

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 2.27  
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 2.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50301.00 TO NODE 50302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 960.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 225.00 CHANNEL SLOPE = 0.3333  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.27  
FLOW VELOCITY(FEET/SEC.) = 6.31 FLOW DEPTH(FEET) = 0.35  
TRAVEL TIME(MIN.) = 0.59  $T_c$ (MIN.) = 10.11  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50302.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50302.00 TO NODE 50302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN) = 10.11
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.992
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.30    1.000   -
USER-DEFINED        -         1.00    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.10    SUBAREA RUNOFF(CFS) = 2.67
EFFECTIVE AREA(ACRES) = 2.00    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.0        PEAK FLOW RATE(CFS) = 4.85

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*****
FLOW PROCESS FROM NODE 50302.00 TO NODE 50303.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 84.00 CHANNEL SLOPE = 0.1190
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.85
FLOW VELOCITY(FEET/SEC.) = 5.26 FLOW DEPTH(FEET) = 0.55
TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 10.38
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50303.00 = 631.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50303.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 10.38
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.950
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.30    1.000   -
USER-DEFINED        -         0.30    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.70    SUBAREA RUNOFF(CFS) = 1.67
EFFECTIVE AREA(ACRES) = 2.70    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.7        PEAK FLOW RATE(CFS) = 6.44

```

```

*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50304.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 940.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 72.00 CHANNEL SLOPE = 0.1389
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

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```

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 6.44
FLOW VELOCITY(FEET/SEC.) = 5.96 FLOW DEPTH(FEET) = 0.60
TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 10.58
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50304.00 = 703.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50304.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 10.58
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.917
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.30    0.30    1.000   -
USER-DEFINED        -         0.90    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.20    SUBAREA RUNOFF(CFS) = 5.18
EFFECTIVE AREA(ACRES) = 4.90    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.9        PEAK FLOW RATE(CFS) = 11.54

```

```

*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50305.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 940.00 DOWNSTREAM(FEET) = 890.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.2941
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 11.54
FLOW VELOCITY(FEET/SEC.) = 9.23 FLOW DEPTH(FEET) = 0.65
TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 10.89
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50305.00 = 873.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

```

=====
MAINLINE Tc(MIN) = 10.89
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.868
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00    0.30    1.000   -
USER-DEFINED        -         0.80    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.80    SUBAREA RUNOFF(CFS) = 6.47
EFFECTIVE AREA(ACRES) = 7.70    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 7.7        PEAK FLOW RATE(CFS) = 17.80

```

```

*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50306.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 890.00 DOWNSTREAM(FEET) = 785.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 439.00 CHANNEL SLOPE = 0.2392
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 17.80
FLOW VELOCITY(FEET/SEC.) = 9.49 FLOW DEPTH(FEET) = 0.79
TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 11.66
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50306.00 = 1312.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 11.66
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.758
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         3.80   0.30  1.000  -
USER-DEFINED       -         3.30   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 15.71
EFFECTIVE AREA(ACRES) = 14.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.8 PEAK FLOW RATE(CFS) = 32.74

```

```

*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50307.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 737.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 213.00 CHANNEL SLOPE = 0.2254
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 32.74
FLOW VELOCITY(FEET/SEC.) = 10.82 FLOW DEPTH(FEET) = 1.00
TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 11.98
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50307.00 = 1525.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 11.98
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.712
SUBAREA LOSS RATE DATA(AMC II):

```

```

DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         2.00   0.30  1.000  -
USER-DEFINED       -         0.90   0.30  1.000  -
USER-DEFINED       -         0.20   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 6.73
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 38.86

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*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50308.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 737.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 527.00 CHANNEL SLOPE = 0.2600
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 38.86
FLOW VELOCITY(FEET/SEC.) = 11.92 FLOW DEPTH(FEET) = 1.04
TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 12.72
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50308.00 = 2052.00 FEET.

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*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.72
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.623
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         5.70   0.30  1.000  -
USER-DEFINED       -         1.00   0.30  1.000  -
USER-DEFINED       -         3.30   0.30  1.000  -
USER-DEFINED       -         0.40   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 21.75
EFFECTIVE AREA(ACRES) = 28.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 28.3 PEAK FLOW RATE(CFS) = 59.18

```

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*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50309.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 555.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 561.00 CHANNEL SLOPE = 0.0802
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00

```

CHANNEL FLOW THRU SUBAREA(CFS) = 59.18  
FLOW VELOCITY(FEET/SEC.) = 8.50 FLOW DEPTH(FEET) = 1.52  
TRAVEL TIME(MIN.) = 1.10 Tc(MIN.) = 13.82  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 2613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 13.82  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.508  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 6.16  
EFFECTIVE AREA(ACRES) = 31.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.4 PEAK FLOW RATE(CFS) = 62.40

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50310.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 555.00 DOWNSTREAM(FEET) = 509.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 401.00 CHANNEL SLOPE = 0.1147  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 62.40  
FLOW VELOCITY(FEET/SEC.) = 9.83 FLOW DEPTH(FEET) = 1.45  
TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 14.50  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50310.00 = 3014.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 14.50  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.440  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	7.60	0.30	1.000	-
USER-DEFINED	-	6.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 33.32

EFFECTIVE AREA(ACRES) = 48.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 48.7 PEAK FLOW RATE(CFS) = 93.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50311.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 509.00 DOWNSTREAM(FEET) = 395.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 685.00 CHANNEL SLOPE = 0.1664  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 93.80  
FLOW VELOCITY(FEET/SEC.) = 12.49 FLOW DEPTH(FEET) = 1.58  
TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 15.41  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50311.00 = 3699.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50311.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 15.41  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 17.43  
EFFECTIVE AREA(ACRES) = 58.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 58.1 PEAK FLOW RATE(CFS) = 107.73

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50312.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 383.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 216.00 CHANNEL SLOPE = 0.0556  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 107.73  
FLOW VELOCITY(FEET/SEC.) = 8.57 FLOW DEPTH(FEET) = 2.05  
TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 15.83  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50312.00 = 3915.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.83

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.330

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	18.40	0.30	1.000	-
USER-DEFINED	-	11.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 37.70 SUBAREA RUNOFF(CFS) = 68.88

EFFECTIVE AREA(ACRES) = 95.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 95.8 PEAK FLOW RATE(CFS) = 175.03

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.83

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.330

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 6.21

EFFECTIVE AREA(ACRES) = 99.20 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 99.2 PEAK FLOW RATE(CFS) = 181.24

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50313.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 383.00 DOWNSTREAM(FEET) = 350.00

CHANNEL LENGTH THRU SUBAREA( FEET) = 762.00 CHANNEL SLOPE = 0.0433

CHANNEL BASE( FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH( FEET) = 4.00

CHANNEL FLOW THRU SUBAREA(CFS) = 181.24

FLOW VELOCITY( FEET/SEC.) = 8.91 FLOW DEPTH( FEET) = 2.60

TRAVEL TIME( MIN.) = 1.43 Tc( MIN.) = 17.26

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50313.00 = 4677.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.26

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.227

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 10.93

EFFECTIVE AREA(ACRES) = 105.50 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 105.5 PEAK FLOW RATE(CFS) = 183.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.26

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.227

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 10.90 SUBAREA RUNOFF(CFS) = 18.91

EFFECTIVE AREA(ACRES) = 116.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 116.4 PEAK FLOW RATE(CFS) = 201.91

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50314.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM( FEET) = 350.00 DOWNSTREAM( FEET) = 318.00

CHANNEL LENGTH THRU SUBAREA( FEET) = 957.00 CHANNEL SLOPE = 0.0334

CHANNEL BASE( FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH( FEET) = 4.00

CHANNEL FLOW THRU SUBAREA(CFS) = 201.91

FLOW VELOCITY( FEET/SEC.) = 8.29 FLOW DEPTH( FEET) = 2.85

TRAVEL TIME( MIN.) = 1.92 Tc( MIN.) = 19.18

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50314.00 = 5634.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.18  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.089  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	3.70	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	10.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 21.80 SUBAREA RUNOFF(CFS) = 35.10  
 EFFECTIVE AREA(ACRES) = 138.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 138.2 PEAK FLOW RATE(CFS) = 222.50

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.18  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.089  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.80	0.30	1.000	-
USER-DEFINED	-	15.20	0.30	1.000	-
USER-DEFINED	-	5.90	0.30	1.000	-
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 34.70 SUBAREA RUNOFF(CFS) = 55.87  
 EFFECTIVE AREA(ACRES) = 172.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 172.9 PEAK FLOW RATE(CFS) = 278.37

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.18  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.089  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 1.29  
 EFFECTIVE AREA(ACRES) = 173.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 173.7 PEAK FLOW RATE(CFS) = 279.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50315.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

=====

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 318.00 DOWNSTREAM(FEET) = 313.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00 CHANNEL SLOPE = 0.0179  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 279.65  
 FLOW VELOCITY(FEET/SEC.) = 7.12 FLOW DEPTH(FEET) = 3.62  
 TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 19.84  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50315.00 = 5914.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50315.00 TO NODE 50315.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.84  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.042  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	2.40	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 10.50  
 EFFECTIVE AREA(ACRES) = 180.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 180.4 PEAK FLOW RATE(CFS) = 282.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 50315.00 TO NODE 50316.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

=====

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 313.00 DOWNSTREAM(FEET) = 285.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 642.00 CHANNEL SLOPE = 0.0436  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 282.77  
 FLOW VELOCITY(FEET/SEC.) = 9.99 FLOW DEPTH(FEET) = 3.07  
 TRAVEL TIME(MIN.) = 1.07 Tc(MIN.) = 20.91  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50316.00 = 6556.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 20.91  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.986  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 11.08  
EFFECTIVE AREA(ACRES) = 187.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 187.7 PEAK FLOW RATE(CFS) = 284.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 20.91  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.986  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 3.34  
EFFECTIVE AREA(ACRES) = 189.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 189.9 PEAK FLOW RATE(CFS) = 288.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50316.00 TO NODE 50317.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 282.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 448.00 CHANNEL SLOPE = 0.0067  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 288.22  
FLOW VELOCITY(FEET/SEC.) = 4.96 FLOW DEPTH(FEET) = 4.40  
TRAVEL TIME(MIN.) = 1.50 Tc(MIN.) = 22.41  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50317.00 = 7004.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.41  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.914  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	2.60	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	10.20	0.30	1.000	-
USER-DEFINED	-	42.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.997  
SUBAREA AREA(ACRES) = 59.70 SUBAREA RUNOFF(CFS) = 86.78  
EFFECTIVE AREA(ACRES) = 249.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 249.6 PEAK FLOW RATE(CFS) = 362.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.41  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.914  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.30	1.000	-
USER-DEFINED	-	17.50	0.30	1.000	-
USER-DEFINED	-	22.00	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 65.80 SUBAREA RUNOFF(CFS) = 95.59  
EFFECTIVE AREA(ACRES) = 315.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 315.4 PEAK FLOW RATE(CFS) = 458.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50317.00 TO NODE 50318.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 600.00 CHANNEL SLOPE = 0.0817  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 458.25  
FLOW VELOCITY(FEET/SEC.) = 14.23 FLOW DEPTH(FEET) = 3.28  
TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 23.12  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50318.00 = 7604.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81  
-----

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.12

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.880

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	0.100	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.839

SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 9.82

EFFECTIVE AREA(ACRES) = 322.10 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 322.1 PEAK FLOW RATE(CFS) = 458.50

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.12

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.880

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	5.00	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.935

SUBAREA AREA(ACRES) = 7.60 SUBAREA RUNOFF(CFS) = 10.94

EFFECTIVE AREA(ACRES) = 329.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 329.7 PEAK FLOW RATE(CFS) = 469.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50318.00 TO NODE 50319.00 IS CODE = 51  
=====

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 233.00 DOWNSTREAM(FEET) = 228.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 201.00 CHANNEL SLOPE = 0.0249

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00

CHANNEL FLOW THRU SUBAREA(CFS) = 469.44

FLOW VELOCITY(FEET/SEC.) = 11.40 FLOW DEPTH(FEET) = 3.71

TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 23.41

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50319.00 = 7805.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.41

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.866

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 9.20

EFFECTIVE AREA(ACRES) = 336.00 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 336.0 PEAK FLOW RATE(CFS) = 474.45

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.41

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.866

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.994

SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 11.01

EFFECTIVE AREA(ACRES) = 343.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 343.8 PEAK FLOW RATE(CFS) = 485.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50319.00 TO NODE 50320.00 IS CODE = 51  
=====

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 228.00 DOWNSTREAM(FEET) = 214.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 809.00 CHANNEL SLOPE = 0.0173

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00

CHANNEL FLOW THRU SUBAREA(CFS) = 485.46

FLOW VELOCITY(FEET/SEC.) = 10.02 FLOW DEPTH(FEET) = 4.02



TRAVEL TIME (MIN.) = 1.35 Tc (MIN.) = 24.76  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50320.00 = 8614.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 24.76

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.802

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	4.80	0.30	0.850	-
USER-DEFINED	-	5.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.929

SUBAREA AREA (ACRES) = 11.40 SUBAREA RUNOFF (CFS) = 15.63

EFFECTIVE AREA (ACRES) = 355.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 355.2 PEAK FLOW RATE (CFS) = 485.46

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 24.76

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.802

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.90	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.854

SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 15.58

EFFECTIVE AREA (ACRES) = 366.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 366.4 PEAK FLOW RATE (CFS) = 496.69

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 366.4 TC (MIN.) = 24.76

EFFECTIVE AREA (ACRES) = 366.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.985

PEAK FLOW RATE (CFS) = 496.69

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 4 \*  
\* HYDROLOGIC ANALYSIS - 50-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E504XX50.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.000; 4.470
- 2) 6.000; 4.030
- 3) 7.000; 3.690
- 4) 8.000; 3.420
- 5) 9.000; 3.200
- 6) 10.000; 3.010
- 7) 11.000; 2.850
- 8) 12.000; 2.710
- 9) 13.000; 2.590
- 10) 14.000; 2.490
- 11) 15.000; 2.390
- 12) 20.000; 2.030
- 13) 25.000; 1.790
- 14) 30.000; 1.610
- 15) 40.000; 1.370
- 16) 50.000; 1.200
- 17) 60.000; 1.090
- 18) 90.000; 0.860
- 19) 120.000; 0.730
- 20) 180.000; 0.580

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.482  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.933  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.50	0.30	1.000	95	10.48

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.18  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.18  
FLOW VELOCITY(FEET/SEC.) = 4.86 FLOW DEPTH(FEET) = 0.29  
TRAVEL TIME(MIN.) = 0.90  $T_c$ (MIN.) = 11.38  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.38

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.797  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.90  
 EFFECTIVE AREA (ACRES) = 0.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 2.02

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 239.00 CHANNEL SLOPE = 0.4184  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 2.02  
 FLOW VELOCITY (FEET/SEC.) = 6.77 FLOW DEPTH (FEET) = 0.32  
 TRAVEL TIME (MIN.) = 0.59 Tc (MIN.) = 11.97  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50403.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 11.97  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.714  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.87  
 EFFECTIVE AREA (ACRES) = 1.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.3 PEAK FLOW RATE (CFS) = 2.82

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00 CHANNEL SLOPE = 0.7042  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 2.82

FLOW VELOCITY (FEET/SEC.) = 8.90 FLOW DEPTH (FEET) = 0.33  
 TRAVEL TIME (MIN.) = 0.13 Tc (MIN.) = 12.10  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50404.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.10  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.698  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 2.59  
 EFFECTIVE AREA (ACRES) = 2.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.5 PEAK FLOW RATE (CFS) = 5.39

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 145.00 CHANNEL SLOPE = 0.3448  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 5.39  
 FLOW VELOCITY (FEET/SEC.) = 8.14 FLOW DEPTH (FEET) = 0.47  
 TRAVEL TIME (MIN.) = 0.30 Tc (MIN.) = 12.40  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50405.00 TO NODE 50405.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.40  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.662  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.34  
 EFFECTIVE AREA (ACRES) = 3.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.6 PEAK FLOW RATE (CFS) = 7.65

```

*****
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.65
FLOW VELOCITY(FEET/SEC.) = 8.54 FLOW DEPTH(FEET) = 0.55
TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 12.71
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50406.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.71
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.625
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.80 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 2.51
EFFECTIVE AREA(ACRES) = 4.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 10.04

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.2193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.04
FLOW VELOCITY(FEET/SEC.) = 7.89 FLOW DEPTH(FEET) = 0.65
TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 13.19
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50407.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 13.19
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.571
SUBAREA LOSS RATE DATA(AMC II):

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```

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.30 1.000 -
USER-DEFINED - 1.20 0.30 1.000 -
USER-DEFINED - 1.70 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 13.08
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 22.89

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 325.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 490.00 CHANNEL SLOPE = 0.1531
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 22.89
FLOW VELOCITY(FEET/SEC.) = 8.47 FLOW DEPTH(FEET) = 0.95
TRAVEL TIME(MIN.) = 0.96 Tc(MIN.) = 14.15
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.15
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.475
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 1.30 0.30 1.000 -
USER-DEFINED - 0.50 0.30 1.000 -
USER-DEFINED - 1.20 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 7.44
EFFECTIVE AREA(ACRES) = 15.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.0 PEAK FLOW RATE(CFS) = 29.36

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.15
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.475
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.76  
EFFECTIVE AREA(ACRES) = 15.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.9 PEAK FLOW RATE(CFS) = 31.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 31.12  
FLOW VELOCITY(FEET/SEC.) = 6.82 FLOW DEPTH(FEET) = 1.23  
TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 14.33  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.33  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.457  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	6.40	0.30	1.000	-
USER-DEFINED	-	6.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 14.80 SUBAREA RUNOFF(CFS) = 28.73  
EFFECTIVE AREA(ACRES) = 30.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.7 PEAK FLOW RATE(CFS) = 59.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.33  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.457  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.16  
EFFECTIVE AREA(ACRES) = 31.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.3 PEAK FLOW RATE(CFS) = 60.76

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 60.76  
FLOW VELOCITY(FEET/SEC.) = 8.47 FLOW DEPTH(FEET) = 1.55  
TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 14.53  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.53  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.437  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 12.31  
EFFECTIVE AREA(ACRES) = 37.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 37.7 PEAK FLOW RATE(CFS) = 72.50

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.53  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.437  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 1.15  
 EFFECTIVE AREA (ACRES) = 38.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 38.3 PEAK FLOW RATE (CFS) = 73.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 312.00 DOWNSTREAM (FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 566.00 CHANNEL SLOPE = 0.0530  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 73.66  
 FLOW VELOCITY (FEET/SEC.) = 7.66 FLOW DEPTH (FEET) = 1.79  
 TRAVEL TIME (MIN.) = 1.23 Tc (MIN.) = 15.76  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 15.76  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.335  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658  
 SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 9.62  
 EFFECTIVE AREA (ACRES) = 43.30 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 43.3 PEAK FLOW RATE (CFS) = 79.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 15.76  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.335  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

USER-DEFINED - 5.80 0.30 1.000 -  
 USER-DEFINED - 0.50 0.30 1.000 -  
 USER-DEFINED - 3.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 10.50 SUBAREA RUNOFF (CFS) = 19.23  
 EFFECTIVE AREA (ACRES) = 53.80 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 53.8 PEAK FLOW RATE (CFS) = 99.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 216.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 954.00 CHANNEL SLOPE = 0.0692  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 99.00  
 FLOW VELOCITY (FEET/SEC.) = 11.34 FLOW DEPTH (FEET) = 1.71  
 TRAVEL TIME (MIN.) = 1.40 Tc (MIN.) = 17.17  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 17.17  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.234  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875  
 SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 6.39  
 EFFECTIVE AREA (ACRES) = 57.40 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 57.4 PEAK FLOW RATE (CFS) = 100.50

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 17.17  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.234  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.30 0.30 1.000 -  
 USER-DEFINED - 9.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 18.46  
 EFFECTIVE AREA(ACRES) = 68.00 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 68.0 PEAK FLOW RATE(CFS) = 118.96

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.17  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.234  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.934  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 4.40  
 EFFECTIVE AREA(ACRES) = 70.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 70.5 PEAK FLOW RATE(CFS) = 123.35

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 70.5 TC(MIN.) = 17.17  
 EFFECTIVE AREA(ACRES) = 70.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.967  
 PEAK FLOW RATE(CFS) = 123.35

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 2 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 50-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P201XX50.DAT  
TIME/DATE OF STUDY: 10:20 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.470
2)	6.000;	4.030
3)	7.000;	3.690
4)	8.000;	3.420
5)	9.000;	3.200
6)	10.000;	3.010
7)	11.000;	2.850
8)	12.000;	2.710
9)	13.000;	2.590
10)	14.000;	2.490
11)	15.000;	2.390
12)	20.000;	2.030
13)	25.000;	1.790
14)	30.000;	1.610
15)	40.000;	1.370
16)	50.000;	1.200
17)	60.000;	1.090
18)	90.000;	0.860
19)	120.000;	0.730
20)	180.000;	0.580

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	(FT)	(FT)	SIDE /	HEIGHT	WIDTH	LIP	HIKE	FACTOR
			SIDE /	(FT)	(FT)	(FT)	(FT)	(n)
			WAY					
			IN- /					
			OUT-/PARK-					
			HEIGHT					
			WIDTH					
			LIP					
			HIKE					
			FACTOR					

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20100.00 TO NODE 20101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 830.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.230  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.156  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER						
"OPEN BRUSH"	-	0.30	0.30	1.000	95	9.23
NATURAL FAIR COVER						
"WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.23

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.54  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.54

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20101.00 TO NODE 20102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 276.00 CHANNEL SLOPE = 0.2899  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.54  
FLOW VELOCITY(FEET/SEC.) = 5.42 FLOW DEPTH(FEET) = 0.31  
TRAVEL TIME(MIN.) = 0.85  $T_c$ (MIN.) = 10.08  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20102.00 = 595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20102.00 TO NODE 20102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<



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=====
MAINLINE Tc(MIN) = 10.08
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.997
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.80    0.30    1.000    -
USER-DEFINED        -         0.20    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.00    SUBAREA RUNOFF(CFS) = 2.43
EFFECTIVE AREA(ACRES) = 1.60    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6        PEAK FLOW RATE(CFS) = 3.88

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*****
FLOW PROCESS FROM NODE 20102.00 TO NODE 20103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.1863
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.88
FLOW VELOCITY(FEET/SEC.) = 5.91 FLOW DEPTH(FEET) = 0.47
TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 10.53
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20103.00 = 756.00 FEET.

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.53
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.925
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50    0.30    1.000    -
USER-DEFINED        -         0.10    0.30    1.000    -
USER-DEFINED        -         0.30    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90    SUBAREA RUNOFF(CFS) = 2.13
EFFECTIVE AREA(ACRES) = 2.50    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.5        PEAK FLOW RATE(CFS) = 5.91

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 690.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 64.00 CHANNEL SLOPE = 0.4688

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CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.91
FLOW VELOCITY(FEET/SEC.) = 9.20 FLOW DEPTH(FEET) = 0.48
TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 10.65
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20104.00 = 820.00 FEET.

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.65
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.906
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.30    1.000    -
USER-DEFINED        -         3.30    0.30    1.000    -
USER-DEFINED        -         0.10    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 8.91
EFFECTIVE AREA(ACRES) = 6.30    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.3        PEAK FLOW RATE(CFS) = 14.78

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 690.00 DOWNSTREAM(FEET) = 670.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 159.00 CHANNEL SLOPE = 0.1258
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 14.78
FLOW VELOCITY(FEET/SEC.) = 7.07 FLOW DEPTH(FEET) = 0.83
TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 11.02
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20105.00 = 979.00 FEET.

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*****
FLOW PROCESS FROM NODE 20105.00 TO NODE 20105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.02
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.847
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.30    1.000    -
USER-DEFINED        -         1.50    0.30    1.000    -
USER-DEFINED        -         2.20    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90    SUBAREA RUNOFF(CFS) = 8.94

```

EFFECTIVE AREA (ACRES) = 10.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 10.2 PEAK FLOW RATE (CFS) = 23.38

\*\*\*\*\*

FLOW PROCESS FROM NODE 20105.00 TO NODE 20106.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 670.00 DOWNSTREAM (FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 192.00 CHANNEL SLOPE = 0.1042  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 23.38  
FLOW VELOCITY (FEET/SEC.) = 7.41 FLOW DEPTH (FEET) = 1.03  
TRAVEL TIME (MIN.) = 0.43 Tc (MIN.) = 11.46  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20106.00 = 1171.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 11.46  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.786  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.10 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 3.80 SUBAREA RUNOFF (CFS) = 8.50  
EFFECTIVE AREA (ACRES) = 14.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 14.0 PEAK FLOW RATE (CFS) = 31.33

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 650.00 DOWNSTREAM (FEET) = 640.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 156.00 CHANNEL SLOPE = 0.0641  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.33  
FLOW VELOCITY (FEET/SEC.) = 6.64 FLOW DEPTH (FEET) = 1.25  
TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 11.85  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20107.00 = 1327.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 11.85  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.731

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.20 0.30 1.000 -  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 8.75  
EFFECTIVE AREA (ACRES) = 18.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 18.0 PEAK FLOW RATE (CFS) = 39.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 640.00 DOWNSTREAM (FEET) = 609.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 512.00 CHANNEL SLOPE = 0.0605  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 39.39  
FLOW VELOCITY (FEET/SEC.) = 6.91 FLOW DEPTH (FEET) = 1.38  
TRAVEL TIME (MIN.) = 1.23 Tc (MIN.) = 13.08  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20108.00 = 1839.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20108.00 TO NODE 20108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 13.08  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.582  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.200 -  
USER-DEFINED - 1.50 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970  
SUBAREA AREA (ACRES) = 2.70 SUBAREA RUNOFF (CFS) = 5.57  
EFFECTIVE AREA (ACRES) = 20.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.7 PEAK FLOW RATE (CFS) = 42.53

\*\*\*\*\*

FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 600.00
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.69
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 42.53
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 13.27
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20109.00 = 2033.00 FEET.

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*****
FLOW PROCESS FROM NODE 20109.00 TO NODE 20109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 13.27
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.563
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.70    0.30    0.200  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.58
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 43.75

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*****
FLOW PROCESS FROM NODE 20109.00 TO NODE 20110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 594.00
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.53
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 43.75
PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 13.80
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20110.00 = 2393.00 FEET.

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*****
FLOW PROCESS FROM NODE 20110.00 TO NODE 20110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 13.80
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.510
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.30    0.30    0.100  -
USER-DEFINED         -        3.50    0.30    0.200  -
USER-DEFINED         -        2.70    0.30    1.000  -
USER-DEFINED         -        0.20    0.30    1.000  -
USER-DEFINED         -        1.20    0.30    1.000  -

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USER-DEFINED         -        0.30    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 17.14
EFFECTIVE AREA(ACRES) = 29.60 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 29.6 PEAK FLOW RATE(CFS) = 59.89

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*****
FLOW PROCESS FROM NODE 20110.00 TO NODE 20111.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 594.00 DOWNSTREAM(FEET) = 590.00
FLOW LENGTH(FEET) = 246.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.24
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 59.89
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 14.13
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20111.00 = 2639.00 FEET.

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*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 14.13
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.477
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN

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USER-DEFINED         -        0.70    0.30    0.100  -
USER-DEFINED         -        2.10    0.30    0.200  -
USER-DEFINED         -        2.10    0.30    1.000  -
USER-DEFINED         -        0.60    0.30    1.000  -
USER-DEFINED         -        4.70    0.30    1.000  -
USER-DEFINED         -        0.90    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.792
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 22.37
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 81.37

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*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20112.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 580.00
FLOW LENGTH(FEET) = 628.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.30
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 81.37

```

PIPE TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 14.92  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20112.00 = 3267.00 FEET.

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FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 14.92

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.398

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.200	-
USER-DEFINED	-	4.40	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	7.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.797

SUBAREA AREA(ACRES) = 15.20 SUBAREA RUNOFF(CFS) = 29.54

EFFECTIVE AREA(ACRES) = 55.90 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 55.9 PEAK FLOW RATE(CFS) = 108.03

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 14.92

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.398

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.56

EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 112.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20113.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 580.00 DOWNSTREAM(FEET) = 570.00

FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.46

ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 112.59  
PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 15.48  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20113.00 = 3786.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.48

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.356

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.100	-
USER-DEFINED	-	4.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.877

SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 23.73

EFFECTIVE AREA(ACRES) = 70.90 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 134.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.48

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.356

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	1.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.787

SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 6.87

EFFECTIVE AREA(ACRES) = 74.50 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 74.5 PEAK FLOW RATE(CFS) = 140.95

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20114.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00

FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.68

ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 140.95  
PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 16.34  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20114.00 = 4393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.34  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.293  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.30 0.100 -  
USER-DEFINED - 4.00 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 0.50 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.747  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 14.71  
EFFECTIVE AREA(ACRES) = 82.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 82.4 PEAK FLOW RATE(CFS) = 151.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.34  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.293  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 1.000 -  
USER-DEFINED - 8.20 0.30 1.000 -  
USER-DEFINED - 3.20 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 3.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.932  
SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 31.72  
EFFECTIVE AREA(ACRES) = 99.90 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 99.9 PEAK FLOW RATE(CFS) = 183.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20115.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 560.00  
FLOW LENGTH(FEET) = 461.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 54.0 INCH PIPE IS 41.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.89  
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 183.20  
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 16.90  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20115.00 = 4854.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.90  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.253  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.60 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 0.100 -  
USER-DEFINED - 6.20 0.30 0.850 -  
USER-DEFINED - 2.20 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798  
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 23.20  
EFFECTIVE AREA(ACRES) = 112.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 112.7 PEAK FLOW RATE(CFS) = 202.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.90  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.253  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.23  
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 204.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20116.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 560.00 DOWNSTREAM(FEET) = 528.00  
FLOW LENGTH(FEET) = 219.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 38.36

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 204.05  
 PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 16.99  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20116.00 = 5073.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20116.00 TO NODE 20117.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 489.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 174.00 CHANNEL SLOPE = 0.2241  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 204.05  
 FLOW VELOCITY(FEET/SEC.) = 21.09 FLOW DEPTH(FEET) = 1.80  
 TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 17.13  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20117.00 = 5247.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.13  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.237  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.910  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 4.42  
 EFFECTIVE AREA(ACRES) = 115.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 115.9 PEAK FLOW RATE(CFS) = 206.76

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.13  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.237  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.200	-
USER-DEFINED	-	3.30	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	6.50	0.30	1.000	-

USER-DEFINED - 0.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.855  
 SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 22.81  
 EFFECTIVE AREA(ACRES) = 128.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 128.7 PEAK FLOW RATE(CFS) = 229.57

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.13  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.237  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 8.92  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 133.8 PEAK FLOW RATE(CFS) = 238.49

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 133.8 TC(MIN.) = 17.13  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.854  
 PEAK FLOW RATE(CFS) = 238.49

=====

END OF RATIONAL METHOD ANALYSIS



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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S31 \*  
\* Rational Method Hydrology Analysis - 50-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S31.DAT  
TIME/DATE OF STUDY: 15:49 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.440
- 2) 10.00; 3.011
- 3) 15.00; 2.390
- 4) 20.00; 2.029
- 5) 25.00; 1.787
- 6) 30.00; 1.600
- 7) 40.00; 1.368
- 8) 50.00; 1.205
- 9) 60.00; 1.060
- 10) 90.00; 0.862
- 11) 120.00; 0.732
- 12) 180.00; 0.593
- 13) 360.00; 0.412
- 14) 1440.00; 0.172

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13100.00 TO NODE 13101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.58  
ELEVATION DATA: UPSTREAM(FEET) = 1069.66 DOWNSTREAM(FEET) = 969.92

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.312  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.493  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.94	0.30	1.000	0	8.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.70  
TOTAL AREA(ACRES) = 0.94 PEAK FLOW RATE(CFS) = 2.70

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13101.00 TO NODE 13102.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 969.92 DOWNSTREAM(FEET) = 807.20  
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.89 CHANNEL SLOPE = 0.2444  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.27  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.925  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.67	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.80  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.66  
AVERAGE FLOW DEPTH(FEET) = 0.24 TRAVEL TIME(MIN.) = 2.38  
Tc(MIN.) = 10.69  
SUBAREA AREA(ACRES) = 7.67 SUBAREA RUNOFF(CFS) = 18.12  
EFFECTIVE AREA(ACRES) = 8.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 20.34  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:



DEPTH(FEET) = 0.34 FLOW VELOCITY(FEET/SEC.) = 5.63  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13102.00 = 948.47 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13102.00 TO NODE 13103.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 807.20 DOWNSTREAM(FEET) = 769.94  
CHANNEL LENGTH THRU SUBAREA(FEET) = 691.01 CHANNEL SLOPE = 0.0539  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.84

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.606

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	20.65	0.30	0.999	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.84

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.48

AVERAGE FLOW DEPTH(FEET) = 0.80 TRAVEL TIME(MIN.) = 2.57

Tc(MIN.) = 13.26

SUBAREA AREA(ACRES) = 20.65 SUBAREA RUNOFF(CFS) = 42.87

EFFECTIVE AREA(ACRES) = 29.26 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 29.3 PEAK FLOW RATE(CFS) = 60.74

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.00 FLOW VELOCITY(FEET/SEC.) = 5.08

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13103.00 = 1639.48 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 769.94 DOWNSTREAM(FEET) = 693.88

FLOW LENGTH(FEET) = 1563.10 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000

DEPTH OF FLOW IN 36.0 INCH PIPE IS 16.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 19.06

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 60.74

PIPE TRAVEL TIME(MIN.) = 1.37 Tc(MIN.) = 14.63

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13104.00 = 3202.58 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.63

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.437

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	28.00	0.30	0.750	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750

SUBAREA AREA(ACRES) = 28.00 SUBAREA RUNOFF(CFS) = 55.73

EFFECTIVE AREA(ACRES) = 57.26 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88

TOTAL AREA(ACRES) = 57.3 PEAK FLOW RATE(CFS) = 112.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 693.88 DOWNSTREAM(FEET) = 645.69

FLOW LENGTH(FEET) = 1068.98 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.27

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 112.01

PIPE TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 15.47

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13105.00 = 4271.56 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.47

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.357

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	35.28	0.30	0.867	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867

SUBAREA AREA(ACRES) = 35.28 SUBAREA RUNOFF(CFS) = 66.58

EFFECTIVE AREA(ACRES) = 92.54 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87

TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 174.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 645.69 DOWNSTREAM(FEET) = 608.48

FLOW LENGTH(FEET) = 1127.55 MANNING'S N = 0.013

DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.13

ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 174.47

PIPE TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 16.35  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.35  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.293  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 37.68 0.30 0.889 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.889  
SUBAREA AREA(ACRES) = 37.68 SUBAREA RUNOFF(CFS) = 68.70  
EFFECTIVE AREA(ACRES) = 130.22 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 130.2 PEAK FLOW RATE(CFS) = 237.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 15.1

>>>>DEFINE MEMORY BANK # 2 <<<<

PEAK FLOWRATE TABLE FILE NAME: S30.DNA  
MEMORY BANK # 2 DEFINED AS FOLLOWS:  
STREAM Q Tc Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (ACRES) NODE  
1 2145.57 37.08 0.30( 0.24) 0.81 1996.4 13000.00  
2 2081.84 39.11 0.30( 0.24) 0.81 2016.1 13010.00  
TOTAL AREA(ACRES) = 2016.1

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 14.0

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:  
STREAM Q Tc Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (ACRES) NODE  
1 2145.57 37.08 0.30( 0.24) 0.81 1996.4 13000.00  
2 2081.84 39.11 0.30( 0.24) 0.81 2016.1 13010.00  
TOTAL AREA(ACRES) = 2016.1

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13026.00 TO NODE 13106.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 662.66 DOWNSTREAM(FEET) = 608.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 3098.88 CHANNEL SLOPE = 0.0175  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.01  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.347  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 75.28 0.30 0.755 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.755  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2183.53  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.29  
AVERAGE FLOW DEPTH(FEET) = 3.01 TRAVEL TIME(MIN.) = 4.20  
Tc(MIN.) = 41.28  
SUBAREA AREA(ACRES) = 75.28 SUBAREA RUNOFF(CFS) = 75.93  
EFFECTIVE AREA(ACRES) = 2071.69 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 2091.4 PEAK FLOW RATE(CFS) = 2145.57  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.98 FLOW VELOCITY(FEET/SEC.) = 12.22  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 2145.57 41.28 1.347 0.30( 0.24) 0.80 2071.7 13000.00  
2 2081.84 43.35 1.313 0.30( 0.24) 0.80 2091.4 13010.00  
NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 2145.57 Tc(MIN.) = 41.28  
AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA(ACRES) = 2071.69

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 2145.57 41.28 1.347 0.30( 0.24) 0.80 2071.7 13000.00  
2 2081.84 43.35 1.313 0.30( 0.24) 0.80 2091.4 13010.00  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 237.83 16.35 2.293 0.30( 0.26) 0.88 130.2 13100.00  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1814.42	16.35	2.293	0.30 ( 0.24)	0.81	950.9	13100.00
2	2272.58	41.28	1.347	0.30 ( 0.24)	0.81	2201.9	13000.00
3	2204.91	43.35	1.313	0.30 ( 0.24)	0.81	2221.6	13010.00
TOTAL AREA (ACRES) =							2221.6

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 2272.58 Tc (MIN.) = 41.283  
EFFECTIVE AREA (ACRES) = 2201.91 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA (ACRES) = 2221.6  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13106.00 TO NODE 13107.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 608.48 DOWNSTREAM (FEET) = 584.29  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1650.20 CHANNEL SLOPE = 0.0147  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.32

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.309

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	190.45	0.30	0.755	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2365.40

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.91

AVERAGE FLOW DEPTH (FEET) = 3.31 TRAVEL TIME (MIN.) = 2.31

Tc (MIN.) = 43.59

SUBAREA AREA (ACRES) = 190.45 SUBAREA RUNOFF (CFS) = 185.62

EFFECTIVE AREA (ACRES) = 2392.36 AREA-AVERAGED Fm (INCH/HR) = 0.24

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80

TOTAL AREA (ACRES) = 2412.1 PEAK FLOW RATE (CFS) = 2300.24

GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 3.26 FLOW VELOCITY (FEET/SEC.) = 11.80

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13107.00 = 20924.84 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1925.55	18.81	2.116	0.30 ( 0.24)	0.80	1141.4	13100.00
2	2300.24	43.59	1.309	0.30 ( 0.24)	0.80	2392.4	13000.00
3	2245.49	45.68	1.275	0.30 ( 0.24)	0.80	2412.1	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 2300.24 Tc (MIN.) = 43.59

AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA (ACRES) = 2392.36

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13107.00 TO NODE 13108.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 584.29 DOWNSTREAM (FEET) = 563.78  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1061.67 CHANNEL SLOPE = 0.0193  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.13

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.288

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	314.12	0.30	0.939	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.939

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2442.44

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.20

AVERAGE FLOW DEPTH (FEET) = 3.12 TRAVEL TIME (MIN.) = 1.34

Tc (MIN.) = 44.93

SUBAREA AREA (ACRES) = 314.12 SUBAREA RUNOFF (CFS) = 284.38

EFFECTIVE AREA (ACRES) = 2706.48 AREA-AVERAGED Fm (INCH/HR) = 0.25

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82

TOTAL AREA (ACRES) = 2726.2 PEAK FLOW RATE (CFS) = 2537.54

GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 3.19 FLOW VELOCITY (FEET/SEC.) = 13.37

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13108.00 = 21986.51 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2318.48	20.20	2.020	0.30 ( 0.25)	0.83	1455.5	13100.00
2	2537.54	44.93	1.288	0.30 ( 0.25)	0.82	2706.5	13000.00
3	2472.36	47.03	1.253	0.30 ( 0.25)	0.82	2726.2	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 2537.54 Tc (MIN.) = 44.93

AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2706.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13108.00 TO NODE 13109.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 563.78 DOWNSTREAM (FEET) = 541.61  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1657.28 CHANNEL SLOPE = 0.0134  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.61  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.250  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 203.63 0.30 0.785 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.785  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2630.50  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.97  
 AVERAGE FLOW DEPTH (FEET) = 3.61 TRAVEL TIME (MIN.) = 2.31  
 Tc (MIN.) = 47.24  
 SUBAREA AREA (ACRES) = 203.63 SUBAREA RUNOFF (CFS) = 185.91  
 EFFECTIVE AREA (ACRES) = 2910.11 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 2929.8 PEAK FLOW RATE (CFS) = 2631.73  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.61 FLOW VELOCITY (FEET/SEC.) = 11.97  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13109.00 = 23643.79 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 2475.07 22.56 1.906 0.30 ( 0.25) 0.83 1659.1 13100.00  
 2 2631.73 47.24 1.250 0.30 ( 0.25) 0.82 2910.1 13000.00  
 3 2558.73 49.36 1.215 0.30 ( 0.24) 0.82 2929.8 13010.00  
 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 2631.73 Tc (MIN.) = 47.24  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2910.11

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13109.00 TO NODE 13110.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 541.61 DOWNSTREAM (FEET) = 509.94  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 2016.96 CHANNEL SLOPE = 0.0157  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.55  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.207  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 283.06 0.30 0.791 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.791  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2755.27  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.82  
 AVERAGE FLOW DEPTH (FEET) = 3.54 TRAVEL TIME (MIN.) = 2.62  
 Tc (MIN.) = 49.86  
 SUBAREA AREA (ACRES) = 283.06 SUBAREA RUNOFF (CFS) = 247.08

EFFECTIVE AREA (ACRES) = 3193.17 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3212.9 PEAK FLOW RATE (CFS) = 2766.77  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.55 FLOW VELOCITY (FEET/SEC.) = 12.84  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13110.00 = 25660.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 2679.89 25.21 1.780 0.30 ( 0.25) 0.82 1942.2 13100.00  
 2 2766.77 49.86 1.207 0.30 ( 0.24) 0.81 3193.2 13000.00  
 3 2693.57 52.01 1.176 0.30 ( 0.24) 0.81 3212.9 13010.00  
 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 2766.77 Tc (MIN.) = 49.86  
 AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA (ACRES) = 3193.17

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13110.00 TO NODE 13111.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 509.94 DOWNSTREAM (FEET) = 461.07  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 3058.95 CHANNEL SLOPE = 0.0160  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.61  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.150  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 248.05 0.30 0.783 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2868.96  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.06  
 AVERAGE FLOW DEPTH (FEET) = 3.61 TRAVEL TIME (MIN.) = 3.90  
 Tc (MIN.) = 53.77  
 SUBAREA AREA (ACRES) = 248.05 SUBAREA RUNOFF (CFS) = 204.37  
 EFFECTIVE AREA (ACRES) = 3441.22 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3460.9 PEAK FLOW RATE (CFS) = 2807.85  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.57 FLOW VELOCITY (FEET/SEC.) = 12.97  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13111.00 = 28719.70 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	2735.03	29.13	1.633	0.30 ( 0.25)	0.82	2190.2 13100.00
2	2807.85	53.77	1.150	0.30 ( 0.24)	0.81	3441.2 13000.00
3	2726.06	55.94	1.119	0.30 ( 0.24)	0.81	3460.9 13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 2807.85 Tc(MIN.) = 53.77  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3441.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 13111.00 TO NODE 13112.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 461.07 DOWNSTREAM(FEET) = 452.77  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1781.78 CHANNEL SLOPE = 0.0047  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 5.12  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.100

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	179.91	0.30	0.694	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.694  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2880.08  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.60  
 AVERAGE FLOW DEPTH(FEET) = 5.12 TRAVEL TIME(MIN.) = 3.45  
 Tc(MIN.) = 57.22

SUBAREA AREA(ACRES) = 179.91 SUBAREA RUNOFF(CFS) = 144.45  
 EFFECTIVE AREA(ACRES) = 3621.13 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3640.9 PEAK FLOW RATE(CFS) = 2807.85  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 5.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 5.05 FLOW VELOCITY(FEET/SEC.) = 8.54  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13112.00 = 30501.48 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2767.63	32.59	1.540	0.30 ( 0.24)	0.81	2370.2	13100.00
2	2807.85	57.22	1.100	0.30 ( 0.24)	0.81	3621.1	13000.00
3	2726.06	59.43	1.068	0.30 ( 0.24)	0.81	3640.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 2807.85 Tc(MIN.) = 57.22  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3621.13

\*\*\*\*\*

FLOW PROCESS FROM NODE 13112.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 452.77 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1625.01 CHANNEL SLOPE = 0.0155  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.64  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.070

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	155.96	0.30	0.836	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.836  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2865.34  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.94  
 AVERAGE FLOW DEPTH(FEET) = 3.63 TRAVEL TIME(MIN.) = 2.09  
 Tc(MIN.) = 59.31

SUBAREA AREA(ACRES) = 155.96 SUBAREA RUNOFF(CFS) = 114.99  
 EFFECTIVE AREA(ACRES) = 3777.09 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3796.8 PEAK FLOW RATE(CFS) = 2813.56  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.60

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.60 FLOW VELOCITY(FEET/SEC.) = 12.86  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13222.00 = 32126.49 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2838.09	34.69	1.491	0.30 ( 0.24)	0.81	2526.1	13100.00
2	2813.56	59.31	1.070	0.30 ( 0.24)	0.81	3777.1	13000.00
3	2759.78	61.54	1.050	0.30 ( 0.24)	0.81	3796.8	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 2838.09 Tc(MIN.) = 34.69  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 2526.12

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 3796.8 TC(MIN.) = 34.69  
 EFFECTIVE AREA(ACRES) = 2526.12 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.810  
 PEAK FLOW RATE(CFS) = 2838.09

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2838.09	34.69	1.491	0.30 ( 0.24)	0.81	2526.1	13100.00
2	2813.56	59.31	1.070	0.30 ( 0.24)	0.81	3777.1	13000.00
3	2759.78	61.54	1.050	0.30 ( 0.24)	0.81	3796.8	13010.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S32 \*  
\* Rational Method Hydrology Analysis - 50-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S32.DAT  
TIME/DATE OF STUDY: 15:49 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.440
- 2) 10.00; 3.011
- 3) 15.00; 2.390
- 4) 20.00; 2.029
- 5) 25.00; 1.787
- 6) 30.00; 1.600
- 7) 40.00; 1.368
- 8) 50.00; 1.205
- 9) 60.00; 1.060
- 10) 90.00; 0.862
- 11) 120.00; 0.732
- 12) 180.00; 0.593
- 13) 360.00; 0.412
- 14) 1440.00; 0.172

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13200.00 TO NODE 13201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 298.57  
ELEVATION DATA: UPSTREAM(FEET) = 1069.04 DOWNSTREAM(FEET) = 1005.76

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.179  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.67	0.30	1.000	0	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.74  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 1.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13201.00 TO NODE 13202.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.76 DOWNSTREAM(FEET) = 896.98  
CHANNEL LENGTH THRU SUBAREA(FEET) = 747.55 CHANNEL SLOPE = 0.1455  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.28  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.657  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.70  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.62  
AVERAGE FLOW DEPTH(FEET) = 0.25 TRAVEL TIME(MIN.) = 3.44  
Tc(MIN.) = 12.85  
SUBAREA AREA(ACRES) = 7.42 SUBAREA RUNOFF(CFS) = 15.74  
EFFECTIVE AREA(ACRES) = 8.09 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.1 PEAK FLOW RATE(CFS) = 17.17  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 FLOW VELOCITY(FEET/SEC.) = 4.51  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13202.00 = 1046.12 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 896.98 DOWNSTREAM(FEET) = 840.27  
FLOW LENGTH(FEET) = 1789.59 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 9.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.52  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 17.17  
PIPE TRAVEL TIME(MIN.) = 2.59 Tc(MIN.) = 15.44  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13203.00 = 2835.71 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.44  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.359  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.89 0.30 0.731 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.731  
SUBAREA AREA(ACRES) = 38.89 SUBAREA RUNOFF(CFS) = 74.89  
EFFECTIVE AREA(ACRES) = 46.98 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
TOTAL AREA(ACRES) = 47.0 PEAK FLOW RATE(CFS) = 89.88

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 840.27 DOWNSTREAM(FEET) = 782.97  
FLOW LENGTH(FEET) = 992.54 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 19.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.40  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 89.88  
PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 16.18  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13204.00 = 3828.25 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.18  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.306  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 83.09 0.30 0.645 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645  
SUBAREA AREA(ACRES) = 83.09 SUBAREA RUNOFF(CFS) = 157.94  
EFFECTIVE AREA(ACRES) = 130.07 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 130.1 PEAK FLOW RATE(CFS) = 245.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 782.97 DOWNSTREAM(FEET) = 692.52  
FLOW LENGTH(FEET) = 2046.57 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.62  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 245.57  
PIPE TRAVEL TIME(MIN.) = 1.33 Tc(MIN.) = 17.51  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13205.00 = 5874.82 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.51  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.209  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 88.51 0.30 0.679 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.679  
SUBAREA AREA(ACRES) = 88.51 SUBAREA RUNOFF(CFS) = 159.78  
EFFECTIVE AREA(ACRES) = 218.58 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 218.6 PEAK FLOW RATE(CFS) = 394.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 13205.00 TO NODE 13206.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 692.52 DOWNSTREAM(FEET) = 605.24  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2704.69 CHANNEL SLOPE = 0.0323  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.07  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.948



SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	163.73	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 518.84  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.79  
AVERAGE FLOW DEPTH(FEET) = 3.00 TRAVEL TIME(MIN.) = 4.18  
Tc(MIN.) = 21.68  
SUBAREA AREA(ACRES) = 163.73 SUBAREA RUNOFF(CFS) = 249.13  
EFFECTIVE AREA(ACRES) = 382.31 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 382.3 PEAK FLOW RATE(CFS) = 591.80  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.22 FLOW VELOCITY(FEET/SEC.) = 11.20  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13206.00 = 8579.51 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13206.00 TO NODE 13207.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 687.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.81  
AVERAGE FLOW DEPTH(FEET) = 3.93 TRAVEL TIME(MIN.) = 4.21  
Tc(MIN.) = 25.89  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 192.01  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 717.04  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.01

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 687.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.81  
AVERAGE FLOW DEPTH(FEET) = 3.93 TRAVEL TIME(MIN.) = 4.21  
Tc(MIN.) = 25.89  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 192.01  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 717.04  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 4.01 FLOW VELOCITY(FEET/SEC.) = 9.92  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13207.00 = 11058.66 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 795.08  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.61  
AVERAGE FLOW DEPTH(FEET) = 3.86 TRAVEL TIME(MIN.) = 2.49  
Tc(MIN.) = 28.38  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 156.05  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 828.92  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.94

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 795.08  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.61  
AVERAGE FLOW DEPTH(FEET) = 3.86 TRAVEL TIME(MIN.) = 2.49  
Tc(MIN.) = 28.38  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 156.05  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 828.92  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.94 FLOW VELOCITY(FEET/SEC.) = 11.76  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 28.38  
RAINFALL INTENSITY(INCH/HR) = 1.66  
AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.81  
EFFECTIVE STREAM AREA(ACRES) = 649.28  
TOTAL STREAM AREA(ACRES) = 649.28  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 828.92

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13210.00 TO NODE 13211.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.51  
ELEVATION DATA: UPSTREAM(FEET) = 949.80 DOWNSTREAM(FEET) = 828.64

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.525  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.432  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	1.96	0.30	1.000	0	8.53

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 5.53  
 TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 5.53

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13211.00 TO NODE 13212.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 828.64 DOWNSTREAM(FEET) = 767.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 652.49 CHANNEL SLOPE = 0.0930  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.48  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.862

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.95	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.40  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.07  
 AVERAGE FLOW DEPTH(FEET) = 0.44 TRAVEL TIME(MIN.) = 2.67  
 Tc(MIN.) = 11.19

SUBAREA AREA(ACRES) = 11.95 SUBAREA RUNOFF(CFS) = 27.56  
 EFFECTIVE AREA(ACRES) = 13.91 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 32.08  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.59 FLOW VELOCITY(FEET/SEC.) = 4.86  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13212.00 = 967.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13212.00 TO NODE 13213.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 767.94 DOWNSTREAM(FEET) = 706.43  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 967.91 CHANNEL SLOPE = 0.0635  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.97  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.485

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	27.07	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 58.82  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.30  
 AVERAGE FLOW DEPTH(FEET) = 0.94 TRAVEL TIME(MIN.) = 3.05  
 Tc(MIN.) = 14.24  
 SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 53.22  
 EFFECTIVE AREA(ACRES) = 40.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 41.0 PEAK FLOW RATE(CFS) = 80.57  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.12 FLOW VELOCITY(FEET/SEC.) = 5.89  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13213.00 = 1934.91 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13213.00 TO NODE 13214.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 706.43 DOWNSTREAM(FEET) = 659.31  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 948.11 CHANNEL SLOPE = 0.0497  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.35  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.246

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	18.09	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 96.43  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.72  
 AVERAGE FLOW DEPTH(FEET) = 1.33 TRAVEL TIME(MIN.) = 2.76  
 Tc(MIN.) = 17.00

SUBAREA AREA(ACRES) = 18.09 SUBAREA RUNOFF(CFS) = 31.68  
 EFFECTIVE AREA(ACRES) = 59.07 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 103.46  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.38 FLOW VELOCITY(FEET/SEC.) = 5.86  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13214.00 = 2883.02 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13214.00 TO NODE 13215.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 659.31 DOWNSTREAM(FEET) = 628.91  
CHANNEL LENGTH THRU SUBAREA(FEET) = 970.24 CHANNEL SLOPE = 0.0313  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.05

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.041

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	71.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 159.48

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.69

AVERAGE FLOW DEPTH(FEET) = 2.00 TRAVEL TIME(MIN.) = 2.84

Tc(MIN.) = 19.84

SUBAREA AREA(ACRES) = 71.42 SUBAREA RUNOFF(CFS) = 111.90

EFFECTIVE AREA(ACRES) = 130.49 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 130.5 PEAK FLOW RATE(CFS) = 204.44

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.29 FLOW VELOCITY(FEET/SEC.) = 6.12

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13215.00 = 3853.26 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13215.00 TO NODE 13216.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 628.91 DOWNSTREAM(FEET) = 598.39  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.63 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.42

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.922

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	36.33	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 230.97

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.47

AVERAGE FLOW DEPTH(FEET) = 2.41 TRAVEL TIME(MIN.) = 2.38

Tc(MIN.) = 22.22

SUBAREA AREA(ACRES) = 36.33 SUBAREA RUNOFF(CFS) = 53.04

EFFECTIVE AREA(ACRES) = 166.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 166.8 PEAK FLOW RATE(CFS) = 243.55

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.48 FLOW VELOCITY(FEET/SEC.) = 6.56

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13216.00 = 4775.89 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13216.00 TO NODE 13217.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 598.39 DOWNSTREAM(FEET) = 568.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.40 CHANNEL SLOPE = 0.0470  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.41

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.855

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	42.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 273.30

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.69

AVERAGE FLOW DEPTH(FEET) = 2.40 TRAVEL TIME(MIN.) = 1.38

Tc(MIN.) = 23.60

SUBAREA AREA(ACRES) = 42.51 SUBAREA RUNOFF(CFS) = 59.51

EFFECTIVE AREA(ACRES) = 209.33 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 209.3 PEAK FLOW RATE(CFS) = 293.03

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.49 FLOW VELOCITY(FEET/SEC.) = 7.85

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13217.00 = 5412.29 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 568.48 DOWNSTREAM(FEET) = 505.65  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1896.50 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.98

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.676

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	73.24	0.30	0.951	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.951  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 338.89  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 7.21  
 AVERAGE FLOW DEPTH( FEET) = 2.96 TRAVEL TIME( MIN.) = 4.39  
 Tc( MIN.) = 27.98  
 SUBAREA AREA( ACRES) = 73.24 SUBAREA RUNOFF( CFS) = 91.65  
 EFFECTIVE AREA( ACRES) = 282.57 AREA-AVERAGED Fm( INCH/HR) = 0.30  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA( ACRES) = 282.6 PEAK FLOW RATE( CFS) = 350.82  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 3.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 3.01 FLOW VELOCITY( FEET/SEC.) = 7.28  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13220.00 = 7308.79 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION( MIN.) = 27.98  
 RAINFALL INTENSITY( INCH/HR) = 1.68  
 AREA-AVERAGED Fm( INCH/HR) = 0.30  
 AREA-AVERAGED Fp( INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.99  
 EFFECTIVE STREAM AREA( ACRES) = 282.57  
 TOTAL STREAM AREA( ACRES) = 282.57  
 PEAK FLOW RATE( CFS) AT CONFLUENCE = 350.82

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	828.92	28.38	1.661	0.30( 0.24)	0.81	649.3	13200.00
2	350.82	27.98	1.676	0.30( 0.30)	0.99	282.6	13210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1176.70	27.98	1.676	0.30( 0.26)	0.86	922.7	13210.00
2	1175.92	28.38	1.661	0.30( 0.26)	0.86	931.8	13200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE( CFS) = 1176.70 Tc( MIN.) = 27.98  
 EFFECTIVE AREA( ACRES) = 922.70 AREA-AVERAGED Fm( INCH/HR) = 0.26  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA( ACRES) = 931.8  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13220.00 TO NODE 13221.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM( FEET) = 505.65 DOWNSTREAM( FEET) = 478.94  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 1949.14 CHANNEL SLOPE = 0.0137  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 5.03  
 \* 50 YEAR RAINFALL INTENSITY( INCH/HR) = 1.586

SUBAREA LOSS RATE DATA( AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 108.50 0.30 0.637 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.637  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1244.79  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 12.33  
 AVERAGE FLOW DEPTH( FEET) = 5.03 TRAVEL TIME( MIN.) = 2.63  
 Tc( MIN.) = 30.62

SUBAREA AREA( ACRES) = 108.50 SUBAREA RUNOFF( CFS) = 136.19  
 EFFECTIVE AREA( ACRES) = 1031.20 AREA-AVERAGED Fm( INCH/HR) = 0.25  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA( ACRES) = 1040.3 PEAK FLOW RATE( CFS) = 1238.21  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 5.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 5.02 FLOW VELOCITY( FEET/SEC.) = 12.33  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13221.00 = 14742.35 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1238.21	30.62	1.586	0.30( 0.25)	0.84	1031.2	13210.00
2	1240.62	31.02	1.576	0.30( 0.25)	0.84	1040.3	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE( CFS) = 1240.62 Tc( MIN.) = 31.02  
 AREA-AVERAGED Fm( INCH/HR) = 0.25 AREA-AVERAGED Fp( INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.84 EFFECTIVE AREA( ACRES) = 1040.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13221.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM( FEET) = 478.94 DOWNSTREAM( FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 2078.70 CHANNEL SLOPE = 0.0247  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 4.43  
 \* 50 YEAR RAINFALL INTENSITY( INCH/HR) = 1.525

SUBAREA LOSS RATE DATA( AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 87.26 0.30 0.699 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.699  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1292.26  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 15.48  
 AVERAGE FLOW DEPTH( FEET) = 4.43 TRAVEL TIME(MIN.) = 2.24  
 $T_c$ (MIN.) = 33.25  
 SUBAREA AREA(ACRES) = 87.26 SUBAREA RUNOFF(CFS) = 103.26  
 EFFECTIVE AREA(ACRES) = 1127.61 AREA-AVERAGED  $F_m$ (INCH/HR) = 0.25  
 AREA-AVERAGED  $F_p$ (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.83  
 TOTAL AREA(ACRES) = 1127.6 PEAK FLOW RATE(CFS) = 1295.27  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 4.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 4.43 FLOW VELOCITY( FEET/SEC.) = 15.50  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13222.00 = 16821.05 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	$T_c$ (MIN.)	Intensity (INCH/HR)	$F_p$ ( $F_m$ ) (INCH/HR)	$A_p$	$A_e$ (ACRES)	HEADWATER NODE
1	1294.02	32.85	1.534	0.30( 0.25)	0.83	1118.5	13210.00
2	1295.27	33.25	1.525	0.30( 0.25)	0.83	1127.6	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1295.27  $T_c$ (MIN.) = 33.25  
 AREA-AVERAGED  $F_m$ (INCH/HR) = 0.25 AREA-AVERAGED  $F_p$ (INCH/HR) = 0.30  
 AREA-AVERAGED  $A_p$  = 0.83 EFFECTIVE AREA(ACRES) = 1127.61

=====  
 END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1127.6  $T_c$ (MIN.) = 33.25  
 EFFECTIVE AREA(ACRES) = 1127.61 AREA-AVERAGED  $F_m$ (INCH/HR) = 0.25  
 AREA-AVERAGED  $F_p$ (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.828  
 PEAK FLOW RATE(CFS) = 1295.27

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	$T_c$ (MIN.)	Intensity (INCH/HR)	$F_p$ ( $F_m$ ) (INCH/HR)	$A_p$	$A_e$ (ACRES)	HEADWATER NODE
1	1294.02	32.85	1.534	0.30( 0.25)	0.83	1118.5	13210.00
2	1295.27	33.25	1.525	0.30( 0.25)	0.83	1127.6	13200.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S35 \*  
\* Rational Method Hydrology Analysis - 50-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S35.DAT  
TIME/DATE OF STUDY: 15:49 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.440
- 2) 10.00; 3.011
- 3) 15.00; 2.390
- 4) 20.00; 2.029
- 5) 25.00; 1.787
- 6) 30.00; 1.600
- 7) 40.00; 1.368
- 8) 50.00; 1.205
- 9) 60.00; 1.060
- 10) 90.00; 0.862
- 11) 120.00; 0.732
- 12) 180.00; 0.593
- 13) 360.00; 0.412
- 14) 1440.00; 0.172

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.00 TO NODE 13500.50 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 548.43  
ELEVATION DATA: UPSTREAM(FEET) = 1183.47 DOWNSTREAM(FEET) = 1065.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.768  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	5.11	0.30	1.000	0	11.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 11.35  
TOTAL AREA(ACRES) = 5.11 PEAK FLOW RATE(CFS) = 11.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.50 TO NODE 13501.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1033.15  
CHANNEL LENGTH THRU SUBAREA(FEET) = 431.71 CHANNEL SLOPE = 0.0738  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.49  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.538  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.87	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.29  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.88  
AVERAGE FLOW DEPTH(FEET) = 0.48 TRAVEL TIME(MIN.) = 1.86  
Tc(MIN.) = 13.81  
SUBAREA AREA(ACRES) = 8.87 SUBAREA RUNOFF(CFS) = 17.87  
EFFECTIVE AREA(ACRES) = 13.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 28.16  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.58 FLOW VELOCITY(FEET/SEC.) = 4.33  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13501.00 = 980.14 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13501.00 TO NODE 13502.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1033.15 DOWNSTREAM(FEET) = 990.26  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.63 CHANNEL SLOPE = 0.0452  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.88

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.207

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.82	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.64

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.25

AVERAGE FLOW DEPTH(FEET) = 0.86 TRAVEL TIME(MIN.) = 3.72

Tc(MIN.) = 17.54

SUBAREA AREA(ACRES) = 16.82 SUBAREA RUNOFF(CFS) = 28.88

EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 52.87

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.97 FLOW VELOCITY(FEET/SEC.) = 4.56

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13502.00 = 1928.77 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13502.00 TO NODE 13503.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.26 DOWNSTREAM(FEET) = 956.06

CHANNEL LENGTH THRU SUBAREA(FEET) = 940.98 CHANNEL SLOPE = 0.0363

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.42

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.997

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	46.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 88.07

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.01

AVERAGE FLOW DEPTH(FEET) = 1.38 TRAVEL TIME(MIN.) = 3.13

Tc(MIN.) = 20.67

SUBAREA AREA(ACRES) = 46.02 SUBAREA RUNOFF(CFS) = 70.30

EFFECTIVE AREA(ACRES) = 76.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 76.8 PEAK FLOW RATE(CFS) = 117.35

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.62 FLOW VELOCITY(FEET/SEC.) = 5.46

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13503.00 = 2869.75 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13503.00 TO NODE 13504.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 956.06 DOWNSTREAM(FEET) = 889.48

CHANNEL LENGTH THRU SUBAREA(FEET) = 2131.31 CHANNEL SLOPE = 0.0312

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.02

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.713

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	58.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 154.63

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.63

AVERAGE FLOW DEPTH(FEET) = 1.97 TRAVEL TIME(MIN.) = 6.31

Tc(MIN.) = 26.98

SUBAREA AREA(ACRES) = 58.46 SUBAREA RUNOFF(CFS) = 74.36

EFFECTIVE AREA(ACRES) = 135.28 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 135.3 PEAK FLOW RATE(CFS) = 172.08

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.09 FLOW VELOCITY(FEET/SEC.) = 5.81

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13504.00 = 5001.06 FEET.

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FLOW PROCESS FROM NODE 13504.00 TO NODE 13505.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 889.48 DOWNSTREAM(FEET) = 848.10

CHANNEL LENGTH THRU SUBAREA(FEET) = 1661.97 CHANNEL SLOPE = 0.0249

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.43

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.555  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 49.30 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 199.94  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.60  
 AVERAGE FLOW DEPTH (FEET) = 2.41 TRAVEL TIME (MIN.) = 4.94  
 Tc (MIN.) = 31.92  
 SUBAREA AREA (ACRES) = 49.30 SUBAREA RUNOFF (CFS) = 55.71  
 EFFECTIVE AREA (ACRES) = 184.58 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 184.6 PEAK FLOW RATE (CFS) = 208.56  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.46  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.46 FLOW VELOCITY (FEET/SEC.) = 5.68  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.00 = 6663.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13505.00 TO NODE 13505.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 848.10 DOWNSTREAM (FEET) = 811.10  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1234.61 CHANNEL SLOPE = 0.0300  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.47  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.479  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 39.35 0.30 0.811 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.811  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 230.44  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.23  
 AVERAGE FLOW DEPTH (FEET) = 2.47 TRAVEL TIME (MIN.) = 3.30  
 Tc (MIN.) = 35.23  
 SUBAREA AREA (ACRES) = 39.35 SUBAREA RUNOFF (CFS) = 43.76  
 EFFECTIVE AREA (ACRES) = 223.93 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 223.9 PEAK FLOW RATE (CFS) = 239.59  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.52 FLOW VELOCITY (FEET/SEC.) = 6.31  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.50 = 7897.64 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13505.50 TO NODE 13506.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 811.10 DOWNSTREAM (FEET) = 781.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1415.98 CHANNEL SLOPE = 0.0213  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.93  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.384  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 54.33 0.30 0.738 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.738  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 268.01  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.76  
 AVERAGE FLOW DEPTH (FEET) = 2.93 TRAVEL TIME (MIN.) = 4.10  
 Tc (MIN.) = 39.33  
 SUBAREA AREA (ACRES) = 54.33 SUBAREA RUNOFF (CFS) = 56.83  
 EFFECTIVE AREA (ACRES) = 278.26 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
 TOTAL AREA (ACRES) = 278.3 PEAK FLOW RATE (CFS) = 277.25  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.99 FLOW VELOCITY (FEET/SEC.) = 5.81  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.00 = 9313.62 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13506.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 781.00 DOWNSTREAM (FEET) = 743.17  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1542.62 CHANNEL SLOPE = 0.0245  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.04  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.312  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 61.33 0.30 0.783 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 306.99  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.30  
 AVERAGE FLOW DEPTH (FEET) = 3.03 TRAVEL TIME (MIN.) = 4.08  
 Tc (MIN.) = 43.41  
 SUBAREA AREA (ACRES) = 61.33 SUBAREA RUNOFF (CFS) = 59.48  
 EFFECTIVE AREA (ACRES) = 339.59 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90



TOTAL AREA (ACRES) = 339.6 PEAK FLOW RATE (CFS) = 318.89  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.09  
  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.09 FLOW VELOCITY (FEET/SEC.) = 6.37  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.50 = 10856.24 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.50 TO NODE 13520.00 IS CODE = 56  
 -----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 743.17 DOWNSTREAM (FEET) = 717.04  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1370.93 CHANNEL SLOPE = 0.0191  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.41  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.249  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.86	0.30	0.848	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.848  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 336.74  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.90  
 AVERAGE FLOW DEPTH (FEET) = 3.40 TRAVEL TIME (MIN.) = 3.87  
 Tc (MIN.) = 47.28  
 SUBAREA AREA (ACRES) = 39.86 SUBAREA RUNOFF (CFS) = 35.69  
 EFFECTIVE AREA (ACRES) = 379.45 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
 TOTAL AREA (ACRES) = 379.5 PEAK FLOW RATE (CFS) = 335.28  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.39 FLOW VELOCITY (FEET/SEC.) = 5.89  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13520.00 IS CODE = 1  
 -----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 -----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 47.28  
 RAINFALL INTENSITY (INCH/HR) = 1.25  
 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.89  
 EFFECTIVE STREAM AREA (ACRES) = 379.45  
 TOTAL STREAM AREA (ACRES) = 379.45  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 335.28

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13510.00 TO NODE 13511.00 IS CODE = 21  
 -----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 -----  
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 903.68  
 ELEVATION DATA: UPSTREAM (FEET) = 1216.90 DOWNSTREAM (FEET) = 1022.78

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.615  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.438  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	6.66	0.30	1.000	0	14.62

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 12.82  
 TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 12.82

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13511.00 TO NODE 13512.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 1022.78 DOWNSTREAM (FEET) = 954.27  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1027.63 CHANNEL SLOPE = 0.0667  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.71  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.142  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.30	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 33.97  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.48  
 AVERAGE FLOW DEPTH (FEET) = 0.67 TRAVEL TIME (MIN.) = 3.82  
 Tc (MIN.) = 18.44  
 SUBAREA AREA (ACRES) = 25.40 SUBAREA RUNOFF (CFS) = 42.12  
 EFFECTIVE AREA (ACRES) = 32.06 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 53.16  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.87 FLOW VELOCITY (FEET/SEC.) = 5.23  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13512.00 = 1931.31 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13512.00 TO NODE 13513.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 954.27 DOWNSTREAM(FEET) = 872.45  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.42 CHANNEL SLOPE = 0.0425  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.63  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.834

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	90.23	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 115.80  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.73  
AVERAGE FLOW DEPTH(FEET) = 1.54 TRAVEL TIME(MIN.) = 5.60  
Tc(MIN.) = 24.04

SUBAREA AREA(ACRES) = 90.23 SUBAREA RUNOFF(CFS) = 124.57  
EFFECTIVE AREA(ACRES) = 122.29 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 122.3 PEAK FLOW RATE(CFS) = 168.84  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.90 FLOW VELOCITY(FEET/SEC.) = 6.43  
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13513.00 = 3857.73 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13513.00 TO NODE 13514.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 872.45 DOWNSTREAM(FEET) = 813.12  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1895.66 CHANNEL SLOPE = 0.0313  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.62  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.641

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	135.65	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 250.84  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.48  
AVERAGE FLOW DEPTH(FEET) = 2.56 TRAVEL TIME(MIN.) = 4.87  
Tc(MIN.) = 28.91

SUBAREA AREA(ACRES) = 135.65 SUBAREA RUNOFF(CFS) = 163.70  
EFFECTIVE AREA(ACRES) = 257.94 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 257.9 PEAK FLOW RATE(CFS) = 311.28  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.87 FLOW VELOCITY(FEET/SEC.) = 6.90  
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13514.00 = 5753.39 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13514.00 TO NODE 13515.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 813.12 DOWNSTREAM(FEET) = 773.74  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.15 CHANNEL SLOPE = 0.0204  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.54  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.505

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	109.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 370.60  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.21  
AVERAGE FLOW DEPTH(FEET) = 3.51 TRAVEL TIME(MIN.) = 5.17  
Tc(MIN.) = 34.08

SUBAREA AREA(ACRES) = 109.30 SUBAREA RUNOFF(CFS) = 118.58  
EFFECTIVE AREA(ACRES) = 367.24 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 367.2 PEAK FLOW RATE(CFS) = 398.42  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.64 FLOW VELOCITY(FEET/SEC.) = 6.33  
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13515.00 = 7679.54 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 773.74 DOWNSTREAM(FEET) = 717.04  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2279.49 CHANNEL SLOPE = 0.0249  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.98  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.384

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	135.65	0.30	1.000	-

USER-DEFINED - 231.44 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 511.44  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.28  
 AVERAGE FLOW DEPTH (FEET) = 3.93 TRAVEL TIME (MIN.) = 5.22  
 Tc (MIN.) = 39.30  
 SUBAREA AREA (ACRES) = 231.44 SUBAREA RUNOFF (CFS) = 225.88  
 EFFECTIVE AREA (ACRES) = 598.68 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 598.7 PEAK FLOW RATE (CFS) = 584.29  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 4.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 4.21 FLOW VELOCITY (FEET/SEC.) = 7.54  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13520.00 = 9959.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 39.30  
 RAINFALL INTENSITY (INCH/HR) = 1.38  
 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 598.68  
 TOTAL STREAM AREA (ACRES) = 598.68  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 584.29

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	335.28	47.28	1.249	0.30 (0.27)	0.89	379.5	13500.00
2	584.29	39.30	1.384	0.30 (0.30)	1.00	598.7	13510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	901.29	39.30	1.384	0.30 (0.29)	0.96	914.1	13510.00
2	846.79	47.28	1.249	0.30 (0.29)	0.96	978.1	13500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 901.29 Tc (MIN.) = 39.30  
 EFFECTIVE AREA (ACRES) = 914.06 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 978.1  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.00 TO NODE 13520.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 717.04 DOWNSTREAM (FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 2019.22 CHANNEL SLOPE = 0.0084  
 GIVEN CHANNEL BASE (FEET) = 30.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.61  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.298  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 989.05  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.74  
 AVERAGE FLOW DEPTH (FEET) = 3.60 TRAVEL TIME (MIN.) = 4.99  
 Tc (MIN.) = 44.29  
 SUBAREA AREA (ACRES) = 193.31 SUBAREA RUNOFF (CFS) = 175.48  
 EFFECTIVE AREA (ACRES) = 1107.37 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 1171.4 PEAK FLOW RATE (CFS) = 1005.81  
 GIVEN CHANNEL BASE (FEET) = 30.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.63 FLOW VELOCITY (FEET/SEC.) = 6.78  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.50 = 14246.39 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1005.81	44.29	1.298	0.30 (0.29)	0.96	1107.4	13510.00
2	930.74	52.37	1.171	0.30 (0.29)	0.96	1171.4	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 1005.81 Tc (MIN.) = 44.29  
 AREA-AVERAGED Fm (INCH/HR) = 0.29 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA (ACRES) = 1107.37

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.50 TO NODE 13521.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 661.95  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1622.36 CHANNEL SLOPE = 0.0235  
 GIVEN CHANNEL BASE (FEET) = 30.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.82  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.253  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -        129.79     0.30        0.897       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1063.29  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.81  
 AVERAGE FLOW DEPTH(FEET) = 2.82    TRAVEL TIME(MIN.) = 2.76  
 Tc(MIN.) = 47.04  
 SUBAREA AREA(ACRES) = 129.79        SUBAREA RUNOFF(CFS) = 114.95  
 EFFECTIVE AREA(ACRES) = 1237.16    AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 1301.2        PEAK FLOW RATE(CFS) = 1075.96  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.84    FLOW VELOCITY(FEET/SEC.) = 9.86  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13521.00 = 15868.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1075.96	47.04	1.253	0.30( 0.29)	0.96	1237.2	13510.00
2	988.14	55.20	1.130	0.30( 0.29)	0.95	1301.2	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1075.96    Tc(MIN.) = 47.04  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96    EFFECTIVE AREA(ACRES) = 1237.16

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13521.00 TO NODE 13522.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 661.95    DOWNSTREAM(FEET) = 632.19  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2746.01    CHANNEL SLOPE = 0.0108  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.73  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.163  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	278.60	0.30	0.905	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1187.70  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.78  
 AVERAGE FLOW DEPTH(FEET) = 3.71    TRAVEL TIME(MIN.) = 5.88  
 Tc(MIN.) = 52.93  
 SUBAREA AREA(ACRES) = 278.60        SUBAREA RUNOFF(CFS) = 223.43  
 EFFECTIVE AREA(ACRES) = 1515.76    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.95  
 TOTAL AREA(ACRES) = 1579.8        PEAK FLOW RATE(CFS) = 1198.50  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.73  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.73    FLOW VELOCITY(FEET/SEC.) = 7.81  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13522.00 = 18614.76 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1198.50	52.93	1.163	0.30( 0.28)	0.95	1515.8	13510.00
2	1092.68	61.25	1.052	0.30( 0.28)	0.94	1579.8	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1198.50    Tc(MIN.) = 52.93  
 AREA-AVERAGED Fm(INCH/HR) = 0.28    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.95    EFFECTIVE AREA(ACRES) = 1515.76

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1579.8    TC(MIN.) = 52.93  
 EFFECTIVE AREA(ACRES) = 1515.76    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.947  
 PEAK FLOW RATE(CFS) = 1198.50

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1198.50	52.93	1.163	0.30( 0.28)	0.95	1515.8	13510.00
2	1092.68	61.25	1.052	0.30( 0.28)	0.94	1579.8	13500.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2011 Advanced Engineering Software (aes)  
Ver. 18.0 Release Date: 07/01/2011 License ID 1264

Analysis prepared by:

RBF Consulting

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 100-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P00EVAA.DAT  
TIME/DATE OF STUDY: 15:06 11/13/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.785
- 2) 10.00; 3.745
- 3) 15.00; 2.904
- 4) 20.00; 2.401
- 5) 25.00; 2.083
- 6) 30.00; 1.861
- 7) 40.00; 1.606
- 8) 50.00; 1.392
- 9) 60.00; 1.279
- 10) 90.00; 1.075
- 11) 120.00; 0.938
- 12) 180.00; 0.782
- 13) 360.00; 0.577
- 14) 1200.00; 0.251

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE/ WAY		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 571.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.305  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.844  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56	7.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 3.44  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 3.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.844  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.170  
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 14.24  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 17.68

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.844  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.60 0.30 0.200 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 11.20  
 EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19  
 TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 28.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 -----

UPSTREAM ELEVATION(FEET) = 571.00 DOWNSTREAM ELEVATION(FEET) = 530.50  
 STREET LENGTH(FEET) = 1215.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.79  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.49  
 HALFSTREET FLOOD WIDTH(FEET) = 18.24  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.49  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.68  
 STREET FLOW TRAVEL TIME(MIN.) = 3.69 Tc(MIN.) = 10.99

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.578  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.20	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	2.40	0.30	0.100	56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.135					
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 11.78					
EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.05					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17					
TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 33.02					

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 17.85  
 FLOW VELOCITY(FEET/SEC.) = 5.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.61  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1542.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 10.99  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.578  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 APARTMENTS B 4.40 0.30 0.200 56  
 COMMERCIAL B 18.20 0.30 0.100 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.119  
 SUBAREA AREA(ACRES) = 22.60 SUBAREA RUNOFF(CFS) = 72.05  
 EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.13  
 TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 105.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 10.99  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.578  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 APARTMENTS B 6.20 0.30 0.200 56  
 COMMERCIAL B 0.10 0.30 0.100 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.198  
 SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 19.95  
 EFFECTIVE AREA(ACRES) = 39.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA(ACRES) = 39.3 PEAK FLOW RATE(CFS) = 125.03

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 530.50 DOWNSTREAM(FEET) = 522.00  
 FLOW LENGTH(FEET) = 837.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.38  
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 125.03  
 PIPE TRAVEL TIME(MIN.) = 1.13 Tc(MIN.) = 12.12  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2379.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 12.12  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.389  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 15.30 0.30 0.100 56  
 PUBLIC PARK B 0.70 0.30 0.850 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.133  
 SUBAREA AREA(ACRES) = 16.00 SUBAREA RUNOFF(CFS) = 48.23  
 EFFECTIVE AREA(ACRES) = 55.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA(ACRES) = 55.3 PEAK FLOW RATE(CFS) = 166.55

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 522.00 DOWNSTREAM(FEET) = 473.00  
 FLOW LENGTH(FEET) = 568.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 29.74  
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 166.55  
 PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 12.44  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2947.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.44  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.335  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	2.10	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
COMMERCIAL	B	0.50	0.30	0.100	56
PUBLIC PARK	B	13.00	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.820  
 SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 44.21  
 EFFECTIVE AREA(ACRES) = 71.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 71.2 PEAK FLOW RATE(CFS) = 208.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 127.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 435.00  
 FLOW LENGTH(FEET) = 588.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 28.35

ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 208.10  
 PIPE TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 12.78  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 100.00 TO NODE 121.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 574.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.382  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56	8.44

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 2.33  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 2.33

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 574.00 DOWNSTREAM ELEVATION(FEET) = 557.00  
 STREET LENGTH(FEET) = 221.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 28.72  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.42  
 HALFSTREET FLOOD WIDTH(FEET) = 14.18  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.22  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.00



STREET FLOW TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 8.95  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.174  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 7.90 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.10 0.30 0.400 56  
 APARTMENTS B 2.20 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.257  
 SUBAREA AREA(ACRES) = 14.30 SUBAREA RUNOFF(CFS) = 52.73  
 EFFECTIVE AREA(ACRES) = 14.90 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.26  
 TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 54.95

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 18.48  
 FLOW VELOCITY(FEET/SEC.) = 8.47 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.17  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 551.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 557.00 DOWNSTREAM ELEVATION(FEET) = 527.00  
 STREET LENGTH(FEET) = 317.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 71.05  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.51  
 HALFSTREET FLOOD WIDTH(FEET) = 19.65  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.76  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 5.01  
 STREET FLOW TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 9.49  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.953  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.50 0.30 0.400 56  
 APARTMENTS B 0.70 0.30 0.200 56

COMMERCIAL B 0.40 0.30 0.100 56  
 CONDOMINIUMS B 3.50 0.30 0.350 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.352  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 32.20  
 EFFECTIVE AREA(ACRES) = 24.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 24.2 PEAK FLOW RATE(CFS) = 84.19

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 21.05  
 FLOW VELOCITY(FEET/SEC.) = 10.14 DEPTH\*VELOCITY(FT\*FT/SEC.) = 5.46  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 123.00 = 868.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 527.00 DOWNSTREAM ELEVATION(FEET) = 496.00  
 STREET LENGTH(FEET) = 315.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 102.86  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.57  
 HALFSTREET FLOOD WIDTH(FEET) = 22.62  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.80  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.12  
 STREET FLOW TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 9.98  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.755

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 2.90 0.30 0.400 56  
 CONDOMINIUMS B 1.40 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.00 0.30 0.400 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 CONDOMINIUMS B 2.70 0.30 0.350 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387  
 SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 37.33  
 EFFECTIVE AREA(ACRES) = 35.60 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32

TOTAL AREA (ACRES) = 35.6 PEAK FLOW RATE (CFS) = 117.21

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.59 HALFSTREET FLOOD WIDTH (FEET) = 23.79
FLOW VELOCITY (FEET/SEC.) = 11.17 DEPTH\*VELOCITY (FT\*FT/SEC.) = 6.56
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 124.00 = 1183.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 9.98

RAINFALL INTENSITY (INCH/HR) = 3.75

AREA-AVERAGED Fm (INCH/HR) = 0.10

AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.32

EFFECTIVE STREAM AREA (ACRES) = 35.60

TOTAL STREAM AREA (ACRES) = 35.60

PEAK FLOW RATE (CFS) AT CONFLUENCE = 117.21

\*\*\*\*\*

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 317.00

ELEVATION DATA: UPSTREAM (FEET) = 699.00 DOWNSTREAM (FEET) = 610.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.111

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.108

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER
"OPEN BRUSH" B 1.50 0.30 1.000 66 9.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 5.14

TOTAL AREA (ACRES) = 1.50 PEAK FLOW RATE (CFS) = 5.14

\*\*\*\*\*

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 610.00 DOWNSTREAM (FEET) = 575.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 206.00 CHANNEL SLOPE = 0.1699

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.911

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 2.80 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.69

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.11

AVERAGE FLOW DEPTH (FEET) = 0.67 TRAVEL TIME (MIN.) = 0.48

Tc (MIN.) = 9.59

SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 9.10

EFFECTIVE AREA (ACRES) = 4.30 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 4.3 PEAK FLOW RATE (CFS) = 13.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.77 FLOW VELOCITY (FEET/SEC.) = 7.79

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 523.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 575.00 DOWNSTREAM (FEET) = 548.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.1350

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.741

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 3.30 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 19.08

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.77

AVERAGE FLOW DEPTH (FEET) = 0.91 TRAVEL TIME (MIN.) = 0.43

Tc (MIN.) = 10.02

SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 10.22

EFFECTIVE AREA (ACRES) = 7.60 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 7.6 PEAK FLOW RATE (CFS) = 23.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.98 FLOW VELOCITY (FEET/SEC.) = 8.18

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 723.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 548.00 DOWNSTREAM (FEET) = 524.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 318.00 CHANNEL SLOPE = 0.0755

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.610  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	2.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 26.96  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.81  
 AVERAGE FLOW DEPTH (FEET) = 1.15 TRAVEL TIME (MIN.) = 0.78  
 Tc (MIN.) = 10.80  
 SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 6.85  
 EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 29.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.19 FLOW VELOCITY (FEET/SEC.) = 6.97  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 1041.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 524.00 DOWNSTREAM (FEET) = 515.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 94.00 CHANNEL SLOPE = 0.0957  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.577  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	3.70	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 34.95  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.95  
 AVERAGE FLOW DEPTH (FEET) = 1.21 TRAVEL TIME (MIN.) = 0.20  
 Tc (MIN.) = 11.00  
 SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 10.91  
 EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 40.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.28 FLOW VELOCITY (FEET/SEC.) = 8.20  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 1135.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 507.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 207.00 CHANNEL SLOPE = 0.0386  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.484  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	8.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 52.00  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.25  
 AVERAGE FLOW DEPTH (FEET) = 1.67 TRAVEL TIME (MIN.) = 0.55  
 Tc (MIN.) = 11.55  
 SUBAREA AREA (ACRES) = 8.30 SUBAREA RUNOFF (CFS) = 23.79  
 EFFECTIVE AREA (ACRES) = 21.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 21.9 PEAK FLOW RATE (CFS) = 62.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.79 FLOW VELOCITY (FEET/SEC.) = 6.54  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 1342.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 507.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 338.00 CHANNEL SLOPE = 0.0207  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.313  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	0.60	0.30	1.000	66
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
NATURAL FAIR COVER "OPEN BRUSH"	B	13.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 81.90  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.52  
 AVERAGE FLOW DEPTH (FEET) = 2.22 TRAVEL TIME (MIN.) = 1.02  
 Tc (MIN.) = 12.57  
 SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 38.28  
 EFFECTIVE AREA (ACRES) = 36.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 36.0 PEAK FLOW RATE (CFS) = 97.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.37 FLOW VELOCITY(FEET/SEC.) = 5.80  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 1680.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 137.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 496.00  
FLOW LENGTH(FEET) = 726.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.17  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 97.66  
PIPE TRAVEL TIME(MIN.) = 1.32 Tc(MIN.) = 13.89  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 13.89  
RAINFALL INTENSITY(INCH/HR) = 3.09  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 36.00  
TOTAL STREAM AREA(ACRES) = 36.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 97.66

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	117.21	9.98	3.755	0.30( 0.10)	0.32	35.6	100.00
2	97.66	13.89	3.091	0.30( 0.30)	1.00	36.0	130.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	204.03	9.98	3.755	0.30( 0.18)	0.61	61.5	100.00
2	193.58	13.89	3.091	0.30( 0.20)	0.66	71.6	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 204.03 Tc(MIN.) = 9.98  
EFFECTIVE AREA(ACRES) = 61.45 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 71.6  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 444.00  
FLOW LENGTH(FEET) = 888.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.10  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 204.03  
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 10.52  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 125.00 = 3294.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.52  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.657  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCs SOIL AREA Fp Ap SCs  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 7.50 0.30 0.400 56  
NATURAL FAIR COVER  
"OPEN BRUSH" B 0.10 0.30 1.000 66  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.407  
SUBAREA AREA(ACRES) = 8.60 SUBAREA RUNOFF(CFS) = 27.36  
EFFECTIVE AREA(ACRES) = 70.05 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 219.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 444.00 DOWNSTREAM(FEET) = 438.00  
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 60.0 INCH PIPE IS 45.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.63  
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 219.59  
PIPE TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 11.33  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.33

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.522  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	4.30	0.30	0.200	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.70	0.30	0.400	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.20	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 7.10 SUBAREA RUNOFF (CFS) = 22.07  
 EFFECTIVE AREA (ACRES) = 77.15 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 87.3 PEAK FLOW RATE (CFS) = 233.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 11.33  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.522  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.62  
 EFFECTIVE AREA (ACRES) = 77.35 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 87.5 PEAK FLOW RATE (CFS) = 233.72

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 11.33  
 RAINFALL INTENSITY (INCH/HR) = 3.52  
 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.55  
 EFFECTIVE STREAM AREA (ACRES) = 77.35  
 TOTAL STREAM AREA (ACRES) = 87.50  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 233.72

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21  
 -----

-----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====  
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 557.00 DOWNSTREAM (FEET) = 546.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.105  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 5.334  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.50	0.30	0.100	56	6.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 2.39  
 TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 2.39

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION (FEET) = 546.00 DOWNSTREAM ELEVATION (FEET) = 488.00  
 STREET LENGTH (FEET) = 671.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00  
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 13.23  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.34  
 HALfstREET FLOOD WIDTH (FEET) = 9.72  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.38  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.14  
 STREET FLOW TRAVEL TIME (MIN.) = 1.75 Tc (MIN.) = 7.86  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.619  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.50	0.30	0.200	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	3.90	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293  
 SUBAREA AREA (ACRES) = 5.30 SUBAREA RUNOFF (CFS) = 21.61  
 EFFECTIVE AREA (ACRES) = 5.80 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA (ACRES) = 5.8 PEAK FLOW RATE (CFS) = 23.68

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 12.70  
 FLOW VELOCITY(FEET/SEC.) = 7.25 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.82  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1001.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 7.86  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.619  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	14.60	0.30	0.200	56
COMMERCIAL	B	1.10	0.30	0.100	56
CONDOMINIUMS	B	4.30	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.227  
 SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 81.91  
 EFFECTIVE AREA(ACRES) = 25.80 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 25.8 PEAK FLOW RATE(CFS) = 105.59

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

-----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 488.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
 STREET LENGTH(FEET) = 371.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 132.19  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.63  
 HALFSTREET FLOOD WIDTH(FEET) = 26.29  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.38  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.56  
 STREET FLOW TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 8.45  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.376

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.50	0.30	0.200	56

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 10.00 0.30 0.200 56  
 APARTMENTS B 1.70 0.30 0.200 56  
 COMMERCIAL B 0.50 0.30 0.100 56  
 CONDOMINIUMS B 1.00 0.30 0.350 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.207  
 SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 53.19  
 EFFECTIVE AREA(ACRES) = 39.50 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA(ACRES) = 39.5 PEAK FLOW RATE(CFS) = 153.13

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 27.85  
 FLOW VELOCITY(FEET/SEC.) = 10.75 DEPTH\*VELOCITY(FT\*FT/SEC.) = 7.10  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1372.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 113.00 TO NODE 126.00 IS CODE = 31

-----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 438.00  
 FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.50  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 153.13  
 PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 8.82  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 1872.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 8.82  
 RAINFALL INTENSITY(INCH/HR) = 4.22  
 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.23  
 EFFECTIVE STREAM AREA(ACRES) = 39.50  
 TOTAL STREAM AREA(ACRES) = 39.50  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 153.13

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	233.72	11.33	3.522	0.30( 0.16)	0.55	77.4	100.00
1	212.36	15.27	2.877	0.30( 0.18)	0.60	87.5	130.00
2	153.13	8.82	4.225	0.30( 0.07)	0.23	39.5	110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	373.32	8.82	4.225	0.30 ( 0.13)	0.42	99.8	110.00
2	360.95	11.33	3.522	0.30 ( 0.13)	0.44	116.9	100.00
3	315.83	15.27	2.877	0.30 ( 0.15)	0.48	127.0	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 373.32 Tc(MIN.) = 8.82  
EFFECTIVE AREA(ACRES) = 99.75 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 127.0  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 435.00  
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.24  
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 373.32  
PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 9.13  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.13

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.101

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	5.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.366

SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 28.02

EFFECTIVE AREA(ACRES) = 107.55 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 134.8 PEAK FLOW RATE(CFS) = 384.84

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.13

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.101

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	1.50	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519

SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 17.40

EFFECTIVE AREA(ACRES) = 112.45 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 139.7 PEAK FLOW RATE(CFS) = 402.23

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	402.23	9.13	4.101	0.30 ( 0.13)	0.42	112.5	110.00
2	389.18	11.64	3.469	0.30 ( 0.13)	0.44	129.6	100.00
3	339.56	15.59	2.844	0.30 ( 0.14)	0.48	139.7	130.00

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	208.10	12.78	3.277	0.30 ( 0.09)	0.29	71.2	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	589.23	9.13	4.101	0.30 ( 0.11)	0.38	163.3	110.00
2	590.10	11.64	3.469	0.30 ( 0.12)	0.39	194.4	100.00
3	582.95	12.78	3.277	0.30 ( 0.12)	0.39	203.7	100.00
4	519.41	15.59	2.844	0.30 ( 0.12)	0.42	210.9	130.00

TOTAL AREA(ACRES) = 210.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 590.10 Tc(MIN.) = 11.640

EFFECTIVE AREA(ACRES) = 194.39 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39

TOTAL AREA(ACRES) = 210.9

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

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FLOW PROCESS FROM NODE 127.00 TO NODE 127.10 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 500.20 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 47.69
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 590.10
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 11.81
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.10 = 4750.20 FEET.

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FLOW PROCESS FROM NODE 127.10 TO NODE 127.20 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 353.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 595.30 CHANNEL SLOPE = 0.0218
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.243
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B       3.50    0.30    0.100    56
COMMERCIAL          B       0.10    0.30    0.100    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 595.31
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.50
AVERAGE FLOW DEPTH(FEET) = 1.33 TRAVEL TIME(MIN.) = 1.17
Tc(MIN.) = 12.98
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 10.41
EFFECTIVE AREA(ACRES) = 197.99 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 214.5 PEAK FLOW RATE(CFS) = 590.10
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.32 FLOW VELOCITY(FEET/SEC.) = 8.47
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.20 = 5345.50 FEET.

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FLOW PROCESS FROM NODE 127.20 TO NODE 127.30 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 340.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 476.00 CHANNEL SLOPE = 0.0273
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.097
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS

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LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B       3.10    0.30    0.100    56
COMMERCIAL          B       0.10    0.30    0.100    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 594.52
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.13
AVERAGE FLOW DEPTH(FEET) = 1.24 TRAVEL TIME(MIN.) = 0.87
Tc(MIN.) = 13.85
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 8.83
EFFECTIVE AREA(ACRES) = 201.19 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 217.7 PEAK FLOW RATE(CFS) = 590.10
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.24 FLOW VELOCITY(FEET/SEC.) = 9.08
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.30 = 5821.50 FEET.

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FLOW PROCESS FROM NODE 127.30 TO NODE 13569.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 338.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 506.00 CHANNEL SLOPE = 0.0040
CHANNEL BASE(FEET) = 150.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.768
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B       2.80    0.30    0.100    56
COMMERCIAL          B       0.60    0.30    0.100    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 594.29
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.38
AVERAGE FLOW DEPTH(FEET) = 1.15 TRAVEL TIME(MIN.) = 2.50
Tc(MIN.) = 16.35
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 8.38
EFFECTIVE AREA(ACRES) = 204.59 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 221.1 PEAK FLOW RATE(CFS) = 590.10
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.15 FLOW VELOCITY(FEET/SEC.) = 3.37
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 13569.00 = 6327.50 FEET.

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FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 12
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>>>>CLEAR MEMORY BANK # 1 <<<<
=====
END OF STUDY SUMMARY:

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TOTAL AREA (ACRES) = 221.1 TC (MIN.) = 16.35  
 EFFECTIVE AREA (ACRES) = 204.59 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.375  
 PEAK FLOW RATE (CFS) = 590.10

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	589.23	13.84	3.099	0.30 ( 0.11)	0.36	173.5	110.00
2	590.10	16.35	2.768	0.30 ( 0.11)	0.38	204.6	100.00
3	582.95	17.51	2.651	0.30 ( 0.11)	0.38	213.9	100.00
4	519.41	20.54	2.367	0.30 ( 0.12)	0.40	221.1	130.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2012 Advanced Engineering Software (aes)  
Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 100-YR ULTIMATE EV DECEMBER 2013 MCHANDOO/TMULI \*  
\*\*\*\*\*

FILE NAME: 2P00EVBB.DAT  
TIME/DATE OF STUDY: 16:36 12/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.847
- 2) 10.00; 3.775
- 3) 15.00; 2.924
- 4) 20.00; 2.413
- 5) 25.00; 2.092
- 6) 30.00; 1.869
- 7) 40.00; 1.613
- 8) 50.00; 1.397
- 9) 60.00; 1.287
- 10) 90.00; 1.084
- 11) 120.00; 0.947
- 12) 180.00; 0.791
- 13) 360.00; 0.584
- 14) 1200.00; 0.255

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0313 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0313 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00  
ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 543.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.596  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.771  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.80	0.30	0.100	56	7.60

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 3.41  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 3.41

\*\*\*\*\*  
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 543.00 DOWNSTREAM ELEVATION(FEET) = 523.00  
STREET LENGTH(FEET) = 502.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.56  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.71  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.18  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.31  
STREET FLOW TRAVEL TIME(MIN.) = 2.00 Tc(MIN.) = 9.60  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.942

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.20	0.30	0.200	56
COMMERCIAL	B	1.30	0.30	0.100	56

NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.261  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 6.26  
 EFFECTIVE AREA(ACRES) = 2.60 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 9.08

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 9.12  
 FLOW VELOCITY(FEET/SEC.) = 4.44 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.51  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 810.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.60  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.942  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 1.40 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 4.93  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 14.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 523.00 DOWNSTREAM ELEVATION(FEET) = 468.00  
 STREET LENGTH(FEET) = 987.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.16  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.40  
 HALFSTREET FLOOD WIDTH(FEET) = 12.11  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.09  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.44  
 STREET FLOW TRAVEL TIME(MIN.) = 2.70 Tc(MIN.) = 12.30  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.384  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56  
 COMMERCIAL B 2.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.426  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 12.31  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 24.30

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 13.16  
 FLOW VELOCITY(FEET/SEC.) = 6.32 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.66  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 1797.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 468.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 28.34  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.43  
 HALFSTREET FLOOD WIDTH(FEET) = 14.88  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.52  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.79  
 STREET FLOW TRAVEL TIME(MIN.) = 2.50 Tc(MIN.) = 14.79  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.959  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.10 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 COMMERCIAL B 1.90 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.232  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 8.06  
EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 29.23

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 15.04  
FLOW VELOCITY(FEET/SEC.) = 6.60 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.85  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2774.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 14.79  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.959  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
NATURAL FAIR COVER  
"OPEN BRUSH" B 1.30 0.30 1.000 66  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 3.11  
EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 32.34

\*\*\*\*\*  
FLOW PROCESS FROM NODE 204.00 TO NODE 218.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

-----  
UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 343.00  
STREET LENGTH(FEET) = 1228.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 36.84  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.46  
HALFSTREET FLOOD WIDTH(FEET) = 16.84  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.76  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.13  
STREET FLOW TRAVEL TIME(MIN.) = 3.03 Tc(MIN.) = 17.82  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.636

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
COMMERCIAL B 0.50 0.30 0.100 56  
NATURAL FAIR COVER  
"OPEN BRUSH" B 0.40 0.30 1.000 66  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.70 0.30 0.500 56  
COMMERCIAL B 1.50 0.30 0.100 56  
NATURAL FAIR COVER  
"OPEN BRUSH" B 0.80 0.30 1.000 66  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.450  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 9.00  
EFFECTIVE AREA(ACRES) = 16.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA(ACRES) = 16.6 PEAK FLOW RATE(CFS) = 37.67

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 16.99  
FLOW VELOCITY(FEET/SEC.) = 6.80 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.17  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 17.82  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.636  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 1.20 0.30 0.500 56  
COMMERCIAL B 0.10 0.30 0.100 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
COMMERCIAL B 0.10 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.450  
SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 3.60  
EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 41.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 17.82  
RAINFALL INTENSITY(INCH/HR) = 2.64  
AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.39  
EFFECTIVE STREAM AREA (ACRES) = 18.20  
TOTAL STREAM AREA (ACRES) = 18.20  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 41.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----

INITIAL SUBAREA FLOW-LENGTH (FEET) = 268.00  
ELEVATION DATA: UPSTREAM (FEET) = 514.00 DOWNSTREAM (FEET) = 511.50

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.724  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.718

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	B	2.30	0.30	0.500	56	9.27
APARTMENTS	B	0.40	0.30	0.200	56	7.72

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456

SUBAREA RUNOFF (CFS) = 11.13

TOTAL AREA (ACRES) = 2.70 PEAK FLOW RATE (CFS) = 11.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 511.50 DOWNSTREAM ELEVATION (FEET) = 503.00  
STREET LENGTH (FEET) = 503.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.13  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.48  
HALFSTREET FLOOD WIDTH (FEET) = 17.70  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.87  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.85  
STREET FLOW TRAVEL TIME (MIN.) = 2.17 Tc (MIN.) = 9.89  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.820

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL	AREA	Fp	Ap	SCS
-------------------------------	------	----	----	-----

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.20	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.475  
SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 23.83  
EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.14  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47  
TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 32.78

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.53 HALFSTREET FLOOD WIDTH (FEET) = 20.35  
FLOW VELOCITY (FEET/SEC.) = 4.21 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.21  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 771.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc (MIN.) = 9.89

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.820

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.281

SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 4.37

EFFECTIVE AREA (ACRES) = 11.20 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45

TOTAL AREA (ACRES) = 11.2 PEAK FLOW RATE (CFS) = 37.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 503.00 DOWNSTREAM ELEVATION (FEET) = 476.00  
STREET LENGTH (FEET) = 423.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 39.04  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.46  
HALFSTREET FLOOD WIDTH(FEET) = 16.68  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.29  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.36  
STREET FLOW TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 10.86  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.629

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 1.00 0.30 0.500 56  
COMMERCIAL B 0.10 0.30 0.100 56  
CONDOMINIUMS B 0.10 0.30 0.350 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.454  
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 3.77  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 39.00

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.68  
FLOW VELOCITY(FEET/SEC.) = 7.28 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.35  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 10.86  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.629  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.50 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
COMMERCIAL B 0.30 0.30 0.100 56  
CONDOMINIUMS B 3.30 0.30 0.350 56  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.332  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 15.56  
EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 54.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 10.86  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.629  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 3.40 0.30 0.100 56  
CONDOMINIUMS B 8.10 0.30 0.350 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.276  
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 36.70  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 91.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

-----  
UPSTREAM ELEVATION(FEET) = 476.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
STREET LENGTH(FEET) = 789.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 91.26  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.69  
HALFSTREET FLOOD WIDTH(FEET) = 30.33  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.78  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.97  
STREET FLOW TRAVEL TIME(MIN.) = 2.27 Tc(MIN.) = 13.13  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.242  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 91.26  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.69 HALFSTREET FLOOD WIDTH(FEET) = 30.33  
FLOW VELOCITY(FEET/SEC.) = 5.78 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.97  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1983.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.13  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.242  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	8.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.40	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 40.07  
 EFFECTIVE AREA(ACRES) = 43.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
 TOTAL AREA(ACRES) = 43.2 PEAK FLOW RATE(CFS) = 121.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 460.00 DOWNSTREAM ELEVATION(FEET) = 419.00  
STREET LENGTH(FEET) = 529.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 126.61  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.62  
 HALFSTREET FLOOD WIDTH(FEET) = 25.74  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.36  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.45  
 STREET FLOW TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 13.98  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.097  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 10.61  
 EFFECTIVE AREA(ACRES) = 47.20 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 47.2 PEAK FLOW RATE(CFS) = 126.28

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 25.66  
FLOW VELOCITY(FEET/SEC.) = 10.39 DEPTH\*VELOCITY(FT\*FT/SEC.) = 6.45  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 2512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.98  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.097  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.70	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 14.85  
 EFFECTIVE AREA(ACRES) = 52.80 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
 TOTAL AREA(ACRES) = 52.8 PEAK FLOW RATE(CFS) = 141.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.98  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.097  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.90	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.50	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 19.89  
 EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 161.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 419.00 DOWNSTREAM ELEVATION(FEET) = 405.00  
STREET LENGTH(FEET) = 174.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 161.02  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.66  
HALFSTREET FLOOD WIDTH(FEET) = 28.01  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 11.18  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 7.41  
STREET FLOW TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 14.24  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.053  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 161.02  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 28.01  
FLOW VELOCITY(FEET/SEC.) = 11.18 DEPTH\*VELOCITY(FT\*FT/SEC.) = 7.41  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 2686.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 372.00  
FLOW LENGTH(FEET) = 395.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.20  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 161.02  
PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 14.47  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 3081.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.47  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.014  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500					
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 5.67					
EFFECTIVE AREA(ACRES) = 62.50 AREA-AVERAGED Fm(INCH/HR) = 0.13					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44					
TOTAL AREA(ACRES) = 62.5 PEAK FLOW RATE(CFS) = 162.22					

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.47  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.014  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 3.50 0.30 0.500 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 6.90 0.30 0.500 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 27.33  
EFFECTIVE AREA(ACRES) = 73.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 73.1 PEAK FLOW RATE(CFS) = 189.54

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 343.00  
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.57  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 189.54  
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 14.88  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 3688.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.88



\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.944  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.443  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.77  
 EFFECTIVE AREA (ACRES) = 73.80 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 73.8 PEAK FLOW RATE (CFS) = 189.54  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
 -----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 14.88  
 RAINFALL INTENSITY (INCH/HR) = 2.94  
 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.44  
 EFFECTIVE STREAM AREA (ACRES) = 73.80  
 TOTAL STREAM AREA (ACRES) = 73.80  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 189.54

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	41.28	17.82	2.636	0.30 ( 0.12)	0.39	18.2	200.00
2	189.54	14.88	2.944	0.30 ( 0.13)	0.44	73.8	210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	228.23	14.88	2.944	0.30 ( 0.13)	0.43	89.0	210.00
2	210.00	17.82	2.636	0.30 ( 0.13)	0.43	92.0	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 228.23 Tc (MIN.) = 14.88  
 EFFECTIVE AREA (ACRES) = 89.00 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA (ACRES) = 92.0  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 343.00 DOWNSTREAM (FEET) = 326.50  
 FLOW LENGTH (FEET) = 734.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 39.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 19.26  
 ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 228.23  
 PIPE TRAVEL TIME (MIN.) = 0.64 Tc (MIN.) = 15.52  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 219.00 = 4736.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 15.52  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.871  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56  
 COMMERCIAL  
 B 0.60 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.70 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.90 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 7.06  
 EFFECTIVE AREA (ACRES) = 91.90 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 94.9 PEAK FLOW RATE (CFS) = 228.23  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 15.52  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.871  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL  
 B 0.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 1.49  
 EFFECTIVE AREA (ACRES) = 92.50 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA (ACRES) = 95.5 PEAK FLOW RATE (CFS) = 228.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 326.50 DOWNSTREAM(FEET) = 325.00  
FLOW LENGTH(FEET) = 161.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 60.0 INCH PIPE IS 47.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.83  
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 228.23  
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 15.71  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 220.00 = 4897.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.71  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.852  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.90	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.60	0.30	0.400	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	18.40	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	4.30	0.30	0.400	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.50	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	6.90	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462  
SUBAREA AREA(ACRES) = 38.60 SUBAREA RUNOFF(CFS) = 94.25  
EFFECTIVE AREA(ACRES) = 131.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 134.1 PEAK FLOW RATE(CFS) = 320.69

\*\*\*\*\*  
FLOW PROCESS FROM NODE 220.00 TO NODE 245.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 315.00  
FLOW LENGTH(FEET) = 1019.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 69.0 INCH PIPE IS 51.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.49

ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 320.69  
PIPE TRAVEL TIME(MIN.) = 1.10 Tc(MIN.) = 16.81  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.81  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.739  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.30	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.00	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379  
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 6.85  
EFFECTIVE AREA(ACRES) = 134.00 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 137.0 PEAK FLOW RATE(CFS) = 320.69  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.81  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.739  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.264  
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 2.63  
EFFECTIVE AREA(ACRES) = 135.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 138.1 PEAK FLOW RATE(CFS) = 320.69  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN.) = 16.81
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.739
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"    B        1.10     0.30     0.500     56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"   B        0.30     0.30     0.400     56
COMMERCIAL              B        0.10     0.30     0.100     56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"    B        0.30     0.30     0.500     56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"   B        1.40     0.30     0.400     56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.434
SUBAREA AREA(ACRES) = 3.20      SUBAREA RUNOFF(CFS) = 7.51
EFFECTIVE AREA(ACRES) = 138.30  AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 141.3      PEAK FLOW RATE(CFS) = 324.47
*****
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<
=====
*****
FLOW PROCESS FROM NODE 220.50 TO NODE 221.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 251.00
ELEVATION DATA: UPSTREAM(FEET) = 551.00  DOWNSTREAM(FEET) = 547.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.785
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.864
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS  Tc
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE"      B        3.10     0.30     0.800     56   9.79
RESIDENTIAL
"1 DWELLING/ACRE"      B        3.10     0.30     0.800     56   9.79
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800
SUBAREA RUNOFF(CFS) = 20.22
TOTAL AREA(ACRES) = 6.20      PEAK FLOW RATE(CFS) = 20.22
*****
FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 547.00  DOWNSTREAM(FEET) = 542.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00  CHANNEL SLOPE = 0.0130
CHANNEL BASE(FEET) = 10.00  "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.015  MAXIMUM DEPTH(FEET) = 5.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.630
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"   B        0.60     0.30     0.200     56
APARTMENTS             B        0.10     0.30     0.200     56
COMMERCIAL              B        3.70     0.30     0.100     56
PUBLIC PARK             B        0.30     0.30     0.850     56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.163
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.79
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.04
AVERAGE FLOW DEPTH(FEET) = 0.42  TRAVEL TIME(MIN.) = 1.07
Tc(MIN.) = 10.85
SUBAREA AREA(ACRES) = 4.70      SUBAREA RUNOFF(CFS) = 15.15
EFFECTIVE AREA(ACRES) = 10.90  AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 10.9      PEAK FLOW RATE(CFS) = 34.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.48  FLOW VELOCITY(FEET/SEC.) = 6.42
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 222.00 = 637.00 FEET.
*****
FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 542.00  DOWNSTREAM ELEVATION(FEET) = 531.00
STREET LENGTH(FEET) = 1146.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 56.11
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.66
HALFSTREET FLOOD WIDTH(FEET) = 28.09
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.88
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.57
STREET FLOW TRAVEL TIME(MIN.) = 4.93  Tc(MIN.) = 15.78
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.844
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN

```

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 11.50 0.30 0.200 56  
 APARTMENTS B 2.90 0.30 0.200 56  
 COMMERCIAL B 0.70 0.30 0.100 56  
 PUBLIC PARK B 2.60 0.30 0.850 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.292  
 SUBAREA AREA(ACRES) = 17.70 SUBAREA RUNOFF(CFS) = 43.92  
 EFFECTIVE AREA(ACRES) = 28.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 28.6 PEAK FLOW RATE(CFS) = 70.28

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.71 HALFSTREET FLOOD WIDTH(FEET) = 32.04  
 FLOW VELOCITY(FEET/SEC.) = 4.11 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.91  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 223.00 = 1783.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 531.00 DOWNSTREAM ELEVATION(FEET) = 520.00  
 STREET LENGTH(FEET) = 702.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 84.09  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.70  
 HALFSTREET FLOOD WIDTH(FEET) = 31.36  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.13  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.57  
 STREET FLOW TRAVEL TIME(MIN.) = 2.28 Tc(MIN.) = 18.06  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.611

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.40	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
CONDOMINIUMS	B	0.70	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175  
 SUBAREA AREA(ACRES) = 12.00 SUBAREA RUNOFF(CFS) = 27.64  
 EFFECTIVE AREA(ACRES) = 40.60 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32  
 TOTAL AREA(ACRES) = 40.6 PEAK FLOW RATE(CFS) = 91.92

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.71 HALFSTREET FLOOD WIDTH(FEET) = 32.22  
 FLOW VELOCITY(FEET/SEC.) = 5.30 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.77  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 224.00 = 2485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 463.00  
 FLOW LENGTH(FEET) = 1760.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.93  
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 91.92  
 PIPE TRAVEL TIME(MIN.) = 1.64 Tc(MIN.) = 19.69  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 225.00 = 4245.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 19.69  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.444  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.20	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	0.30	0.30	0.350	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	2.00	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.235  
 SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 24.57  
 EFFECTIVE AREA(ACRES) = 52.10 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 52.1 PEAK FLOW RATE(CFS) = 110.37

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 19.69  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.444  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.40	0.30	0.500	56
CONDOMINIUMS	B	0.90	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	5.20	0.30	0.500	56
CONDOMINIUMS	B	0.80	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.481  
SUBAREA AREA (ACRES) = 13.30 SUBAREA RUNOFF (CFS) = 27.53  
EFFECTIVE AREA (ACRES) = 65.40 AREA-AVERAGED Fm (INCH/HR) = 0.10  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34  
TOTAL AREA (ACRES) = 65.4 PEAK FLOW RATE (CFS) = 137.90

\*\*\*\*\*  
FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 425.00  
FLOW LENGTH(FEET) = 639.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.68  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 137.90  
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 20.13  
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 226.00 = 4884.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 226.00 TO NODE 226.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 20.13  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.405  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.90	0.30	0.500	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.30	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.00	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
SUBAREA AREA (ACRES) = 18.10 SUBAREA RUNOFF (CFS) = 37.48  
EFFECTIVE AREA (ACRES) = 83.50 AREA-AVERAGED Fm (INCH/HR) = 0.10  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34  
TOTAL AREA (ACRES) = 83.5 PEAK FLOW RATE (CFS) = 173.07

\*\*\*\*\*  
FLOW PROCESS FROM NODE 226.00 TO NODE 243.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 394.00  
FLOW LENGTH(FEET) = 653.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.18  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 173.07  
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 20.58  
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 243.00 = 5537.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 20.58  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.376  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.60	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
SUBAREA AREA (ACRES) = 4.50 SUBAREA RUNOFF (CFS) = 9.25  
EFFECTIVE AREA (ACRES) = 88.00 AREA-AVERAGED Fm (INCH/HR) = 0.10  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34  
TOTAL AREA (ACRES) = 88.0 PEAK FLOW RATE (CFS) = 180.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 20.58  
RAINFALL INTENSITY(INCH/HR) = 2.38  
AREA-AVERAGED Fm (INCH/HR) = 0.10  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.34  
EFFECTIVE STREAM AREA (ACRES) = 88.00  
TOTAL STREAM AREA (ACRES) = 88.00  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 180.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 547.50

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.751  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.293  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
APARTMENTS	B	0.60	0.30	0.200	56	8.75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 2.29  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 2.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM( FEET) = 547.50 DOWNSTREAM( FEET) = 541.00  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 802.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE( FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH( FEET) = 3.00  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.566  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.20	0.30	0.200	56
COMMERCIAL	B	5.90	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.04  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 5.40  
 AVERAGE FLOW DEPTH( FEET) = 1.06 TRAVEL TIME( MIN.) = 2.48  
 Tc( MIN.) = 11.23  
 SUBAREA AREA( ACRES) = 6.10 SUBAREA RUNOFF( CFS) = 19.41  
 EFFECTIVE AREA( ACRES) = 6.70 AREA-AVERAGED Fm( INCH/HR) = 0.03  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA( ACRES) = 6.7 PEAK FLOW RATE( CFS) = 21.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 1.31 FLOW VELOCITY( FEET/SEC.) = 6.23  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1132.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM( FEET) = 541.00 DOWNSTREAM( FEET) = 533.00  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 849.00 CHANNEL SLOPE = 0.0094  
 CHANNEL BASE( FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH( FEET) = 5.00  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	14.90	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.98  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 7.87  
 AVERAGE FLOW DEPTH( FEET) = 1.65 TRAVEL TIME( MIN.) = 1.80  
 Tc( MIN.) = 13.02  
 SUBAREA AREA( ACRES) = 14.90 SUBAREA RUNOFF( CFS) = 43.32  
 EFFECTIVE AREA( ACRES) = 21.60 AREA-AVERAGED Fm( INCH/HR) = 0.03  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA( ACRES) = 21.6 PEAK FLOW RATE( CFS) = 62.77

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 1.90 FLOW VELOCITY( FEET/SEC.) = 8.65  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1981.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc( MIN.) = 13.02  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.10	0.30	0.400	56
APARTMENTS	B	0.20	0.30	0.200	56
COMMERCIAL	B	1.80	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124  
 SUBAREA AREA( ACRES) = 2.10 SUBAREA RUNOFF( CFS) = 6.09  
 EFFECTIVE AREA( ACRES) = 23.70 AREA-AVERAGED Fm( INCH/HR) = 0.03  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA( ACRES) = 23.7 PEAK FLOW RATE( CFS) = 68.86

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc( MIN.) = 13.02  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.10	0.30	0.400	56
COMMERCIAL	B	1.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.117  
 SUBAREA AREA( ACRES) = 1.80 SUBAREA RUNOFF( CFS) = 5.22  
 EFFECTIVE AREA( ACRES) = 25.50 AREA-AVERAGED Fm( INCH/HR) = 0.03  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA( ACRES) = 25.5 PEAK FLOW RATE( CFS) = 74.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 537.00 DOWNSTREAM(FEET) = 510.00
FLOW LENGTH(FEET) = 513.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.33
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 74.09
PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 13.45
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2494.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.45
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.189
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 9.40 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 25.96
EFFECTIVE AREA(ACRES) = 34.90 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 34.9 PEAK FLOW RATE(CFS) = 98.41

\*\*\*\*\*
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.45
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.189
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.70 0.30 0.200 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 2.50 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 8.88
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 107.28

\*\*\*\*\*
FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 478.00
FLOW LENGTH(FEET) = 474.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.51
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 107.28
PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 13.77
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 2968.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.77
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.134
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.70 0.30 0.200 -
USER-DEFINED - 1.60 0.30 0.400 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 9.04
EFFECTIVE AREA(ACRES) = 41.40 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21
TOTAL AREA(ACRES) = 41.4 PEAK FLOW RATE(CFS) = 114.44

\*\*\*\*\*
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 478.00 DOWNSTREAM(FEET) = 471.00
FLOW LENGTH(FEET) = 473.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.76
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 114.44
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 14.34
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 3441.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.34
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.036
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.40 0.30 0.200 56
RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 7.10 0.30 0.400 56  
 APARTMENTS B 2.70 0.30 0.200 56  
 COMMERCIAL B 1.10 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
 SUBAREA AREA (ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 32.59  
 EFFECTIVE AREA(ACRES) = 53.70 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA(ACRES) = 53.7 PEAK FLOW RATE(CFS) = 143.40

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.34  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.036  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.90 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 5.40 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
 COMMERCIAL B 0.60 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.378  
 SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 26.04  
 EFFECTIVE AREA(ACRES) = 63.60 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 63.6 PEAK FLOW RATE(CFS) = 169.45

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 471.00 DOWNSTREAM(FEET) = 468.00  
 FLOW LENGTH(FEET) = 283.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.63  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 169.45  
 PIPE TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 14.69  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 237.00 = 3724.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.69  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.977  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 6.10 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.60 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.218  
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 17.56  
 EFFECTIVE AREA(ACRES) = 70.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 70.3 PEAK FLOW RATE(CFS) = 183.63

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 468.00 DOWNSTREAM(FEET) = 461.00  
 FLOW LENGTH(FEET) = 698.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.39  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 183.63  
 PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 15.56  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 238.00 = 4422.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.56  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.867  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 8.40 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.220  
 SUBAREA AREA(ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 22.69  
 EFFECTIVE AREA(ACRES) = 79.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 79.3 PEAK FLOW RATE(CFS) = 199.36

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.56  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.867  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN



RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.10 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 5.31  
 EFFECTIVE AREA (ACRES) = 81.40 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA (ACRES) = 81.4 PEAK FLOW RATE (CFS) = 204.66

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 461.00 DOWNSTREAM(FEET) = 440.00  
 FLOW LENGTH(FEET) = 582.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.6 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 22.43  
 ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 204.66  
 PIPE TRAVEL TIME (MIN.) = 0.43 Tc (MIN.) = 15.99  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 5004.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 15.99  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.823  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 5.00 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 12.43  
 EFFECTIVE AREA (ACRES) = 86.40 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 86.4 PEAK FLOW RATE (CFS) = 213.86

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 418.00  
 FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.1 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 22.41  
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 213.86  
 PIPE TRAVEL TIME (MIN.) = 0.48 Tc (MIN.) = 16.47  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 5654.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.47  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.774  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 5.30 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA (ACRES) = 5.30 SUBAREA RUNOFF (CFS) = 12.94  
 EFFECTIVE AREA (ACRES) = 91.70 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 222.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.47  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.774  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 1.20 0.30 0.200 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186  
 SUBAREA AREA (ACRES) = 1.40 SUBAREA RUNOFF (CFS) = 3.42  
 EFFECTIVE AREA (ACRES) = 93.10 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 93.1 PEAK FLOW RATE (CFS) = 226.39

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.47  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.774  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 1.20 0.30 0.200 56  
 SCHOOL B 0.70 0.30 0.600 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347  
 SUBAREA AREA (ACRES) = 1.90 SUBAREA RUNOFF (CFS) = 4.56  
 EFFECTIVE AREA (ACRES) = 95.00 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 95.0 PEAK FLOW RATE (CFS) = 230.95

\*\*\*\*\*

FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 418.00 DOWNSTREAM(FEET) = 404.00
FLOW LENGTH(FEET) = 1279.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 44.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.88
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 230.95
PIPE TRAVEL TIME(MIN.) = 1.43 Tc(MIN.) = 17.90
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 241.00 = 6933.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.90

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.627

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Residential, Commercial, Public Park, School, and another Residential entry.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 18.80 SUBAREA RUNOFF(CFS) = 41.98
EFFECTIVE AREA(ACRES) = 113.80 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 113.8 PEAK FLOW RATE(CFS) = 260.41

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.90

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.627

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Public Park and School.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.666
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 32.11
EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33

TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 292.53

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 403.00
FLOW LENGTH(FEET) = 66.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 47.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.64
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 292.53
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 17.97
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 6999.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.97

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.621

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Residential, Commercial, and another Residential entry.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.193
SUBAREA AREA(ACRES) = 19.10 SUBAREA RUNOFF(CFS) = 44.06
EFFECTIVE AREA(ACRES) = 147.60 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 147.6 PEAK FLOW RATE(CFS) = 335.85

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 1270.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 72.0 INCH PIPE IS 58.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.64
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 335.85
PIPE TRAVEL TIME(MIN.) = 1.55 Tc(MIN.) = 19.52
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 19.52
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.462
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"   B       1.00   0.30   0.200   56
PUBLIC PARK            B       2.00   0.30   0.850   56
RESIDENTIAL
"11+ DWELLINGS/ACRE"   B       2.80   0.30   0.200   56
COMMERCIAL            B       1.50   0.30   0.100   56
CONDOMINIUMS         B       0.10   0.30   0.350   56
PUBLIC PARK            B       1.10   0.30   0.850   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.421
SUBAREA AREA(ACRES) = 8.50   SUBAREA RUNOFF(CFS) = 17.87
EFFECTIVE AREA(ACRES) = 156.10   AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 156.1   PEAK FLOW RATE(CFS) = 335.85
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 19.52
RAINFALL INTENSITY(INCH/HR) = 2.46
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA(ACRES) = 156.10
TOTAL STREAM AREA(ACRES) = 156.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 335.85

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\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	180.15	20.58	2.376	0.30( 0.10)	0.34	88.0	220.50
2	335.85	19.52	2.462	0.30( 0.09)	0.32	156.1	230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	513.21	19.52	2.462	0.30( 0.10)	0.32	239.6	230.00
2	503.76	20.58	2.376	0.30( 0.10)	0.32	244.1	220.50

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

```

PEAK FLOW RATE(CFS) = 513.21   Tc(MIN.) = 19.52
EFFECTIVE AREA(ACRES) = 239.58   AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.32

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TOTAL AREA(ACRES) = 244.1
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 244.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 394.00   DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 849.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 44.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 34.88
ESTIMATED PIPE DIAMETER(INCH) = 57.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 513.21
PIPE TRAVEL TIME(MIN.) = 0.41   Tc(MIN.) = 19.92
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 244.00 = 9118.00 FEET.

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FLOW PROCESS FROM NODE 244.00 TO NODE 244.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 19.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.421
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"   B       0.10   0.30   0.200   56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"   B       1.70   0.30   0.500   56
PUBLIC PARK            B       0.30   0.30   0.850   56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"   B       0.80   0.30   0.500   56
PUBLIC PARK            B       0.10   0.30   0.850   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.537
SUBAREA AREA(ACRES) = 3.00   SUBAREA RUNOFF(CFS) = 6.10
EFFECTIVE AREA(ACRES) = 242.58   AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 247.1   PEAK FLOW RATE(CFS) = 513.21
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 244.00 TO NODE 245.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 340.00   DOWNSTREAM(FEET) = 315.00
FLOW LENGTH(FEET) = 777.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 48.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.21
ESTIMATED PIPE DIAMETER(INCH) = 66.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 513.21
PIPE TRAVEL TIME(MIN.) = 0.48   Tc(MIN.) = 20.40
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

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FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.40

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.387

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
PUBLIC PARK	B	0.20	0.30	0.850	56

RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
PUBLIC PARK	B	0.10	0.30	0.850	56

RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
PUBLIC PARK	B	0.10	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631

SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 1.58

EFFECTIVE AREA(ACRES) = 243.38 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33

TOTAL AREA(ACRES) = 247.9 PEAK FLOW RATE(CFS) = 513.21

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	513.21	20.40	2.387	0.30( 0.10)	0.33	243.4	230.00
2	503.76	21.47	2.319	0.30( 0.10)	0.33	247.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	324.47	16.81	2.739	0.30( 0.13)	0.44	138.3	210.00
2	292.84	19.79	2.435	0.30( 0.13)	0.44	141.3	200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	812.29	16.81	2.739	0.30( 0.11)	0.37	338.8	210.00
2	800.94	19.79	2.435	0.30( 0.11)	0.37	377.3	200.00
3	800.00	20.40	2.387	0.30( 0.11)	0.37	384.7	230.00
4	781.81	21.47	2.319	0.30( 0.11)	0.37	389.2	220.50

TOTAL AREA(ACRES) = 389.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 812.29 Tc(MIN.) = 16.806

EFFECTIVE AREA(ACRES) = 338.80 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 389.2

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 3 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 246.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 306.00

FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 90.0 INCH PIPE IS 68.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 22.57

ESTIMATED PIPE DIAMETER(INCH) = 90.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 812.29

PIPE TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 17.26

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 246.00 = 10514.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.26

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.693

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.90	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56

RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.50	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.70	0.30	0.400	56

CONDOMINIUMS	B	9.10	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.410

SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 37.70

EFFECTIVE AREA(ACRES) = 355.10 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38

TOTAL AREA(ACRES) = 405.5 PEAK FLOW RATE(CFS) = 824.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.26

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.693  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.60 0.30 0.400 56  
 CONDOMINIUMS B 7.40 0.30 0.350 56  
 PUBLIC PARK B 0.30 0.30 0.850 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.375  
 SUBAREA AREA (ACRES) = 9.30 SUBAREA RUNOFF (CFS) = 21.60  
 EFFECTIVE AREA (ACRES) = 364.40 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 414.8 PEAK FLOW RATE (CFS) = 846.16

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 246.00 TO NODE 247.00 IS CODE = 31  
 -----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 306.00 DOWNSTREAM (FEET) = 300.00  
 FLOW LENGTH (FEET) = 185.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 78.0 INCH PIPE IS 60.4 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 30.70  
 ESTIMATED PIPE DIAMETER (INCH) = 78.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 846.16  
 PIPE TRAVEL TIME (MIN.) = 0.10 Tc (MIN.) = 17.36  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 247.00 = 10699.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81  
 -----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 17.36  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.682  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 COMMERCIAL B 0.30 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 PUBLIC PARK B 0.10 0.30 0.850 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.30 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.413  
 SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 4.61  
 EFFECTIVE AREA (ACRES) = 366.40 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 416.8 PEAK FLOW RATE (CFS) = 847.40  
 \*\*\*\*\*

FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81  
 -----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 17.36  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.682  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.90 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.40 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.80 0.30 0.400 56  
 COMMERCIAL B 0.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.365  
 SUBAREA AREA (ACRES) = 2.60 SUBAREA RUNOFF (CFS) = 6.02  
 EFFECTIVE AREA (ACRES) = 369.00 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 419.4 PEAK FLOW RATE (CFS) = 853.43

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 248.00 IS CODE = 31  
 -----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 300.00 DOWNSTREAM (FEET) = 271.00  
 FLOW LENGTH (FEET) = 859.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 78.0 INCH PIPE IS 59.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 31.29  
 ESTIMATED PIPE DIAMETER (INCH) = 78.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 853.43  
 PIPE TRAVEL TIME (MIN.) = 0.46 Tc (MIN.) = 17.82  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 17.82  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.636  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.60 0.30 0.400 56  
 COMMERCIAL B 0.30 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 2.60 0.30 0.400 56  
 COMMERCIAL B 1.00 0.30 0.100 56  
 NATURAL FAIR COVER

"OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356  
 SUBAREA AREA (ACRES) = 4.80 SUBAREA RUNOFF (CFS) = 10.92  
 EFFECTIVE AREA (ACRES) = 373.80 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 424.2 PEAK FLOW RATE (CFS) = 853.43  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.82  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.636  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.50 0.30 0.400 56  
 COMMERCIAL B 0.30 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367  
 SUBAREA AREA (ACRES) = 0.90 SUBAREA RUNOFF (CFS) = 2.05  
 EFFECTIVE AREA (ACRES) = 374.70 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 425.1 PEAK FLOW RATE (CFS) = 853.43  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.82  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.636  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 2.20 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.80 0.30 0.400 56  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 3.20 0.30 0.500 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.466  
 SUBAREA AREA (ACRES) = 8.20 SUBAREA RUNOFF (CFS) = 18.42  
 EFFECTIVE AREA (ACRES) = 382.90 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38

TOTAL AREA (ACRES) = 433.3 PEAK FLOW RATE (CFS) = 869.29

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.82  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.636  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 5.70 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 5.70 SUBAREA RUNOFF (CFS) = 12.91  
 EFFECTIVE AREA (ACRES) = 388.60 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 439.0 PEAK FLOW RATE (CFS) = 882.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.82  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.636  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 6.40 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.40 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.60 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 17.66  
 EFFECTIVE AREA (ACRES) = 397.00 AREA-AVERAGED Fm (INCH/HR) = 0.12  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA (ACRES) = 447.4 PEAK FLOW RATE (CFS) = 899.85

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

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FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00

ELEVATION DATA: UPSTREAM (FEET) = 413.04 DOWNSTREAM (FEET) = 405.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.928  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 5.048  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
CONDOMINIUMS RESIDENTIAL	B	0.20	0.30	0.350	56	7.70
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56	6.93
CONDOMINIUMS	B	0.10	0.30	0.350	56	7.70

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.312  
 SUBAREA RUNOFF(CFS) = 1.78  
 TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.78

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 405.00 DOWNSTREAM ELEVATION(FEET) = 385.00  
 STREET LENGTH(FEET) = 587.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.59  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.32  
 HALFSTREET FLOOD WIDTH(FEET) = 8.66  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.82  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.21  
 STREET FLOW TRAVEL TIME(MIN.) = 2.56 Tc(MIN.) = 9.49  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.987

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.20	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.224  
 SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 9.52  
 EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24

TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 10.93

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.05  
 FLOW VELOCITY(FEET/SEC.) = 4.25 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.53  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 917.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 385.00 DOWNSTREAM(FEET) = 378.50  
 FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.55  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 10.93  
 PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 9.72  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1079.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 9.72  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.890  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56
COMMERCIAL	B	1.30	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 8.34  
 EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
 TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 18.99

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 378.50 DOWNSTREAM(FEET) = 348.50  
 FLOW LENGTH(FEET) = 637.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.81  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 18.99  
 PIPE TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 10.49  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 1716.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.49  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.691  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.60	0.30	0.500	56
COMMERCIAL	B	1.70	0.30	0.100	56
CONDOMINIUMS	B	1.00	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
COMMERCIAL	B	0.70	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.240  
 SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 14.66  
 EFFECTIVE AREA(ACRES) = 10.00 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 10.0 PEAK FLOW RATE(CFS) = 32.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 304.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 348.50 DOWNSTREAM(FEET) = 306.00  
 FLOW LENGTH(FEET) = 944.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.76  
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 32.67  
 PIPE TRAVEL TIME(MIN.) = 1.00 Tc(MIN.) = 11.49  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.49  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.521  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.20	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.50	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.90	0.30	0.400	56

COMMERCIAL B 2.00 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
 SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 22.45  
 EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.27  
 TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 53.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.49  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.521  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	4.40	0.30	0.200	56
COMMERCIAL	B	0.10	0.30	0.100	56
APARTMENTS	B	6.70	0.30	0.200	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.199  
 SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 34.89  
 EFFECTIVE AREA(ACRES) = 28.50 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 28.5 PEAK FLOW RATE(CFS) = 88.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.49  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.521  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 8.99  
 EFFECTIVE AREA(ACRES) = 31.60 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 97.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 11.49  
 RAINFALL INTENSITY(INCH/HR) = 3.52  
 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30



AREA-AVERAGED Ap = 0.31  
EFFECTIVE STREAM AREA (ACRES) = 31.60  
TOTAL STREAM AREA (ACRES) = 31.60  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 97.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 400.00 TO NODE 420.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 300.40  
ELEVATION DATA: UPSTREAM (FEET) = 312.80 DOWNSTREAM (FEET) = 310.80

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.115  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.556  
SUBAREA Tc AND LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL B 0.50 0.30 0.100 56 8.11  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF (CFS) = 2.04  
TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 2.04

\*\*\*\*\*  
FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 310.80 DOWNSTREAM ELEVATION (FEET) = 307.00  
STREET LENGTH (FEET) = 266.50 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 67.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 62.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.07  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.35  
HALFSTREET FLOOD WIDTH (FEET) = 10.66  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.65  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.91  
STREET FLOW TRAVEL TIME (MIN.) = 1.68 Tc (MIN.) = 9.79  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.860

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.60 0.30 0.100 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 2.07  
EFFECTIVE AREA (ACRES) = 1.10 AREA-AVERAGED Fm (INCH/HR) = 0.03  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 3.79

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.36 HALFSTREET FLOOD WIDTH (FEET) = 11.75  
FLOW VELOCITY (FEET/SEC.) = 2.77 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.01  
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.00 = 566.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.00 TO NODE 421.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 307.00 DOWNSTREAM (FEET) = 305.50  
FLOW LENGTH (FEET) = 105.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.0 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.99  
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 3.79  
PIPE TRAVEL TIME (MIN.) = 0.29 Tc (MIN.) = 10.09  
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.10 = 671.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION (MIN.) = 10.09  
RAINFALL INTENSITY (INCH/HR) = 3.76  
AREA-AVERAGED Fm (INCH/HR) = 0.03  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA (ACRES) = 1.10  
TOTAL STREAM AREA (ACRES) = 1.10  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 3.79

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	97.47	11.49	3.521	0.30 (0.09)	0.31	31.6	300.00
2	3.79	10.09	3.760	0.30 (0.03)	0.10	1.1	400.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	95.32	10.09	3.760	0.30 (0.09)	0.31	28.8	400.00
2	101.02	11.49	3.521	0.30 (0.09)	0.31	32.7	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 101.02 Tc(MIN.) = 11.49
EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.7
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 421.10 TO NODE 426.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 305.50 DOWNSTREAM(FEET) = 301.00
FLOW LENGTH(FEET) = 261.40 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.12
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 101.02
PIPE TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 11.80
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.10 = 2921.40 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 426.10 TO NODE 426.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.80
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.469
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.60
EFFECTIVE AREA(ACRES) = 32.90 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.9 PEAK FLOW RATE(CFS) = 101.02
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 426.10 TO NODE 426.20 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 289.00
FLOW LENGTH(FEET) = 448.56 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.69
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 101.02
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 12.25
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.20 = 3369.96 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 426.20 TO NODE 426.20 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.25
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.393
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.47
EFFECTIVE AREA(ACRES) = 33.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 33.4 PEAK FLOW RATE(CFS) = 101.02
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 426.20 TO NODE 426.30 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 289.00 DOWNSTREAM(FEET) = 282.00
FLOW LENGTH(FEET) = 260.45 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.72
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 101.02
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 12.51
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.30 = 3630.41 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 426.30 TO NODE 426.30 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.51
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.349
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.80 0.30 0.400 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 3.20
EFFECTIVE AREA(ACRES) = 34.50 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 34.5 PEAK FLOW RATE(CFS) = 101.07

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*****
FLOW PROCESS FROM NODE 426.30 TO NODE 248.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 271.00
FLOW LENGTH(FEET) = 411.44 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.68
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 101.07
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 12.92
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.
*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.92
RAINFALL INTENSITY(INCH/HR) = 3.28
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 34.50
TOTAL STREAM AREA(ACRES) = 34.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 101.07
*****
FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 233.60
ELEVATION DATA: UPSTREAM(FEET) = 306.50 DOWNSTREAM(FEET) = 301.80

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.882
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 5.481
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.20 0.30 0.100 56 5.88
COMMERCIAL B 0.20 0.30 0.100 56 5.88
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 1.96
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.96
*****
FLOW PROCESS FROM NODE 426.00 TO NODE 427.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<

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=====
UPSTREAM ELEVATION(FEET) = 301.80 DOWNSTREAM ELEVATION(FEET) = 294.00
STREET LENGTH(FEET) = 478.70 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.32
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.35
HALFSTREET FLOOD WIDTH(FEET) = 10.73
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.83
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.98
STREET FLOW TRAVEL TIME(MIN.) = 2.82 Tc(MIN.) = 8.70
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.313
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.20 0.30 0.100 56
COMMERCIAL B 0.50 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 2.70
EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 4.24

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 12.02
FLOW VELOCITY(FEET/SEC.) = 2.98 DEPTH*VELOCITY(FT*FT/SEC.) = 1.10
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 427.00 = 712.30 FEET.
*****
FLOW PROCESS FROM NODE 427.00 TO NODE 428.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 294.00 DOWNSTREAM ELEVATION(FEET) = 286.00
STREET LENGTH(FEET) = 300.80 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      5.08
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.36
HALFSTREET FLOOD WIDTH(FEET) = 11.71
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.73
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.36
STREET FLOW TRAVEL TIME(MIN.) = 1.34  Tc(MIN.) = 10.05
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.767
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
COMMERCIAL          B      0.10    0.30    0.100  56
COMMERCIAL          B      0.40    0.30    0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.50  SUBAREA RUNOFF(CFS) = 1.68
EFFECTIVE AREA(ACRES) = 1.60  AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.6  PEAK FLOW RATE(CFS) = 5.38

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37  HALFSTREET FLOOD WIDTH(FEET) = 11.93
FLOW VELOCITY(FEET/SEC.) = 3.83  DEPTH*VELOCITY(FT*FT/SEC.) = 1.41
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 428.00 = 1013.10 FEET.

*****
FLOW PROCESS FROM NODE 428.00 TO NODE 429.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 286.00  DOWNSTREAM ELEVATION(FEET) = 276.00
STREET LENGTH(FEET) = 242.40  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      6.03
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.36
HALFSTREET FLOOD WIDTH(FEET) = 11.39
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.64
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.66
STREET FLOW TRAVEL TIME(MIN.) = 0.87  Tc(MIN.) = 10.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.619
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
COMMERCIAL          B      0.40    0.30    0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

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SUBAREA AREA(ACRES) = 0.40  SUBAREA RUNOFF(CFS) = 1.29
EFFECTIVE AREA(ACRES) = 2.00  AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 2.0  PEAK FLOW RATE(CFS) = 6.46

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37  HALFSTREET FLOOD WIDTH(FEET) = 11.82
FLOW VELOCITY(FEET/SEC.) = 4.67  DEPTH*VELOCITY(FT*FT/SEC.) = 1.71
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 429.00 = 1255.50 FEET.

*****
FLOW PROCESS FROM NODE 429.00 TO NODE 429.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 10.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.619
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B      0.50    0.30    0.400  56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B      1.50    0.30    0.400  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 2.00  SUBAREA RUNOFF(CFS) = 6.30
EFFECTIVE AREA(ACRES) = 4.00  AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 4.0  PEAK FLOW RATE(CFS) = 12.76

*****
FLOW PROCESS FROM NODE 429.00 TO NODE 248.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 276.00  DOWNSTREAM(FEET) = 273.00
FLOW LENGTH(FEET) = 100.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.69
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 12.76
PIPE TRAVEL TIME(MIN.) = 0.16  Tc(MIN.) = 11.07
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 248.00 = 1355.50 FEET.

*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 11.07
RAINFALL INTENSITY(INCH/HR) = 3.59
AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30

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AREA-AVERAGED Ap = 0.25  
 EFFECTIVE STREAM AREA(ACRES) = 4.00  
 TOTAL STREAM AREA(ACRES) = 4.00  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.76

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	96.33	11.52	3.516	0.30( 0.09)	0.31	30.6	400.00
1	101.07	12.92	3.279	0.30( 0.09)	0.31	34.5	300.00
2	12.76	11.07	3.593	0.30( 0.08)	0.25	4.0	425.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	107.41	11.07	3.593	0.30( 0.09)	0.30	33.4	425.00
2	108.81	11.52	3.516	0.30( 0.09)	0.30	34.6	400.00
3	112.69	12.92	3.279	0.30( 0.09)	0.31	38.5	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 112.69 Tc(MIN.) = 12.92  
 EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 38.5  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 11  
 -----  
 >>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
 =====

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	107.41	11.07	3.593	0.30( 0.09)	0.30	33.4	425.00
2	108.81	11.52	3.516	0.30( 0.09)	0.30	34.6	400.00
3	112.69	12.92	3.279	0.30( 0.09)	0.31	38.5	300.00

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	899.85	17.82	2.636	0.30( 0.12)	0.39	397.0	210.00
2	880.16	20.81	2.361	0.30( 0.12)	0.39	435.5	200.00
3	879.37	21.42	2.322	0.30( 0.12)	0.38	442.9	230.00
4	860.50	22.50	2.252	0.30( 0.12)	0.38	447.4	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	878.87	11.07	3.593	0.30( 0.11)	0.38	280.1	425.00
2	893.87	11.52	3.516	0.30( 0.11)	0.38	291.2	400.00
3	931.40	12.92	3.279	0.30( 0.11)	0.38	326.3	300.00

4	989.81	17.82	2.636	0.30( 0.11)	0.38	435.5	210.00
5	960.41	20.81	2.361	0.30( 0.11)	0.38	474.0	200.00
6	958.22	21.42	2.322	0.30( 0.11)	0.38	481.4	230.00
7	936.90	22.50	2.252	0.30( 0.11)	0.38	485.9	220.50

TOTAL AREA(ACRES) = 485.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 989.81 Tc(MIN.) = 17.821  
 EFFECTIVE AREA(ACRES) = 435.50 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 485.9  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 12  
 -----  
 >>>>CLEAR MEMORY BANK # 1<<<<<  
 =====

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 249.00 IS CODE = 31  
 -----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 261.00  
 FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 66.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 30.53  
 ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 989.81  
 PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 18.01  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 10  
 -----  
 >>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<  
 =====

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 429.00 TO NODE 430.00 IS CODE = 21  
 -----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 262.70  
  
 Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.459  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 5.242  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.20	0.30	0.100	56	6.46
COMMERCIAL	B	0.40	0.30	0.100	56	6.46

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 2.81  
TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 2.81

\*\*\*\*\*  
FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 262.70 DOWNSTREAM ELEVATION(FEET) = 258.98  
STREET LENGTH(FEET) = 345.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.97

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 12.82  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.49  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.95  
STREET FLOW TRAVEL TIME(MIN.) = 2.31 Tc(MIN.) = 8.77

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.285

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 2.30  
EFFECTIVE AREA(ACRES) = 1.20 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 4.60

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 13.62  
FLOW VELOCITY(FEET/SEC.) = 2.59 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.03  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.00 = 675.60 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.00 TO NODE 431.10 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 258.98 DOWNSTREAM(FEET) = 258.00  
FLOW LENGTH(FEET) = 91.03 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 5.68  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 4.60  
PIPE TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 9.04  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.10 = 766.63 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 9.04  
RAINFALL INTENSITY(INCH/HR) = 4.17  
AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 1.20  
TOTAL STREAM AREA(ACRES) = 1.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 410.00 TO NODE 440.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 299.70  
ELEVATION DATA: UPSTREAM(FEET) = 312.69 DOWNSTREAM(FEET) = 310.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.196  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.523

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.40	0.30	0.100	56	8.20

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 1.62  
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.62

\*\*\*\*\*  
FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 306.50  
STREET LENGTH(FEET) = 299.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.29  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 9.24  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.48  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.80  
STREET FLOW TRAVEL TIME(MIN.) = 2.01 Tc(MIN.) = 10.20  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.740

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.10 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.34  
EFFECTIVE AREA(ACRES) = 0.80 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 2.67

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 10.00  
FLOW VELOCITY(FEET/SEC.) = 2.56 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.85  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 441.00 = 598.70 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 61  
-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 306.50 DOWNSTREAM ELEVATION(FEET) = 299.00  
STREET LENGTH(FEET) = 341.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.59  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 10.43  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.21  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.10  
STREET FLOW TRAVEL TIME(MIN.) = 1.78 Tc(MIN.) = 11.98  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.438  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.20 0.30 0.100 56  
COMMERCIAL B 0.40 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.84  
EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 4.29

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.33  
FLOW VELOCITY(FEET/SEC.) = 3.34 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.19  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 442.00 = 940.30 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 61  
-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 299.00 DOWNSTREAM ELEVATION(FEET) = 288.50  
STREET LENGTH(FEET) = 390.10 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.14  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 11.72  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.77  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.37  
STREET FLOW TRAVEL TIME(MIN.) = 1.73 Tc(MIN.) = 13.71  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.144  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.30 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.68  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 5.61

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 12.12  
FLOW VELOCITY(FEET/SEC.) = 3.88 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.44  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 443.00 = 1330.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 443.00 TO NODE 444.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 288.50 DOWNSTREAM ELEVATION(FEET) = 281.00
STREET LENGTH(FEET) = 272.60 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.13

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.38
HALFSTREET FLOOD WIDTH(FEET) = 12.62
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.96
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.50
STREET FLOW TRAVEL TIME(MIN.) = 1.15 Tc(MIN.) = 14.85
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.949

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.40 0.30 0.100 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.05
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 6.30

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.72
FLOW VELOCITY(FEET/SEC.) = 4.01 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.53
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 444.00 = 1603.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 444.00 TO NODE 445.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 281.00 DOWNSTREAM ELEVATION(FEET) = 268.10
STREET LENGTH(FEET) = 462.90 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.16

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.39
HALFSTREET FLOOD WIDTH(FEET) = 13.42
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.15
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.63
STREET FLOW TRAVEL TIME(MIN.) = 1.86 Tc(MIN.) = 16.71
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.749

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.70 0.30 0.100 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.71
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 7.59

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 13.82
FLOW VELOCITY(FEET/SEC.) = 4.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.67
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 445.00 = 2065.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 445.00 TO NODE 446.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 268.10 DOWNSTREAM ELEVATION(FEET) = 257.00
STREET LENGTH(FEET) = 532.90 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.70

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.43
HALFSTREET FLOOD WIDTH(FEET) = 15.58
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.85
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.65
STREET FLOW TRAVEL TIME(MIN.) = 2.31 Tc(MIN.) = 19.02
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.513

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS



LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.60	0.30	0.100	56
COMMERCIAL	B	0.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 2.23  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 9.16

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 15.90  
FLOW VELOCITY(FEET/SEC.) = 3.91 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.70  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 446.00 = 2598.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 446.00 TO NODE 431.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 257.00 DOWNSTREAM(FEET) = 256.50  
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.97  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 9.16  
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 19.35  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 19.35  
RAINFALL INTENSITY(INCH/HR) = 2.48  
AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 4.10  
TOTAL STREAM AREA(ACRES) = 4.10  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.16

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	4.60	9.04	4.174	0.30( 0.03)	0.10	1.2	429.00
2	9.16	19.35	2.479	0.30( 0.03)	0.10	4.1	410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	11.84	9.04	4.174	0.30( 0.03)	0.10	3.1	429.00
2	11.88	19.35	2.479	0.30( 0.03)	0.10	5.3	410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 11.88 Tc(MIN.) = 19.35  
EFFECTIVE AREA(ACRES) = 5.30 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 5.3  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 249.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 258.00 DOWNSTREAM(FEET) = 257.00  
FLOW LENGTH(FEET) = 230.42 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.04  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 11.88  
PIPE TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 20.12  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	11.84	9.80	3.858	0.30( 0.03)	0.10	3.1	429.00
2	11.88	20.12	2.406	0.30( 0.03)	0.10	5.3	410.00

LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	878.87	11.26	3.560	0.30( 0.11)	0.38	280.1	425.00
2	893.87	11.71	3.484	0.30( 0.11)	0.38	291.2	400.00
3	931.40	13.11	3.246	0.30( 0.11)	0.38	326.3	300.00
4	989.81	18.01	2.616	0.30( 0.11)	0.38	435.5	210.00
5	960.41	21.00	2.349	0.30( 0.11)	0.38	474.0	200.00
6	958.22	21.61	2.309	0.30( 0.11)	0.38	481.4	230.00
7	936.90	22.69	2.240	0.30( 0.11)	0.38	485.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	842.59	9.80	3.858	0.30( 0.11)	0.38	246.8	429.00
2	890.71	11.26	3.560	0.30( 0.11)	0.38	283.5	425.00
3	905.71	11.71	3.484	0.30( 0.11)	0.38	294.8	400.00

4	943.25	13.11	3.246	0.30 ( 0.11)	0.38	330.1	300.00
5	1001.68	18.01	2.616	0.30 ( 0.11)	0.38	440.3	210.00
6	980.97	20.12	2.406	0.30 ( 0.11)	0.38	468.0	410.00
7	972.01	21.00	2.349	0.30 ( 0.11)	0.38	479.3	200.00
8	969.62	21.61	2.309	0.30 ( 0.11)	0.38	486.7	230.00
9	947.95	22.69	2.240	0.30 ( 0.11)	0.37	491.2	220.50
TOTAL AREA (ACRES) =							491.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1001.68 Tc (MIN.) = 18.009  
EFFECTIVE AREA (ACRES) = 440.35 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA (ACRES) = 491.2  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 491.2 TC (MIN.) = 18.01  
EFFECTIVE AREA (ACRES) = 440.35 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.380  
PEAK FLOW RATE (CFS) = 1001.68

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	842.59	9.80	3.858	0.30 ( 0.11)	0.38	246.8	429.00
2	890.71	11.26	3.560	0.30 ( 0.11)	0.38	283.5	425.00
3	905.71	11.71	3.484	0.30 ( 0.11)	0.38	294.8	400.00
4	943.25	13.11	3.246	0.30 ( 0.11)	0.38	330.1	300.00
5	1001.68	18.01	2.616	0.30 ( 0.11)	0.38	440.3	210.00
6	980.97	20.12	2.406	0.30 ( 0.11)	0.38	468.0	410.00
7	972.01	21.00	2.349	0.30 ( 0.11)	0.38	479.3	200.00
8	969.62	21.61	2.309	0.30 ( 0.11)	0.38	486.7	230.00
9	947.95	22.69	2.240	0.30 ( 0.11)	0.37	491.2	220.50

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

FILE NAME: 0506101B.DAT
TIME/DATE OF STUDY: 12:41 04/15/2013

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.820
2) 6.00; 4.350
3) 7.00; 3.990
4) 8.00; 3.700
5) 9.00; 3.460
6) 10.00; 3.260
7) 11.00; 3.090
8) 12.00; 2.940
9) 13.00; 2.810
10) 14.00; 2.690
11) 15.00; 2.590
12) 20.00; 2.200
13) 25.00; 1.940
14) 30.00; 1.750
15) 40.00; 1.490
16) 50.00; 1.310
17) 60.00; 1.180
18) 90.00; 0.940
19) 120.00; 0.800
20) 180.00; 0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

Table with columns: NO., HALF WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-SIDE, PARK-/SIDE/WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), GEOMETRIES LIP (FT), HIKE (FT), MANNING FACTOR (n). Rows 1-4.

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10100.00 TO NODE 10101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00
ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 820.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.606
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.339
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"GRASS" - 0.10 0.30 1.000 98 9.61
NATURAL FAIR COVER
"OPEN BRUSH" - 0.30 0.30 1.000 98 9.61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.09
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 10101.00 TO NODE 10102.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 790.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 152.00 CHANNEL SLOPE = 0.1974
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.09
FLOW VELOCITY(FEET/SEC.) = 4.43 FLOW DEPTH(FEET) = 0.29
TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 10.18
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10102.00 = 479.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10102.00 TO NODE 10102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.18
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.230
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.50      0.30       1.000      -
USER-DEFINED  -        0.30      0.30       1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.80    SUBAREA RUNOFF (CFS) = 2.11
EFFECTIVE AREA (ACRES) = 1.20  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.2      PEAK FLOW RATE (CFS) = 3.16

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*****
FLOW PROCESS FROM NODE 10102.00 TO NODE 10103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 790.00  DOWNSTREAM(FEET) = 762.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00  CHANNEL SLOPE = 0.1400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.16
FLOW VELOCITY(FEET/SEC.) = 4.97  FLOW DEPTH(FEET) = 0.46
TRAVEL TIME(MIN.) = 0.67  Tc(MIN.) = 10.85
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10103.00 = 679.00 FEET.

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FLOW PROCESS FROM NODE 10103.00 TO NODE 10103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 10.85
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.116
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.40    0.30    1.000  -
USER-DEFINED        -        0.80    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.20    SUBAREA RUNOFF (CFS) = 3.04
EFFECTIVE AREA (ACRES) = 2.40  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 2.4      PEAK FLOW RATE (CFS) = 6.08

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FLOW PROCESS FROM NODE 10103.00 TO NODE 10104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 762.00  DOWNSTREAM(FEET) = 754.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 124.00  CHANNEL SLOPE = 0.0645
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 6.08
FLOW VELOCITY(FEET/SEC.) = 4.43  FLOW DEPTH(FEET) = 0.68
TRAVEL TIME(MIN.) = 0.47  Tc(MIN.) = 11.31
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10104.00 = 803.00 FEET.

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.31
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.043
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.70    0.30    1.000  -
USER-DEFINED        -        1.10    0.30    1.000  -
USER-DEFINED        -        0.10    0.30    1.000  -
USER-DEFINED        -        0.40    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30    SUBAREA RUNOFF (CFS) = 5.68
EFFECTIVE AREA (ACRES) = 4.70  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.7      PEAK FLOW RATE (CFS) = 11.60

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 754.00  DOWNSTREAM(FEET) = 740.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00  CHANNEL SLOPE = 0.0255
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 11.60
FLOW VELOCITY(FEET/SEC.) = 3.67  FLOW DEPTH(FEET) = 1.03
TRAVEL TIME(MIN.) = 2.50  Tc(MIN.) = 13.81
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10105.00 = 1353.00 FEET.

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.81
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.712
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        3.40    0.30    1.000  -
USER-DEFINED        -        0.60    0.30    1.000  -
USER-DEFINED        -        6.00    0.30    1.000  -
USER-DEFINED        -        0.60    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 10.60    SUBAREA RUNOFF (CFS) = 23.01
EFFECTIVE AREA (ACRES) = 15.30  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 15.3      PEAK FLOW RATE (CFS) = 33.22

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10106.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 740.00 DOWNSTREAM(FEET) = 623.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 929.00 CHANNEL SLOPE = 0.1259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 33.22
FLOW VELOCITY(FEET/SEC.) = 8.73 FLOW DEPTH(FEET) = 1.13
TRAVEL TIME(MIN.) = 1.77 Tc(MIN.) = 15.59
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10106.00 = 2282.00 FEET.
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10106.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.59
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.544
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 10.40 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 4.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 31.31
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 62.21
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 592.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 417.00 CHANNEL SLOPE = 0.0743
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 62.21
FLOW VELOCITY(FEET/SEC.) = 8.34 FLOW DEPTH(FEET) = 1.58
TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 16.42
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10107.00 = 2699.00 FEET.
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10107.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.42

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* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.479
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 5.10 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 2.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 18.63
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 79.04
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 592.00 DOWNSTREAM(FEET) = 590.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0333
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.000
CHANNEL FLOW THRU SUBAREA(CFS) = 79.04
FLOW VELOCITY(FEET/SEC.) = 6.56 FLOW DEPTH(FEET) = 2.00
TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 16.57
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10108.00 = 2759.00 FEET.
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.57
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.467
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 7.00 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 7.50 0.30 1.000 -
USER-DEFINED - 1.80 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 35.31
EFFECTIVE AREA(ACRES) = 58.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.4 PEAK FLOW RATE(CFS) = 113.91
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 16.57
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.467
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.20     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20     SUBAREA RUNOFF(CFS) = 0.39
EFFECTIVE AREA(ACRES) = 58.60   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.6     PEAK FLOW RATE(CFS) = 114.30

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*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10109.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 526.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 973.00 CHANNEL SLOPE = 0.0658
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 114.30
FLOW VELOCITY(FEET/SEC.) = 9.28 FLOW DEPTH(FEET) = 2.03
TRAVEL TIME(MIN.) = 1.75 Tc(MIN.) = 18.32
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10109.00 = 3732.00 FEET.

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*****
FLOW PROCESS FROM NODE 10109.00 TO NODE 10109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 18.32
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.331
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -       16.40     0.30     1.000    -
USER-DEFINED        -        0.60     0.30     1.000    -
USER-DEFINED        -        3.00     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.00     SUBAREA RUNOFF(CFS) = 36.56
EFFECTIVE AREA(ACRES) = 78.60   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.6     PEAK FLOW RATE(CFS) = 143.67

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*****
FLOW PROCESS FROM NODE 10109.00 TO NODE 10110.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 526.00 DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1045.00 CHANNEL SLOPE = 0.0679

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CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 143.67
FLOW VELOCITY(FEET/SEC.) = 9.95 FLOW DEPTH(FEET) = 2.19
TRAVEL TIME(MIN.) = 1.75 Tc(MIN.) = 20.07
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10110.00 = 4777.00 FEET.

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*****
FLOW PROCESS FROM NODE 10110.00 TO NODE 10110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 20.07
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.196
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        1.00     0.30     1.000    -
USER-DEFINED        -        0.50     0.30     1.000    -
USER-DEFINED        -       31.60     0.30     1.000    -
USER-DEFINED        -        1.60     0.30     1.000    -
USER-DEFINED        -        0.40     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.10     SUBAREA RUNOFF(CFS) = 59.90
EFFECTIVE AREA(ACRES) = 113.70   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.7     PEAK FLOW RATE(CFS) = 194.04

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*****
FLOW PROCESS FROM NODE 10110.00 TO NODE 10111.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 675.00 CHANNEL SLOPE = 0.0667
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 194.04
FLOW VELOCITY(FEET/SEC.) = 10.63 FLOW DEPTH(FEET) = 2.47
TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 21.13
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10111.00 = 5452.00 FEET.

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*****
FLOW PROCESS FROM NODE 10111.00 TO NODE 10111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 21.13
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.141
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        7.40     0.30     1.000    -
USER-DEFINED        -        6.00     0.30     1.000    -
USER-DEFINED        -       24.80     0.30     1.000    -
USER-DEFINED        -        0.90     0.30     1.000    -

```

USER-DEFINED - 4.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 43.20 SUBAREA RUNOFF (CFS) = 71.59  
EFFECTIVE AREA (ACRES) = 156.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 156.9 PEAK FLOW RATE (CFS) = 260.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10111.00 TO NODE 10112.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	410.00	DOWNSTREAM (FEET) =	405.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	143.00	CHANNEL SLOPE =	0.0350
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	4.00
CHANNEL FLOW THRU SUBAREA (CFS) =	260.00		
FLOW VELOCITY (FEET/SEC.) =	9.00	FLOW DEPTH (FEET) =	3.10
TRAVEL TIME (MIN.) =	0.26	Tc (MIN.) =	21.40
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10112.00 =	5595.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 21.40  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.127

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	7.90	0.30	1.000	-
USER-DEFINED	-	25.90	0.30	1.000	-
USER-DEFINED	-	19.30	0.30	1.000	-
USER-DEFINED	-	2.10	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 56.20 SUBAREA RUNOFF (CFS) = 92.43  
EFFECTIVE AREA (ACRES) = 213.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 213.1 PEAK FLOW RATE (CFS) = 350.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10113.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	405.00	DOWNSTREAM (FEET) =	363.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	1642.00	CHANNEL SLOPE =	0.0256
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	350.48		
FLOW VELOCITY (FEET/SEC.) =	8.62	FLOW DEPTH (FEET) =	3.68

TRAVEL TIME (MIN.) = 3.18 Tc (MIN.) = 24.57  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10113.00 = 7237.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 24.57  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.962

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	33.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 35.40 SUBAREA RUNOFF (CFS) = 52.96  
EFFECTIVE AREA (ACRES) = 248.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 248.5 PEAK FLOW RATE (CFS) = 371.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10114.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	363.00	DOWNSTREAM (FEET) =	340.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	918.00	CHANNEL SLOPE =	0.0251
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	371.77		
FLOW VELOCITY (FEET/SEC.) =	8.68	FLOW DEPTH (FEET) =	3.78
TRAVEL TIME (MIN.) =	1.76	Tc (MIN.) =	26.34
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10114.00 =	8155.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 26.34  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.889

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	10.10	0.30	1.000	-
USER-DEFINED	-	17.70	0.30	1.000	-
USER-DEFINED	-	52.90	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 83.10 SUBAREA RUNOFF (CFS) = 118.86

EFFECTIVE AREA(ACRES) = 331.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 331.6 PEAK FLOW RATE(CFS) = 474.31

\*\*\*\*\*

FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 26.34  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.889  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 2.15  
EFFECTIVE AREA(ACRES) = 333.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 333.1 PEAK FLOW RATE(CFS) = 476.45

\*\*\*\*\*

FLOW PROCESS FROM NODE 10114.00 TO NODE 10115.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 301.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1467.00 CHANNEL SLOPE = 0.0266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 476.45  
FLOW VELOCITY(FEET/SEC.) = 9.44 FLOW DEPTH(FEET) = 4.10  
TRAVEL TIME(MIN.) = 2.59 Tc(MIN.) = 28.93  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10115.00 = 9622.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10115.00 TO NODE 10115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 28.93  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.791  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.60 0.30 1.000 -  
USER-DEFINED - 24.30 0.30 1.000 -  
USER-DEFINED - 47.70 0.30 1.000 -  
USER-DEFINED - 9.80 0.30 1.000 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 94.00 SUBAREA RUNOFF(CFS) = 126.13  
EFFECTIVE AREA(ACRES) = 427.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 427.1 PEAK FLOW RATE(CFS) = 573.07

\*\*\*\*\*

FLOW PROCESS FROM NODE 10115.00 TO NODE 10116.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 272.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1696.00 CHANNEL SLOPE = 0.0171  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 573.07  
FLOW VELOCITY(FEET/SEC.) = 8.38 FLOW DEPTH(FEET) = 4.77  
TRAVEL TIME(MIN.) = 3.37 Tc(MIN.) = 32.30  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10116.00 = 11318.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 32.30  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.690  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.90 0.30 1.000 -  
USER-DEFINED - 4.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 32.00 0.30 1.000 -  
USER-DEFINED - 3.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 45.60 SUBAREA RUNOFF(CFS) = 57.06  
EFFECTIVE AREA(ACRES) = 472.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 472.7 PEAK FLOW RATE(CFS) = 591.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 32.30  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.690  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 1.000 -  
USER-DEFINED - 7.70 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.70 SUBAREA RUNOFF(CFS) = 12.14  
EFFECTIVE AREA(ACRES) = 482.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 482.4 PEAK FLOW RATE(CFS) = 603.62



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*****
FLOW PROCESS FROM NODE 10116.00 TO NODE 10117.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 272.00 DOWNSTREAM(FEET) = 252.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 878.00 CHANNEL SLOPE = 0.0228
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 603.62
FLOW VELOCITY(FEET/SEC.) = 9.46 FLOW DEPTH(FEET) = 4.61
TRAVEL TIME(MIN.) = 1.55 Tc(MIN.) = 33.85
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10117.00 = 12196.00 FEET.
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 33.85
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.650
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 8.20 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 14.97
EFFECTIVE AREA(ACRES) = 494.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 494.7 PEAK FLOW RATE(CFS) = 603.62
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 33.85
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.650
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 14.60 0.30 1.000 -
USER-DEFINED - 6.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 3.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996
SUBAREA AREA(ACRES) = 25.00 SUBAREA RUNOFF(CFS) = 30.40
EFFECTIVE AREA(ACRES) = 519.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

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AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 519.7 PEAK FLOW RATE(CFS) = 631.53
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10118.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 252.00 DOWNSTREAM(FEET) = 249.00
FLOW LENGTH(FEET) = 280.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 87.0 INCH PIPE IS 65.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.92
ESTIMATED PIPE DIAMETER(INCH) = 87.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 631.53
PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 34.09
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10118.00 = 12476.00 FEET.
*****
FLOW PROCESS FROM NODE 10118.00 TO NODE 10119.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 249.00 DOWNSTREAM(FEET) = 240.00
FLOW LENGTH(FEET) = 892.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 87.0 INCH PIPE IS 67.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.42
ESTIMATED PIPE DIAMETER(INCH) = 87.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 631.53
PIPE TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 34.90
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10119.00 = 13368.00 FEET.
*****
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 34.90
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.623
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.100 -
USER-DEFINED - 1.00 0.30 0.600 -
USER-DEFINED - 0.80 0.30 0.850 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.706
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 4.57
EFFECTIVE AREA(ACRES) = 523.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 523.3 PEAK FLOW RATE(CFS) = 631.53
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****

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FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 34.90  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.623  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	9.60	0.30	0.600	-
USER-DEFINED	-	1.00	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.627  
 SUBAREA AREA (ACRES) = 13.60 SUBAREA RUNOFF (CFS) = 17.56  
 EFFECTIVE AREA (ACRES) = 536.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 536.9 PEAK FLOW RATE (CFS) = 640.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 34.90  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.623  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.12  
 EFFECTIVE AREA (ACRES) = 537.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 537.0 PEAK FLOW RATE (CFS) = 640.96

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10119.00 TO NODE 10120.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 240.00 DOWNSTREAM(FEET) = 239.00  
 FLOW LENGTH(FEET) = 120.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 90.0 INCH PIPE IS 71.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.14  
 ESTIMATED PIPE DIAMETER(INCH) = 90.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 640.96  
 PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 35.02  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10120.00 = 13488.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 35.02  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.620  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.657  
 SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 7.17  
 EFFECTIVE AREA (ACRES) = 542.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA (ACRES) = 542.6 PEAK FLOW RATE (CFS) = 646.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 35.02  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.620  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.717  
 SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 6.45  
 EFFECTIVE AREA (ACRES) = 547.70 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA (ACRES) = 547.7 PEAK FLOW RATE (CFS) = 653.11

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 35.02  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.620  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	2.70	0.30	1.000	-
USER-DEFINED	-	11.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 18.77  
EFFECTIVE AREA(ACRES) = 563.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 563.5 PEAK FLOW RATE(CFS) = 671.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10121.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 239.00 DOWNSTREAM(FEET) = 213.00  
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 48.95  
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 671.88  
PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 35.08  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10121.00 = 13682.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10121.00 TO NODE 10122.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 213.00 DOWNSTREAM(FEET) = 176.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 995.00 CHANNEL SLOPE = 0.0372  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 671.88  
FLOW VELOCITY(FEET/SEC.) = 11.66 FLOW DEPTH(FEET) = 4.38  
TRAVEL TIME(MIN.) = 1.42 Tc(MIN.) = 36.50  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10122.00 = 14677.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 36.50  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.581  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.80 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 8.42  
EFFECTIVE AREA(ACRES) = 570.80 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98

TOTAL AREA(ACRES) = 570.8 PEAK FLOW RATE(CFS) = 671.88  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 36.50  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.581  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 3.30 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 3.00 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 12.11  
EFFECTIVE AREA(ACRES) = 581.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 581.3 PEAK FLOW RATE(CFS) = 672.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 36.50  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.581  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 3.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 3.50 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 9.11  
EFFECTIVE AREA(ACRES) = 589.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 589.2 PEAK FLOW RATE(CFS) = 681.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 36.50  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.581  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.80 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$  (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 2.08  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.98  
TOTAL AREA (ACRES) = 591.0 PEAK FLOW RATE (CFS) = 683.96

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 591.0 TC (MIN.) = 36.50  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.984  
PEAK FLOW RATE (CFS) = 683.96

=====

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 100 Yr \*  
\* From Node: 10200 To Node: 10256 \*  
\*\*\*\*\*

FILE NAME: 0506102B.DAT  
TIME/DATE OF STUDY: 16:39 10/18/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.800
- 2) 10.00; 3.258
- 3) 15.00; 2.590
- 4) 20.00; 2.201
- 5) 25.00; 1.940
- 6) 30.00; 1.740
- 7) 40.00; 1.487
- 8) 50.00; 1.310
- 9) 60.00; 1.150
- 10) 90.00; 0.940
- 11) 120.00; 0.798
- 12) 180.00; 0.647
- 13) 360.00; 0.452
- 14) 1440.00; 0.187

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
- \*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10200.00 TO NODE 10201.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 293.00  
ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 617.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.991  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.261

SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "3-4 DWELLINGS/ACRE"	-	0.73	0.30	0.600	0	9.99

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.600  
SUBAREA RUNOFF(CFS) = 2.03  
TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 2.03

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10201.00 TO NODE 10202.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 617.00 DOWNSTREAM ELEVATION(FEET) = 613.00  
STREET LENGTH(FEET) = 323.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.15  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 10.07  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.62  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.94  
STREET FLOW TRAVEL TIME(MIN.) = 2.06  $T_c$ (MIN.) = 12.05

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.984  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.88 0.30 0.600 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600  
 SUBAREA AREA (ACRES) = 0.88 SUBAREA RUNOFF (CFS) = 2.23  
 EFFECTIVE AREA (ACRES) = 1.62 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA (ACRES) = 1.6 PEAK FLOW RATE (CFS) = 4.08

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.38 HALFSTREET FLOOD WIDTH (FEET) = 11.32  
 FLOW VELOCITY (FEET/SEC.) = 2.77 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.07  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10202.00 = 616.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10202.00 TO NODE 10203.00 IS CODE = 63  
 -----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<

=====

UPSTREAM ELEVATION (FEET) = 613.00 DOWNSTREAM ELEVATION (FEET) = 594.00  
 STREET LENGTH (FEET) = 613.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 30.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.12  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.38  
 HALFSTREET FLOOD WIDTH (FEET) = 11.05  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.34  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.64  
 STREET FLOW TRAVEL TIME (MIN.) = 2.36 Tc (MIN.) = 14.40

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.670  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.82 0.30 0.614 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.614  
 SUBAREA AREA (ACRES) = 1.82 SUBAREA RUNOFF (CFS) = 4.08  
 EFFECTIVE AREA (ACRES) = 3.44 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
 TOTAL AREA (ACRES) = 3.4 PEAK FLOW RATE (CFS) = 7.70

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.40 HALFSTREET FLOOD WIDTH (FEET) = 12.25

FLOW VELOCITY (FEET/SEC.) = 4.55 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.84  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10203.00 = 1229.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10203.00 TO NODE 10204.00 IS CODE = 63  
 -----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<

=====

UPSTREAM ELEVATION (FEET) = 594.00 DOWNSTREAM ELEVATION (FEET) = 578.00  
 STREET LENGTH (FEET) = 433.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 30.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.96

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.41  
 HALFSTREET FLOOD WIDTH (FEET) = 12.58  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.06  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.07  
 STREET FLOW TRAVEL TIME (MIN.) = 1.43 Tc (MIN.) = 15.83  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.525

SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.21 0.30 0.655 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.655  
 SUBAREA AREA (ACRES) = 1.21 SUBAREA RUNOFF (CFS) = 2.53  
 EFFECTIVE AREA (ACRES) = 4.64 AREA-AVERAGED Fm (INCH/HR) = 0.19  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
 TOTAL AREA (ACRES) = 4.6 PEAK FLOW RATE (CFS) = 9.78

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 13.07  
 FLOW VELOCITY (FEET/SEC.) = 5.15 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.16  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10204.00 = 1662.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 31  
 -----

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 578.00 DOWNSTREAM (FEET) = 575.00  
 FLOW LENGTH (FEET) = 147.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.0 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.68  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 9.78  
PIPE TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 16.11  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10205.00 = 1809.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.11  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.503

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.61	0.30	0.917	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 3.61 SUBAREA RUNOFF(CFS) = 7.23  
EFFECTIVE AREA(ACRES) = 8.25 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 16.92

\*\*\*\*\*

FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 563.00  
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.05  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 16.92  
PIPE TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 17.05  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10206.00 = 2374.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.05  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.430

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.75	0.30	0.669	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.669  
SUBAREA AREA(ACRES) = 4.75 SUBAREA RUNOFF(CFS) = 9.53  
EFFECTIVE AREA(ACRES) = 13.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA(ACRES) = 13.0 PEAK FLOW RATE(CFS) = 25.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 10206.00 TO NODE 10207.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 563.00 DOWNSTREAM(FEET) = 547.00  
FLOW LENGTH(FEET) = 599.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.22  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 25.90  
PIPE TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 17.87  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10207.00 = 2973.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10206.10 TO NODE 10207.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.87  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.367

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.59	0.30	0.664	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.664  
SUBAREA AREA(ACRES) = 4.59 SUBAREA RUNOFF(CFS) = 8.95  
EFFECTIVE AREA(ACRES) = 17.58 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71  
TOTAL AREA(ACRES) = 17.6 PEAK FLOW RATE(CFS) = 34.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 516.00  
FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 17.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.20  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 34.11  
PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 18.49  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10208.00 = 3573.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.49  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.319

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.60	0.30	0.697	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.697

SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 6.84  
EFFECTIVE AREA (ACRES) = 21.18 AREA-AVERAGED Fm (INCH/HR) = 0.21  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA (ACRES) = 21.2 PEAK FLOW RATE (CFS) = 40.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 516.00 DOWNSTREAM (FEET) = 480.00  
FLOW LENGTH (FEET) = 604.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 18.38  
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 40.18  
PIPE TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 19.03  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10209.00 = 4177.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 19.03  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.276  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.21	0.30	0.645	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645  
SUBAREA AREA (ACRES) = 8.21 SUBAREA RUNOFF (CFS) = 15.40  
EFFECTIVE AREA (ACRES) = 29.40 AREA-AVERAGED Fm (INCH/HR) = 0.21  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA (ACRES) = 29.4 PEAK FLOW RATE (CFS) = 54.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 480.00 DOWNSTREAM (FEET) = 438.00  
FLOW LENGTH (FEET) = 678.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 20.18  
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 54.77  
PIPE TRAVEL TIME (MIN.) = 0.56 Tc (MIN.) = 19.59  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10210.00 = 4855.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 19.59  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.233  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.49	0.30	0.986	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 10.49 SUBAREA RUNOFF (CFS) = 18.29  
EFFECTIVE AREA (ACRES) = 39.89 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
TOTAL AREA (ACRES) = 39.9 PEAK FLOW RATE (CFS) = 71.91

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 438.00 DOWNSTREAM (FEET) = 280.00  
FLOW LENGTH (FEET) = 2662.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.5 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 21.24  
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 71.91  
PIPE TRAVEL TIME (MIN.) = 2.09 Tc (MIN.) = 21.68  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10211.00 = 7517.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 21.68  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.113  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 10.00 SUBAREA RUNOFF (CFS) = 16.32  
EFFECTIVE AREA (ACRES) = 49.89 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA (ACRES) = 49.9 PEAK FLOW RATE (CFS) = 83.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 280.00 DOWNSTREAM (FEET) = 176.00  
FLOW LENGTH (FEET) = 935.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 27.70  
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 83.94



PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 22.24  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10212.00 = 8452.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.24  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.084  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.37 0.30 0.926 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.926  
SUBAREA AREA(ACRES) = 18.37 SUBAREA RUNOFF(CFS) = 29.86  
EFFECTIVE AREA(ACRES) = 68.26 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 68.3 PEAK FLOW RATE(CFS) = 112.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10212.00 TO NODE 10242.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 176.00 DOWNSTREAM(FEET) = 169.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00 CHANNEL SLOPE = 0.0211  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.97 0.30 0.970 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 114.03  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.06  
AVERAGE FLOW DEPTH(FEET) = 2.51 TRAVEL TIME(MIN.) = 0.91  
Tc(MIN.) = 23.16  
SUBAREA AREA(ACRES) = 1.97 SUBAREA RUNOFF(CFS) = 3.09  
EFFECTIVE AREA(ACRES) = 70.23 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 112.65

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.49 FLOW VELOCITY(FEET/SEC.) = 6.05  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

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FLOW PROCESS FROM NODE 10220.00 TO NODE 10221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 308.00 DOWNSTREAM(FEET) = 300.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.111  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.581  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"GRASS" - 1.03 0.30 1.000 0 15.11  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.12  
TOTAL AREA(ACRES) = 1.03 PEAK FLOW RATE(CFS) = 2.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10221.10 TO NODE 10222.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 300.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.72  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.23  
HALFSTREET FLOOD WIDTH(FEET) = 3.80  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.57  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.31  
STREET FLOW TRAVEL TIME(MIN.) = 1.30 Tc(MIN.) = 16.41  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.480

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.64 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 3.21  
EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 2.7 PEAK FLOW RATE (CFS) = 5.24

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.26 HALFSTREET FLOOD WIDTH (FEET) = 5.22  
FLOW VELOCITY (FEET/SEC.) = 5.66 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.49  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10222.00 = 764.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10221.20 TO NODE 10222.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 16.41

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.480

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.12	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 3.12 SUBAREA RUNOFF (CFS) = 6.11

EFFECTIVE AREA (ACRES) = 5.78 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 5.8 PEAK FLOW RATE (CFS) = 11.35

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.10 TO NODE 10223.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION (FEET) = 261.00 DOWNSTREAM ELEVATION (FEET) = 208.00

STREET LENGTH (FEET) = 622.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.97

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.34

HALFSTREET FLOOD WIDTH (FEET) = 8.98

AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.51

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.20

STREET FLOW TRAVEL TIME (MIN.) = 1.59 Tc (MIN.) = 18.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.357

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.75	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 1.75 SUBAREA RUNOFF (CFS) = 3.25

EFFECTIVE AREA (ACRES) = 7.54 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 7.5 PEAK FLOW RATE (CFS) = 13.95

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.35 HALFSTREET FLOOD WIDTH (FEET) = 9.34

FLOW VELOCITY (FEET/SEC.) = 6.57 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.27

LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10223.00 = 1386.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.20 TO NODE 10223.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 18.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.357

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.91	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 7.91 SUBAREA RUNOFF (CFS) = 14.64

EFFECTIVE AREA (ACRES) = 15.45 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 15.4 PEAK FLOW RATE (CFS) = 28.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 10223.10 TO NODE 10224.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION (FEET) = 208.00 DOWNSTREAM ELEVATION (FEET) = 204.00

STREET LENGTH (FEET) = 758.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 32.33

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.63

HALFSTREET FLOOD WIDTH (FEET) = 23.76

AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.77

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.76

STREET FLOW TRAVEL TIME (MIN.) = 4.56 Tc (MIN.) = 22.56

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.067

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.70 SUBAREA RUNOFF (CFS) = 7.47  
EFFECTIVE AREA (ACRES) = 20.15 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.1 PEAK FLOW RATE (CFS) = 32.05

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.63 HALFSTREET FLOOD WIDTH (FEET) = 23.70  
FLOW VELOCITY (FEET/SEC.) = 2.76 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.74  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10224.00 = 2144.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10223.20 TO NODE 10224.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 22.56  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.067  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.21	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.21 SUBAREA RUNOFF (CFS) = 1.92  
EFFECTIVE AREA (ACRES) = 21.35 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 21.4 PEAK FLOW RATE (CFS) = 33.97

\*\*\*\*\*

FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 204.00 DOWNSTREAM (FEET) = 201.00  
FLOW LENGTH (FEET) = 422.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 7.92  
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 33.97  
PIPE TRAVEL TIME (MIN.) = 0.89 Tc (MIN.) = 23.45  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10225.00 = 2566.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 23.45  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.021  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.81	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.81 SUBAREA RUNOFF (CFS) = 7.46  
EFFECTIVE AREA (ACRES) = 26.17 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.2 PEAK FLOW RATE (CFS) = 40.53

\*\*\*\*\*

FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 201.00 DOWNSTREAM (FEET) = 197.00  
FLOW LENGTH (FEET) = 799.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 7.17  
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 40.53  
PIPE TRAVEL TIME (MIN.) = 1.86 Tc (MIN.) = 25.31  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10238.00 = 3365.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 25.31  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.928  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.24	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.24 SUBAREA RUNOFF (CFS) = 6.21  
EFFECTIVE AREA (ACRES) = 30.41 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 30.4 PEAK FLOW RATE (CFS) = 44.55

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 25.31  
RAINFALL INTENSITY (INCH/HR) = 1.93  
AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA (ACRES) = 30.41  
TOTAL STREAM AREA (ACRES) = 30.41  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 44.55

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FLOW PROCESS FROM NODE 10230.00 TO NODE 10231.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 276.00
ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 390.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.944
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.509

SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
AGRICULTURAL POOR COVER
"FALLOW" - 0.95 0.30 1.000 0 5.94
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 3.60
TOTAL AREA(ACRES) = 0.95 PEAK FLOW RATE(CFS) = 3.60

\*\*\*\*\*
FLOW PROCESS FROM NODE 10231.10 TO NODE 10232.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 390.00 DOWNSTREAM(FEET) = 301.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 394.00 CHANNEL SLOPE = 0.2259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.281

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.68 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.62
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.87
AVERAGE FLOW DEPTH(FEET) = 0.50 TRAVEL TIME(MIN.) = 0.74
Tc(MIN.) = 6.68
SUBAREA AREA(ACRES) = 1.68 SUBAREA RUNOFF(CFS) = 6.03
EFFECTIVE AREA(ACRES) = 2.63 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 9.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.57 FLOW VELOCITY(FEET/SEC.) = 9.77
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10232.00 = 670.00 FEET.

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FLOW PROCESS FROM NODE 10231.20 TO NODE 10232.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 6.68
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.281

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.38 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.38 SUBAREA RUNOFF(CFS) = 22.85
EFFECTIVE AREA(ACRES) = 9.01 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 9.0 PEAK FLOW RATE(CFS) = 32.29

\*\*\*\*\*
FLOW PROCESS FROM NODE 10232.00 TO NODE 10233.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 301.00 DOWNSTREAM ELEVATION(FEET) = 277.00
STREET LENGTH(FEET) = 341.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.61

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.20
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.46
HALFSTREET FLOOD WIDTH(FEET) = 15.15
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.69
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.55
STREET FLOW TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 7.42
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.053

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 11.83
EFFECTIVE AREA(ACRES) = 12.52 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 12.5 PEAK FLOW RATE(CFS) = 42.27

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 15.79
FLOW VELOCITY(FEET/SEC.) = 7.88 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.73
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10233.00 = 1011.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10233.10 TO NODE 10234.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 277.00 DOWNSTREAM ELEVATION(FEET) = 226.00
STREET LENGTH(FEET) = 682.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 48.68

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.49
HALFSTREET FLOOD WIDTH(FEET) = 16.49
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.36
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.08
STREET FLOW TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 8.78

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.634

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.27 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 4.27 SUBAREA RUNOFF(CFS) = 12.81

EFFECTIVE AREA(ACRES) = 16.78 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 50.36

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 16.73
FLOW VELOCITY(FEET/SEC.) = 8.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.15
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10234.00 = 1693.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10233.20 TO NODE 10234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 8.78

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.634

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 15.60 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 46.80

EFFECTIVE AREA(ACRES) = 32.38 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 97.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.10 TO NODE 10235.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 3 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 226.00 DOWNSTREAM ELEVATION(FEET) = 205.00
STREET LENGTH(FEET) = 759.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 103.30

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.70
HALFSTREET FLOOD WIDTH(FEET) = 28.56
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.89
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.81
STREET FLOW TRAVEL TIME(MIN.) = 1.84 Tc(MIN.) = 10.62

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.175

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.74 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 12.28

EFFECTIVE AREA(ACRES) = 37.13 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 97.16

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.69 HALFSTREET FLOOD WIDTH(FEET) = 27.31
FLOW VELOCITY(FEET/SEC.) = 6.79 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.66

\*NOTE: ESTIMATED STREET FLOW DEPTH IS GREATER THAN
THE MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

SIZE PIPE(S) TO SATISFY THE STREET CONSTRAINT AS FOLLOWS:

\*\* PIPE SIZED TO MAXIMIZE STREETFLOW AT DOWNSTREAM NODE \*\*

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

ASSUME FULL-FLOWING PIPELINE

PIPE-FLOW VELOCITY(FEET/SEC.) = 9.37

PIPE-FLOW(CFS) = 16.57

PIPEFLOW TRAVEL TIME(MIN.) = 1.35 Tc(MIN.) = 10.13

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.240

SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 12.56

TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 98.25

STREETFLOW HYDRAULICS BASED ON MAINLINE Tc :

STREET HYDRAULICS COMPUTED USING ESTIMATED FLOW(CFS) = 81.68  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.65  
HALFSTREET FLOOD WIDTH(FEET) = 24.73  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.48  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.23  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10235.00 = 2452.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10234.20 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.13  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.240  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.02 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.02 SUBAREA RUNOFF(CFS) = 21.22  
EFFECTIVE AREA(ACRES) = 45.15 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 45.1 PEAK FLOW RATE(CFS) = 119.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10234.30 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.13  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.240  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.62 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.62 SUBAREA RUNOFF(CFS) = 6.92  
EFFECTIVE AREA(ACRES) = 47.76 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 47.8 PEAK FLOW RATE(CFS) = 126.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10235.00 TO NODE 10236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 205.00 DOWNSTREAM(FEET) = 201.00  
FLOW LENGTH(FEET) = 489.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 36.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.51  
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 126.39  
PIPE TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 10.84  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10236.00 = 2941.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10235.10 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.84  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.146  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.89 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.89 SUBAREA RUNOFF(CFS) = 7.41  
EFFECTIVE AREA(ACRES) = 50.65 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 50.7 PEAK FLOW RATE(CFS) = 129.73

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10235.20 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.84  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.146  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.84 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.84 SUBAREA RUNOFF(CFS) = 12.39  
EFFECTIVE AREA(ACRES) = 55.49 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 55.5 PEAK FLOW RATE(CFS) = 142.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 201.00 DOWNSTREAM(FEET) = 199.00  
FLOW LENGTH(FEET) = 278.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.26  
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 142.13  
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 11.25  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10237.00 = 3219.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.25

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.091  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.62 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.62 SUBAREA RUNOFF (CFS) = 4.07  
 EFFECTIVE AREA (ACRES) = 57.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 57.1 PEAK FLOW RATE (CFS) = 143.45

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 31  
 -----

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 199.00 DOWNSTREAM (FEET) = 197.00  
 FLOW LENGTH (FEET) = 345.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.44  
 ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 143.45  
 PIPE TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 11.80  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 81  
 -----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<<  
 =====  
 MAINLINE Tc (MIN.) = 11.80  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.017  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.38 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.38 SUBAREA RUNOFF (CFS) = 3.37  
 EFFECTIVE AREA (ACRES) = 58.49 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 58.5 PEAK FLOW RATE (CFS) = 143.45  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1  
 -----

>>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE <<<<<  
 >>>> AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES <<<<<  
 =====  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 11.80  
 RAINFALL INTENSITY (INCH/HR) = 3.02  
 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 58.49  
 TOTAL STREAM AREA (ACRES) = 58.49  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 143.45

\*\* CONFLUENCE DATA \*\*  
 STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 44.55 25.31 1.928 0.30 ( 0.30) 1.00 30.4 10220.00  
 2 143.45 11.80 3.017 0.30 ( 0.30) 1.00 58.5 10230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 178.13 11.80 3.017 0.30 ( 0.30) 1.00 72.7 10230.00  
 2 130.49 25.31 1.928 0.30 ( 0.30) 1.00 88.9 10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 178.13 Tc (MIN.) = 11.80  
 EFFECTIVE AREA (ACRES) = 72.67 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 88.9  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.00 TO NODE 10239.00 IS CODE = 31  
 -----

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 197.00 DOWNSTREAM (FEET) = 193.00  
 FLOW LENGTH (FEET) = 753.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 60.0 INCH PIPE IS 48.6 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.45  
 ESTIMATED PIPE DIAMETER (INCH) = 60.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 178.13  
 PIPE TRAVEL TIME (MIN.) = 1.20 Tc (MIN.) = 13.00  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10239.00 = 4317.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.10 TO NODE 10239.00 IS CODE = 81  
 -----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<<  
 =====  
 MAINLINE Tc (MIN.) = 13.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.857  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.72 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.72 SUBAREA RUNOFF (CFS) = 6.26  
 EFFECTIVE AREA (ACRES) = 75.39 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 91.6 PEAK FLOW RATE (CFS) = 178.13  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10238.20 TO NODE 10239.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 13.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.857  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 34.37 0.30 0.991 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.991  
SUBAREA AREA (ACRES) = 34.37 SUBAREA RUNOFF (CFS) = 79.17  
EFFECTIVE AREA (ACRES) = 109.76 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 126.0 PEAK FLOW RATE (CFS) = 252.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 193.00 DOWNSTREAM (FEET) = 191.00  
FLOW LENGTH (FEET) = 301.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 66.0 INCH PIPE IS 52.6 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 12.46  
ESTIMATED PIPE DIAMETER (INCH) = 66.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 252.66  
PIPE TRAVEL TIME (MIN.) = 0.40 Tc (MIN.) = 13.41  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10240.00 = 4618.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 13.41  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.803  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.22 0.30 0.916 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.916  
SUBAREA AREA (ACRES) = 2.22 SUBAREA RUNOFF (CFS) = 5.06  
EFFECTIVE AREA (ACRES) = 111.99 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 128.2 PEAK FLOW RATE (CFS) = 252.66  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10240.00 TO NODE 10241.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 191.00 DOWNSTREAM (FEET) = 180.00  
FLOW LENGTH (FEET) = 150.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.6 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 30.62  
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 252.66  
PIPE TRAVEL TIME (MIN.) = 0.08 Tc (MIN.) = 13.49  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10241.00 = 4768.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10241.00 TO NODE 10242.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 180.00 DOWNSTREAM (FEET) = 169.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 267.00 CHANNEL SLOPE = 0.0412  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.742  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.16 0.30 0.958 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.958  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 255.05  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.81  
AVERAGE FLOW DEPTH (FEET) = 2.68 TRAVEL TIME (MIN.) = 0.38  
Tc (MIN.) = 13.86  
SUBAREA AREA (ACRES) = 2.16 SUBAREA RUNOFF (CFS) = 4.77  
EFFECTIVE AREA (ACRES) = 114.15 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 130.4 PEAK FLOW RATE (CFS) = 252.66  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.67 FLOW VELOCITY (FEET/SEC.) = 11.79  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\*\*\*\*  
\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	252.66	13.86	2.742	0.30 (0.30)	0.99	114.1	10230.00
2	180.75	27.52	1.839	0.30 (0.30)	1.00	130.4	10220.00

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\*\*\*\*  
\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM	Q	Tc	Intensity	Fp (Fm)	Ap	Ae	HEADWATER
--------	---	----	-----------	---------	----	----	-----------



NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 112.65 23.16 2.036 0.30( 0.25) 0.85 70.2 10200.00  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	346.80	13.86	2.742	0.30( 0.29)	0.96	156.2	10230.00
2	316.38	23.16	2.036	0.30( 0.28)	0.94	195.4	10200.00
3	280.93	27.52	1.839	0.30( 0.28)	0.94	200.6	10220.00
TOTAL AREA (ACRES) =		200.6					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 346.80 Tc(MIN.) = 13.865  
EFFECTIVE AREA(ACRES) = 156.19 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
TOTAL AREA(ACRES) = 200.6  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 12  
-----  
>>>>CLEAR MEMORY BANK # 1 <<<<<<  
-----  
\*\*\*\*\*

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10256.00 IS CODE = 51  
-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
-----  
ELEVATION DATA: UPSTREAM(FEET) = 169.00 DOWNSTREAM(FEET) = 163.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 315.00 CHANNEL SLOPE = 0.0190  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.669  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.10 0.30 0.995 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.995  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 356.51  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.62  
AVERAGE FLOW DEPTH(FEET) = 3.51 TRAVEL TIME(MIN.) = 0.55  
Tc(MIN.) = 14.41  
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 19.42  
EFFECTIVE AREA(ACRES) = 165.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
TOTAL AREA(ACRES) = 209.7 PEAK FLOW RATE(CFS) = 354.32  
  
END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.51 FLOW VELOCITY(FEET/SEC.) = 9.60  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.  
  
\*\*\*\*\*  
FLOW PROCESS FROM NODE 10243.00 TO NODE 10256.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc(MIN.) = 14.41  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.669  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.01 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.01 SUBAREA RUNOFF(CFS) = 14.93  
EFFECTIVE AREA(ACRES) = 172.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
TOTAL AREA(ACRES) = 216.7 PEAK FLOW RATE(CFS) = 369.26  
  
\*\*\*\*\*  
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1  
-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.41  
RAINFALL INTENSITY(INCH/HR) = 2.67  
AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.96  
EFFECTIVE STREAM AREA(ACRES) = 172.30  
TOTAL STREAM AREA(ACRES) = 216.71  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 369.26  
  
\*\*\*\*\*  
FLOW PROCESS FROM NODE 10250.00 TO NODE 10251.00 IS CODE = 21  
-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 284.00  
ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 243.00  
  
Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.802  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.450  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"WOODLAND,GRASS" - 1.04 0.30 1.000 0 16.80  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.01  
TOTAL AREA(ACRES) = 1.04 PEAK FLOW RATE(CFS) = 2.01  
  
\*\*\*\*\*  
FLOW PROCESS FROM NODE 10251.00 TO NODE 10252.00 IS CODE = 63  
-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 243.00 DOWNSTREAM ELEVATION(FEET) = 240.00  
STREET LENGTH(FEET) = 301.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.31  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.78  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.08  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.65  
STREET FLOW TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 19.21  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.263

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.47 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 2.60  
EFFECTIVE AREA(ACRES) = 2.51 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 4.44

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 8.97  
FLOW VELOCITY(FEET/SEC.) = 2.23 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.75  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10252.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10252.00 TO NODE 10253.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 240.00 DOWNSTREAM ELEVATION(FEET) = 234.00  
STREET LENGTH(FEET) = 544.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.09  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.60  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.64  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.03  
STREET FLOW TRAVEL TIME(MIN.) = 3.44 Tc(MIN.) = 22.65  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.063

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.60 SUBAREA RUNOFF(CFS) = 7.30  
EFFECTIVE AREA(ACRES) = 7.12 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 11.29

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 13.40  
FLOW VELOCITY(FEET/SEC.) = 2.84 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.21  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10253.00 = 1129.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 234.00 DOWNSTREAM(FEET) = 219.00  
FLOW LENGTH(FEET) = 362.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.78  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 11.29  
PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 23.16  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10254.00 = 1491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
-----

MAINLINE Tc(MIN.) = 23.16  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.55 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 13.35  
EFFECTIVE AREA(ACRES) = 15.66 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.7 PEAK FLOW RATE(CFS) = 24.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 10254.00 TO NODE 10255.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 219.00 DOWNSTREAM(FEET) = 182.00
FLOW LENGTH(FEET) = 716.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.45
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 24.47
PIPE TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 23.93
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10255.00 = 2207.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10255.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 182.00 DOWNSTREAM(FEET) = 163.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.0833
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.974
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 13.88 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.93
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.34
AVERAGE FLOW DEPTH(FEET) = 1.12 TRAVEL TIME(MIN.) = 0.41
Tc(MIN.) = 24.34
SUBAREA AREA(ACRES) = 13.88 SUBAREA RUNOFF(CFS) = 20.92
EFFECTIVE AREA(ACRES) = 29.54 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 29.5 PEAK FLOW RATE(CFS) = 44.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.22 FLOW VELOCITY(FEET/SEC.) = 9.91
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10256.00 = 2435.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 24.34
RAINFALL INTENSITY(INCH/HR) = 1.97
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00

EFFECTIVE STREAM AREA(ACRES) = 29.54

TOTAL STREAM AREA(ACRES) = 29.54

PEAK FLOW RATE(CFS) AT CONFLUENCE = 44.52

\*\* CONFLUENCE DATA \*\*

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 6 rows of data.

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 4 rows of data.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 406.54 Tc(MIN.) = 14.41
EFFECTIVE AREA(ACRES) = 189.79 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 246.3
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 246.3 TC(MIN.) = 14.41
EFFECTIVE AREA(ACRES) = 189.79 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.963
PEAK FLOW RATE(CFS) = 406.54

\*\* PEAK FLOW RATE TABLE \*\*

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 4 rows of data.

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506103B.DAT  
TIME/DATE OF STUDY: 12:44 04/15/2013  
=====

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--\*TIME-OF-CONCENTRATION MODEL\*--  
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Table with 10 columns: NO., HALF WIDTH (FT), CROWN CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-/SIDE, PARK-/WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), GEOMETRIES LIP HIKE (FT), MANNING FACTOR (n). Rows 1-4.

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10300.00 TO NODE 10301.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
ELEVATION DATA: UPSTREAM (FEET) = 627.00 DOWNSTREAM (FEET) = 540.00
Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.147
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.751
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.20 0.30 0.500 95 5.15
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF (CFS) = 4.97
TOTAL AREA (ACRES) = 1.20 PEAK FLOW RATE (CFS) = 4.97

\*\*\*\*\*

FLOW PROCESS FROM NODE 10301.00 TO NODE 10302.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<<<
=====

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FLOW PROCESS FROM NODE 10302.00 TO NODE 10302.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<<<
=====

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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 6.04  
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 10.87

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10302.00 TO NODE 10303.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 467.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.2575  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.87  
FLOW VELOCITY(FEET/SEC.) = 8.54 FLOW DEPTH(FEET) = 0.65  
TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 5.74  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10303.00 = 610.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10303.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.74  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.471  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 8.55  
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 19.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10304.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 467.00 DOWNSTREAM(FEET) = 446.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 19.05  
FLOW VELOCITY(FEET/SEC.) = 8.64 FLOW DEPTH(FEET) = 0.86  
TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 5.97  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10304.00 = 725.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10304.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.97  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.366  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.500 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 9.05  
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 27.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10305.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 446.00 DOWNSTREAM(FEET) = 366.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 423.00 CHANNEL SLOPE = 0.1891  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 27.65  
FLOW VELOCITY(FEET/SEC.) = 9.72 FLOW DEPTH(FEET) = 0.97  
TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 6.69  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10305.00 = 1148.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10305.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.69  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.101  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.912  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 11.71  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.65  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 37.62

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10306.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 300.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 574.00 CHANNEL SLOPE = 0.1150  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 37.62  
FLOW VELOCITY (FEET/SEC.) = 8.67 FLOW DEPTH (FEET) = 1.20  
TRAVEL TIME (MIN.) = 1.10 Tc (MIN.) = 7.79  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10306.00 = 1722.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10306.00 TO NODE 10306.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 7.79  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.760  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 11.22  
EFFECTIVE AREA (ACRES) = 14.30 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA (ACRES) = 14.3 PEAK FLOW RATE (CFS) = 45.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10306.00 TO NODE 10307.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 300.00 DOWNSTREAM (FEET) = 293.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0350  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 45.55  
FLOW VELOCITY (FEET/SEC.) = 5.82 FLOW DEPTH (FEET) = 1.61  
TRAVEL TIME (MIN.) = 0.57 Tc (MIN.) = 8.37  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10307.00 = 1922.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10307.00 TO NODE 10307.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 8.37  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.612  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 2.09  
EFFECTIVE AREA (ACRES) = 15.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 15.0 PEAK FLOW RATE (CFS) = 45.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10307.00 TO NODE 10308.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 293.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0850  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 45.74  
FLOW VELOCITY (FEET/SEC.) = 10.06 FLOW DEPTH (FEET) = 1.23  
TRAVEL TIME (MIN.) = 0.33 Tc (MIN.) = 8.70  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10308.00 = 2122.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10308.00 TO NODE 10308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 8.70  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.533  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	8.50	0.30	0.500	-
USER-DEFINED	-	3.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.696  
SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 41.88  
EFFECTIVE AREA (ACRES) = 29.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA (ACRES) = 29.0 PEAK FLOW RATE (CFS) = 86.54

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10308.00 TO NODE 10309.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 250.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 600.00 CHANNEL SLOPE = 0.0433  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 86.54  
FLOW VELOCITY (FEET/SEC.) = 9.18 FLOW DEPTH (FEET) = 1.77  
TRAVEL TIME (MIN.) = 1.09 Tc (MIN.) = 9.79  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10309.00 = 2722.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.79  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.303  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.00	0.30	0.600	-
USER-DEFINED	-	1.80	0.30	0.850	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	0.500	-
USER-DEFINED	-	2.10	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.662  
 SUBAREA AREA (ACRES) = 15.40 SUBAREA RUNOFF (CFS) = 43.02  
 EFFECTIVE AREA (ACRES) = 44.40 AREA-AVERAGED Fm (INCH/HR) = 0.21  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
 TOTAL AREA (ACRES) = 44.4 PEAK FLOW RATE (CFS) = 123.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.79  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.303  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.30	0.850	-
USER-DEFINED	-	8.80	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.967  
 SUBAREA AREA (ACRES) = 15.80 SUBAREA RUNOFF (CFS) = 42.84  
 EFFECTIVE AREA (ACRES) = 60.20 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA (ACRES) = 60.2 PEAK FLOW RATE (CFS) = 166.40

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10309.00 TO NODE 10310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 250.00 DOWNSTREAM(FEET) = 208.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1021.00 CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 166.40  
 FLOW VELOCITY(FEET/SEC.) = 10.61 FLOW DEPTH(FEET) = 2.29  
 TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 11.39  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10310.00 = 3743.00 FEET.

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.39  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.031  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	1.80	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.668  
 SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 16.82  
 EFFECTIVE AREA (ACRES) = 66.80 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA (ACRES) = 66.8 PEAK FLOW RATE (CFS) = 168.53

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.39  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.031  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	8.00	0.30	0.600	-
USER-DEFINED	-	7.10	0.30	0.850	-
USER-DEFINED	-	8.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814  
 SUBAREA AREA (ACRES) = 23.50 SUBAREA RUNOFF (CFS) = 58.95  
 EFFECTIVE AREA (ACRES) = 90.30 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA (ACRES) = 90.3 PEAK FLOW RATE (CFS) = 227.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10310.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 208.00 DOWNSTREAM(FEET) = 189.00  
 FLOW LENGTH(FEET) = 1595.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.12  
 ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 227.48  
 PIPE TRAVEL TIME(MIN.) = 1.76 Tc(MIN.) = 13.15  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10335.00 = 5338.00 FEET.



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*****
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.15
RAINFALL INTENSITY(INCH/HR) = 2.79
AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.77
EFFECTIVE STREAM AREA(ACRES) = 90.30
TOTAL STREAM AREA(ACRES) = 90.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 227.48

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FLOW PROCESS FROM NODE 10320.00 TO NODE 10321.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 671.00 DOWNSTREAM(FEET) = 622.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.795
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.447
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.00 0.30 0.500 95 5.79
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 3.87
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 3.87

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*****
FLOW PROCESS FROM NODE 10321.00 TO NODE 10322.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 622.00 DOWNSTREAM(FEET) = 599.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 227.00 CHANNEL SLOPE = 0.1013
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.87
FLOW VELOCITY(FEET/SEC.) = 5.83 FLOW DEPTH(FEET) = 0.47
TRAVEL TIME(MIN.) = 0.65 Tc(MIN.) = 6.44
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10322.00 = 557.00 FEET.

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*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10322.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 6.44
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.190
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.30 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 5.09
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 8.73

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*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10323.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 599.00 DOWNSTREAM(FEET) = 539.00
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.39
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.73
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 6.55
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10323.00 = 719.00 FEET.

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*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10323.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 6.55
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.151
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.30 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.80
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 10.44

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*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10324.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 539.00 DOWNSTREAM(FEET) = 530.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 97.00 CHANNEL SLOPE = 0.0928
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.44

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FLOW VELOCITY(FEET/SEC.) = 5.79 FLOW DEPTH(FEET) = 0.78  
TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 6.83  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10324.00 = 816.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10324.00 TO NODE 10324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.83  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.050

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 6.32  
EFFECTIVE AREA(ACRES) = 4.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.7 PEAK FLOW RATE(CFS) = 16.50

\*\*\*\*\*

FLOW PROCESS FROM NODE 10324.00 TO NODE 10325.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 210.00 CHANNEL SLOPE = 0.1429  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 16.50  
FLOW VELOCITY(FEET/SEC.) = 7.62 FLOW DEPTH(FEET) = 0.85  
TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 7.29  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10325.00 = 1026.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.29  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.905

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 5.75  
EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 21.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10326.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 460.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 345.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 21.63  
FLOW VELOCITY(FEET/SEC.) = 7.60 FLOW DEPTH(FEET) = 0.97  
TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 8.05  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10326.00 = 1371.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10326.00 TO NODE 10326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.05  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.688

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 6.05  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 26.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10326.00 TO NODE 10327.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 430.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 263.00 CHANNEL SLOPE = 0.1141  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 26.43  
FLOW VELOCITY(FEET/SEC.) = 7.90 FLOW DEPTH(FEET) = 1.06  
TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 8.60  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10327.00 = 1634.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10327.00 TO NODE 10327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.60  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.555

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.10	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500

SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 12.57  
EFFECTIVE AREA (ACRES) = 12.40 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 12.4 PEAK FLOW RATE (CFS) = 38.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 10327.00 TO NODE 10328.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 375.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 437.00 CHANNEL SLOPE = 0.1259  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 38.00  
FLOW VELOCITY (FEET/SEC.) = 11.16 FLOW DEPTH (FEET) = 1.07  
TRAVEL TIME (MIN.) = 0.65 Tc (MIN.) = 9.26  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10328.00 = 2071.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10328.00 TO NODE 10328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.26  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.409  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.500 -  
USER-DEFINED - 1.20 0.30 0.850 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.772  
SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 9.15  
EFFECTIVE AREA (ACRES) = 15.60 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 15.6 PEAK FLOW RATE (CFS) = 45.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 10328.00 TO NODE 10329.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 375.00 DOWNSTREAM(FEET) = 372.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 224.00 CHANNEL SLOPE = 0.0134  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 45.52  
FLOW VELOCITY (FEET/SEC.) = 5.03 FLOW DEPTH (FEET) = 1.74  
TRAVEL TIME (MIN.) = 0.74 Tc (MIN.) = 10.00  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10329.00 = 2295.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10329.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.260  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.20 0.30 0.500 -  
USER-DEFINED - 1.40 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.571  
SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 31.14  
EFFECTIVE AREA (ACRES) = 26.80 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 26.8 PEAK FLOW RATE (CFS) = 74.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10330.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 300.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 452.00 CHANNEL SLOPE = 0.1593  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 74.58  
FLOW VELOCITY (FEET/SEC.) = 14.37 FLOW DEPTH (FEET) = 1.32  
TRAVEL TIME (MIN.) = 0.52 Tc (MIN.) = 10.52  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10330.00 = 2747.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10330.00 TO NODE 10330.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.52  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.171  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 4.20 0.30 0.500 -  
USER-DEFINED - 2.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.673  
SUBAREA AREA (ACRES) = 7.80 SUBAREA RUNOFF (CFS) = 20.84  
EFFECTIVE AREA (ACRES) = 34.60 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 34.6 PEAK FLOW RATE (CFS) = 93.27

\*\*\*\*\*

FLOW PROCESS FROM NODE 10330.00 TO NODE 10331.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 295.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 182.00 CHANNEL SLOPE = 0.0275  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 93.27  
FLOW VELOCITY(FEET/SEC.) = 7.88 FLOW DEPTH(FEET) = 1.99  
TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 10.91  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10331.00 = 2929.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10331.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 10.91  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.106  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 11.30 0.30 0.500 -  
USER-DEFINED - 0.20 0.30 0.600 -  
USER-DEFINED - 4.20 0.30 0.850 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.652  
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 49.77  
EFFECTIVE AREA(ACRES) = 53.60 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 53.6 PEAK FLOW RATE(CFS) = 141.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10332.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 295.00 DOWNSTREAM(FEET) = 245.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.00 CHANNEL SLOPE = 0.0542  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 141.00  
FLOW VELOCITY(FEET/SEC.) = 11.29 FLOW DEPTH(FEET) = 2.04  
TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 12.27  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10332.00 = 3851.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10332.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 12.27  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.905  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.850 -

USER-DEFINED - 1.40 0.30 0.500 -  
USER-DEFINED - 15.40 0.30 0.850 -  
USER-DEFINED - 8.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.881  
SUBAREA AREA(ACRES) = 25.60 SUBAREA RUNOFF(CFS) = 60.85  
EFFECTIVE AREA(ACRES) = 79.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 79.2 PEAK FLOW RATE(CFS) = 192.17

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10333.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 199.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 564.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 192.17  
FLOW VELOCITY(FEET/SEC.) = 14.20 FLOW DEPTH(FEET) = 2.12  
TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 12.93  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10333.00 = 4415.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10333.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 12.93  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.819  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 0.500 -  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 5.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.761  
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 19.35  
EFFECTIVE AREA(ACRES) = 87.50 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 87.5 PEAK FLOW RATE(CFS) = 205.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10334.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 195.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 454.00 CHANNEL SLOPE = 0.0088  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 205.39  
FLOW VELOCITY(FEET/SEC.) = 6.26 FLOW DEPTH(FEET) = 3.31

TRAVEL TIME(MIN.) = 1.21 Tc(MIN.) = 14.14  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10334.00 = 4869.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10334.00 TO NODE 10334.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.14  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.676  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.800 -  
USER-DEFINED - 2.60 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 8.08  
EFFECTIVE AREA(ACRES) = 91.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71  
TOTAL AREA(ACRES) = 91.2 PEAK FLOW RATE(CFS) = 205.39  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10334.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 195.00 DOWNSTREAM(FEET) = 189.00  
FLOW LENGTH(FEET) = 1291.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 66.0 INCH PIPE IS 51.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.40  
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 205.39  
PIPE TRAVEL TIME(MIN.) = 2.07 Tc(MIN.) = 16.21  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 16.21  
RAINFALL INTENSITY(INCH/HR) = 2.50  
AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.71  
EFFECTIVE STREAM AREA(ACRES) = 91.20  
TOTAL STREAM AREA(ACRES) = 91.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 205.39

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	227.48	13.15	2.792	0.30( 0.23)	0.77	90.3	10300.00
2	205.39	16.21	2.496	0.30( 0.21)	0.71	91.2	10320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	415.73	13.15	2.792	0.30( 0.22)	0.75	164.3	10300.00
2	406.53	16.21	2.496	0.30( 0.22)	0.74	181.5	10320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 415.73 Tc(MIN.) = 13.15  
EFFECTIVE AREA(ACRES) = 164.29 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA(ACRES) = 181.5  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10336.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 189.00 DOWNSTREAM(FEET) = 188.00  
FLOW LENGTH(FEET) = 103.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 75.0 INCH PIPE IS 57.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.36  
ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 415.73  
PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 13.25  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10336.00 = 6263.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10336.00 TO NODE 10337.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 46.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.93  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 415.73  
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 13.38  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10337.00 = 6475.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10337.00 TO NODE 10338.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 161.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0218  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 415.73  
FLOW VELOCITY (FEET/SEC.) = 10.49 FLOW DEPTH (FEET) = 3.63  
TRAVEL TIME (MIN.) = 1.39 Tc (MIN.) = 14.77  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10338.00 = 7347.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 14.77  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.613  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.850 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.943  
SUBAREA AREA (ACRES) = 4.20 SUBAREA RUNOFF (CFS) = 8.81  
EFFECTIVE AREA (ACRES) = 168.49 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 185.7 PEAK FLOW RATE (CFS) = 415.73  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 14.77  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.613  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 10.41  
EFFECTIVE AREA (ACRES) = 173.49 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 190.7 PEAK FLOW RATE (CFS) = 415.73  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10339.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 161.00 DOWNSTREAM (FEET) = 159.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 328.00 CHANNEL SLOPE = 0.0061

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 415.73  
FLOW VELOCITY (FEET/SEC.) = 6.52 FLOW DEPTH (FEET) = 4.61  
TRAVEL TIME (MIN.) = 0.84 Tc (MIN.) = 15.61  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10339.00 = 7675.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.61  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.543  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 2.30 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.767  
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 14.36  
EFFECTIVE AREA (ACRES) = 180.39 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 415.73  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.61  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.543  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 6.30 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 2.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.876  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 18.88  
EFFECTIVE AREA (ACRES) = 189.59 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 206.8 PEAK FLOW RATE (CFS) = 415.73  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10390.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

```
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 159.00 DOWNSTREAM(FEET) = 155.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 782.00 CHANNEL SLOPE = 0.0051
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 415.73
FLOW VELOCITY(FEET/SEC.) = 6.10 FLOW DEPTH(FEET) = 4.77
TRAVEL TIME(MIN.) = 2.14 Tc(MIN.) = 17.74
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
```

```
MAINLINE Tc(MIN.) = 17.74
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.376
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 0.800 -
USER-DEFINED - 3.70 0.30 0.850 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 2.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.901
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 11.75
EFFECTIVE AREA(ACRES) = 195.79 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 213.0 PEAK FLOW RATE(CFS) = 415.73
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

```
*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10
-----
```

```
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====
```

```
*****
FLOW PROCESS FROM NODE 10340.00 TO NODE 10341.00 IS CODE = 21
-----
```

```
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
```

```
INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 585.00
```

```
Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.581
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.161
```

```
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE" - 0.10 0.30 0.800 95 10.58
PUBLIC PARK - 0.50 0.30 0.850 95 10.90
AGRICULTURAL GOOD COVER
```

```
"ROW CROPS, STRAIGHT ROW" - 0.40 0.30 1.000 95 21.09
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA RUNOFF(CFS) = 2.60
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.60
```

```
*****
FLOW PROCESS FROM NODE 10341.00 TO NODE 10342.00 IS CODE = 63
-----
```

```
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====
```

```
UPSTREAM ELEVATION(FEET) = 585.00 DOWNSTREAM ELEVATION(FEET) = 570.00
STREET LENGTH(FEET) = 250.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00
```

```
DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020
```

```
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64
```

```
**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.19
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 5.99
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.74
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.32
STREET FLOW TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 11.46
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.021
```

```
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.70 0.30 0.800 -
USER-DEFINED - 1.40 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 5.18
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 7.66
```

```
END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 7.51
FLOW VELOCITY(FEET/SEC.) = 5.08 DEPTH*VELOCITY(FT*FT/SEC.) = 1.57
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10342.00 = 558.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
-----
```

```
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====
```

```
UPSTREAM ELEVATION(FEET) = 570.00 DOWNSTREAM ELEVATION(FEET) = 560.00
```

STREET LENGTH(FEET) = 415.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.39  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 10.91  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.76  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.42  
STREET FLOW TRAVEL TIME(MIN.) = 1.84 Tc(MIN.) = 13.30

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.774  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.20 0.30 0.800 -  
USER-DEFINED - 1.20 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.825  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 5.46  
EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 12.42

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.78  
FLOW VELOCITY(FEET/SEC.) = 3.94 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.55  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10343.00 = 973.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10343.00 TO NODE 10344.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 560.00 DOWNSTREAM ELEVATION(FEET) = 550.00  
STREET LENGTH(FEET) = 616.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.37  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.44  
HALFSTREET FLOOD WIDTH(FEET) = 14.06  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.55  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.56  
STREET FLOW TRAVEL TIME(MIN.) = 2.89 Tc(MIN.) = 16.19

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.497  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.800 -  
USER-DEFINED - 0.80 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814  
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 5.88  
EFFECTIVE AREA(ACRES) = 8.40 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 16.93

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.45 HALFSTREET FLOOD WIDTH(FEET) = 14.62  
FLOW VELOCITY(FEET/SEC.) = 3.64 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.64  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10344.00 = 1589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10344.00 TO NODE 10345.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 550.00 DOWNSTREAM ELEVATION(FEET) = 510.00  
STREET LENGTH(FEET) = 474.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.86  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 11.01  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.08  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.68  
STREET FLOW TRAVEL TIME(MIN.) = 1.12 Tc(MIN.) = 17.31

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.410  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.80 0.30 0.800 -  
USER-DEFINED - 0.20 0.30 0.850 -



SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.803  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.86  
EFFECTIVE AREA(ACRES) = 11.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 11.4 PEAK FLOW RATE(CFS) = 22.13

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.52  
FLOW VELOCITY(FEET/SEC.) = 7.29 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.84  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10345.00 = 2063.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10345.00 TO NODE 10346.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 510.00 DOWNSTREAM ELEVATION(FEET) = 484.00  
STREET LENGTH(FEET) = 231.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.54

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.43  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 11.32  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.31  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.20  
STREET FLOW TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 17.77  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.374

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.40 0.30 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.61  
EFFECTIVE AREA(ACRES) = 13.80 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 13.8 PEAK FLOW RATE(CFS) = 26.37

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.72  
FLOW VELOCITY(FEET/SEC.) = 8.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.31  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10346.00 = 2294.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10346.00 TO NODE 10347.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 484.00 DOWNSTREAM ELEVATION(FEET) = 378.00  
STREET LENGTH(FEET) = 995.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.55

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.03  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.41  
HALFSTREET FLOOD WIDTH(FEET) = 12.54  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.52  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.49  
STREET FLOW TRAVEL TIME(MIN.) = 1.95 Tc(MIN.) = 19.72  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.222

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.30 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 7.31  
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 31.80

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 12.84  
FLOW VELOCITY(FEET/SEC.) = 8.65 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.59  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10347.00 = 3289.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10347.00 TO NODE 10348.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 378.00 DOWNSTREAM ELEVATION(FEET) = 303.00  
STREET LENGTH(FEET) = 751.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.56

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.81  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.44  
HALFSTREET FLOOD WIDTH(FEET) = 14.16  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.84  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.90  
STREET FLOW TRAVEL TIME(MIN.) = 1.42 Tc(MIN.) = 21.13  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.141

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.20 0.30 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 14.03  
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 44.52

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 14.97  
FLOW VELOCITY(FEET/SEC.) = 9.15 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.19  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10348.00 = 4040.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10348.00 TO NODE 10349.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 303.00 DOWNSTREAM ELEVATION(FEET) = 252.00  
STREET LENGTH(FEET) = 607.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 53.04  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.49  
HALFSTREET FLOOD WIDTH(FEET) = 16.67  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.93  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.39  
STREET FLOW TRAVEL TIME(MIN.) = 1.13 Tc(MIN.) = 22.27  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.082  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.30 0.30 0.800 -  
USER-DEFINED - 3.00 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.815  
SUBAREA AREA(ACRES) = 10.30 SUBAREA RUNOFF(CFS) = 17.04  
EFFECTIVE AREA(ACRES) = 36.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 36.4 PEAK FLOW RATE(CFS) = 60.18

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.51 HALFSTREET FLOOD WIDTH(FEET) = 17.55  
FLOW VELOCITY(FEET/SEC.) = 9.20 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.69  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10349.00 = 4647.00 FEET.

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FLOW PROCESS FROM NODE 10349.00 TO NODE 10350.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 252.00 DOWNSTREAM ELEVATION(FEET) = 246.00  
STREET LENGTH(FEET) = 224.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 70.85  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.63  
HALFSTREET FLOOD WIDTH(FEET) = 23.53  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.19  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.89  
STREET FLOW TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 22.87  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.051  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 12.60 0.30 0.800 -  
USER-DEFINED - 0.50 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.802  
SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 21.34  
EFFECTIVE AREA(ACRES) = 49.50 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 49.5 PEAK FLOW RATE(CFS) = 80.49

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.65 HALFSTREET FLOOD WIDTH(FEET) = 24.70  
FLOW VELOCITY(FEET/SEC.) = 6.40 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.17

LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10350.00 = 4871.00 FEET.

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FLOW PROCESS FROM NODE 10350.00 TO NODE 10351.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 237.00
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.43
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 80.49
PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 23.51
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10351.00 = 5390.00 FEET.

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FLOW PROCESS FROM NODE 10351.00 TO NODE 10351.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.51
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.017
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 0.100 -
USER-DEFINED - 5.60 0.30 0.800 -
USER-DEFINED - 0.70 0.30 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.784
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 10.43
EFFECTIVE AREA(ACRES) = 56.00 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 56.0 PEAK FLOW RATE(CFS) = 89.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10352.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 237.00 DOWNSTREAM(FEET) = 230.00
FLOW LENGTH(FEET) = 675.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.46
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 89.43
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 24.50
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10352.00 = 6065.00 FEET.

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FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.50

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.966

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.30 0.100 -
USER-DEFINED - 0.40 0.30 0.800 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.300
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.36
EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 89.43
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.50
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.966
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.80 0.30 0.100 -
USER-DEFINED - 9.40 0.30 0.800 -
USER-DEFINED - 1.10 0.30 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 17.69
EFFECTIVE AREA(ACRES) = 68.70 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79
TOTAL AREA(ACRES) = 68.7 PEAK FLOW RATE(CFS) = 106.91

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10353.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 230.00 DOWNSTREAM(FEET) = 180.00
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 34.05
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 106.91
PIPE TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 24.64
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10353.00 = 6366.00 FEET.

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FLOW PROCESS FROM NODE 10353.00 TO NODE 10353.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.64
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.959
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            0.10       0.30       0.100       -  
 USER-DEFINED       -            6.00       0.30       0.800       -  
 USER-DEFINED       -            1.30       0.30       0.850       -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.799  
 SUBAREA AREA(ACRES) = 7.40       SUBAREA RUNOFF(CFS) = 11.45  
 EFFECTIVE AREA(ACRES) = 76.10    AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 76.1        PEAK FLOW RATE(CFS) = 117.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10353.00 TO NODE 10354.00 IS CODE = 31  
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 180.00    DOWNSTREAM(FEET) = 172.00  
 FLOW LENGTH(FEET) = 458.00    MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.90  
 ESTIMATED PIPE DIAMETER(INCH) = 42.00    NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 117.88  
 PIPE TRAVEL TIME(MIN.) = 0.51    Tc(MIN.) = 25.16  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10354.00 = 6824.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10354.00 TO NODE 10390.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 172.00    DOWNSTREAM(FEET) = 155.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00    CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030    MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 117.88  
 FLOW VELOCITY(FEET/SEC.) = 9.73    FLOW DEPTH(FEET) = 2.01  
 TRAVEL TIME(MIN.) = 0.71    Tc(MIN.) = 25.86  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 25.86  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.907  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS  
                           LAND USE    GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            0.60       0.30       0.100       -  
 USER-DEFINED       -            0.10       0.30       0.850       -  
 USER-DEFINED       -            0.10       0.30       1.000       -  
 USER-DEFINED       -            0.30       0.30       0.100       -  
 USER-DEFINED       -            0.90       0.30       0.850       -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520

SUBAREA AREA(ACRES) = 2.00        SUBAREA RUNOFF(CFS) = 3.15  
 EFFECTIVE AREA(ACRES) = 78.10    AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.78  
 TOTAL AREA(ACRES) = 78.1        PEAK FLOW RATE(CFS) = 117.88  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 25.86  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.907  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS  
                           LAND USE    GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            0.60       0.30       1.000       -  
 USER-DEFINED       -            0.60       0.30       1.000       -  
 USER-DEFINED       -            0.30       0.30       0.850       -  
 USER-DEFINED       -            0.10       0.30       1.000       -  
 USER-DEFINED       -            0.10       0.30       0.100       -  
 USER-DEFINED       -            2.10       0.30       1.000       -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.964  
 SUBAREA AREA(ACRES) = 3.80        SUBAREA RUNOFF(CFS) = 5.53  
 EFFECTIVE AREA(ACRES) = 81.90    AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 81.9        PEAK FLOW RATE(CFS) = 123.05

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 25.86  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.907  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS  
                           LAND USE    GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            2.50       0.30       1.000       -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.50        SUBAREA RUNOFF(CFS) = 3.62  
 EFFECTIVE AREA(ACRES) = 84.40    AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 84.4        PEAK FLOW RATE(CFS) = 126.66

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
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>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
 =====  
 \*\* MAIN STREAM CONFLUENCE DATA \*\*  
 STREAM            Q    Tc    Intensity    Fp(Fm)    Ap    Ae    HEADWATER  
 NUMBER            (CFS)    (MIN.)    (INCH/HR)    (INCH/HR)    (ACRES)    NODE  
 1            126.66    25.86    1.907    0.30( 0.24)    0.80    84.4    10340.00  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	415.73	17.74	2.376	0.30 ( 0.23)	0.77	195.8	10300.00
2	406.53	20.83	2.157	0.30 ( 0.23)	0.76	213.0	10320.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	527.06	17.74	2.376	0.30 ( 0.23)	0.77	253.7	10300.00
2	523.81	20.83	2.157	0.30 ( 0.23)	0.77	281.0	10320.00
3	480.53	25.86	1.907	0.30 ( 0.23)	0.77	297.4	10340.00

TOTAL AREA (ACRES) = 297.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 527.06 Tc (MIN.) = 17.745  
EFFECTIVE AREA (ACRES) = 253.69 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
TOTAL AREA (ACRES) = 297.4  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10360.00 TO NODE 10361.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
ELEVATION DATA: UPSTREAM (FEET) = 337.00 DOWNSTREAM (FEET) = 292.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.697

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.141

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.30	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"GRASS"	-	0.50	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.10	0.30	1.000	95	10.70

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 2.30  
TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 2.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 10361.00 TO NODE 10362.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 292.00 DOWNSTREAM (FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 199.00 CHANNEL SLOPE = 0.0101  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.30  
FLOW VELOCITY (FEET/SEC.) = 2.15 FLOW DEPTH (FEET) = 0.60  
TRAVEL TIME (MIN.) = 1.55 Tc (MIN.) = 12.24  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10362.00 = 529.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.24

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.908

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.986

SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.59

EFFECTIVE AREA (ACRES) = 2.00 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 4.70

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10363.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 290.00 DOWNSTREAM (FEET) = 288.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.70  
FLOW VELOCITY (FEET/SEC.) = 2.88 FLOW DEPTH (FEET) = 0.74  
TRAVEL TIME (MIN.) = 0.85 Tc (MIN.) = 13.09  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10363.00 = 676.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10363.00 TO NODE 10363.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.09  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.799  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.40 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 0.850 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 5.41  
 EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 9.91

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10363.00 TO NODE 10364.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 288.00 DOWNSTREAM(FEET) = 286.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 9.91  
 FLOW VELOCITY(FEET/SEC.) = 3.44 FLOW DEPTH(FEET) = 0.98  
 TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 13.80  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10364.00 = 823.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10364.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.80  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.713  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.40 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
 SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 4.14  
 EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 13.70

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10365.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 286.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 13.70  
 FLOW VELOCITY(FEET/SEC.) = 3.08 FLOW DEPTH(FEET) = 1.22  
 TRAVEL TIME(MIN.) = 1.34 Tc(MIN.) = 15.15  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10365.00 = 1071.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10365.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.15  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.579  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.90 0.30 1.000 -  
 USER-DEFINED - 1.80 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.850 -  
 USER-DEFINED - 0.50 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 7.19  
 EFFECTIVE AREA(ACRES) = 9.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 20.13

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10366.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 20.13  
 FLOW VELOCITY(FEET/SEC.) = 3.39 FLOW DEPTH(FEET) = 1.41  
 TRAVEL TIME(MIN.) = 1.22 Tc(MIN.) = 16.37  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10366.00 = 1319.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10366.00 TO NODE 10366.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.37  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.484  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.20 0.30 1.000 -  
 USER-DEFINED - 2.30 0.30 1.000 -

USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 2.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995  
SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 16.72  
EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 36.01

\*\*\*\*\*

FLOW PROCESS FROM NODE 10366.00 TO NODE 10367.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 279.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 292.00 CHANNEL SLOPE = 0.0103  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 36.01  
FLOW VELOCITY(FEET/SEC.) = 4.31 FLOW DEPTH(FEET) = 1.67  
TRAVEL TIME(MIN.) = 1.13 Tc(MIN.) = 17.49  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10367.00 = 1611.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10367.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.49

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.396

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972

SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 3.03

EFFECTIVE AREA(ACRES) = 19.90 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 19.9 PEAK FLOW RATE(CFS) = 37.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10368.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 279.00 DOWNSTREAM(FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 378.00 CHANNEL SLOPE = 0.0079  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 37.59  
FLOW VELOCITY(FEET/SEC.) = 3.94 FLOW DEPTH(FEET) = 1.78

TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 19.09  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10368.00 = 1989.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10368.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.09

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.271

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.973  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 3.92  
EFFECTIVE AREA(ACRES) = 22.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 22.1 PEAK FLOW RATE(CFS) = 39.28

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10369.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 247.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 229.00 CHANNEL SLOPE = 0.1266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 39.28  
FLOW VELOCITY(FEET/SEC.) = 11.25 FLOW DEPTH(FEET) = 1.08  
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 19.43  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10369.00 = 2218.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10369.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.43

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.244

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	9.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996  
SUBAREA AREA(ACRES) = 11.60 SUBAREA RUNOFF(CFS) = 20.31  
EFFECTIVE AREA(ACRES) = 33.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 33.7 PEAK FLOW RATE(CFS) = 59.06

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10369.00 TO NODE 10370.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	247.00	DOWNSTREAM(FEET) =	226.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	179.00	CHANNEL SLOPE =	0.1173
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH(FEET) =	2.00
CHANNEL FLOW THRU SUBAREA(CFS) =	59.06		
FLOW VELOCITY(FEET/SEC.) =	12.07	FLOW DEPTH(FEET) =	1.28
TRAVEL TIME(MIN.) =	0.25	Tc(MIN.) =	19.68
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10370.00 =	2397.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10370.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	19.68				
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	2.225				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	3.60	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	5.60	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.997				
SUBAREA AREA(ACRES) =	11.10	SUBAREA RUNOFF(CFS) =	19.24		
EFFECTIVE AREA(ACRES) =	44.80	AREA-AVERAGED Fm(INCH/HR) =	0.30		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.99		
TOTAL AREA(ACRES) =	44.8	PEAK FLOW RATE(CFS) =	77.72		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10371.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	226.00	DOWNSTREAM(FEET) =	188.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	434.00	CHANNEL SLOPE =	0.0876
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH(FEET) =	2.00
CHANNEL FLOW THRU SUBAREA(CFS) =	77.72		
FLOW VELOCITY(FEET/SEC.) =	11.63	FLOW DEPTH(FEET) =	1.49
TRAVEL TIME(MIN.) =	0.62	Tc(MIN.) =	20.30
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10371.00 =	2831.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10371.00 TO NODE 10371.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.30  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.184  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.20	0.30	0.850	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	7.20	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.958				
SUBAREA AREA(ACRES) =	10.70	SUBAREA RUNOFF(CFS) =	18.27		
EFFECTIVE AREA(ACRES) =	55.50	AREA-AVERAGED Fm(INCH/HR) =	0.30		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.99		
TOTAL AREA(ACRES) =	55.5	PEAK FLOW RATE(CFS) =	94.35		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10371.00 TO NODE 10389.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	188.00	DOWNSTREAM(FEET) =	157.00
FLOW LENGTH(FEET) =	1918.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	39.0 INCH PIPE IS	30.3 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) =	13.66		
ESTIMATED PIPE DIAMETER(INCH) =	39.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	94.35		
PIPE TRAVEL TIME(MIN.) =	2.34	Tc(MIN.) =	22.64
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 =	4749.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS =	2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:	
TIME OF CONCENTRATION(MIN.) =	22.64
RAINFALL INTENSITY(INCH/HR) =	2.06
AREA-AVERAGED Fm(INCH/HR) =	0.30
AREA-AVERAGED Fp(INCH/HR) =	0.30
AREA-AVERAGED Ap =	0.99
EFFECTIVE STREAM AREA(ACRES) =	55.50
TOTAL STREAM AREA(ACRES) =	55.50
PEAK FLOW RATE(CFS) AT CONFLUENCE =	94.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10380.00 TO NODE 10381.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) =	241.00		
ELEVATION DATA: UPSTREAM(FEET) =	275.00	DOWNSTREAM(FEET) =	273.00



Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.110  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.958  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.30	0.100	95	7.11
PUBLIC PARK	-	1.10	0.30	0.850	95	11.30

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.735  
 SUBAREA RUNOFF(CFS) = 4.37  
 TOTAL AREA(ACRES) = 1.30 PEAK FLOW RATE(CFS) = 4.37

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10381.00 TO NODE 10382.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 273.00 DOWNSTREAM ELEVATION(FEET) = 271.00  
 STREET LENGTH(FEET) = 238.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.89  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.39  
 HALfstREET FLOOD WIDTH(FEET) = 11.45  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.30  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.89  
 STREET FLOW TRAVEL TIME(MIN.) = 1.73 Tc(MIN.) = 8.84  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.499

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	1.40	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.718  
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 5.02  
 EFFECTIVE AREA(ACRES) = 3.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 8.86

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.41 HALfstREET FLOOD WIDTH(FEET) = 12.77  
 FLOW VELOCITY(FEET/SEC.) = 2.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.01  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10382.00 = 479.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10382.00 TO NODE 10383.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 271.00 DOWNSTREAM ELEVATION(FEET) = 268.00  
 STREET LENGTH(FEET) = 357.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.83  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.46  
 HALfstREET FLOOD WIDTH(FEET) = 14.96  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.64  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.21  
 STREET FLOW TRAVEL TIME(MIN.) = 2.25 Tc(MIN.) = 11.09  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.077

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	1.30	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.452  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 7.94  
 EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 15.66

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.48 HALfstREET FLOOD WIDTH(FEET) = 16.21  
 FLOW VELOCITY(FEET/SEC.) = 2.78 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.34  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10383.00 = 836.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10383.00 TO NODE 10384.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 268.00 DOWNSTREAM ELEVATION(FEET) = 264.00  
 STREET LENGTH(FEET) = 473.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.61  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.52  
 HALFSTREET FLOOD WIDTH(FEET) = 18.09  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.98  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.55  
 STREET FLOW TRAVEL TIME(MIN.) = 2.65 Tc(MIN.) = 13.74  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.722

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.60	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 9.90  
 EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.57  
 TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 23.64

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 19.18  
 FLOW VELOCITY(FEET/SEC.) = 3.06 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.66  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10384.00 = 1309.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10384.00 TO NODE 10385.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 264.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
 STREET LENGTH(FEET) = 463.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.26  
 \*\*\*STREET FLOWING FULL\*\*\*

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.60  
 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.07  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.83  
 STREET FLOW TRAVEL TIME(MIN.) = 2.52 Tc(MIN.) = 16.25  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.492

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.600	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.650  
 SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 13.23  
 EFFECTIVE AREA(ACRES) = 16.70 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.7 PEAK FLOW RATE(CFS) = 34.75

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
 FLOW VELOCITY(FEET/SEC.) = 3.25 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.00  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10385.00 = 1772.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10385.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
 =====

MAINLINE Tc(MIN.) = 16.25  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.492  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.42  
 EFFECTIVE AREA(ACRES) = 16.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.9 PEAK FLOW RATE(CFS) = 35.17

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10386.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 261.00 DOWNSTREAM(FEET) = 200.00  
 FLOW LENGTH(FEET) = 712.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.32  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 35.17

PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 16.84  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10386.00 = 2484.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.84

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.447

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.561

SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.87

EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60

TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 37.35

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.84

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.447

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	1.70	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.544

SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 8.43

EFFECTIVE AREA(ACRES) = 22.40 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59

TOTAL AREA(ACRES) = 22.4 PEAK FLOW RATE(CFS) = 45.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.84

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.447

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	2.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223

SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 7.50

EFFECTIVE AREA(ACRES) = 25.90 AREA-AVERAGED Fm(INCH/HR) = 0.16

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54

TOTAL AREA(ACRES) = 25.9 PEAK FLOW RATE(CFS) = 53.27

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.84

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.447

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.228

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 4.28

EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52

TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 57.55

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.84

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.447

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	0.850	-
USER-DEFINED	-	2.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.225

SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 6.42

EFFECTIVE AREA(ACRES) = 30.90 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49

TOTAL AREA(ACRES) = 30.9 PEAK FLOW RATE(CFS) = 63.98

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 16.84  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.447  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.100 -  
USER-DEFINED - 1.50 0.30 0.600 -  
USER-DEFINED - 1.70 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.204  
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 15.46  
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 79.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10387.00 IS CODE = 31  
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 200.00 DOWNSTREAM(FEET) = 163.00  
FLOW LENGTH(FEET) = 1145.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.14  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 79.44  
PIPE TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 17.95  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10387.00 = 3629.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.95  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.100 -  
USER-DEFINED - 23.80 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 0.100 -  
USER-DEFINED - 6.90 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.830  
SUBAREA AREA(ACRES) = 32.90 SUBAREA RUNOFF(CFS) = 62.51  
EFFECTIVE AREA(ACRES) = 71.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 71.0 PEAK FLOW RATE(CFS) = 138.96

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81  
=====

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.95  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 1.20 0.30 0.100 -  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.641  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 7.41  
EFFECTIVE AREA(ACRES) = 74.80 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 74.8 PEAK FLOW RATE(CFS) = 146.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10388.00 IS CODE = 31  
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 163.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.29  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 146.38  
PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 18.07  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10388.00 = 3779.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.07  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.350  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.80 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.400 -  
USER-DEFINED - 0.60 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 12.54  
EFFECTIVE AREA(ACRES) = 80.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 80.9 PEAK FLOW RATE(CFS) = 158.27

```

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.07
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.350
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -      0.10    0.30    0.100  -
USER-DEFINED          -     10.70    0.30    0.400  -
USER-DEFINED          -      2.30    0.30    0.850  -
USER-DEFINED          -      0.50    0.30    1.000  -
USER-DEFINED          -      0.30    0.30    1.000  -
USER-DEFINED          -      0.70    0.30    0.400  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.502
SUBAREA AREA(ACRES) = 14.60    SUBAREA RUNOFF(CFS) = 28.91
EFFECTIVE AREA(ACRES) = 95.50    AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 95.5    PEAK FLOW RATE(CFS) = 187.17

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.07
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.350
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -      0.70    0.30    0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.70    SUBAREA RUNOFF(CFS) = 1.32
EFFECTIVE AREA(ACRES) = 96.20    AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 96.2    PEAK FLOW RATE(CFS) = 188.49

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10389.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 158.00    DOWNSTREAM(FEET) = 157.00
FLOW LENGTH(FEET) = 51.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.31
ESTIMATED PIPE DIAMETER(INCH) = 48.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 188.49
PIPE TRAVEL TIME(MIN.) = 0.05    Tc(MIN.) = 18.12
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10389.00 = 3830.00 FEET.

*****

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FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 18.12
RAINFALL INTENSITY(INCH/HR) = 2.35
AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.58
EFFECTIVE STREAM AREA(ACRES) = 96.20
TOTAL STREAM AREA(ACRES) = 96.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 188.49

** CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER     (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1          94.35 22.64 2.063 0.30( 0.30) 0.99 55.5 10360.00
2         188.49 18.12 2.346 0.30( 0.17) 0.58 96.2 10380.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER     (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1          276.14 18.12 2.346 0.30( 0.21) 0.71 140.6 10380.00
2          258.23 22.64 2.063 0.30( 0.22) 0.73 151.7 10360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 276.14    Tc(MIN.) = 18.12
EFFECTIVE AREA(ACRES) = 140.63    AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 151.7
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

*****
FLOW PROCESS FROM NODE 10389.00 TO NODE 10390.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 157.00    DOWNSTREAM(FEET) = 155.00
FLOW LENGTH(FEET) = 312.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.59
ESTIMATED PIPE DIAMETER(INCH) = 69.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 276.14
PIPE TRAVEL TIME(MIN.) = 0.41    Tc(MIN.) = 18.53
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

MAINLINE Tc(MIN.) = 18.53  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.314  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 5.70 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 17.23  
 EFFECTIVE AREA(ACRES) = 150.13 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA(ACRES) = 161.2 PEAK FLOW RATE(CFS) = 283.31

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.53  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.314  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 3.99  
 EFFECTIVE AREA(ACRES) = 152.33 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 163.4 PEAK FLOW RATE(CFS) = 287.30

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	287.30	18.53	2.314	0.30( 0.22)	0.73	152.3	10380.00
2	267.25	23.06	2.041	0.30( 0.22)	0.75	163.4	10360.00

LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	527.06	17.74	2.376	0.30( 0.23)	0.77	253.7	10300.00
2	523.81	20.83	2.157	0.30( 0.23)	0.77	281.0	10320.00
3	480.53	25.86	1.907	0.30( 0.23)	0.77	297.4	10340.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	810.21	17.74	2.376	0.30( 0.23)	0.76	399.5	10300.00
2	813.53	18.53	2.314	0.30( 0.23)	0.76	413.0	10380.00
3	800.95	20.83	2.157	0.30( 0.23)	0.76	438.9	10320.00
4	771.92	23.06	2.041	0.30( 0.23)	0.76	451.6	10360.00
5	728.08	25.86	1.907	0.30( 0.23)	0.76	460.8	10340.00

TOTAL AREA(ACRES) = 460.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 813.53 Tc(MIN.) = 18.535  
 EFFECTIVE AREA(ACRES) = 413.01 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA(ACRES) = 460.8  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 460.8 TC(MIN.) = 18.53  
 EFFECTIVE AREA(ACRES) = 413.01 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.757  
 PEAK FLOW RATE(CFS) = 813.53

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	810.21	17.74	2.376	0.30( 0.23)	0.76	399.5	10300.00
2	813.53	18.53	2.314	0.30( 0.23)	0.76	413.0	10380.00
3	800.95	20.83	2.157	0.30( 0.23)	0.76	438.9	10320.00
4	771.92	23.06	2.041	0.30( 0.23)	0.76	451.6	10360.00
5	728.08	25.86	1.907	0.30( 0.23)	0.76	460.8	10340.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506104B.DAT  
TIME/DATE OF STUDY: 12:46 04/15/2013  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.820
- 2) 6.00; 4.350
- 3) 7.00; 3.990
- 4) 8.00; 3.700
- 5) 9.00; 3.460
- 6) 10.00; 3.260
- 7) 11.00; 3.090
- 8) 12.00; 2.940
- 9) 13.00; 2.810
- 10) 14.00; 2.690
- 11) 15.00; 2.590
- 12) 20.00; 2.200
- 13) 25.00; 1.940
- 14) 30.00; 1.750
- 15) 40.00; 1.490
- 16) 50.00; 1.310
- 17) 60.00; 1.180
- 18) 90.00; 0.940
- 19) 120.00; 0.800
- 20) 180.00; 0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10400.00 TO NODE 10401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00  
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.434  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.194  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
PUBLIC PARK	-	0.50	0.30	0.850	95	6.43

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.850  
 SUBAREA RUNOFF(CFS) = 1.77  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 10401.00 TO NODE 10402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.3419  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.77  
 FLOW VELOCITY(FEET/SEC.) = 6.15 FLOW DEPTH(FEET) = 0.31  
 TRAVEL TIME(MIN.) = 0.32  $T_c$ (MIN.) = 6.75  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10402.00 = 424.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 6.75  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.080  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-



SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.940  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.71  
EFFECTIVE AREA(ACRES) = 1.00 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 3.43

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10402.00 TO NODE 10403.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.2439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.43  
FLOW VELOCITY(FEET/SEC.) = 6.35 FLOW DEPTH(FEET) = 0.42  
TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 7.07  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10403.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10403.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 7.07  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.969  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 2.99  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 6.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10404.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 420.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 266.00 CHANNEL SLOPE = 0.1880  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 6.32  
FLOW VELOCITY(FEET/SEC.) = 6.68 FLOW DEPTH(FEET) = 0.56  
TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 7.74  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10404.00 = 813.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10404.00 IS CODE = 81  
-----

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc(MIN.) = 7.74  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.776  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.863  
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 7.28  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 13.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10405.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 370.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 289.00 CHANNEL SLOPE = 0.1730  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 13.27  
FLOW VELOCITY(FEET/SEC.) = 7.81 FLOW DEPTH(FEET) = 0.75  
TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 8.35  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10405.00 = 1102.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10405.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 8.35  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.615  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 12.10  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 24.76

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10406.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 367.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 23.00 CHANNEL SLOPE = 0.1304

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 24.76  
FLOW VELOCITY (FEET/SEC.) = 8.18 FLOW DEPTH (FEET) = 1.00  
TRAVEL TIME (MIN.) = 0.05 Tc (MIN.) = 8.40  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10406.00 = 1125.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10406.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 8.40  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.604  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 6.33  
EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 31.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10407.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 367.00 DOWNSTREAM (FEET) = 344.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 214.00 CHANNEL SLOPE = 0.1075  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.01  
FLOW VELOCITY (FEET/SEC.) = 8.04 FLOW DEPTH (FEET) = 1.13  
TRAVEL TIME (MIN.) = 0.44 Tc (MIN.) = 8.84  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10407.00 = 1339.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10407.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 8.84  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.497  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 5.84  
EFFECTIVE AREA (ACRES) = 12.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 35.86

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10408.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 344.00 DOWNSTREAM (FEET) = 327.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 919.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 35.86  
FLOW VELOCITY (FEET/SEC.) = 5.37 FLOW DEPTH (FEET) = 1.49  
TRAVEL TIME (MIN.) = 2.85 Tc (MIN.) = 11.70  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10408.00 = 2258.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10408.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 11.70  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.985  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.800 -  
USER-DEFINED - 7.90 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.849  
SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 19.66  
EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 49.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 327.00 DOWNSTREAM (FEET) = 314.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 807.00 CHANNEL SLOPE = 0.0161  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 49.85  
FLOW VELOCITY (FEET/SEC.) = 5.52 FLOW DEPTH (FEET) = 1.73  
TRAVEL TIME (MIN.) = 2.44 Tc (MIN.) = 14.13  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10409.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10409.00 TO NODE 10409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 14.13  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.677  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

```

LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        6.90     0.30      0.800     -
USER-DEFINED  -        5.70     0.30      0.850     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.823
SUBAREA AREA (ACRES) = 12.60  SUBAREA RUNOFF(CFS) = 27.55
EFFECTIVE AREA (ACRES) = 32.90  AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.84
TOTAL AREA (ACRES) = 32.9  PEAK FLOW RATE (CFS) = 71.76

```

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*****
FLOW PROCESS FROM NODE 10409.00 TO NODE 10410.00 IS CODE = 31
-----

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

```

```

ELEVATION DATA: UPSTREAM(FEET) = 314.00  DOWNSTREAM(FEET) = 266.00
FLOW LENGTH(FEET) = 213.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 14.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 35.13
ESTIMATED PIPE DIAMETER(INCH) = 24.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 71.76
PIPE TRAVEL TIME(MIN.) = 0.10  Tc(MIN.) = 14.24
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10410.00 = 3278.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10410.00 TO NODE 10411.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

```

```

ELEVATION DATA: UPSTREAM(FEET) = 266.00  DOWNSTREAM(FEET) = 170.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1470.00  CHANNEL SLOPE = 0.0653
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 71.76
FLOW VELOCITY(FEET/SEC.) = 10.21  FLOW DEPTH(FEET) = 1.53
TRAVEL TIME(MIN.) = 2.40  Tc(MIN.) = 16.64
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10411.00 = 4748.00 FEET.

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*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10411.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN.) = 16.64
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.462
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.60     0.30     0.100  -
USER-DEFINED  -        0.10     0.30     0.850  -
USER-DEFINED  -        0.40     0.30     0.100  -
USER-DEFINED  -        6.60     0.30     0.800  -
USER-DEFINED  -        0.80     0.30     0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.723
SUBAREA AREA (ACRES) = 8.50  SUBAREA RUNOFF(CFS) = 17.18

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```

EFFECTIVE AREA(ACRES) = 41.40  AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.82
TOTAL AREA(ACRES) = 41.4  PEAK FLOW RATE(CFS) = 82.60

```

```

*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10412.00 IS CODE = 31
-----

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

```

```

ELEVATION DATA: UPSTREAM(FEET) = 170.00  DOWNSTREAM(FEET) = 161.00
FLOW LENGTH(FEET) = 1129.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.09
ESTIMATED PIPE DIAMETER(INCH) = 42.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 82.60
PIPE TRAVEL TIME(MIN.) = 1.86  Tc(MIN.) = 18.50
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10412.00 = 5877.00 FEET.

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*****
FLOW PROCESS FROM NODE 10412.00 TO NODE 10413.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

```

```

ELEVATION DATA: UPSTREAM(FEET) = 161.00  DOWNSTREAM(FEET) = 141.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 360.00  CHANNEL SLOPE = 0.0556
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 82.60
FLOW VELOCITY(FEET/SEC.) = 9.99  FLOW DEPTH(FEET) = 1.66
TRAVEL TIME(MIN.) = 0.60  Tc(MIN.) = 19.10
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10413.00 = 6237.00 FEET.

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*****
FLOW PROCESS FROM NODE 10413.00 TO NODE 10413.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 19.10
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.270
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        1.20     0.30     0.100  -
USER-DEFINED  -        0.40     0.30     0.850  -
USER-DEFINED  -        0.30     0.30     0.100  -
USER-DEFINED  -        0.10     0.30     0.850  -
USER-DEFINED  -        0.90     0.30     1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.509
SUBAREA AREA (ACRES) = 2.90  SUBAREA RUNOFF(CFS) = 5.53
EFFECTIVE AREA(ACRES) = 44.30  AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 44.3  PEAK FLOW RATE(CFS) = 82.60
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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=====
END OF STUDY SUMMARY:

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TOTAL AREA (ACRES) = 44.3 TC (MIN.) = 19.10  
EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.798  
PEAK FLOW RATE (CFS) = 82.60

=====  
=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506105I.DAT  
TIME/DATE OF STUDY: 12:49 04/15/2013  
=====

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:  
=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.820
- 2) 6.00; 4.350
- 3) 7.00; 3.990
- 4) 8.00; 3.700
- 5) 9.00; 3.460
- 6) 10.00; 3.260
- 7) 11.00; 3.090
- 8) 12.00; 2.940
- 9) 13.00; 2.810
- 10) 14.00; 2.690
- 11) 15.00; 2.590
- 12) 20.00; 2.200
- 13) 25.00; 1.940
- 14) 30.00; 1.750
- 15) 40.00; 1.490
- 16) 50.00; 1.310
- 17) 60.00; 1.180
- 18) 90.00; 0.940
- 19) 120.00; 0.800
- 20) 180.00; 0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB	GUTTER-GEOMETRIES:			MANNING
	WIDTH	CROSSFALL	IN-	OUT-/PARK-		HEIGHT	WIDTH	LIP	
	(FT)	(FT)	SIDE	SIDE/ WAY	(FT)	(FT)	(FT)	(FT)	(n)
1	60.0	30.0	0.020/0.020/0.020		0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020		0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020		0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020		0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10500.00 TO NODE 10501.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 1123.00 DOWNSTREAM(FEET) = 1085.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.984  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.093  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.20	0.30	1.000	95	10.98
NATURAL FAIR COVER "GRASS"	-	0.30	0.30	1.000	95	10.98

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
 SUBAREA RUNOFF(CFS) = 1.26  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.26

\*\*\*\*\*

FLOW PROCESS FROM NODE 10501.00 TO NODE 10502.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 1085.00 DOWNSTREAM(FEET) = 1050.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 181.00 CHANNEL SLOPE = 0.1934  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.26  
 FLOW VELOCITY(FEET/SEC.) = 4.58 FLOW DEPTH(FEET) = 0.30  
 TRAVEL TIME(MIN.) = 0.66  $T_c$ (MIN.) = 11.64  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10502.00 = 507.00 FEET.

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FLOW PROCESS FROM NODE 10502.00 TO NODE 10502.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 11.64  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.994  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.10     0.30      1.000     -
USER-DEFINED  -        0.80     0.30      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 2.18
EFFECTIVE AREA (ACRES) = 1.40  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.4    PEAK FLOW RATE (CFS) = 3.39

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*****
FLOW PROCESS FROM NODE 10502.00 TO NODE 10503.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1025.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 193.00  CHANNEL SLOPE = 0.1295
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.39
FLOW VELOCITY(FEET/SEC.) = 4.96  FLOW DEPTH(FEET) = 0.48
TRAVEL TIME(MIN.) = 0.65  Tc(MIN.) = 12.29
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10503.00 = 700.00 FEET.

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10503.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.29
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.902
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.50   0.30  1.000  -
USER-DEFINED      -        1.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 5.39
EFFECTIVE AREA (ACRES) = 3.70  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 3.7    PEAK FLOW RATE (CFS) = 8.67

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10504.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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```

ELEVATION DATA: UPSTREAM(FEET) = 1025.00  DOWNSTREAM(FEET) = 1020.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00  CHANNEL SLOPE = 0.0151
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 8.67
FLOW VELOCITY(FEET/SEC.) = 3.48  FLOW DEPTH(FEET) = 0.91
TRAVEL TIME(MIN.) = 1.59  Tc(MIN.) = 13.88
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10504.00 = 1032.00 FEET.

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10504.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.88
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.704
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.10   0.30  1.000  -
USER-DEFINED      -        0.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 1.95
EFFECTIVE AREA (ACRES) = 4.60  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.6    PEAK FLOW RATE (CFS) = 9.95

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10505.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1020.00  DOWNSTREAM(FEET) = 975.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 397.00  CHANNEL SLOPE = 0.1134
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 9.95
FLOW VELOCITY(FEET/SEC.) = 7.64  FLOW DEPTH(FEET) = 0.66
TRAVEL TIME(MIN.) = 0.87  Tc(MIN.) = 14.75
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10505.00 = 1429.00 FEET.

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10505.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.75
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.615
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.20   0.30  1.000  -
USER-DEFINED      -        1.20   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.40  SUBAREA RUNOFF (CFS) = 2.92
EFFECTIVE AREA (ACRES) = 6.00  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.0    PEAK FLOW RATE (CFS) = 12.50

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10506.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 905.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 334.00 CHANNEL SLOPE = 0.2096
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 12.50
FLOW VELOCITY(FEET/SEC.) = 10.24 FLOW DEPTH(FEET) = 0.64
TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 15.29
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10506.00 = 1763.00 FEET.

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10506.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.29
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.567
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE   GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED -      6.10   0.30   1.000  -
USER-DEFINED -      3.70   0.30   1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 20.00
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 32.24

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10507.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 790.00 CHANNEL SLOPE = 0.0380
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 32.24
FLOW VELOCITY(FEET/SEC.) = 5.49 FLOW DEPTH(FEET) = 1.40
TRAVEL TIME(MIN.) = 2.40 Tc(MIN.) = 17.69
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10507.00 = 2553.00 FEET.

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10507.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.69
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.380
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE   GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED -      2.70   0.30   1.000  -
USER-DEFINED -      6.30   0.30   1.000  -
USER-DEFINED -      0.30   0.30   1.000  -

```

```

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 17.41
EFFECTIVE AREA(ACRES) = 25.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 47.00

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10508.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 755.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 47.00
FLOW VELOCITY(FEET/SEC.) = 8.93 FLOW DEPTH(FEET) = 1.32
TRAVEL TIME(MIN.) = 2.09 Tc(MIN.) = 19.78
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10508.00 = 3673.00 FEET.

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10508.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.78
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.217
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE   GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED -      0.80   0.30   1.000  -
USER-DEFINED -     11.10   0.30   1.000  -
USER-DEFINED -      3.10   0.30   1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 25.88
EFFECTIVE AREA(ACRES) = 40.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 69.20

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10509.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 755.00 DOWNSTREAM(FEET) = 533.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1578.00 CHANNEL SLOPE = 0.1407
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 69.20
FLOW VELOCITY(FEET/SEC.) = 10.90 FLOW DEPTH(FEET) = 1.45
TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 22.19
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10509.00 = 5251.00 FEET.

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FLOW PROCESS FROM NODE 10509.00 TO NODE 10509.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.19

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.086

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.80	0.30	1.000	-
USER-DEFINED	-	11.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	8.30	0.30	1.000	-
USER-DEFINED	-	38.10	0.30	1.000	-
USER-DEFINED	-	8.70	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 77.40 SUBAREA RUNOFF (CFS) = 124.42

EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 188.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10509.00 TO NODE 10510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 415.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1236.00 CHANNEL SLOPE = 0.0955  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 188.88  
 FLOW VELOCITY (FEET/SEC.) = 12.07 FLOW DEPTH (FEET) = 2.28  
 TRAVEL TIME (MIN.) = 1.71 Tc (MIN.) = 23.90  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10510.00 = 6487.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10510.00 TO NODE 10510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.90

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.997

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	30.10	0.30	1.000	-
USER-DEFINED	-	15.30	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	11.30	0.30	1.000	-
USER-DEFINED	-	5.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 64.90 SUBAREA RUNOFF (CFS) = 99.14

EFFECTIVE AREA (ACRES) = 182.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 182.4 PEAK FLOW RATE (CFS) = 278.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10510.00 TO NODE 10511.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1161.00 CHANNEL SLOPE = 0.0973  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 278.64  
 FLOW VELOCITY (FEET/SEC.) = 13.44 FLOW DEPTH (FEET) = 2.63  
 TRAVEL TIME (MIN.) = 1.44 Tc (MIN.) = 25.34  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10511.00 = 7648.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10511.00 TO NODE 10511.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 25.34

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.927

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.50	0.30	1.000	-
USER-DEFINED	-	10.80	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	22.10	0.30	1.000	-
USER-DEFINED	-	4.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 54.80 SUBAREA RUNOFF (CFS) = 80.25

EFFECTIVE AREA (ACRES) = 237.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 237.2 PEAK FLOW RATE (CFS) = 347.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10511.00 TO NODE 10512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 302.00 DOWNSTREAM (FEET) = 190.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1644.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 347.38  
 FLOW VELOCITY (FEET/SEC.) = 12.41 FLOW DEPTH (FEET) = 3.05  
 TRAVEL TIME (MIN.) = 2.21 Tc (MIN.) = 27.55  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10512.00 = 9292.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10512.00 TO NODE 10512.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<



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=====
MAINLINE Tc(MIN.) = 27.55
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.843
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        0.50     0.30     1.000     -
USER-DEFINED          -        0.20     0.30     1.000     -
USER-DEFINED          -        1.70     0.30     1.000     -
USER-DEFINED          -        0.10     0.30     1.000     -
USER-DEFINED          -       14.20     0.30     1.000     -
USER-DEFINED          -        2.80     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 19.50      SUBAREA RUNOFF(CFS) = 27.09
EFFECTIVE AREA(ACRES) = 256.70   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 256.7      PEAK FLOW RATE(CFS) = 356.55

*****
FLOW PROCESS FROM NODE 10512.00 TO NODE 10513.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 190.00 DOWNSTREAM(FEET) = 183.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 86.00 CHANNEL SLOPE = 0.0814
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00
CHANNEL FLOW THRU SUBAREA(CFS) = 356.55
FLOW VELOCITY(FEET/SEC.) = 13.38 FLOW DEPTH(FEET) = 2.98
TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 27.65
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10513.00 = 9378.00 FEET.

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 27.65
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.839
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        0.10     0.30     0.100     -
USER-DEFINED          -        1.30     0.30     1.000     -
USER-DEFINED          -       29.90     0.30     1.000     -
USER-DEFINED          -       11.90     0.30     1.000     -
USER-DEFINED          -        1.70     0.30     1.000     -
USER-DEFINED          -        0.60     0.30     0.100     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 45.50      SUBAREA RUNOFF(CFS) = 63.20
EFFECTIVE AREA(ACRES) = 302.20   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 302.2      PEAK FLOW RATE(CFS) = 418.82

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FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 27.65
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.839
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        9.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30      SUBAREA RUNOFF(CFS) = 12.88
EFFECTIVE AREA(ACRES) = 311.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 311.5      PEAK FLOW RATE(CFS) = 431.70

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10514.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 171.00
FLOW LENGTH(FEET) = 1209.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 75.0 INCH PIPE IS 59.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.57
ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 431.70
PIPE TRAVEL TIME(MIN.) = 1.22 Tc(MIN.) = 28.87
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10514.00 = 10587.00 FEET.

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10514.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 28.87
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.793
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        0.20     0.30     0.100     -
USER-DEFINED          -        0.40     0.30     1.000     -
USER-DEFINED          -        1.70     0.30     0.100     -
USER-DEFINED          -       31.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 33.60      SUBAREA RUNOFF(CFS) = 45.61
EFFECTIVE AREA(ACRES) = 345.10   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 345.1      PEAK FLOW RATE(CFS) = 464.36

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10515.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

ELEVATION DATA: UPSTREAM(FEET) = 171.00 DOWNSTREAM(FEET) = 165.00  
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 78.0 INCH PIPE IS 58.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.49  
ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 464.36  
PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 29.41  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10515.00 = 11152.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10515.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 29.41  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.773  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 1.30 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 15.30 0.30 0.100 -  
USER-DEFINED - 1.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.202  
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 29.58  
EFFECTIVE AREA(ACRES) = 364.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 364.3 PEAK FLOW RATE(CFS) = 487.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10525.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 709.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 78.0 INCH PIPE IS 63.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.98  
ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 487.58  
PIPE TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 30.10  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 30.10  
RAINFALL INTENSITY(INCH/HR) = 1.75  
AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.95  
EFFECTIVE STREAM AREA(ACRES) = 364.30  
TOTAL STREAM AREA(ACRES) = 364.30  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 487.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10520.00 TO NODE 10521.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 289.00  
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 180.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.311  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.900  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL - 0.30 0.30 0.100 95 7.31  
PUBLIC PARK - 1.20 0.30 0.850 95 11.62  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.700  
SUBAREA RUNOFF(CFS) = 4.98  
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 4.98

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10521.00 TO NODE 10522.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

\*\*\*\*\*  
UPSTREAM ELEVATION(FEET) = 180.00 DOWNSTREAM ELEVATION(FEET) = 176.00  
STREET LENGTH(FEET) = 408.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.49  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.40  
HALFSTREET FLOOD WIDTH(FEET) = 12.15  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.55  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.02  
STREET FLOW TRAVEL TIME(MIN.) = 2.67 Tc(MIN.) = 9.98  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.264  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            0.50       0.30       0.100       -  
 USER-DEFINED       -            0.60       0.30       0.850       -  
 USER-DEFINED       -            0.60       0.30       0.100       -  
 USER-DEFINED       -            0.80       0.30       0.850       -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520  
 SUBAREA AREA (ACRES) = 2.50    SUBAREA RUNOFF (CFS) = 6.99  
 EFFECTIVE AREA (ACRES) = 4.00    AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.59  
 TOTAL AREA (ACRES) = 4.0        PEAK FLOW RATE (CFS) = 11.12

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.43    HALFSTREET FLOOD WIDTH (FEET) = 13.63  
 FLOW VELOCITY (FEET/SEC.) = 2.71    DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.17  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10522.00 = 697.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10522.00 TO NODE 10523.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION (FEET) = 176.00    DOWNSTREAM ELEVATION (FEET) = 173.00  
 STREET LENGTH (FEET) = 333.00    CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.24  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.50  
 HALFSTREET FLOOD WIDTH (FEET) = 16.99  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.96  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.48  
 STREET FLOW TRAVEL TIME (MIN.) = 1.87    Tc (MIN.) = 11.85  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.962

SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS  
 LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            0.50       0.30       0.100       -  
 USER-DEFINED       -            4.70       0.30       0.100       -  
 USER-DEFINED       -            0.10       0.30       0.600       -  
 USER-DEFINED       -            0.10       0.30       0.100       -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.109  
 SUBAREA AREA (ACRES) = 5.40    SUBAREA RUNOFF (CFS) = 14.24  
 EFFECTIVE AREA (ACRES) = 9.40    AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.31  
 TOTAL AREA (ACRES) = 9.4        PEAK FLOW RATE (CFS) = 24.27

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.54    HALFSTREET FLOOD WIDTH (FEET) = 19.10  
 FLOW VELOCITY (FEET/SEC.) = 3.16    DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.71  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10523.00 = 1030.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10523.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 11.85  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.962  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.90	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	0.100	-
USER-DEFINED	-	4.80	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	4.90	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.785  
 SUBAREA AREA (ACRES) = 12.70    SUBAREA RUNOFF (CFS) = 31.17  
 EFFECTIVE AREA (ACRES) = 22.10    AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 22.1        PEAK FLOW RATE (CFS) = 55.43

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10524.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 173.00    DOWNSTREAM (FEET) = 165.00  
 FLOW LENGTH (FEET) = 736.00    MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.46  
 ESTIMATED PIPE DIAMETER (INCH) = 36.00    NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 55.43  
 PIPE TRAVEL TIME (MIN.) = 1.17    Tc (MIN.) = 13.03  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10524.00 = 1766.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10524.00 TO NODE 10524.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 13.03  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.807  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.308  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.40  
EFFECTIVE AREA(ACRES) = 23.90 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 23.9 PEAK FLOW RATE(CFS) = 56.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10524.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 623.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.64  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 56.74  
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 14.00  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10525.00 = 2389.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.690  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	6.80	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 19.93  
EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64  
TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 74.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.00  
RAINFALL INTENSITY(INCH/HR) = 2.69  
AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.64  
EFFECTIVE STREAM AREA(ACRES) = 33.00

TOTAL STREAM AREA(ACRES) = 33.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 74.16

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	487.58	30.10	1.747	0.30( 0.29)	0.95	364.3	10500.00
2	74.16	14.00	2.690	0.30( 0.19)	0.64	33.0	10520.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	447.15	14.00	2.690	0.30( 0.27)	0.90	202.4	10520.00
2	533.75	30.10	1.747	0.30( 0.28)	0.93	397.3	10500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 533.75 Tc(MIN.) = 30.10  
EFFECTIVE AREA(ACRES) = 397.30 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
TOTAL AREA(ACRES) = 397.3  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10526.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 158.00 DOWNSTREAM(FEET) = 148.00  
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 65.25  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 533.75  
PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 30.11  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10526.00 = 11891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10526.00 TO NODE 10527.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 148.00 DOWNSTREAM(FEET) = 135.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 296.00 CHANNEL SLOPE = 0.0439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 533.75  
FLOW VELOCITY(FEET/SEC.) = 14.55 FLOW DEPTH(FEET) = 3.50  
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 30.45  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10527.00 = 12187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN.) = 30.45
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.738
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -        0.30      0.30      1.000      -
USER-DEFINED        -        0.80      0.30      1.000      -
USER-DEFINED        -        0.20      0.30      1.000      -
USER-DEFINED        -        0.10      0.30      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.40      SUBAREA RUNOFF(CFS) = 1.81
EFFECTIVE AREA(ACRES) = 398.70  AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.93
TOTAL AREA(ACRES) = 398.7      PEAK FLOW RATE(CFS) = 533.75
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN.) = 30.45
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.738
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -        0.10      0.30      0.100      -
USER-DEFINED        -        1.10      0.30      1.000      -
USER-DEFINED        -        0.40      0.30      1.000      -
USER-DEFINED        -        1.10      0.30      1.000      -
USER-DEFINED        -        2.20      0.30      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982
SUBAREA AREA(ACRES) = 4.90      SUBAREA RUNOFF(CFS) = 6.37
EFFECTIVE AREA(ACRES) = 403.60  AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.93
TOTAL AREA(ACRES) = 403.6      PEAK FLOW RATE(CFS) = 533.75
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 403.6 TC(MIN.) = 30.45
EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.927
PEAK FLOW RATE(CFS) = 533.75

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** PEAK FLOW RATE TABLE **
STREAM  Q      Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER  (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES)  NODE
  1     447.60  14.36  2.654  0.30( 0.27)  0.90  208.7  10520.00
  2     533.75  30.45  1.738  0.30( 0.28)  0.93  403.6  10500.00

```

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

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FILE NAME: 0506106B.DAT  
TIME/DATE OF STUDY: 12:51 04/15/2013  
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--\*TIME-OF-CONCENTRATION MODEL\*--  
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GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10600.00 TO NODE 10601.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.81  
STREET FLOW TRAVEL TIME (MIN.) = 1.63 Tc (MIN.) = 12.23  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.910  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.517  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 5.21  
EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 7.88

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.40 HALFSTREET FLOOD WIDTH (FEET) = 11.99  
FLOW VELOCITY (FEET/SEC.) = 2.42 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.96  
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10602.00 = 531.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10602.00 TO NODE 10603.00 IS CODE = 63  
-----  
>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
>>>> (STREET TABLE SECTION # 5 USED) <<<<<<  
-----  
UPSTREAM ELEVATION (FEET) = 162.00 DOWNSTREAM ELEVATION (FEET) = 159.00  
STREET LENGTH (FEET) = 328.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.28  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.45  
HALFSTREET FLOOD WIDTH (FEET) = 14.41  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.71  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.21  
STREET FLOW TRAVEL TIME (MIN.) = 2.02 Tc (MIN.) = 14.25  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.665  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.500	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	2.40	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527  
SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 8.80

EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.16  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 15.98

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.48 HALFSTREET FLOOD WIDTH (FEET) = 16.05  
FLOW VELOCITY (FEET/SEC.) = 2.89 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.38  
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10603.00 = 859.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10603.00 TO NODE 10604.00 IS CODE = 63  
-----  
>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
>>>> (STREET TABLE SECTION # 5 USED) <<<<<<  
-----  
UPSTREAM ELEVATION (FEET) = 159.00 DOWNSTREAM ELEVATION (FEET) = 155.00  
STREET LENGTH (FEET) = 465.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.74  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.54  
HALFSTREET FLOOD WIDTH (FEET) = 19.10  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.09  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.67  
STREET FLOW TRAVEL TIME (MIN.) = 2.51 Tc (MIN.) = 16.76  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.453  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.30	0.500	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.513  
SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 15.52  
EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.16  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 30.14

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.57 HALFSTREET FLOOD WIDTH (FEET) = 20.00  
FLOW VELOCITY (FEET/SEC.) = 3.33 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.92  
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10604.00 = 1324.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10604.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.76
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.453
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.30     0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.10     SUBAREA RUNOFF(CFS) = 0.20
EFFECTIVE AREA(ACRES) = 14.70   AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 14.7     PEAK FLOW RATE(CFS) = 30.34

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10605.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 155.00 DOWNSTREAM(FEET) = 140.00
FLOW LENGTH(FEET) = 214.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.22
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 30.34
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 16.95
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10605.00 = 1538.00 FEET.

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10605.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.95
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.438
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20     0.30     0.100    -
USER-DEFINED        -         1.70     0.30     0.100    -
USER-DEFINED        -        10.20     0.30     0.800    -
USER-DEFINED        -         2.90     0.30     0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.682
SUBAREA AREA(ACRES) = 16.00     SUBAREA RUNOFF(CFS) = 32.16
EFFECTIVE AREA(ACRES) = 30.70   AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 30.7     PEAK FLOW RATE(CFS) = 62.29

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10606.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 140.00 DOWNSTREAM(FEET) = 133.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00 CHANNEL SLOPE = 0.0400
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 62.29
FLOW VELOCITY(FEET/SEC.) = 8.22 FLOW DEPTH(FEET) = 1.59
TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 17.31
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10606.00 = 1713.00 FEET.

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.31
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.410
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     0.500    -
USER-DEFINED        -         0.30     0.30     0.850    -
USER-DEFINED        -         0.10     0.30     1.000    -
USER-DEFINED        -         1.10     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 1.80     SUBAREA RUNOFF(CFS) = 3.46
EFFECTIVE AREA(ACRES) = 32.50   AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 32.5     PEAK FLOW RATE(CFS) = 64.98

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.31
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.410
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40     0.30     0.850    -
USER-DEFINED        -         1.20     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     1.000    -
USER-DEFINED        -         1.80     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     0.850    -
USER-DEFINED        -         0.20     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980
SUBAREA AREA(ACRES) = 3.80     SUBAREA RUNOFF(CFS) = 7.24
EFFECTIVE AREA(ACRES) = 36.30   AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.66
TOTAL AREA(ACRES) = 36.3     PEAK FLOW RATE(CFS) = 72.22

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81

```



-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.31

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.410

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.14

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.67

TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 73.36  
=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 36.9 TC(MIN.) = 17.31

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.670

PEAK FLOW RATE(CFS) = 73.36  
=====

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 100 Yr \*  
\* From Node: 40300 To Node: 40313 \*  
\*\*\*\*\*

FILE NAME: 0610403Y.DAT  
TIME/DATE OF STUDY: 16:58 01/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 6.099
- 2) 10.00; 3.899
- 3) 15.00; 3.004
- 4) 20.00; 2.464
- 5) 25.00; 2.128
- 6) 30.00; 1.900
- 7) 40.00; 1.644
- 8) 50.00; 1.418
- 9) 60.00; 1.319
- 10) 90.00; 1.119
- 11) 120.00; 0.983
- 12) 180.00; 0.825
- 13) 360.00; 0.616
- 14) 1440.00; 0.271

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40300.00 TO NODE 40301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 316.00  
ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 720.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.541  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.101  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.39	0.30	1.000	0	9.54

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.35  
TOTAL AREA(ACRES) = 0.39 PEAK FLOW RATE(CFS) = 1.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40301.00 TO NODE 40302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 191.00 CHANNEL SLOPE = 0.2356  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.886  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.88	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.77  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.96  
AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 0.53  
Tc(MIN.) = 10.08  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 2.85  
EFFECTIVE AREA(ACRES) = 1.28 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.3 PEAK FLOW RATE(CFS) = 4.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.46 FLOW VELOCITY(FEET/SEC.) = 6.48  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40302.00 = 507.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40302.00 TO NODE 40303.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	675.00	DOWNSTREAM(FEET) =	625.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	179.00	CHANNEL SLOPE =	0.2793
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.814		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.84	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.45

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.47

AVERAGE FLOW DEPTH(FEET) = 0.49 TRAVEL TIME(MIN.) = 0.40

Tc(MIN.) = 10.47

SUBAREA AREA(ACRES) = 0.84 SUBAREA RUNOFF(CFS) = 2.65

EFFECTIVE AREA(ACRES) = 2.12 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.1 PEAK FLOW RATE(CFS) = 6.69

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.53 FLOW VELOCITY(FEET/SEC.) = 7.90

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40303.00 = 686.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40303.00 TO NODE 40304.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	625.00	DOWNSTREAM(FEET) =	557.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	161.00	CHANNEL SLOPE =	0.4224
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.768		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.94	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.28

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.45

AVERAGE FLOW DEPTH(FEET) = 0.60 TRAVEL TIME(MIN.) = 0.26

Tc(MIN.) = 10.73

SUBAREA AREA(ACRES) = 2.94 SUBAREA RUNOFF(CFS) = 9.18

EFFECTIVE AREA(ACRES) = 5.06 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.1 PEAK FLOW RATE(CFS) = 15.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.68 FLOW VELOCITY(FEET/SEC.) = 11.31

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40304.00 = 847.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40304.00 TO NODE 40305.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	557.00	DOWNSTREAM(FEET) =	548.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	42.00	CHANNEL SLOPE =	0.2143
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.754		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.68	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.39

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.13

AVERAGE FLOW DEPTH(FEET) = 0.82 TRAVEL TIME(MIN.) = 0.08

Tc(MIN.) = 10.81

SUBAREA AREA(ACRES) = 1.68 SUBAREA RUNOFF(CFS) = 5.21

EFFECTIVE AREA(ACRES) = 6.73 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 20.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.86 FLOW VELOCITY(FEET/SEC.) = 9.45

LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40305.00 = 889.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40305.00 TO NODE 40306.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	548.00	DOWNSTREAM(FEET) =	515.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	217.00	CHANNEL SLOPE =	0.1521
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.682		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.67	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 28.05

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.90

AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 0.41

Tc(MIN.) = 11.21

SUBAREA AREA(ACRES) = 4.67 SUBAREA RUNOFF(CFS) = 14.23

EFFECTIVE AREA(ACRES) = 11.41 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.4 PEAK FLOW RATE (CFS) = 34.72

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.11 FLOW VELOCITY (FEET/SEC.) = 9.41  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40306.00 = 1106.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40306.00 TO NODE 40307.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 502.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 180.00 CHANNEL SLOPE = 0.0722  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.612

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.44	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 47.30  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.71  
AVERAGE FLOW DEPTH (FEET) = 1.43 TRAVEL TIME (MIN.) = 0.39  
Tc (MIN.) = 11.60  
SUBAREA AREA (ACRES) = 8.44 SUBAREA RUNOFF (CFS) = 25.15  
EFFECTIVE AREA (ACRES) = 19.84 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 19.8 PEAK FLOW RATE (CFS) = 59.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.55 FLOW VELOCITY (FEET/SEC.) = 8.17  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40307.00 = 1286.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40307.00 TO NODE 40308.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 502.00 DOWNSTREAM (FEET) = 469.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 553.00 CHANNEL SLOPE = 0.0597  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.407

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.07	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 73.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.02  
AVERAGE FLOW DEPTH (FEET) = 1.74 TRAVEL TIME (MIN.) = 1.15  
Tc (MIN.) = 12.75

SUBAREA AREA (ACRES) = 10.07 SUBAREA RUNOFF (CFS) = 28.16  
EFFECTIVE AREA (ACRES) = 29.92 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 29.9 PEAK FLOW RATE (CFS) = 83.65

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.84 FLOW VELOCITY (FEET/SEC.) = 8.27  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40308.00 = 1839.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40308.00 TO NODE 40309.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 469.00 DOWNSTREAM (FEET) = 433.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 631.00 CHANNEL SLOPE = 0.0571  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.183

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.09	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 95.44  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.43  
AVERAGE FLOW DEPTH (FEET) = 1.94 TRAVEL TIME (MIN.) = 1.25  
Tc (MIN.) = 14.00  
SUBAREA AREA (ACRES) = 9.09 SUBAREA RUNOFF (CFS) = 23.59  
EFFECTIVE AREA (ACRES) = 39.01 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 39.0 PEAK FLOW RATE (CFS) = 101.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.99 FLOW VELOCITY (FEET/SEC.) = 8.53  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40309.00 = 2470.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40309.00 TO NODE 40310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 433.00 DOWNSTREAM (FEET) = 406.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 595.00 CHANNEL SLOPE = 0.0454  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.980

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.61	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 115.23  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.09

AVERAGE FLOW DEPTH (FEET) = 2.18 TRAVEL TIME (MIN.) = 1.23  
Tc (MIN.) = 15.23  
SUBAREA AREA (ACRES) = 11.61 SUBAREA RUNOFF (CFS) = 28.00  
EFFECTIVE AREA (ACRES) = 50.62 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 50.6 PEAK FLOW RATE (CFS) = 122.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.22 FLOW VELOCITY (FEET/SEC.) = 8.22  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40310.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40310.00 TO NODE 40311.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 406.00 DOWNSTREAM (FEET) = 353.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1122.00 CHANNEL SLOPE = 0.0472  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.791  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 15.32 0.30 0.897 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 139.47  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.69  
AVERAGE FLOW DEPTH (FEET) = 2.09 TRAVEL TIME (MIN.) = 1.75  
Tc (MIN.) = 16.98  
SUBAREA AREA (ACRES) = 15.32 SUBAREA RUNOFF (CFS) = 34.77  
EFFECTIVE AREA (ACRES) = 65.94 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 65.9 PEAK FLOW RATE (CFS) = 148.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.13 FLOW VELOCITY (FEET/SEC.) = 10.86  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40311.00 = 4187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40311.00 TO NODE 40312.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 353.00 DOWNSTREAM (FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 843.00 CHANNEL SLOPE = 0.0451  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.654  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 26.00 0.30 0.886 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.886

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 176.20  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.11  
AVERAGE FLOW DEPTH (FEET) = 2.30 TRAVEL TIME (MIN.) = 1.26  
Tc (MIN.) = 18.24  
SUBAREA AREA (ACRES) = 26.00 SUBAREA RUNOFF (CFS) = 55.89  
EFFECTIVE AREA (ACRES) = 91.94 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA (ACRES) = 91.9 PEAK FLOW RATE (CFS) = 196.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.39 FLOW VELOCITY (FEET/SEC.) = 11.43  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40312.00 = 5030.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40312.00 TO NODE 40313.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 315.00 DOWNSTREAM (FEET) = 310.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 226.00 CHANNEL SLOPE = 0.0221  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.608  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.53 0.30 0.896 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.896  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 198.70  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.80  
AVERAGE FLOW DEPTH (FEET) = 2.74 TRAVEL TIME (MIN.) = 0.43  
Tc (MIN.) = 18.67  
SUBAREA AREA (ACRES) = 2.53 SUBAREA RUNOFF (CFS) = 5.33  
EFFECTIVE AREA (ACRES) = 94.47 AREA-AVERAGED Fm (INCH/HR) = 0.28  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA (ACRES) = 94.5 PEAK FLOW RATE (CFS) = 197.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.74 FLOW VELOCITY (FEET/SEC.) = 8.76  
LONGEST FLOWPATH FROM NODE 40300.00 TO NODE 40313.00 = 5256.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40313.00 TO NODE 40313.00 IS CODE = 81

-----  
>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 18.67  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.608  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 80.58 0.30 0.984 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
SUBAREA AREA (ACRES) = 80.58 SUBAREA RUNOFF (CFS) = 167.72  
EFFECTIVE AREA (ACRES) = 175.05 AREA-AVERAGED Fm (INCH/HR) = 0.29

AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.97  
TOTAL AREA (ACRES) = 175.0 PEAK FLOW RATE (CFS) = 365.26

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 175.0 TC (MIN.) = 18.67  
EFFECTIVE AREA (ACRES) = 175.05 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.29  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.965  
PEAK FLOW RATE (CFS) = 365.26

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 100 Yr \*  
\* From Node: 40400 To Node: 40453 \*  
\*\*\*\*\*

FILE NAME: 0610404Y.DAT  
TIME/DATE OF STUDY: 16:58 01/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 6.099
- 2) 10.00; 3.899
- 3) 15.00; 3.004
- 4) 20.00; 2.464
- 5) 25.00; 2.128
- 6) 30.00; 1.900
- 7) 40.00; 1.644
- 8) 50.00; 1.418
- 9) 60.00; 1.319
- 10) 90.00; 1.119
- 11) 120.00; 0.983
- 12) 180.00; 0.825
- 13) 360.00; 0.616
- 14) 1440.00; 0.271

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
- \*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40400.00 TO NODE 40401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 928.00 DOWNSTREAM(FEET) = 750.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.081  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.743  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.75	0.30	1.000	0	8.08

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 3.01  
TOTAL AREA(ACRES) = 0.75 PEAK FLOW RATE(CFS) = 3.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40401.00 TO NODE 40402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 710.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 107.00 CHANNEL SLOPE = 0.3738  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.649  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.17	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.31  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.27  
AVERAGE FLOW DEPTH(FEET) = 0.46 TRAVEL TIME(MIN.) = 0.22  
Tc(MIN.) = 8.30  
SUBAREA AREA(ACRES) = 1.17 SUBAREA RUNOFF(CFS) = 4.60  
EFFECTIVE AREA(ACRES) = 1.93 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 7.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.53 FLOW VELOCITY(FEET/SEC.) = 8.97  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40402.00 = 434.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40402.00 TO NODE 40403.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	710.00	DOWNSTREAM(FEET) =	675.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	127.00	CHANNEL SLOPE =	0.2756
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	4.538		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.05	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.54

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.46

AVERAGE FLOW DEPTH(FEET) = 0.61 TRAVEL TIME(MIN.) = 0.25

Tc(MIN.) = 8.55

SUBAREA AREA(ACRES) = 1.05 SUBAREA RUNOFF(CFS) = 3.99

EFFECTIVE AREA(ACRES) = 2.97 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 11.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.65 FLOW VELOCITY(FEET/SEC.) = 8.91

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40403.00 = 561.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40403.00 TO NODE 40404.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	675.00	DOWNSTREAM(FEET) =	650.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	113.00	CHANNEL SLOPE =	0.2212
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	4.444		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.95	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.98

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.82

AVERAGE FLOW DEPTH(FEET) = 0.75 TRAVEL TIME(MIN.) = 0.21

Tc(MIN.) = 8.76

SUBAREA AREA(ACRES) = 1.95 SUBAREA RUNOFF(CFS) = 7.27

EFFECTIVE AREA(ACRES) = 4.92 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 18.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.81 FLOW VELOCITY(FEET/SEC.) = 9.25

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40404.00 = 674.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40404.00 TO NODE 40405.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	650.00	DOWNSTREAM(FEET) =	610.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	219.00	CHANNEL SLOPE =	0.1826
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	4.267		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.15	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.20

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.03

AVERAGE FLOW DEPTH(FEET) = 0.91 TRAVEL TIME(MIN.) = 0.40

Tc(MIN.) = 9.16

SUBAREA AREA(ACRES) = 2.15 SUBAREA RUNOFF(CFS) = 7.66

EFFECTIVE AREA(ACRES) = 7.07 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 25.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.95 FLOW VELOCITY(FEET/SEC.) = 9.34

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40405.00 = 893.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40405.00 TO NODE 40406.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	610.00	DOWNSTREAM(FEET) =	605.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	43.00	CHANNEL SLOPE =	0.1163
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	4.228		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.37

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.23

AVERAGE FLOW DEPTH(FEET) = 1.11 TRAVEL TIME(MIN.) = 0.09

Tc(MIN.) = 9.25

SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 10.26

EFFECTIVE AREA(ACRES) = 9.97 AREA-AVERAGED Fm(INCH/HR) = 0.30



AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 10.0 PEAK FLOW RATE (CFS) = 35.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.17 FLOW VELOCITY (FEET/SEC.) = 8.55  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40406.00 = 936.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40406.00 TO NODE 40407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 605.00 DOWNSTREAM (FEET) = 602.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 52.00 CHANNEL SLOPE = 0.0577  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.173

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 43.11  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.94  
AVERAGE FLOW DEPTH (FEET) = 1.44 TRAVEL TIME (MIN.) = 0.12  
Tc (MIN.) = 9.38  
SUBAREA AREA (ACRES) = 4.51 SUBAREA RUNOFF (CFS) = 15.72  
EFFECTIVE AREA (ACRES) = 14.48 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 14.5 PEAK FLOW RATE (CFS) = 50.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.53 FLOW VELOCITY (FEET/SEC.) = 7.20  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40407.00 = 988.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40407.00 TO NODE 40408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 602.00 DOWNSTREAM (FEET) = 559.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 533.00 CHANNEL SLOPE = 0.0807  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.824

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.99	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 59.97  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.53  
AVERAGE FLOW DEPTH (FEET) = 1.53 TRAVEL TIME (MIN.) = 1.04  
Tc (MIN.) = 10.42

SUBAREA AREA (ACRES) = 5.99 SUBAREA RUNOFF (CFS) = 18.98  
EFFECTIVE AREA (ACRES) = 20.47 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.5 PEAK FLOW RATE (CFS) = 64.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.58 FLOW VELOCITY (FEET/SEC.) = 8.71  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40408.00 = 1521.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40408.00 TO NODE 40409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 559.00 DOWNSTREAM (FEET) = 509.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 702.00 CHANNEL SLOPE = 0.0712  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.580

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.05	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 73.85  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.55  
AVERAGE FLOW DEPTH (FEET) = 1.70 TRAVEL TIME (MIN.) = 1.37  
Tc (MIN.) = 11.79  
SUBAREA AREA (ACRES) = 6.05 SUBAREA RUNOFF (CFS) = 17.86  
EFFECTIVE AREA (ACRES) = 26.51 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.5 PEAK FLOW RATE (CFS) = 78.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.73 FLOW VELOCITY (FEET/SEC.) = 8.67  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40409.00 = 2223.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40409.00 TO NODE 40447.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 509.00 DOWNSTREAM (FEET) = 482.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 440.00 CHANNEL SLOPE = 0.0614  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.424

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.09	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 86.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.45

AVERAGE FLOW DEPTH (FEET) = 1.85 TRAVEL TIME (MIN.) = 0.87  
Tc (MIN.) = 12.65  
SUBAREA AREA (ACRES) = 6.09 SUBAREA RUNOFF (CFS) = 17.11  
EFFECTIVE AREA (ACRES) = 32.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 32.6 PEAK FLOW RATE (CFS) = 91.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.89 FLOW VELOCITY (FEET/SEC.) = 8.56  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 12.65  
RAINFALL INTENSITY (INCH/HR) = 3.42  
AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA (ACRES) = 32.60  
TOTAL STREAM AREA (ACRES) = 32.60  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 91.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40410.00 TO NODE 40411.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 329.00  
ELEVATION DATA: UPSTREAM (FEET) = 878.00 DOWNSTREAM (FEET) = 726.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.371  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.616  
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL, BROADLEAF"	-	0.69	0.30	1.000	0	8.37

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF (CFS) = 2.66  
TOTAL AREA (ACRES) = 0.69 PEAK FLOW RATE (CFS) = 2.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40411.00 TO NODE 40412.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 726.00 DOWNSTREAM (FEET) = 687.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 101.00 CHANNEL SLOPE = 0.3861  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.522

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.91	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.39  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.92  
AVERAGE FLOW DEPTH (FEET) = 0.43 TRAVEL TIME (MIN.) = 0.21  
Tc (MIN.) = 8.58  
SUBAREA AREA (ACRES) = 0.91 SUBAREA RUNOFF (CFS) = 3.46  
EFFECTIVE AREA (ACRES) = 1.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 1.6 PEAK FLOW RATE (CFS) = 6.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.48 FLOW VELOCITY (FEET/SEC.) = 8.65  
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40412.00 = 430.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40412.00 TO NODE 40413.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 687.00 DOWNSTREAM (FEET) = 658.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 153.00 CHANNEL SLOPE = 0.1895  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.363  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.96	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.81  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.06  
AVERAGE FLOW DEPTH (FEET) = 0.61 TRAVEL TIME (MIN.) = 0.36  
Tc (MIN.) = 8.94  
SUBAREA AREA (ACRES) = 0.96 SUBAREA RUNOFF (CFS) = 3.50  
EFFECTIVE AREA (ACRES) = 2.55 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 2.6 PEAK FLOW RATE (CFS) = 9.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.65 FLOW VELOCITY (FEET/SEC.) = 7.33  
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40413.00 = 583.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40413.00 TO NODE 40414.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 658.00 DOWNSTREAM (FEET) = 615.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 247.00 CHANNEL SLOPE = 0.1741  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.134  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 13.66  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.88  
 AVERAGE FLOW DEPTH (FEET) = 0.76 TRAVEL TIME (MIN.) = 0.52  
 Tc (MIN.) = 9.47  
 SUBAREA AREA (ACRES) = 2.51 SUBAREA RUNOFF (CFS) = 8.66  
 EFFECTIVE AREA (ACRES) = 5.06 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.1 PEAK FLOW RATE (CFS) = 17.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.83 FLOW VELOCITY (FEET/SEC.) = 8.36  
 LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40414.00 = 830.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40414.00 TO NODE 40415.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 615.00 DOWNSTREAM (FEET) = 567.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 414.00 CHANNEL SLOPE = 0.1159  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.837  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.38	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 24.43  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.84  
 AVERAGE FLOW DEPTH (FEET) = 1.02 TRAVEL TIME (MIN.) = 0.88  
 Tc (MIN.) = 10.35  
 SUBAREA AREA (ACRES) = 4.38 SUBAREA RUNOFF (CFS) = 13.94  
 EFFECTIVE AREA (ACRES) = 9.44 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.4 PEAK FLOW RATE (CFS) = 30.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.10 FLOW VELOCITY (FEET/SEC.) = 8.23  
 LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40415.00 = 1244.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40415.00 TO NODE 40416.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 567.00 DOWNSTREAM (FEET) = 538.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 301.00 CHANNEL SLOPE = 0.0963  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.730  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.77	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 42.03  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.37  
 AVERAGE FLOW DEPTH (FEET) = 1.29 TRAVEL TIME (MIN.) = 0.60  
 Tc (MIN.) = 10.95  
 SUBAREA AREA (ACRES) = 7.77 SUBAREA RUNOFF (CFS) = 23.97  
 EFFECTIVE AREA (ACRES) = 17.21 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 17.2 PEAK FLOW RATE (CFS) = 53.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.41 FLOW VELOCITY (FEET/SEC.) = 8.85  
 LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40416.00 = 1545.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40416.00 TO NODE 40417.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 538.00 DOWNSTREAM (FEET) = 529.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 116.00 CHANNEL SLOPE = 0.0776  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.691  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 77.84  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.99  
 AVERAGE FLOW DEPTH (FEET) = 1.70 TRAVEL TIME (MIN.) = 0.21  
 Tc (MIN.) = 11.16  
 SUBAREA AREA (ACRES) = 16.20 SUBAREA RUNOFF (CFS) = 49.46  
 EFFECTIVE AREA (ACRES) = 33.41 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 33.4 PEAK FLOW RATE (CFS) = 101.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.88 FLOW VELOCITY (FEET/SEC.) = 9.60  
 LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40417.00 = 1661.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40417.00 TO NODE 40447.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 529.00 DOWNSTREAM(FEET) = 482.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 891.00 CHANNEL SLOPE = 0.0527
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.386
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 14.55 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 122.17
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.70
AVERAGE FLOW DEPTH(FEET) = 2.16 TRAVEL TIME(MIN.) = 1.71
Tc(MIN.) = 12.87
SUBAREA AREA(ACRES) = 14.55 SUBAREA RUNOFF(CFS) = 40.40
EFFECTIVE AREA(ACRES) = 47.96 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 48.0 PEAK FLOW RATE(CFS) = 133.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.24 FLOW VELOCITY(FEET/SEC.) = 8.86
LONGEST FLOWPATH FROM NODE 40410.00 TO NODE 40447.00 = 2552.00 FEET.

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FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 12.87
RAINFALL INTENSITY(INCH/HR) = 3.39
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 47.96
TOTAL STREAM AREA(ACRES) = 47.96
PEAK FLOW RATE(CFS) AT CONFLUENCE = 133.18

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\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	91.66	12.65	3.424	0.30( 0.30)	1.00	32.6	40400.00
2	133.18	12.87	3.386	0.30( 0.30)	1.00	48.0	40410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	224.25	12.65	3.424	0.30( 0.30)	1.00	79.8	40400.00
2	223.71	12.87	3.386	0.30( 0.30)	1.00	80.6	40410.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 224.25 Tc(MIN.) = 12.65
EFFECTIVE AREA(ACRES) = 79.75 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 80.6
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

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*****
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
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*****
FLOW PROCESS FROM NODE 40420.00 TO NODE 40421.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00
ELEVATION DATA: UPSTREAM(FEET) = 925.00 DOWNSTREAM(FEET) = 815.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.799
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.427
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" - 0.31 0.30 1.000 0 8.80
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.14
TOTAL AREA(ACRES) = 0.31 PEAK FLOW RATE(CFS) = 1.14

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FLOW PROCESS FROM NODE 40421.00 TO NODE 40422.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 815.00 DOWNSTREAM(FEET) = 743.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.5854
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.303
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.68
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.26
AVERAGE FLOW DEPTH(FEET) = 0.28 TRAVEL TIME(MIN.) = 0.28
Tc(MIN.) = 9.08
SUBAREA AREA(ACRES) = 0.30 SUBAREA RUNOFF(CFS) = 1.07

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EFFECTIVE AREA (ACRES) = 0.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 0.6 PEAK FLOW RATE (CFS) = 2.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.30 FLOW VELOCITY (FEET/SEC.) = 7.94  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40422.00 = 444.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40422.00 TO NODE 40423.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	743.00	DOWNSTREAM (FEET) =	665.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	142.00	CHANNEL SLOPE =	0.5493
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY (INCH/HR) =	4.183		

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.58

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.66

AVERAGE FLOW DEPTH (FEET) = 0.37 TRAVEL TIME (MIN.) = 0.27

Tc (MIN.) = 9.35

SUBAREA AREA (ACRES) = 0.80 SUBAREA RUNOFF (CFS) = 2.80

EFFECTIVE AREA (ACRES) = 1.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 1.4 PEAK FLOW RATE (CFS) = 4.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.42 FLOW VELOCITY (FEET/SEC.) = 9.42  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40423.00 = 586.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40423.00 TO NODE 40424.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	665.00	DOWNSTREAM (FEET) =	630.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	99.00	CHANNEL SLOPE =	0.3535
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY (INCH/HR) =	4.095		

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.32	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.46

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.23

AVERAGE FLOW DEPTH (FEET) = 0.47 TRAVEL TIME (MIN.) = 0.20

Tc (MIN.) = 9.56  
SUBAREA AREA (ACRES) = 0.32 SUBAREA RUNOFF (CFS) = 1.09  
EFFECTIVE AREA (ACRES) = 1.72 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 1.7 PEAK FLOW RATE (CFS) = 5.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.49 FLOW VELOCITY (FEET/SEC.) = 8.33  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40424.00 = 685.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40424.00 TO NODE 40425.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	630.00	DOWNSTREAM (FEET) =	615.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	35.00	CHANNEL SLOPE =	0.4286
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY (INCH/HR) =	4.069		

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.87	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.05

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.90

AVERAGE FLOW DEPTH (FEET) = 0.55 TRAVEL TIME (MIN.) = 0.06

Tc (MIN.) = 9.61

SUBAREA AREA (ACRES) = 1.87 SUBAREA RUNOFF (CFS) = 6.33

EFFECTIVE AREA (ACRES) = 3.59 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 3.6 PEAK FLOW RATE (CFS) = 12.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.62 FLOW VELOCITY (FEET/SEC.) = 10.73  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40425.00 = 720.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40425.00 TO NODE 40426.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	615.00	DOWNSTREAM (FEET) =	574.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	260.00	CHANNEL SLOPE =	0.1577
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY (INCH/HR) =	3.867		

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.19	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 14.09

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.66  
AVERAGE FLOW DEPTH (FEET) = 0.78 TRAVEL TIME (MIN.) = 0.57  
Tc (MIN.) = 10.18  
SUBAREA AREA (ACRES) = 1.19 SUBAREA RUNOFF (CFS) = 3.82  
EFFECTIVE AREA (ACRES) = 4.78 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 4.8 PEAK FLOW RATE (CFS) = 15.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.81 FLOW VELOCITY (FEET/SEC.) = 7.77  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40426.00 = 980.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40426.00 TO NODE 40427.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 574.00 DOWNSTREAM (FEET) = 533.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 322.00 CHANNEL SLOPE = 0.1273  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.739  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.82 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.16  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.52  
AVERAGE FLOW DEPTH (FEET) = 0.90 TRAVEL TIME (MIN.) = 0.71  
Tc (MIN.) = 10.89  
SUBAREA AREA (ACRES) = 1.82 SUBAREA RUNOFF (CFS) = 5.63  
EFFECTIVE AREA (ACRES) = 6.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 6.6 PEAK FLOW RATE (CFS) = 20.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.94 FLOW VELOCITY (FEET/SEC.) = 7.68  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40427.00 = 1302.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40427.00 TO NODE 40428.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 521.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 160.00 CHANNEL SLOPE = 0.0750  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.671  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 6.79 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 30.73  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.02  
AVERAGE FLOW DEPTH (FEET) = 1.21 TRAVEL TIME (MIN.) = 0.38  
Tc (MIN.) = 11.27  
SUBAREA AREA (ACRES) = 6.79 SUBAREA RUNOFF (CFS) = 20.60  
EFFECTIVE AREA (ACRES) = 13.39 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 13.4 PEAK FLOW RATE (CFS) = 40.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.34 FLOW VELOCITY (FEET/SEC.) = 7.54  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40428.00 = 1462.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40428.00 TO NODE 40429.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 521.00 DOWNSTREAM (FEET) = 508.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 221.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.578  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.74 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 46.14  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.07  
AVERAGE FLOW DEPTH (FEET) = 1.48 TRAVEL TIME (MIN.) = 0.52  
Tc (MIN.) = 11.79  
SUBAREA AREA (ACRES) = 3.74 SUBAREA RUNOFF (CFS) = 11.04  
EFFECTIVE AREA (ACRES) = 17.13 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.1 PEAK FLOW RATE (CFS) = 50.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.52 FLOW VELOCITY (FEET/SEC.) = 7.26  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40429.00 = 1683.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40429.00 TO NODE 40446.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 508.00 DOWNSTREAM (FEET) = 489.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 306.00 CHANNEL SLOPE = 0.0621  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.456  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 0.99 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 51.94  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.46  
AVERAGE FLOW DEPTH (FEET) = 1.52 TRAVEL TIME (MIN.) = 0.68  
Tc (MIN.) = 12.48  
SUBAREA AREA (ACRES) = 0.99 SUBAREA RUNOFF (CFS) = 2.81  
EFFECTIVE AREA (ACRES) = 18.12 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 18.1 PEAK FLOW RATE (CFS) = 51.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.52 FLOW VELOCITY (FEET/SEC.) = 7.41  
LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40446.00 = 1989.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40446.00 TO NODE 40446.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40430.00 TO NODE 40431.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 302.00  
ELEVATION DATA: UPSTREAM (FEET) = 1035.00 DOWNSTREAM (FEET) = 875.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.870  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.836  
SUBAREA Tc AND LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"CHAPARRAL, BROADLEAF" - 0.40 0.30 1.000 0 7.87  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF (CFS) = 1.65  
TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 1.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40431.00 TO NODE 40432.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 875.00 DOWNSTREAM (FEET) = 800.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 160.00 CHANNEL SLOPE = 0.4688  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.684  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 0.65 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.93  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.71  
AVERAGE FLOW DEPTH (FEET) = 0.36 TRAVEL TIME (MIN.) = 0.35  
Tc (MIN.) = 8.22  
SUBAREA AREA (ACRES) = 0.65 SUBAREA RUNOFF (CFS) = 2.56  
EFFECTIVE AREA (ACRES) = 1.05 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 4.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.41 FLOW VELOCITY (FEET/SEC.) = 8.34  
LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40432.00 = 462.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40432.00 TO NODE 40433.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 800.00 DOWNSTREAM (FEET) = 712.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 150.00 CHANNEL SLOPE = 0.5867  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.575  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.08 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.23  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.12  
AVERAGE FLOW DEPTH (FEET) = 0.45 TRAVEL TIME (MIN.) = 0.25  
Tc (MIN.) = 8.46  
SUBAREA AREA (ACRES) = 1.08 SUBAREA RUNOFF (CFS) = 4.16  
EFFECTIVE AREA (ACRES) = 2.13 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 2.1 PEAK FLOW RATE (CFS) = 8.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.50 FLOW VELOCITY (FEET/SEC.) = 10.92  
LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40433.00 = 612.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40433.00 TO NODE 40434.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 657.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 120.00 CHANNEL SLOPE = 0.4583  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.494  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.98	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.95					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.86					
AVERAGE FLOW DEPTH(FEET) = 0.61 TRAVEL TIME(MIN.) = 0.18					
Tc(MIN.) = 8.65					
SUBAREA AREA(ACRES) = 1.98 SUBAREA RUNOFF(CFS) = 7.48					
EFFECTIVE AREA(ACRES) = 4.11 AREA-AVERAGED Fm(INCH/HR) = 0.30					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 15.53					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.67 FLOW VELOCITY(FEET/SEC.) = 11.65  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40434.00 = 732.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40434.00 TO NODE 40435.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 657.00	DOWNSTREAM(FEET) = 620.00				
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00	CHANNEL SLOPE = 0.2298				
CHANNEL BASE(FEET) = 0.00	"Z" FACTOR = 3.000				
MANNING'S FACTOR = 0.040	MAXIMUM DEPTH(FEET) = 20.00				
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.372					
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.34	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.82					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.62					
AVERAGE FLOW DEPTH(FEET) = 0.83 TRAVEL TIME(MIN.) = 0.28					
Tc(MIN.) = 8.93					
SUBAREA AREA(ACRES) = 2.34 SUBAREA RUNOFF(CFS) = 8.58					
EFFECTIVE AREA(ACRES) = 6.46 AREA-AVERAGED Fm(INCH/HR) = 0.30					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 6.5 PEAK FLOW RATE(CFS) = 23.66					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.89 FLOW VELOCITY(FEET/SEC.) = 10.00  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40435.00 = 893.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40435.00 TO NODE 40445.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 620.00	DOWNSTREAM(FEET) = 579.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 358.00	CHANNEL SLOPE = 0.1145
CHANNEL BASE(FEET) = 0.00	"Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00	

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.75	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.61					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.93					
AVERAGE FLOW DEPTH(FEET) = 1.06 TRAVEL TIME(MIN.) = 0.75					
Tc(MIN.) = 9.68					
SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 5.91					
EFFECTIVE AREA(ACRES) = 8.21 AREA-AVERAGED Fm(INCH/HR) = 0.30					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 27.64					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.07 FLOW VELOCITY(FEET/SEC.) = 8.00  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40445.00 = 1251.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40445.00 TO NODE 40445.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 9.68
RAINFALL INTENSITY(INCH/HR) = 4.04
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 8.21
TOTAL STREAM AREA(ACRES) = 8.21
PEAK FLOW RATE(CFS) AT CONFLUENCE = 27.64

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40440.00 TO NODE 40441.00 IS CODE = 21

-----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00	
ELEVATION DATA: UPSTREAM(FEET) = 1020.00	DOWNSTREAM(FEET) = 898.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20						
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.586						
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.521						
SUBAREA Tc AND LOSS RATE DATA(AMC II):						
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	-	0.75	0.30	1.000	0	8.59
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000						
SUBAREA RUNOFF(CFS) = 2.85						
TOTAL AREA(ACRES) = 0.75 PEAK FLOW RATE(CFS) = 2.85						



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FLOW PROCESS FROM NODE 40441.00 TO NODE 40442.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 898.00 DOWNSTREAM(FEET) = 760.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 253.00 CHANNEL SLOPE = 0.5455
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.320
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.89 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.45
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.21
AVERAGE FLOW DEPTH(FEET) = 0.40 TRAVEL TIME(MIN.) = 0.46
Tc(MIN.) = 9.04
SUBAREA AREA(ACRES) = 0.89 SUBAREA RUNOFF(CFS) = 3.21
EFFECTIVE AREA(ACRES) = 1.64 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 5.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 9.87
LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40442.00 = 572.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40442.00 TO NODE 40443.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 760.00 DOWNSTREAM(FEET) = 653.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 188.00 CHANNEL SLOPE = 0.5691
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.195
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.80 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.09
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.05
AVERAGE FLOW DEPTH(FEET) = 0.52 TRAVEL TIME(MIN.) = 0.28
Tc(MIN.) = 9.33
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 6.32
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 12.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.58 FLOW VELOCITY(FEET/SEC.) = 11.85

LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40443.00 = 760.00 FEET.

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FLOW PROCESS FROM NODE 40443.00 TO NODE 40444.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 653.00 DOWNSTREAM(FEET) = 605.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 198.00 CHANNEL SLOPE = 0.2424
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.041
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.16 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.38
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.45
AVERAGE FLOW DEPTH(FEET) = 0.78 TRAVEL TIME(MIN.) = 0.35
Tc(MIN.) = 9.68
SUBAREA AREA(ACRES) = 3.16 SUBAREA RUNOFF(CFS) = 10.63
EFFECTIVE AREA(ACRES) = 6.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.6 PEAK FLOW RATE(CFS) = 22.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.86 FLOW VELOCITY(FEET/SEC.) = 10.03
LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40444.00 = 958.00 FEET.

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FLOW PROCESS FROM NODE 40444.00 TO NODE 40445.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 605.00 DOWNSTREAM(FEET) = 579.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 243.00 CHANNEL SLOPE = 0.1070
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.862
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.67 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.90
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.64
AVERAGE FLOW DEPTH(FEET) = 1.04 TRAVEL TIME(MIN.) = 0.53
Tc(MIN.) = 10.21
SUBAREA AREA(ACRES) = 1.67 SUBAREA RUNOFF(CFS) = 5.37
EFFECTIVE AREA(ACRES) = 8.27 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 26.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.07 FLOW VELOCITY(FEET/SEC.) = 7.71  
 LONGEST FLOWPATH FROM NODE 40440.00 TO NODE 40445.00 = 1201.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40445.00 TO NODE 40445.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 10.21  
 RAINFALL INTENSITY(INCH/HR) = 3.86  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 8.27  
 TOTAL STREAM AREA(ACRES) = 8.27  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 26.53

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	27.64	9.68	4.041	0.30( 0.30)	1.00	8.2	40430.00
2	26.53	10.21	3.862	0.30( 0.30)	1.00	8.3	40440.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	54.05	9.68	4.041	0.30( 0.30)	1.00	16.1	40430.00
2	52.85	10.21	3.862	0.30( 0.30)	1.00	16.5	40440.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 54.05 Tc(MIN.) = 9.68  
 EFFECTIVE AREA(ACRES) = 16.06 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 16.5  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40445.00 = 1251.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40445.00 TO NODE 40446.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 579.00 DOWNSTREAM(FEET) = 489.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 636.00 CHANNEL SLOPE = 0.1415  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.776

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE USER-DEFINED	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
		3.79	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 59.97  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.53  
 AVERAGE FLOW DEPTH(FEET) = 1.38 TRAVEL TIME(MIN.) = 1.01  
 Tc(MIN.) = 10.69  
 SUBAREA AREA(ACRES) = 3.79 SUBAREA RUNOFF(CFS) = 11.84  
 EFFECTIVE AREA(ACRES) = 19.84 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 20.3 PEAK FLOW RATE(CFS) = 62.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.39 FLOW VELOCITY(FEET/SEC.) = 10.66  
 LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40446.00 = 1887.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	62.08	10.69	3.776	0.30( 0.30)	1.00	19.8	40430.00
2	61.66	11.22	3.680	0.30( 0.30)	1.00	20.3	40440.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 62.08 Tc(MIN.) = 10.69  
 AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 19.84

\*\*\*\*\*

FLOW PROCESS FROM NODE 40446.00 TO NODE 40446.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	62.08	10.69	3.776	0.30( 0.30)	1.00	19.8	40430.00
2	61.66	11.22	3.680	0.30( 0.30)	1.00	20.3	40440.00

LONGEST FLOWPATH FROM NODE 40430.00 TO NODE 40446.00 = 1887.00 FEET.

\*\* MEMORY BANK # 2 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	51.46	12.48	3.456	0.30( 0.30)	1.00	18.1	40420.00

LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40446.00 = 1989.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	110.63	10.69	3.776	0.30( 0.30)	1.00	35.4	40430.00
2	111.24	11.22	3.680	0.30( 0.30)	1.00	36.6	40440.00
3	109.03	12.48	3.456	0.30( 0.30)	1.00	38.4	40420.00

TOTAL AREA(ACRES) = 38.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 111.24 Tc(MIN.) = 11.223  
 EFFECTIVE AREA(ACRES) = 36.57 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 38.4  
 LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40446.00 = 1989.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40446.00 TO NODE 40446.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40446.00 TO NODE 40447.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 489.00 DOWNSTREAM(FEET) = 482.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.0419  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.616

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 112.13

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.82

AVERAGE FLOW DEPTH(FEET) = 2.19 TRAVEL TIME(MIN.) = 0.36

Tc(MIN.) = 11.58

SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 1.76

EFFECTIVE AREA(ACRES) = 37.16 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 39.0 PEAK FLOW RATE(CFS) = 111.24

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.18 FLOW VELOCITY(FEET/SEC.) = 7.77

LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40447.00 = 2156.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	110.63	11.04	3.712	0.30( 0.30)	1.00	35.9	40430.00
2	111.24	11.58	3.616	0.30( 0.30)	1.00	37.2	40440.00
3	109.03	12.84	3.391	0.30( 0.30)	1.00	39.0	40420.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 111.24 Tc(MIN.) = 11.58

AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 37.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	110.63	11.04	3.712	0.30( 0.30)	1.00	35.9	40430.00
2	111.24	11.58	3.616	0.30( 0.30)	1.00	37.2	40440.00
3	109.03	12.84	3.391	0.30( 0.30)	1.00	39.0	40420.00

LONGEST FLOWPATH FROM NODE 40420.00 TO NODE 40447.00 = 2156.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	224.25	12.65	3.424	0.30( 0.30)	1.00	79.8	40400.00
2	223.71	12.87	3.386	0.30( 0.30)	1.00	80.6	40410.00

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	324.39	11.04	3.712	0.30( 0.30)	1.00	105.5	40430.00
2	329.08	11.58	3.616	0.30( 0.30)	1.00	110.1	40440.00
3	333.60	12.65	3.424	0.30( 0.30)	1.00	118.5	40400.00
4	332.82	12.84	3.391	0.30( 0.30)	1.00	119.4	40420.00
5	332.53	12.87	3.386	0.30( 0.30)	1.00	119.5	40410.00
TOTAL AREA(ACRES) =		119.5					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 333.60 Tc(MIN.) = 12.654

EFFECTIVE AREA(ACRES) = 118.47 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 119.5

LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40447.00 = 2663.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40447.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40447.00 TO NODE 40448.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 482.00 DOWNSTREAM(FEET) = 447.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 926.00 CHANNEL SLOPE = 0.0378  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.150

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	24.32	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 364.79

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.07

AVERAGE FLOW DEPTH(FEET) = 3.47 TRAVEL TIME(MIN.) = 1.53

Tc(MIN.) = 14.19

SUBAREA AREA(ACRES) = 24.32 SUBAREA RUNOFF(CFS) = 62.37

EFFECTIVE AREA(ACRES) = 142.79 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 143.9 PEAK FLOW RATE(CFS) = 366.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.48 FLOW VELOCITY(FEET/SEC.) = 10.07  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40448.00 = 3589.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	366.69	12.58	3.437	0.30( 0.30)	1.00	129.9	40430.00
2	368.08	13.11	3.342	0.30( 0.30)	1.00	134.5	40440.00
3	366.24	14.19	3.150	0.30( 0.30)	1.00	142.8	40400.00
4	364.45	14.37	3.117	0.30( 0.30)	1.00	143.7	40420.00
5	363.96	14.40	3.111	0.30( 0.30)	1.00	143.9	40410.00

NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 368.08 Tc(MIN.) = 13.11  
AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 134.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40448.00 TO NODE 40449.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 447.00 DOWNSTREAM(FEET) = 433.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 443.00 CHANNEL SLOPE = 0.0316  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.212

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA(ACRES) Fp(INCH/HR) Ap(DECIMAL) SCS CN  
USER-DEFINED - 108.49 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 510.30  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.23  
AVERAGE FLOW DEPTH(FEET) = 4.08 TRAVEL TIME(MIN.) = 0.72  
Tc(MIN.) = 13.84  
SUBAREA AREA(ACRES) = 108.49 SUBAREA RUNOFF(CFS) = 284.39  
EFFECTIVE AREA(ACRES) = 242.95 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 252.3 PEAK FLOW RATE(CFS) = 636.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 4.43 FLOW VELOCITY(FEET/SEC.) = 10.83  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40449.00 = 4032.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	645.40	13.30	3.309	0.30( 0.30)	1.00	238.4	40430.00
2	636.84	13.84	3.212	0.30( 0.30)	1.00	242.9	40440.00
3	615.19	14.91	3.020	0.30( 0.30)	1.00	251.3	40400.00
4	611.56	15.09	2.994	0.30( 0.30)	1.00	252.2	40420.00
5	610.99	15.13	2.990	0.30( 0.30)	1.00	252.3	40410.00

NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 645.40 Tc(MIN.) = 13.30  
AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 238.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40449.00 TO NODE 40450.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 433.00 DOWNSTREAM(FEET) = 398.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1065.00 CHANNEL SLOPE = 0.0329  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.025

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA(ACRES) Fp(INCH/HR) Ap(DECIMAL) SCS CN  
USER-DEFINED - 36.85 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 690.60  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.22  
AVERAGE FLOW DEPTH(FEET) = 4.53 TRAVEL TIME(MIN.) = 1.58  
Tc(MIN.) = 14.88  
SUBAREA AREA(ACRES) = 36.85 SUBAREA RUNOFF(CFS) = 90.38  
EFFECTIVE AREA(ACRES) = 275.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 289.2 PEAK FLOW RATE(CFS) = 675.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 4.49 FLOW VELOCITY(FEET/SEC.) = 11.16  
LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40450.00 = 5097.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	675.06	14.88	3.025	0.30( 0.30)	1.00	275.2	40430.00
2	669.43	15.42	2.958	0.30( 0.30)	1.00	279.8	40440.00
3	658.91	16.51	2.841	0.30( 0.30)	1.00	288.1	40400.00
4	655.80	16.70	2.821	0.30( 0.30)	1.00	289.1	40420.00
5	655.08	16.73	2.817	0.30( 0.30)	1.00	289.2	40410.00

NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 675.06 Tc(MIN.) = 14.88  
AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 275.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40450.00 TO NODE 40451.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 398.00 DOWNSTREAM(FEET) = 386.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 401.00 CHANNEL SLOPE = 0.0299  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.952  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 71.80 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 760.75  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.09  
 AVERAGE FLOW DEPTH (FEET) = 4.78 TRAVEL TIME (MIN.) = 0.60  
 Tc (MIN.) = 15.48  
 SUBAREA AREA (ACRES) = 71.80 SUBAREA RUNOFF (CFS) = 171.38  
 EFFECTIVE AREA (ACRES) = 347.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 361.0 PEAK FLOW RATE (CFS) = 828.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 4.93 FLOW VELOCITY (FEET/SEC.) = 11.34  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40451.00 = 5498.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 828.23 15.48 2.952 0.30 ( 0.30) 1.00 347.0 40430.00  
 2 820.58 16.03 2.893 0.30 ( 0.30) 1.00 351.6 40440.00  
 3 801.89 17.12 2.775 0.30 ( 0.30) 1.00 359.9 40400.00  
 4 797.38 17.31 2.755 0.30 ( 0.30) 1.00 360.9 40420.00  
 5 796.39 17.34 2.751 0.30 ( 0.30) 1.00 361.0 40410.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 828.23 Tc (MIN.) = 15.48  
 AREA-AVERAGED Fm (INCH/HR) = 0.30 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA (ACRES) = 347.00

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40451.00 TO NODE 40452.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 386.00 DOWNSTREAM (FEET) = 358.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 957.00 CHANNEL SLOPE = 0.0293  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.829

SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 12.07 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 841.97  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 14.01  
 AVERAGE FLOW DEPTH (FEET) = 4.48 TRAVEL TIME (MIN.) = 1.14  
 Tc (MIN.) = 16.62  
 SUBAREA AREA (ACRES) = 12.07 SUBAREA RUNOFF (CFS) = 27.48  
 EFFECTIVE AREA (ACRES) = 359.07 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 373.1 PEAK FLOW RATE (CFS) = 828.23

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 4.45 FLOW VELOCITY (FEET/SEC.) = 13.94  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40452.00 = 6455.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 828.23 16.62 2.829 0.30 ( 0.30) 1.00 359.1 40430.00  
 2 820.58 17.17 2.770 0.30 ( 0.30) 1.00 363.7 40440.00  
 3 801.89 18.27 2.651 0.30 ( 0.30) 1.00 372.0 40400.00  
 4 797.38 18.46 2.631 0.30 ( 0.30) 1.00 372.9 40420.00  
 5 796.39 18.49 2.627 0.30 ( 0.30) 1.00 373.1 40410.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 828.23 Tc (MIN.) = 16.62  
 AREA-AVERAGED Fm (INCH/HR) = 0.30 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA (ACRES) = 359.07

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40452.00 TO NODE 40453.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 358.00 DOWNSTREAM (FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 973.00 CHANNEL SLOPE = 0.0576  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.732

SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 9.14 0.30 0.970 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 838.27  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 18.00  
 AVERAGE FLOW DEPTH (FEET) = 3.94 TRAVEL TIME (MIN.) = 0.90  
 Tc (MIN.) = 17.52  
 SUBAREA AREA (ACRES) = 9.14 SUBAREA RUNOFF (CFS) = 20.07  
 EFFECTIVE AREA (ACRES) = 368.21 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 382.2 PEAK FLOW RATE (CFS) = 828.23

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.92 FLOW VELOCITY (FEET/SEC.) = 17.98  
 LONGEST FLOWPATH FROM NODE 40400.00 TO NODE 40453.00 = 7428.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 828.23 17.52 2.732 0.30 ( 0.30) 1.00 368.2 40430.00  
 2 820.58 18.07 2.672 0.30 ( 0.30) 1.00 372.8 40440.00  
 3 801.89 19.17 2.553 0.30 ( 0.30) 1.00 381.1 40400.00  
 4 797.38 19.36 2.533 0.30 ( 0.30) 1.00 382.1 40420.00  
 5 796.39 19.40 2.529 0.30 ( 0.30) 1.00 382.2 40410.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 828.23 Tc(MIN.) = 17.52  
AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 368.21

\*\*\*\*\*

FLOW PROCESS FROM NODE 40453.00 TO NODE 40453.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.52  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.732  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 28.26 0.30 0.882 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.882  
SUBAREA AREA(ACRES) = 28.26 SUBAREA RUNOFF(CFS) = 62.75  
EFFECTIVE AREA(ACRES) = 396.47 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 410.5 PEAK FLOW RATE(CFS) = 868.67

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 410.5 TC(MIN.) = 17.52  
EFFECTIVE AREA(ACRES) = 396.47 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.991  
PEAK FLOW RATE(CFS) = 868.67

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	868.67	17.52	2.732	0.30 ( 0.30)	0.99	396.5	40430.00
2	857.31	18.07	2.672	0.30 ( 0.30)	0.99	401.1	40440.00
3	831.27	19.17	2.553	0.30 ( 0.30)	0.99	409.4	40400.00
4	825.53	19.36	2.533	0.30 ( 0.30)	0.99	410.3	40420.00
5	824.28	19.40	2.529	0.30 ( 0.30)	0.99	410.5	40410.00

END OF RATIONAL METHOD ANALYSIS

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 100 Yr \*  
\* From Node: 40500 To Node: 40519 \*  
\*\*\*\*\*

FILE NAME: 0610405Y.DAT  
TIME/DATE OF STUDY: 16:58 01/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 6.099
- 2) 10.00; 3.899
- 3) 15.00; 3.004
- 4) 20.00; 2.464
- 5) 25.00; 2.128
- 6) 30.00; 1.900
- 7) 40.00; 1.644
- 8) 50.00; 1.418
- 9) 60.00; 1.319
- 10) 90.00; 1.119
- 11) 120.00; 0.983
- 12) 180.00; 0.825
- 13) 360.00; 0.616
- 14) 1440.00; 0.271

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40500.00 TO NODE 40501.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 961.00 DOWNSTREAM(FEET) = 845.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.819  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.418  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.63	0.30	1.000	0	8.82

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 2.34  
TOTAL AREA(ACRES) = 0.63 PEAK FLOW RATE(CFS) = 2.34

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40501.00 TO NODE 40502.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 845.00 DOWNSTREAM(FEET) = 788.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 141.00 CHANNEL SLOPE = 0.4043  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.291  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.11	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.33  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.09  
AVERAGE FLOW DEPTH(FEET) = 0.42 TRAVEL TIME(MIN.) = 0.29  
 $T_c$ (MIN.) = 9.11  
SUBAREA AREA(ACRES) = 1.11 SUBAREA RUNOFF(CFS) = 3.99  
EFFECTIVE AREA(ACRES) = 1.74 AREA-AVERAGED  $F_m$ (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$ (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 1.00  
TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 6.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.49 FLOW VELOCITY(FEET/SEC.) = 8.85  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40502.00 = 469.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40502.00 TO NODE 40503.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	788.00	DOWNSTREAM(FEET) =	719.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	187.00	CHANNEL SLOPE =	0.3690
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	4.143		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.44	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.74

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.30

AVERAGE FLOW DEPTH(FEET) = 0.56 TRAVEL TIME(MIN.) = 0.34

Tc(MIN.) = 9.45

SUBAREA AREA(ACRES) = 1.44 SUBAREA RUNOFF(CFS) = 4.98

EFFECTIVE AREA(ACRES) = 3.18 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 11.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.61 FLOW VELOCITY(FEET/SEC.) = 9.94

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40503.00 = 656.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40503.00 TO NODE 40504.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	719.00	DOWNSTREAM(FEET) =	545.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	302.00	CHANNEL SLOPE =	0.5762
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.972		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.36	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.55

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.93

AVERAGE FLOW DEPTH(FEET) = 0.65 TRAVEL TIME(MIN.) = 0.39

Tc(MIN.) = 9.83

SUBAREA AREA(ACRES) = 3.36 SUBAREA RUNOFF(CFS) = 11.10

EFFECTIVE AREA(ACRES) = 6.54 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 6.5 PEAK FLOW RATE(CFS) = 21.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.72 FLOW VELOCITY(FEET/SEC.) = 13.82

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40504.00 = 958.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40504.00 TO NODE 40505.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	545.00	DOWNSTREAM(FEET) =	470.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	328.00	CHANNEL SLOPE =	0.2287
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.841		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.58	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 36.88

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.15

AVERAGE FLOW DEPTH(FEET) = 1.05 TRAVEL TIME(MIN.) = 0.49

Tc(MIN.) = 10.32

SUBAREA AREA(ACRES) = 9.58 SUBAREA RUNOFF(CFS) = 30.53

EFFECTIVE AREA(ACRES) = 16.12 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 51.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.19 FLOW VELOCITY(FEET/SEC.) = 12.15

LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40505.00 = 1286.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40505.00 TO NODE 40506.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	470.00	DOWNSTREAM(FEET) =	410.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	507.00	CHANNEL SLOPE =	0.1183
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.693		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.98	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 68.14

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.20

AVERAGE FLOW DEPTH(FEET) = 1.49 TRAVEL TIME(MIN.) = 0.83

Tc(MIN.) = 11.15

SUBAREA AREA(ACRES) = 10.98 SUBAREA RUNOFF(CFS) = 33.54

EFFECTIVE AREA(ACRES) = 27.10 AREA-AVERAGED Fm(INCH/HR) = 0.30



AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 27.1 PEAK FLOW RATE (CFS) = 82.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.61 FLOW VELOCITY (FEET/SEC.) = 10.68  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40506.00 = 1793.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40506.00 TO NODE 40507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 410.00 DOWNSTREAM (FEET) = 355.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 698.00 CHANNEL SLOPE = 0.0788  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.470

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.53	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 89.22  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.36  
AVERAGE FLOW DEPTH (FEET) = 1.78 TRAVEL TIME (MIN.) = 1.24  
Tc (MIN.) = 12.40  
SUBAREA AREA (ACRES) = 4.53 SUBAREA RUNOFF (CFS) = 12.93  
EFFECTIVE AREA (ACRES) = 31.63 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 31.6 PEAK FLOW RATE (CFS) = 90.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.79 FLOW VELOCITY (FEET/SEC.) = 9.39  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40507.00 = 2491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40507.00 TO NODE 40518.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 355.00 DOWNSTREAM (FEET) = 341.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 604.00 CHANNEL SLOPE = 0.0232  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.233

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.02	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 102.17  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.59  
AVERAGE FLOW DEPTH (FEET) = 2.12 TRAVEL TIME (MIN.) = 1.33  
Tc (MIN.) = 13.72

SUBAREA AREA (ACRES) = 9.02 SUBAREA RUNOFF (CFS) = 23.82  
EFFECTIVE AREA (ACRES) = 40.66 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 40.7 PEAK FLOW RATE (CFS) = 107.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.16 FLOW VELOCITY (FEET/SEC.) = 7.65  
LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40518.00 = 3095.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40518.00 TO NODE 40518.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 13.72  
RAINFALL INTENSITY (INCH/HR) = 3.23  
AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA (ACRES) = 40.66  
TOTAL STREAM AREA (ACRES) = 40.66  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 107.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40510.00 TO NODE 40511.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 329.00  
ELEVATION DATA: UPSTREAM (FEET) = 851.00 DOWNSTREAM (FEET) = 735.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.835  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.411  
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	-	0.48	0.30	1.000	0	8.84

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF (CFS) = 1.77  
TOTAL AREA (ACRES) = 0.48 PEAK FLOW RATE (CFS) = 1.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40511.00 TO NODE 40512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 735.00 DOWNSTREAM (FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 116.00 CHANNEL SLOPE = 0.7328  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.320

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.73	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.08  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.26  
AVERAGE FLOW DEPTH(FEET) = 0.33 TRAVEL TIME(MIN.) = 0.21  
Tc(MIN.) = 9.04  
SUBAREA AREA(ACRES) = 0.73 SUBAREA RUNOFF(CFS) = 2.62  
EFFECTIVE AREA(ACRES) = 1.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 4.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.38 FLOW VELOCITY(FEET/SEC.) = 10.11  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40512.00 = 445.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40512.00 TO NODE 40513.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 650.00 DOWNSTREAM(FEET) = 581.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 152.00 CHANNEL SLOPE = 0.4539  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.202

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.36	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.73  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.52  
AVERAGE FLOW DEPTH(FEET) = 0.49 TRAVEL TIME(MIN.) = 0.27  
Tc(MIN.) = 9.31  
SUBAREA AREA(ACRES) = 1.36 SUBAREA RUNOFF(CFS) = 4.77  
EFFECTIVE AREA(ACRES) = 2.56 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 8.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.54 FLOW VELOCITY(FEET/SEC.) = 10.11  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40513.00 = 597.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40513.00 TO NODE 40514.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 581.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00 CHANNEL SLOPE = 0.4629  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.088

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.32	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.94  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.19  
AVERAGE FLOW DEPTH(FEET) = 0.62 TRAVEL TIME(MIN.) = 0.26  
Tc(MIN.) = 9.57  
SUBAREA AREA(ACRES) = 2.32 SUBAREA RUNOFF(CFS) = 7.90  
EFFECTIVE AREA(ACRES) = 4.88 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 16.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.68 FLOW VELOCITY(FEET/SEC.) = 11.92  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40514.00 = 772.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40514.00 TO NODE 40515.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 440.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 206.00 CHANNEL SLOPE = 0.2913  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.945

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.15	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.15  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.54  
AVERAGE FLOW DEPTH(FEET) = 0.80 TRAVEL TIME(MIN.) = 0.33  
Tc(MIN.) = 9.90  
SUBAREA AREA(ACRES) = 2.15 SUBAREA RUNOFF(CFS) = 7.06  
EFFECTIVE AREA(ACRES) = 7.03 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.0 PEAK FLOW RATE(CFS) = 23.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.84 FLOW VELOCITY(FEET/SEC.) = 10.84  
LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40515.00 = 978.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40515.00 TO NODE 40516.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 390.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 269.00 CHANNEL SLOPE = 0.1859  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.837  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.24	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.40  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.92  
 AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 0.45  
 Tc(MIN.) = 10.35  
 SUBAREA AREA(ACRES) = 5.24 SUBAREA RUNOFF(CFS) = 16.69  
 EFFECTIVE AREA(ACRES) = 12.27 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 39.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.12 FLOW VELOCITY(FEET/SEC.) = 10.44  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40516.00 = 1247.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40516.00 TO NODE 40517.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 390.00 DOWNSTREAM(FEET) = 355.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 384.00 CHANNEL SLOPE = 0.0911  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.699  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.01	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.20  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.32  
 AVERAGE FLOW DEPTH(FEET) = 1.35 TRAVEL TIME(MIN.) = 0.77  
 Tc(MIN.) = 11.12  
 SUBAREA AREA(ACRES) = 4.01 SUBAREA RUNOFF(CFS) = 12.27  
 EFFECTIVE AREA(ACRES) = 16.28 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 16.3 PEAK FLOW RATE(CFS) = 49.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.39 FLOW VELOCITY(FEET/SEC.) = 8.55  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40517.00 = 1631.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40517.00 TO NODE 40518.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 355.00 DOWNSTREAM(FEET) = 341.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 512.00 CHANNEL SLOPE = 0.0273  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.484  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.89	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 62.55  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.12  
 AVERAGE FLOW DEPTH(FEET) = 1.71 TRAVEL TIME(MIN.) = 1.20  
 Tc(MIN.) = 12.32  
 SUBAREA AREA(ACRES) = 8.89 SUBAREA RUNOFF(CFS) = 25.48  
 EFFECTIVE AREA(ACRES) = 25.17 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 25.2 PEAK FLOW RATE(CFS) = 72.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.81 FLOW VELOCITY(FEET/SEC.) = 7.38  
 LONGEST FLOWPATH FROM NODE 40510.00 TO NODE 40518.00 = 2143.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40518.00 TO NODE 40518.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 12.32  
 RAINFALL INTENSITY(INCH/HR) = 3.48  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 25.17  
 TOTAL STREAM AREA(ACRES) = 25.17  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 72.15

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	107.33	13.72	3.233	0.30( 0.30)	1.00	40.7	40500.00
2	72.15	12.32	3.484	0.30( 0.30)	1.00	25.2	40510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	176.74	12.32	3.484	0.30( 0.30)	1.00	61.7	40510.00
2	173.77	13.72	3.233	0.30( 0.30)	1.00	65.8	40500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 176.74 Tc(MIN.) = 12.32  
 EFFECTIVE AREA(ACRES) = 61.67 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 65.8  
 LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40518.00 = 3095.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40518.00 TO NODE 40519.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 341.00 DOWNSTREAM(FEET) = 295.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 996.00 CHANNEL SLOPE = 0.0462  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.222  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.05 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 184.70  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.34  
 AVERAGE FLOW DEPTH(FEET) = 2.33 TRAVEL TIME(MIN.) = 1.46  
 Tc(MIN.) = 13.78  
 SUBAREA AREA(ACRES) = 6.05 SUBAREA RUNOFF(CFS) = 15.90  
 EFFECTIVE AREA(ACRES) = 67.71 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 71.9 PEAK FLOW RATE(CFS) = 178.10

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.29 FLOW VELOCITY(FEET/SEC.) = 11.29  
 LONGEST FLOWPATH FROM NODE 40500.00 TO NODE 40519.00 = 4091.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	178.10	13.78	3.222	0.30( 0.30)	1.00	67.7	40510.00
2	173.77	15.19	2.984	0.30( 0.30)	1.00	71.9	40500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 178.10 Tc(MIN.) = 13.78  
 AREA-AVERAGED Fm(INCH/HR) = 0.30 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00 EFFECTIVE AREA(ACRES) = 67.71

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 40519.00 TO NODE 40519.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.78  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.222  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 9.50 0.30 0.982 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 25.03  
 EFFECTIVE AREA(ACRES) = 77.21 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 81.4 PEAK FLOW RATE(CFS) = 203.13

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 81.4 TC(MIN.) = 13.78  
 EFFECTIVE AREA(ACRES) = 77.21 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.998  
 PEAK FLOW RATE(CFS) = 203.13

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	203.13	13.78	3.222	0.30( 0.30)	1.00	77.2	40510.00
2	196.61	15.19	2.984	0.30( 0.30)	1.00	81.4	40500.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 100 Yr \*  
\* From Node: 40600 To Node: 40615 \*  
\*\*\*\*\*

FILE NAME: 0610406Y.DAT  
TIME/DATE OF STUDY: 16:59 01/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 6.099
- 2) 10.00; 3.899
- 3) 15.00; 3.004
- 4) 20.00; 2.464
- 5) 25.00; 2.128
- 6) 30.00; 1.900
- 7) 40.00; 1.644
- 8) 50.00; 1.418
- 9) 60.00; 1.319
- 10) 90.00; 1.119
- 11) 120.00; 0.983
- 12) 180.00; 0.825
- 13) 360.00; 0.616
- 14) 1440.00; 0.271

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40600.00 TO NODE 40601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 279.00  
ELEVATION DATA: UPSTREAM(FEET) = 1054.00 DOWNSTREAM(FEET) = 1000.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.326  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.196  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.54	0.30	1.000	0	9.33

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.90  
TOTAL AREA(ACRES) = 0.54 PEAK FLOW RATE(CFS) = 1.90

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40601.00 TO NODE 40602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1000.00 DOWNSTREAM(FEET) = 985.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 199.00 CHANNEL SLOPE = 0.0754  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.869  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.76	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.12  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.94  
AVERAGE FLOW DEPTH(FEET) = 0.51 TRAVEL TIME(MIN.) = 0.84  
Tc(MIN.) = 10.17  
SUBAREA AREA(ACRES) = 0.76 SUBAREA RUNOFF(CFS) = 2.44  
EFFECTIVE AREA(ACRES) = 1.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.3 PEAK FLOW RATE(CFS) = 4.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.57 FLOW VELOCITY(FEET/SEC.) = 4.30  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40602.00 = 478.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40602.00 TO NODE 40603.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	985.00	DOWNSTREAM(FEET) =	958.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	282.00	CHANNEL SLOPE =	0.0957
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.704		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.11	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.88

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.09

AVERAGE FLOW DEPTH(FEET) = 0.62 TRAVEL TIME(MIN.) = 0.92

Tc(MIN.) = 11.09

SUBAREA AREA(ACRES) = 1.11 SUBAREA RUNOFF(CFS) = 3.40

EFFECTIVE AREA(ACRES) = 2.41 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 7.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.68 FLOW VELOCITY(FEET/SEC.) = 5.39

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40603.00 = 760.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40603.00 TO NODE 40604.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	958.00	DOWNSTREAM(FEET) =	940.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	219.00	CHANNEL SLOPE =	0.0822
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.578		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.36	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.92

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.17

AVERAGE FLOW DEPTH(FEET) = 0.71 TRAVEL TIME(MIN.) = 0.71

Tc(MIN.) = 11.80

SUBAREA AREA(ACRES) = 0.36 SUBAREA RUNOFF(CFS) = 1.05

EFFECTIVE AREA(ACRES) = 2.77 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.8 PEAK FLOW RATE(CFS) = 8.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.72 FLOW VELOCITY(FEET/SEC.) = 5.23

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40604.00 = 979.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40604.00 TO NODE 40605.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	940.00	DOWNSTREAM(FEET) =	800.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	547.00	CHANNEL SLOPE =	0.2559
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.393		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.34

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.85

AVERAGE FLOW DEPTH(FEET) = 0.68 TRAVEL TIME(MIN.) = 1.03

Tc(MIN.) = 12.83

SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 8.35

EFFECTIVE AREA(ACRES) = 5.77 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 16.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.75 FLOW VELOCITY(FEET/SEC.) = 9.45

LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40605.00 = 1526.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40605.00 TO NODE 40606.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	800.00	DOWNSTREAM(FEET) =	680.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	277.00	CHANNEL SLOPE =	0.4332
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.324		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.22	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.08

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.01

AVERAGE FLOW DEPTH(FEET) = 0.73 TRAVEL TIME(MIN.) = 0.38

Tc(MIN.) = 13.21

SUBAREA AREA(ACRES) = 2.22 SUBAREA RUNOFF(CFS) = 6.05

EFFECTIVE AREA(ACRES) = 7.99 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.0 PEAK FLOW RATE (CFS) = 21.75

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.77 FLOW VELOCITY (FEET/SEC.) = 12.36  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40606.00 = 1803.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40606.00 TO NODE 40607.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 680.00 DOWNSTREAM (FEET) = 670.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 59.00 CHANNEL SLOPE = 0.1695  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.306

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.34	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 34.38  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.82  
AVERAGE FLOW DEPTH (FEET) = 1.08 TRAVEL TIME (MIN.) = 0.10  
Tc (MIN.) = 13.31

SUBAREA AREA (ACRES) = 9.34 SUBAREA RUNOFF (CFS) = 25.26  
EFFECTIVE AREA (ACRES) = 17.33 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.3 PEAK FLOW RATE (CFS) = 46.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.22 FLOW VELOCITY (FEET/SEC.) = 10.57  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40607.00 = 1862.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40607.00 TO NODE 40608.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 670.00 DOWNSTREAM (FEET) = 585.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 246.00 CHANNEL SLOPE = 0.3455  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.255

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.64	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 53.05  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 14.32  
AVERAGE FLOW DEPTH (FEET) = 1.11 TRAVEL TIME (MIN.) = 0.29  
Tc (MIN.) = 13.60

SUBAREA AREA (ACRES) = 4.64 SUBAREA RUNOFF (CFS) = 12.33  
EFFECTIVE AREA (ACRES) = 21.96 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 58.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.15 FLOW VELOCITY (FEET/SEC.) = 14.60  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40608.00 = 2108.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40608.00 TO NODE 40609.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 585.00 DOWNSTREAM (FEET) = 494.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 482.00 CHANNEL SLOPE = 0.1888  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.137

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.61	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 69.41  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.18  
AVERAGE FLOW DEPTH (FEET) = 1.38 TRAVEL TIME (MIN.) = 0.66  
Tc (MIN.) = 14.26

SUBAREA AREA (ACRES) = 8.61 SUBAREA RUNOFF (CFS) = 21.99  
EFFECTIVE AREA (ACRES) = 30.57 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 30.6 PEAK FLOW RATE (CFS) = 78.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.44 FLOW VELOCITY (FEET/SEC.) = 12.57  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40609.00 = 2590.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40609.00 TO NODE 40610.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 494.00 DOWNSTREAM (FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 236.00 CHANNEL SLOPE = 0.1017  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.071

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	18.33	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 100.93  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.59



AVERAGE FLOW DEPTH (FEET) = 1.78 TRAVEL TIME (MIN.) = 0.37  
Tc (MIN.) = 14.63  
SUBAREA AREA (ACRES) = 18.33 SUBAREA RUNOFF (CFS) = 45.71  
EFFECTIVE AREA (ACRES) = 48.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 48.9 PEAK FLOW RATE (CFS) = 121.95

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.91 FLOW VELOCITY (FEET/SEC.) = 11.12  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40610.00 = 2826.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40610.00 TO NODE 40611.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 425.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 560.00 CHANNEL SLOPE = 0.0804  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.947  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.11 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 133.99  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.40  
AVERAGE FLOW DEPTH (FEET) = 2.07 TRAVEL TIME (MIN.) = 0.90  
Tc (MIN.) = 15.53  
SUBAREA AREA (ACRES) = 10.11 SUBAREA RUNOFF (CFS) = 24.08  
EFFECTIVE AREA (ACRES) = 59.01 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 59.0 PEAK FLOW RATE (CFS) = 140.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.11 FLOW VELOCITY (FEET/SEC.) = 10.54  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40611.00 = 3386.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40611.00 TO NODE 40612.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 425.00 DOWNSTREAM (FEET) = 373.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 906.00 CHANNEL SLOPE = 0.0574  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.779  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 20.87 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 163.89  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.66  
AVERAGE FLOW DEPTH (FEET) = 2.38 TRAVEL TIME (MIN.) = 1.56  
Tc (MIN.) = 17.09  
SUBAREA AREA (ACRES) = 20.87 SUBAREA RUNOFF (CFS) = 46.56  
EFFECTIVE AREA (ACRES) = 79.89 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 79.9 PEAK FLOW RATE (CFS) = 178.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.45 FLOW VELOCITY (FEET/SEC.) = 9.87  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40612.00 = 4292.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40612.00 TO NODE 40613.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 373.00 DOWNSTREAM (FEET) = 326.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1220.00 CHANNEL SLOPE = 0.0385  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.574  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 13.07 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 191.58  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.74  
AVERAGE FLOW DEPTH (FEET) = 2.44 TRAVEL TIME (MIN.) = 1.89  
Tc (MIN.) = 18.98  
SUBAREA AREA (ACRES) = 13.07 SUBAREA RUNOFF (CFS) = 26.75  
EFFECTIVE AREA (ACRES) = 92.95 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 93.0 PEAK FLOW RATE (CFS) = 190.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.44 FLOW VELOCITY (FEET/SEC.) = 10.68  
LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40613.00 = 5512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 40613.00 TO NODE 40614.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 326.00 DOWNSTREAM (FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 209.00 CHANNEL SLOPE = 0.1722  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.554  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 14.71 0.30 0.999 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 205.18  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 19.16  
 AVERAGE FLOW DEPTH(FEET) = 1.89 TRAVEL TIME(MIN.) = 0.18  
 Tc(MIN.) = 19.16  
 SUBAREA AREA(ACRES) = 14.71 SUBAREA RUNOFF(CFS) = 29.86  
 EFFECTIVE AREA(ACRES) = 107.67 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 107.7 PEAK FLOW RATE(CFS) = 218.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.94 FLOW VELOCITY(FEET/SEC.) = 19.45  
 LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40614.00 = 5721.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40614.00 TO NODE 40615.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 290.00 DOWNSTREAM(FEET) = 286.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0104  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.458

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	23.56	0.30	0.971	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.971  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 241.44  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.94  
 AVERAGE FLOW DEPTH(FEET) = 3.41 TRAVEL TIME(MIN.) = 0.93  
 Tc(MIN.) = 20.09  
 SUBAREA AREA(ACRES) = 23.56 SUBAREA RUNOFF(CFS) = 45.94  
 EFFECTIVE AREA(ACRES) = 131.23 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 131.2 PEAK FLOW RATE(CFS) = 255.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.48 FLOW VELOCITY(FEET/SEC.) = 7.04  
 LONGEST FLOWPATH FROM NODE 40600.00 TO NODE 40615.00 = 6107.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 40615.00 TO NODE 40615.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.09  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.458  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.74	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 3.74 SUBAREA RUNOFF(CFS) = 7.27  
 EFFECTIVE AREA(ACRES) = 134.97 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 135.0 PEAK FLOW RATE(CFS) = 262.33

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 135.0 TC(MIN.) = 20.09  
 EFFECTIVE AREA(ACRES) = 134.97 AREA-AVERAGED Fm(INCH/HR)= 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.995  
 PEAK FLOW RATE(CFS) = 262.33

END OF RATIONAL METHOD ANALYSIS



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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 100 Yr \*  
\* From Node: 50100 To Node: 50167 \*  
\*\*\*\*\*

FILE NAME: 0610501Y.DAT  
TIME/DATE OF STUDY: 16:59 01/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 6.058
- 2) 10.00; 3.879
- 3) 15.00; 2.991
- 4) 20.00; 2.456
- 5) 25.00; 2.122
- 6) 30.00; 1.895
- 7) 40.00; 1.639
- 8) 50.00; 1.415
- 9) 60.00; 1.314
- 10) 90.00; 1.113
- 11) 120.00; 0.977
- 12) 180.00; 0.820
- 13) 360.00; 0.611
- 14) 1440.00; 0.268

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50100.00 TO NODE 50101.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00  
ELEVATION DATA: UPSTREAM(FEET) = 1072.00 DOWNSTREAM(FEET) = 1063.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.598  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.063  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.30	1.000	0	14.60

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.50  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.50

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50101.00 TO NODE 50102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1063.00 DOWNSTREAM(FEET) = 975.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 273.00 CHANNEL SLOPE = 0.3223  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.952  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.29	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.85  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.91  
AVERAGE FLOW DEPTH(FEET) = 0.32 TRAVEL TIME(MIN.) = 0.77  
Tc(MIN.) = 15.37  
SUBAREA AREA(ACRES) = 0.29 SUBAREA RUNOFF(CFS) = 0.70  
EFFECTIVE AREA(ACRES) = 0.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 2.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.34 FLOW VELOCITY(FEET/SEC.) = 6.24  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50102.00 = 597.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50102.00 TO NODE 50103.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 948.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 111.00 CHANNEL SLOPE = 0.2432  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.918

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.22	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.41

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.83

AVERAGE FLOW DEPTH(FEET) = 0.37 TRAVEL TIME(MIN.) = 0.32

Tc(MIN.) = 15.68

SUBAREA AREA(ACRES) = 0.22 SUBAREA RUNOFF(CFS) = 0.52

EFFECTIVE AREA(ACRES) = 1.12 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 2.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 FLOW VELOCITY(FEET/SEC.) = 5.90

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50103.00 = 708.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50103.00 TO NODE 50104.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 948.00 DOWNSTREAM(FEET) = 914.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 136.00 CHANNEL SLOPE = 0.2500  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.880

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.33

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.38

AVERAGE FLOW DEPTH(FEET) = 0.42 TRAVEL TIME(MIN.) = 0.36

Tc(MIN.) = 16.04

SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 1.37

EFFECTIVE AREA(ACRES) = 1.71 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 3.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 6.62

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50104.00 = 844.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50104.00 TO NODE 50105.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 914.00 DOWNSTREAM(FEET) = 895.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 52.00 CHANNEL SLOPE = 0.3654  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.869

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.73	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.97

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.45

AVERAGE FLOW DEPTH(FEET) = 0.49 TRAVEL TIME(MIN.) = 0.10

Tc(MIN.) = 16.14

SUBAREA AREA(ACRES) = 1.73 SUBAREA RUNOFF(CFS) = 4.00

EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 7.95

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.54 FLOW VELOCITY(FEET/SEC.) = 9.13

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50105.00 = 896.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50106.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 835.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00 CHANNEL SLOPE = 0.2143  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.808

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.25

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.22

AVERAGE FLOW DEPTH(FEET) = 0.70 TRAVEL TIME(MIN.) = 0.57

Tc(MIN.) = 16.71

SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 8.59

EFFECTIVE AREA(ACRES) = 7.24 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 7.2 PEAK FLOW RATE (CFS) = 16.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.78 FLOW VELOCITY (FEET/SEC.) = 8.89  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50106.00 = 1176.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50106.00 TO NODE 50107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 835.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 413.00 CHANNEL SLOPE = 0.2179  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.730

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.53	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 21.31  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.49  
AVERAGE FLOW DEPTH (FEET) = 0.86 TRAVEL TIME (MIN.) = 0.73  
Tc (MIN.) = 17.44

SUBAREA AREA (ACRES) = 4.53 SUBAREA RUNOFF (CFS) = 9.91  
EFFECTIVE AREA (ACRES) = 11.77 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.8 PEAK FLOW RATE (CFS) = 25.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.93 FLOW VELOCITY (FEET/SEC.) = 10.01  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50107.00 = 1589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50107.00 TO NODE 50108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 302.00 CHANNEL SLOPE = 0.2318  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.680

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.76	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.93  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.76  
AVERAGE FLOW DEPTH (FEET) = 0.99 TRAVEL TIME (MIN.) = 0.47  
Tc (MIN.) = 17.90

SUBAREA AREA (ACRES) = 5.76 SUBAREA RUNOFF (CFS) = 12.35  
EFFECTIVE AREA (ACRES) = 17.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.5 PEAK FLOW RATE (CFS) = 37.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.06 FLOW VELOCITY (FEET/SEC.) = 11.24  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50108.00 = 1891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50108.00 TO NODE 50109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 655.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 81.00 CHANNEL SLOPE = 0.2469  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.669

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.77	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 54.39  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.70  
AVERAGE FLOW DEPTH (FEET) = 1.19 TRAVEL TIME (MIN.) = 0.11  
Tc (MIN.) = 18.01

SUBAREA AREA (ACRES) = 15.77 SUBAREA RUNOFF (CFS) = 33.62  
EFFECTIVE AREA (ACRES) = 33.31 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 33.3 PEAK FLOW RATE (CFS) = 71.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.32 FLOW VELOCITY (FEET/SEC.) = 13.53  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50109.00 = 1972.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 655.00 DOWNSTREAM (FEET) = 590.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 379.00 CHANNEL SLOPE = 0.1715  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.614

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.53	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 83.03  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.30

AVERAGE FLOW DEPTH(FEET) = 1.50 TRAVEL TIME(MIN.) = 0.51  
Tc(MIN.) = 18.52  
SUBAREA AREA(ACRES) = 11.53 SUBAREA RUNOFF(CFS) = 24.02  
EFFECTIVE AREA(ACRES) = 44.84 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 44.8 PEAK FLOW RATE(CFS) = 93.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.57 FLOW VELOCITY(FEET/SEC.) = 12.65  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50110.00 = 2351.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50110.00 TO NODE 50111.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 570.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 340.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.547

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	27.15	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 120.85  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.04  
AVERAGE FLOW DEPTH(FEET) = 2.11 TRAVEL TIME(MIN.) = 0.63  
Tc(MIN.) = 19.15  
SUBAREA AREA(ACRES) = 27.15 SUBAREA RUNOFF(CFS) = 54.91  
EFFECTIVE AREA(ACRES) = 71.99 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 72.0 PEAK FLOW RATE(CFS) = 145.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.26 FLOW VELOCITY(FEET/SEC.) = 9.48  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50111.00 = 2691.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50111.00 TO NODE 50112.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 567.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 403.00 CHANNEL SLOPE = 0.0074  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.418

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	66.68	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 209.18  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.77  
AVERAGE FLOW DEPTH(FEET) = 3.83 TRAVEL TIME(MIN.) = 1.41  
Tc(MIN.) = 20.56  
SUBAREA AREA(ACRES) = 66.68 SUBAREA RUNOFF(CFS) = 127.15  
EFFECTIVE AREA(ACRES) = 138.68 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 138.7 PEAK FLOW RATE(CFS) = 264.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 4.18 FLOW VELOCITY(FEET/SEC.) = 5.05  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50112.00 = 3094.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50112.00 TO NODE 50140.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 20.56  
RAINFALL INTENSITY(INCH/HR) = 2.42  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 138.68  
TOTAL STREAM AREA(ACRES) = 138.68  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 264.42

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50120.00 TO NODE 50121.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00  
ELEVATION DATA: UPSTREAM(FEET) = 1068.00 DOWNSTREAM(FEET) = 968.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.018  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.307

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	-	0.29	0.30	1.000	0	9.02

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.04  
TOTAL AREA(ACRES) = 0.29 PEAK FLOW RATE(CFS) = 1.04

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50121.00 TO NODE 50122.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 968.00 DOWNSTREAM(FEET) = 916.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 242.00 CHANNEL SLOPE = 0.2149  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.967  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.55	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.94  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.18  
 AVERAGE FLOW DEPTH (FEET) = 0.35 TRAVEL TIME (MIN.) = 0.78  
 Tc (MIN.) = 9.80  
 SUBAREA AREA (ACRES) = 0.55 SUBAREA RUNOFF (CFS) = 1.81  
 EFFECTIVE AREA (ACRES) = 0.83 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 0.8 PEAK FLOW RATE (CFS) = 2.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.40 FLOW VELOCITY (FEET/SEC.) = 5.70  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50122.00 = 566.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50122.00 TO NODE 50123.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 916.00 DOWNSTREAM (FEET) = 906.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 111.00 CHANNEL SLOPE = 0.0901  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.841  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.68	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.83  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.43  
 AVERAGE FLOW DEPTH (FEET) = 0.54 TRAVEL TIME (MIN.) = 0.42  
 Tc (MIN.) = 10.21  
 SUBAREA AREA (ACRES) = 0.68 SUBAREA RUNOFF (CFS) = 2.16  
 EFFECTIVE AREA (ACRES) = 1.51 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.5 PEAK FLOW RATE (CFS) = 4.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.58 FLOW VELOCITY (FEET/SEC.) = 4.73  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50123.00 = 677.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50123.00 TO NODE 50124.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 906.00 DOWNSTREAM (FEET) = 903.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 60.00 CHANNEL SLOPE = 0.0500  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.796  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.75  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.94  
 AVERAGE FLOW DEPTH (FEET) = 0.70 TRAVEL TIME (MIN.) = 0.25  
 Tc (MIN.) = 10.47  
 SUBAREA AREA (ACRES) = 0.59 SUBAREA RUNOFF (CFS) = 1.85  
 EFFECTIVE AREA (ACRES) = 2.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.1 PEAK FLOW RATE (CFS) = 6.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.74 FLOW VELOCITY (FEET/SEC.) = 4.08  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50124.00 = 737.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50124.00 TO NODE 50125.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 903.00 DOWNSTREAM (FEET) = 901.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 29.00 CHANNEL SLOPE = 0.0690  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.779  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.44	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.86  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.01  
 AVERAGE FLOW DEPTH (FEET) = 0.77 TRAVEL TIME (MIN.) = 0.10  
 Tc (MIN.) = 10.57  
 SUBAREA AREA (ACRES) = 1.44 SUBAREA RUNOFF (CFS) = 4.51  
 EFFECTIVE AREA (ACRES) = 3.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.5 PEAK FLOW RATE (CFS) = 11.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.84 FLOW VELOCITY (FEET/SEC.) = 5.28  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50125.00 = 766.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50125.00 TO NODE 50126.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<



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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 901.00 DOWNSTREAM(FEET) = 889.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 130.00 CHANNEL SLOPE = 0.0923
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.718
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -       2.69     0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.23
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.33
AVERAGE FLOW DEPTH(FEET) = 0.90 TRAVEL TIME(MIN.) = 0.34
Tc(MIN.) = 10.91
SUBAREA AREA(ACRES) = 2.69 SUBAREA RUNOFF(CFS) = 8.28
EFFECTIVE AREA(ACRES) = 6.23 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.2 PEAK FLOW RATE(CFS) = 19.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.97 FLOW VELOCITY(FEET/SEC.) = 6.74
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50126.00 = 896.00 FEET.

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FLOW PROCESS FROM NODE 50126.00 TO NODE 50127.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 889.00 DOWNSTREAM(FEET) = 855.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 231.00 CHANNEL SLOPE = 0.1472
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.636
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -       2.18     0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.45
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.31
AVERAGE FLOW DEPTH(FEET) = 0.95 TRAVEL TIME(MIN.) = 0.46
Tc(MIN.) = 11.37
SUBAREA AREA(ACRES) = 2.18 SUBAREA RUNOFF(CFS) = 6.55
EFFECTIVE AREA(ACRES) = 8.41 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 25.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.99 FLOW VELOCITY(FEET/SEC.) = 8.61
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50127.00 = 1127.00 FEET.

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FLOW PROCESS FROM NODE 50127.00 TO NODE 50128.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 855.00 DOWNSTREAM(FEET) = 793.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 211.00 CHANNEL SLOPE = 0.2938
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.584
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -       5.70     0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.68
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.03
AVERAGE FLOW DEPTH(FEET) = 0.97 TRAVEL TIME(MIN.) = 0.29
Tc(MIN.) = 11.66
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 16.83
EFFECTIVE AREA(ACRES) = 14.11 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.1 PEAK FLOW RATE(CFS) = 41.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.05 FLOW VELOCITY(FEET/SEC.) = 12.65
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50128.00 = 1338.00 FEET.

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FLOW PROCESS FROM NODE 50128.00 TO NODE 50129.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 793.00 DOWNSTREAM(FEET) = 708.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 353.00 CHANNEL SLOPE = 0.2408
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.501
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -       9.99     0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 56.10
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.65
AVERAGE FLOW DEPTH(FEET) = 1.22 TRAVEL TIME(MIN.) = 0.47
Tc(MIN.) = 12.13
SUBAREA AREA(ACRES) = 9.99 SUBAREA RUNOFF(CFS) = 28.79
EFFECTIVE AREA(ACRES) = 24.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 69.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.32 FLOW VELOCITY(FEET/SEC.) = 13.34
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50129.00 = 1691.00 FEET.

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FLOW PROCESS FROM NODE 50129.00 TO NODE 50130.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 708.00 DOWNSTREAM(FEET) = 571.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 735.00 CHANNEL SLOPE = 0.1864
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.332
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 13.71 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 88.15
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.83
AVERAGE FLOW DEPTH(FEET) = 1.51 TRAVEL TIME (MIN.) = 0.95
Tc(MIN.) = 13.08
SUBAREA AREA(ACRES) = 13.71 SUBAREA RUNOFF(CFS) = 37.42
EFFECTIVE AREA(ACRES) = 37.82 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 103.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.61 FLOW VELOCITY(FEET/SEC.) = 13.35
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50130.00 = 2426.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 50130.00 TO NODE 50131.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 571.00 DOWNSTREAM(FEET) = 566.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 709.00 CHANNEL SLOPE = 0.0071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.890
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.71 0.30 0.986 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 127.37
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.13
AVERAGE FLOW DEPTH(FEET) = 3.21 TRAVEL TIME (MIN.) = 2.86
Tc(MIN.) = 15.95
SUBAREA AREA(ACRES) = 20.71 SUBAREA RUNOFF(CFS) = 48.34
EFFECTIVE AREA(ACRES) = 58.52 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 136.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.29 FLOW VELOCITY(FEET/SEC.) = 4.20
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50131.00 = 3135.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 50132.00 TO NODE 50131.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.95
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.890
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 154.02 0.30 0.949 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 154.02 SUBAREA RUNOFF(CFS) = 361.14
EFFECTIVE AREA(ACRES) = 212.54 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 212.5 PEAK FLOW RATE(CFS) = 497.63

\*\*\*\*\*
FLOW PROCESS FROM NODE 50131.00 TO NODE 50140.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 15.95
RAINFALL INTENSITY(INCH/HR) = 2.89
AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 212.54
TOTAL STREAM AREA(ACRES) = 212.54
PEAK FLOW RATE(CFS) AT CONFLUENCE = 497.63

\*\* CONFLUENCE DATA \*\*

Table with 7 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

Table with 7 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 748.35 Tc(MIN.) = 15.95
EFFECTIVE AREA(ACRES) = 320.11 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 351.2

LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50140.00 = 3135.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 566.00 DOWNSTREAM(FEET) = 416.00
FLOW LENGTH(FEET) = 376.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 77.15
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 748.35
PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 16.03
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50141.00 = 3511.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.03
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.881
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 48.73 0.30 0.922 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.922
SUBAREA AREA(ACRES) = 48.73 SUBAREA RUNOFF(CFS) = 114.24
EFFECTIVE AREA(ACRES) = 368.84 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 400.0 PEAK FLOW RATE(CFS) = 860.08

\*\*\*\*\*

FLOW PROCESS FROM NODE 50141.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 416.00 DOWNSTREAM(FEET) = 404.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 972.00 CHANNEL SLOPE = 0.0123
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.670
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.56 0.30 0.610 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.610
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 868.55
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.23
AVERAGE FLOW DEPTH(FEET) = 5.93 TRAVEL TIME(MIN.) = 1.97
Tc(MIN.) = 18.00
SUBAREA AREA(ACRES) = 7.56 SUBAREA RUNOFF(CFS) = 16.93
EFFECTIVE AREA(ACRES) = 376.40 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 407.5 PEAK FLOW RATE(CFS) = 860.08
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 5.91 FLOW VELOCITY(FEET/SEC.) = 8.21
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50162.00 = 4483.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 860.08 18.00 2.670 0.30( 0.29) 0.96 376.4 50120.00
2 763.80 22.67 2.278 0.30( 0.29) 0.96 407.5 50100.00

NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 860.08 Tc(MIN.) = 18.00
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 376.40

\*\*\*\*\*

FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 18.00
RAINFALL INTENSITY(INCH/HR) = 2.67
AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 376.40
TOTAL STREAM AREA(ACRES) = 407.52
PEAK FLOW RATE(CFS) AT CONFLUENCE = 860.08

\*\*\*\*\*

FLOW PROCESS FROM NODE 50150.00 TO NODE 50151.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00
ELEVATION DATA: UPSTREAM(FEET) = 1076.00 DOWNSTREAM(FEET) = 988.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.235
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.212
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" - 0.46 0.30 1.000 0 9.23
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.61
TOTAL AREA(ACRES) = 0.46 PEAK FLOW RATE(CFS) = 1.61

\*\*\*\*\*

FLOW PROCESS FROM NODE 50151.00 TO NODE 50152.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	988.00	DOWNSTREAM(FEET) =	938.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	220.00	CHANNEL SLOPE =	0.2273
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.934		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.74  
AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 0.64  
Tc(MIN.) = 9.87  
SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 1.92  
EFFECTIVE AREA(ACRES) = 1.04 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 3.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.43 FLOW VELOCITY(FEET/SEC.) = 6.15  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50152.00 = 543.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50152.00 TO NODE 50153.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	938.00	DOWNSTREAM(FEET) =	904.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	218.00	CHANNEL SLOPE =	0.1560
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.793		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.13	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.20  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.96  
AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 0.61  
Tc(MIN.) = 10.48  
SUBAREA AREA(ACRES) = 1.13 SUBAREA RUNOFF(CFS) = 3.56  
EFFECTIVE AREA(ACRES) = 2.18 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.2 PEAK FLOW RATE(CFS) = 6.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.60 FLOW VELOCITY(FEET/SEC.) = 6.34  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50153.00 = 761.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50153.00 TO NODE 50154.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	904.00	DOWNSTREAM(FEET) =	881.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	212.00	CHANNEL SLOPE =	0.1085
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.694		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.42  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.33  
AVERAGE FLOW DEPTH(FEET) = 0.78 TRAVEL TIME(MIN.) = 0.56  
Tc(MIN.) = 11.04  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 9.16  
EFFECTIVE AREA(ACRES) = 5.18 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.2 PEAK FLOW RATE(CFS) = 15.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.88 FLOW VELOCITY(FEET/SEC.) = 6.80  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50154.00 = 973.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50154.00 TO NODE 50155.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	881.00	DOWNSTREAM(FEET) =	877.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	158.00	CHANNEL SLOPE =	0.0253
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.585		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.45  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.27  
AVERAGE FLOW DEPTH(FEET) = 1.29 TRAVEL TIME(MIN.) = 0.62  
Tc(MIN.) = 11.66  
SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 11.27  
EFFECTIVE AREA(ACRES) = 8.99 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 9.0 PEAK FLOW RATE(CFS) = 26.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.40 FLOW VELOCITY(FEET/SEC.) = 4.51

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50155.00 = 1131.00 FEET.

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FLOW PROCESS FROM NODE 50155.00 TO NODE 50156.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 877.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 195.00 CHANNEL SLOPE = 0.0103
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.412

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.32 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.23
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.34
AVERAGE FLOW DEPTH(FEET) = 1.77 TRAVEL TIME(MIN.) = 0.97
Tc(MIN.) = 12.63
SUBAREA AREA(ACRES) = 3.32 SUBAREA RUNOFF(CFS) = 9.30
EFFECTIVE AREA(ACRES) = 12.31 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 34.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.83 FLOW VELOCITY(FEET/SEC.) = 3.42
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50156.00 = 1326.00 FEET.

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FLOW PROCESS FROM NODE 50156.00 TO NODE 50157.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 850.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 424.00 CHANNEL SLOPE = 0.0590
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.229

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.78 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 39.46
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.85
AVERAGE FLOW DEPTH(FEET) = 1.39 TRAVEL TIME(MIN.) = 1.03
Tc(MIN.) = 13.66
SUBAREA AREA(ACRES) = 3.78 SUBAREA RUNOFF(CFS) = 9.96
EFFECTIVE AREA(ACRES) = 16.09 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 42.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.42 FLOW VELOCITY(FEET/SEC.) = 6.97
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50157.00 = 1750.00 FEET.

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FLOW PROCESS FROM NODE 50157.00 TO NODE 50158.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 835.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0949
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.177

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 11.22 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 56.93
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.97
AVERAGE FLOW DEPTH(FEET) = 1.45 TRAVEL TIME(MIN.) = 0.29
Tc(MIN.) = 13.96
SUBAREA AREA(ACRES) = 11.22 SUBAREA RUNOFF(CFS) = 29.04
EFFECTIVE AREA(ACRES) = 27.31 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 27.3 PEAK FLOW RATE(CFS) = 70.69

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.58 FLOW VELOCITY(FEET/SEC.) = 9.41
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50158.00 = 1908.00 FEET.

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FLOW PROCESS FROM NODE 50158.00 TO NODE 50159.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 835.00 DOWNSTREAM(FEET) = 680.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 721.00 CHANNEL SLOPE = 0.2150
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.023

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.87 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 96.27
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.87
AVERAGE FLOW DEPTH(FEET) = 1.52 TRAVEL TIME(MIN.) = 0.87
Tc(MIN.) = 14.82
SUBAREA AREA(ACRES) = 20.87 SUBAREA RUNOFF(CFS) = 51.14
EFFECTIVE AREA(ACRES) = 48.18 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 48.2 PEAK FLOW RATE (CFS) = 118.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.64 FLOW VELOCITY (FEET/SEC.) = 14.57  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50159.00 = 2629.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50159.00 TO NODE 50160.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 680.00 DOWNSTREAM (FEET) = 558.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 874.00 CHANNEL SLOPE = 0.1396

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.893

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	32.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 155.43

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.31

AVERAGE FLOW DEPTH (FEET) = 1.97 TRAVEL TIME (MIN.) = 1.09

Tc (MIN.) = 15.92

SUBAREA AREA (ACRES) = 32.02 SUBAREA RUNOFF (CFS) = 74.72

EFFECTIVE AREA (ACRES) = 80.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 80.2 PEAK FLOW RATE (CFS) = 187.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.12 FLOW VELOCITY (FEET/SEC.) = 13.93  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50160.00 = 3503.00 FEET.

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FLOW PROCESS FROM NODE 50160.00 TO NODE 50161.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 558.00 DOWNSTREAM (FEET) = 463.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 1013.00 CHANNEL SLOPE = 0.0938

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.745

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	13.52	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 202.04

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.23

AVERAGE FLOW DEPTH (FEET) = 2.35 TRAVEL TIME (MIN.) = 1.38

Tc (MIN.) = 17.30

SUBAREA AREA (ACRES) = 13.52 SUBAREA RUNOFF (CFS) = 29.76

EFFECTIVE AREA (ACRES) = 93.72 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 93.7 PEAK FLOW RATE (CFS) = 206.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.37 FLOW VELOCITY (FEET/SEC.) = 12.26

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50161.00 = 4516.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50161.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 463.00 DOWNSTREAM (FEET) = 404.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 1126.00 CHANNEL SLOPE = 0.0524

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.546

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	19.35	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 225.81

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.11

AVERAGE FLOW DEPTH (FEET) = 2.73 TRAVEL TIME (MIN.) = 1.86

Tc (MIN.) = 19.15

SUBAREA AREA (ACRES) = 19.35 SUBAREA RUNOFF (CFS) = 39.11

EFFECTIVE AREA (ACRES) = 113.07 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 113.1 PEAK FLOW RATE (CFS) = 228.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.74 FLOW VELOCITY (FEET/SEC.) = 10.14

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

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TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION (MIN.) = 19.15

RAINFALL INTENSITY (INCH/HR) = 2.55

AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00

EFFECTIVE STREAM AREA (ACRES) = 113.07

TOTAL STREAM AREA (ACRES) = 113.07

PEAK FLOW RATE (CFS) AT CONFLUENCE = 228.59

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	860.08	18.00	2.670	0.30 ( 0.29)	0.96	376.4	50120.00
1	763.80	22.67	2.278	0.30 ( 0.29)	0.96	407.5	50100.00
2	228.59	19.15	2.546	0.30 ( 0.30)	1.00	113.1	50150.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1086.72	18.00	2.670	0.30 ( 0.29)	0.97	482.6	50120.00
2	1064.84	19.15	2.546	0.30 ( 0.29)	0.97	497.2	50150.00
3	965.04	22.67	2.278	0.30 ( 0.29)	0.97	520.6	50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1086.72 Tc(MIN.) = 18.00  
EFFECTIVE AREA(ACRES) = 482.64 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 520.6  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50162.00 TO NODE 50163.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 378.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1158.00 CHANNEL SLOPE = 0.0225  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.487

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 151.93 0.30 0.990 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1236.46  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.25  
AVERAGE FLOW DEPTH(FEET) = 6.05 TRAVEL TIME(MIN.) = 1.72  
Tc(MIN.) = 19.71  
SUBAREA AREA(ACRES) = 151.93 SUBAREA RUNOFF(CFS) = 299.39  
EFFECTIVE AREA(ACRES) = 634.56 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 672.5 PEAK FLOW RATE(CFS) = 1253.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 6.08 FLOW VELOCITY(FEET/SEC.) = 11.29  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50163.00 = 6800.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1253.22	19.71	2.487	0.30 ( 0.29)	0.97	634.6	50120.00
2	1229.56	20.88	2.397	0.30 ( 0.29)	0.97	649.1	50150.00
3	1129.92	24.44	2.159	0.30 ( 0.29)	0.98	672.5	50100.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1253.22 Tc(MIN.) = 19.71  
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.97 EFFECTIVE AREA(ACRES) = 634.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50163.00 TO NODE 50164.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 378.00 DOWNSTREAM(FEET) = 356.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 886.00 CHANNEL SLOPE = 0.0248  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.393

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 177.01 0.30 0.989 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.989  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1420.26  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.08  
AVERAGE FLOW DEPTH(FEET) = 6.26 TRAVEL TIME(MIN.) = 1.22  
Tc(MIN.) = 20.93  
SUBAREA AREA(ACRES) = 177.01 SUBAREA RUNOFF(CFS) = 334.04  
EFFECTIVE AREA(ACRES) = 811.57 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 849.5 PEAK FLOW RATE(CFS) = 1534.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 6.44 FLOW VELOCITY(FEET/SEC.) = 12.32  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50164.00 = 7686.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1534.08	20.93	2.393	0.30 ( 0.29)	0.98	811.6	50120.00
2	1503.28	22.11	2.315	0.30 ( 0.29)	0.98	826.1	50150.00
3	1373.97	25.70	2.091	0.30 ( 0.29)	0.98	849.5	50100.00

NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 1534.08 Tc(MIN.) = 20.93  
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 811.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50164.00 TO NODE 50165.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 356.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1762.00 CHANNEL SLOPE = 0.0233  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.234

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -       155.27     0.30       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1669.24  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.28  
 AVERAGE FLOW DEPTH(FEET) = 6.73    TRAVEL TIME(MIN.) = 2.39  
 Tc(MIN.) = 23.33  
 SUBAREA AREA(ACRES) = 155.27        SUBAREA RUNOFF(CFS) = 270.26  
 EFFECTIVE AREA(ACRES) = 966.84        AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1004.8        PEAK FLOW RATE(CFS) = 1687.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 6.76    FLOW VELOCITY(FEET/SEC.) = 12.32  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50165.00 = 9448.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1687.79	23.33	2.234	0.30( 0.29)	0.98	966.8	50120.00
2	1643.35	24.51	2.155	0.30( 0.29)	0.98	981.4	50150.00
3	1523.12	28.16	1.979	0.30( 0.29)	0.98	1004.8	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1687.79    Tc(MIN.) = 23.33  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.98    EFFECTIVE AREA(ACRES) = 966.84

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50165.00 TO NODE 50166.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00    DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 893.00    CHANNEL SLOPE = 0.0347  
 CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040    MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.165

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	50.24	0.30	0.997	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1729.97  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 14.40  
 AVERAGE FLOW DEPTH(FEET) = 6.33    TRAVEL TIME(MIN.) = 1.03  
 Tc(MIN.) = 24.36  
 SUBAREA AREA(ACRES) = 50.24        SUBAREA RUNOFF(CFS) = 84.36  
 EFFECTIVE AREA(ACRES) = 1017.08        AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1055.0        PEAK FLOW RATE(CFS) = 1712.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 6.30    FLOW VELOCITY(FEET/SEC.) = 14.36  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50166.00 = 10341.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1712.17	24.36	2.165	0.30( 0.29)	0.98	1017.1	50120.00
2	1673.65	25.55	2.097	0.30( 0.29)	0.98	1031.6	50150.00
3	1553.32	29.22	1.931	0.30( 0.29)	0.98	1055.0	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1712.17    Tc(MIN.) = 24.36  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.98    EFFECTIVE AREA(ACRES) = 1017.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50166.00 TO NODE 50167.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 284.00    DOWNSTREAM(FEET) = 240.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00    CHANNEL SLOPE = 0.0437  
 CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040    MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.103

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.36	0.30	0.892	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.892  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1719.07  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 15.67  
 AVERAGE FLOW DEPTH(FEET) = 6.05    TRAVEL TIME(MIN.) = 1.07  
 Tc(MIN.) = 25.43  
 SUBAREA AREA(ACRES) = 8.36        SUBAREA RUNOFF(CFS) = 13.81  
 EFFECTIVE AREA(ACRES) = 1025.44        AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1063.4        PEAK FLOW RATE(CFS) = 1712.17  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 6.04    FLOW VELOCITY(FEET/SEC.) = 15.66  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50167.00 = 11349.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1712.17	25.43	2.103	0.30( 0.29)	0.98	1025.4	50120.00
2	1673.65	26.63	2.048	0.30( 0.29)	0.98	1040.0	50150.00
3	1553.32	30.32	1.887	0.30( 0.29)	0.98	1063.4	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1712.17    Tc(MIN.) = 25.43  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.98    EFFECTIVE AREA(ACRES) = 1025.44

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1063.4    TC(MIN.) = 25.43  
 EFFECTIVE AREA(ACRES) = 1025.44    AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.981  
 PEAK FLOW RATE(CFS) = 1712.17



\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1712.17	25.43	2.103	0.30 ( 0.29)	0.98	1025.4	50120.00
2	1673.65	26.63	2.048	0.30 ( 0.29)	0.98	1040.0	50150.00
3	1553.32	30.32	1.887	0.30 ( 0.29)	0.98	1063.4	50100.00

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END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 100 Yr \*  
\* From Node: 50500 To Node: 50513 \*  
\*\*\*\*\*

FILE NAME: 0610505Y.DAT  
TIME/DATE OF STUDY: 17:00 01/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.850
- 2) 10.00; 3.776
- 3) 15.00; 2.925
- 4) 20.00; 2.414
- 5) 25.00; 2.092
- 6) 30.00; 1.869
- 7) 40.00; 1.614
- 8) 50.00; 1.398
- 9) 60.00; 1.287
- 10) 90.00; 1.084
- 11) 120.00; 0.947
- 12) 180.00; 0.791
- 13) 360.00; 0.585
- 14) 1440.00; 0.255

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50500.00 TO NODE 50501.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 1122.00 DOWNSTREAM(FEET) = 980.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.501  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.398  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.67	0.30	1.000	0	8.50

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.46  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 2.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50501.00 TO NODE 50502.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 832.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 500.00 CHANNEL SLOPE = 0.2960  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.909  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.83	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.07  
AVERAGE FLOW DEPTH(FEET) = 0.42 TRAVEL TIME(MIN.) = 1.18  
Tc(MIN.) = 9.68  
SUBAREA AREA(ACRES) = 0.83 SUBAREA RUNOFF(CFS) = 2.71  
EFFECTIVE AREA(ACRES) = 1.50 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.5 PEAK FLOW RATE(CFS) = 4.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.47 FLOW VELOCITY(FEET/SEC.) = 7.42  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50502.00 = 830.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50502.00 TO NODE 50503.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) =	832.00	DOWNSTREAM(FEET) =	779.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	255.00	CHANNEL SLOPE =	0.2078
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.739		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.76	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.70

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.84

AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 0.54

Tc(MIN.) = 10.22

SUBAREA AREA(ACRES) = 3.76 SUBAREA RUNOFF(CFS) = 11.62

EFFECTIVE AREA(ACRES) = 5.26 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.3 PEAK FLOW RATE(CFS) = 16.28

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.79 FLOW VELOCITY(FEET/SEC.) = 8.72

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50503.00 = 1085.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50503.00 TO NODE 50504.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	779.00	DOWNSTREAM(FEET) =	765.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	382.00	CHANNEL SLOPE =	0.0366
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.521		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.56	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.89

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.97

AVERAGE FLOW DEPTH(FEET) = 1.24 TRAVEL TIME(MIN.) = 1.28

Tc(MIN.) = 11.50

SUBAREA AREA(ACRES) = 4.56 SUBAREA RUNOFF(CFS) = 13.21

EFFECTIVE AREA(ACRES) = 9.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 28.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.34 FLOW VELOCITY(FEET/SEC.) = 5.28  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50504.00 = 1467.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50504.00 TO NODE 50505.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	765.00	DOWNSTREAM(FEET) =	750.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	355.00	CHANNEL SLOPE =	0.0423
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.347		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.79	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.65

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.79

AVERAGE FLOW DEPTH(FEET) = 1.39 TRAVEL TIME(MIN.) = 1.02

Tc(MIN.) = 12.52

SUBAREA AREA(ACRES) = 3.79 SUBAREA RUNOFF(CFS) = 10.39

EFFECTIVE AREA(ACRES) = 13.61 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 13.6 PEAK FLOW RATE(CFS) = 37.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.45 FLOW VELOCITY(FEET/SEC.) = 5.94

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50505.00 = 1822.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50505.00 TO NODE 50506.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	750.00	DOWNSTREAM(FEET) =	712.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	261.00	CHANNEL SLOPE =	0.1456
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.272		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.43	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.91

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.94

AVERAGE FLOW DEPTH(FEET) = 1.24 TRAVEL TIME(MIN.) = 0.44

Tc(MIN.) = 12.96

SUBAREA AREA(ACRES) = 6.43 SUBAREA RUNOFF(CFS) = 17.19

EFFECTIVE AREA(ACRES) = 20.03 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.0 PEAK FLOW RATE (CFS) = 53.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.32 FLOW VELOCITY (FEET/SEC.) = 10.33  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50506.00 = 2083.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50506.00 TO NODE 50507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 464.00 CHANNEL SLOPE = 0.2414  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.168  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.57	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 56.91  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.67  
AVERAGE FLOW DEPTH (FEET) = 1.22 TRAVEL TIME (MIN.) = 0.61  
Tc (MIN.) = 13.57  
SUBAREA AREA (ACRES) = 2.57 SUBAREA RUNOFF (CFS) = 6.63  
EFFECTIVE AREA (ACRES) = 22.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.6 PEAK FLOW RATE (CFS) = 58.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.23 FLOW VELOCITY (FEET/SEC.) = 12.79  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50507.00 = 2547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50507.00 TO NODE 50508.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 535.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 310.00 CHANNEL SLOPE = 0.2097  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.098  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.09	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 66.02  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.54  
AVERAGE FLOW DEPTH (FEET) = 1.32 TRAVEL TIME (MIN.) = 0.41  
Tc (MIN.) = 13.98

SUBAREA AREA (ACRES) = 6.09 SUBAREA RUNOFF (CFS) = 15.34  
EFFECTIVE AREA (ACRES) = 28.69 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 28.7 PEAK FLOW RATE (CFS) = 72.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.37 FLOW VELOCITY (FEET/SEC.) = 12.83  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50508.00 = 2857.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50508.00 TO NODE 50509.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 405.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.2658  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.003  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 84.45  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 14.54  
AVERAGE FLOW DEPTH (FEET) = 1.39 TRAVEL TIME (MIN.) = 0.56  
Tc (MIN.) = 14.54  
SUBAREA AREA (ACRES) = 10.02 SUBAREA RUNOFF (CFS) = 24.38  
EFFECTIVE AREA (ACRES) = 38.72 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.7 PEAK FLOW RATE (CFS) = 94.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.45 FLOW VELOCITY (FEET/SEC.) = 14.88  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50509.00 = 3346.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50509.00 TO NODE 50510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 285.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 706.00 CHANNEL SLOPE = 0.1700  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.878  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 101.83  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.90

AVERAGE FLOW DEPTH (FEET) = 1.62 TRAVEL TIME (MIN.) = 0.91  
Tc (MIN.) = 15.46  
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 15.31  
EFFECTIVE AREA (ACRES) = 45.32 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 105.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.64 FLOW VELOCITY (FEET/SEC.) = 12.98  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50510.00 = 4052.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50510.00 TO NODE 50511.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 285.00 DOWNSTREAM (FEET) = 238.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1169.00 CHANNEL SLOPE = 0.0402  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.677

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 22.45 0.30 0.991 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 129.20  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.88  
AVERAGE FLOW DEPTH (FEET) = 2.09 TRAVEL TIME (MIN.) = 1.97  
Tc (MIN.) = 17.43  
SUBAREA AREA (ACRES) = 22.45 SUBAREA RUNOFF (CFS) = 48.08  
EFFECTIVE AREA (ACRES) = 67.77 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 67.8 PEAK FLOW RATE (CFS) = 145.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.18 FLOW VELOCITY (FEET/SEC.) = 10.18  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50511.00 = 5221.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50511.00 TO NODE 50512.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 238.00 DOWNSTREAM (FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.0102  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.548

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 39.83 0.30 0.990 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 185.35  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.46  
AVERAGE FLOW DEPTH (FEET) = 3.09 TRAVEL TIME (MIN.) = 1.26  
Tc (MIN.) = 18.69  
SUBAREA AREA (ACRES) = 39.83 SUBAREA RUNOFF (CFS) = 80.67  
EFFECTIVE AREA (ACRES) = 107.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 107.6 PEAK FLOW RATE (CFS) = 217.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 3.28 FLOW VELOCITY (FEET/SEC.) = 6.73  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50512.00 = 5710.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50512.00 TO NODE 50513.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 233.00 DOWNSTREAM (FEET) = 209.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 537.00 CHANNEL SLOPE = 0.0447  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.470

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.40 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 225.04  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.81  
AVERAGE FLOW DEPTH (FEET) = 2.52 TRAVEL TIME (MIN.) = 0.76  
Tc (MIN.) = 19.45  
SUBAREA AREA (ACRES) = 7.40 SUBAREA RUNOFF (CFS) = 14.45  
EFFECTIVE AREA (ACRES) = 114.99 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 115.0 PEAK FLOW RATE (CFS) = 224.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.52 FLOW VELOCITY (FEET/SEC.) = 11.79  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50513.00 = 6247.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50513.00 TO NODE 50513.00 IS CODE = 81

-----  
>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 19.45  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.470  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.19 0.30 0.961 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.961  
SUBAREA AREA (ACRES) = 38.19 SUBAREA RUNOFF (CFS) = 74.99  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.99  
TOTAL AREA (ACRES) = 153.2 PEAK FLOW RATE (CFS) = 299.75

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 153.2 TC (MIN.) = 19.45  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.986  
PEAK FLOW RATE (CFS) = 299.75

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 100 Yr \*  
\* From Node: 50600 To Node: 50610 \*  
\*\*\*\*\*

FILE NAME: 0610506Y.DAT  
TIME/DATE OF STUDY: 17:00 01/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.850
- 2) 10.00; 3.776
- 3) 15.00; 2.925
- 4) 20.00; 2.414
- 5) 25.00; 2.092
- 6) 30.00; 1.869
- 7) 40.00; 1.614
- 8) 50.00; 1.398
- 9) 60.00; 1.287
- 10) 90.00; 1.084
- 11) 120.00; 0.947
- 12) 180.00; 0.791
- 13) 360.00; 0.585
- 14) 1440.00; 0.255

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50600.00 TO NODE 50601.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00  
ELEVATION DATA: UPSTREAM(FEET) = 780.00 DOWNSTREAM(FEET) = 730.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.166  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.748  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	1.44	0.30	1.000	0	10.17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 4.46  
TOTAL AREA(ACRES) = 1.44 PEAK FLOW RATE(CFS) = 4.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50601.00 TO NODE 50602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.1541  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.584  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.27	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.34  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.18  
AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 0.96  
Tc(MIN.) = 11.13  
SUBAREA AREA(ACRES) = 1.27 SUBAREA RUNOFF(CFS) = 3.76  
EFFECTIVE AREA(ACRES) = 2.71 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 8.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.64 FLOW VELOCITY(FEET/SEC.) = 6.55  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50602.00 = 671.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50602.00 TO NODE 50603.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	675.00	DOWNSTREAM(FEET) =	600.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	258.00	CHANNEL SLOPE =	0.2907
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.501		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.31	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.89

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.77

AVERAGE FLOW DEPTH(FEET) = 0.61 TRAVEL TIME(MIN.) = 0.49

Tc(MIN.) = 11.62

SUBAREA AREA(ACRES) = 1.31 SUBAREA RUNOFF(CFS) = 3.78

EFFECTIVE AREA(ACRES) = 4.02 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 11.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.65 FLOW VELOCITY(FEET/SEC.) = 9.10

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50603.00 = 929.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50603.00 TO NODE 50604.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	600.00	DOWNSTREAM(FEET) =	585.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	116.00	CHANNEL SLOPE =	0.1293
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.454		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.58	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.82

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.10

AVERAGE FLOW DEPTH(FEET) = 0.81 TRAVEL TIME(MIN.) = 0.27

Tc(MIN.) = 11.89

SUBAREA AREA(ACRES) = 1.58 SUBAREA RUNOFF(CFS) = 4.49

EFFECTIVE AREA(ACRES) = 5.60 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.6 PEAK FLOW RATE(CFS) = 15.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.85 FLOW VELOCITY(FEET/SEC.) = 7.31

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50604.00 = 1045.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50604.00 TO NODE 50605.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	585.00	DOWNSTREAM(FEET) =	584.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	16.00	CHANNEL SLOPE =	0.0625
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.447		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.98	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.95

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.11

AVERAGE FLOW DEPTH(FEET) = 1.12 TRAVEL TIME(MIN.) = 0.04

Tc(MIN.) = 11.94

SUBAREA AREA(ACRES) = 4.98 SUBAREA RUNOFF(CFS) = 14.11

EFFECTIVE AREA(ACRES) = 10.58 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 10.6 PEAK FLOW RATE(CFS) = 29.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.24 FLOW VELOCITY(FEET/SEC.) = 6.51

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50605.00 = 1061.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50605.00 TO NODE 50606.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	584.00	DOWNSTREAM(FEET) =	579.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	122.00	CHANNEL SLOPE =	0.0410
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.388		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.18	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.17

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.87

AVERAGE FLOW DEPTH(FEET) = 1.45 TRAVEL TIME(MIN.) = 0.35

Tc(MIN.) = 12.28

SUBAREA AREA(ACRES) = 5.18 SUBAREA RUNOFF(CFS) = 14.40

EFFECTIVE AREA(ACRES) = 15.76 AREA-AVERAGED Fm(INCH/HR) = 0.30



AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 15.8 PEAK FLOW RATE (CFS) = 43.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.55 FLOW VELOCITY (FEET/SEC.) = 6.11  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50606.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50606.00 TO NODE 50607.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 579.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 637.00 CHANNEL SLOPE = 0.0801  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.169  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.34	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 53.29  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.25  
AVERAGE FLOW DEPTH (FEET) = 1.47 TRAVEL TIME (MIN.) = 1.29  
Tc (MIN.) = 13.57  
SUBAREA AREA (ACRES) = 7.34 SUBAREA RUNOFF (CFS) = 18.96  
EFFECTIVE AREA (ACRES) = 23.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 23.1 PEAK FLOW RATE (CFS) = 59.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.53 FLOW VELOCITY (FEET/SEC.) = 8.49  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50607.00 = 1820.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50607.00 TO NODE 50608.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 422.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 529.00 CHANNEL SLOPE = 0.2004  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.045  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.99	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 63.35  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.17  
AVERAGE FLOW DEPTH (FEET) = 1.32 TRAVEL TIME (MIN.) = 0.72  
Tc (MIN.) = 14.29

SUBAREA AREA (ACRES) = 2.99 SUBAREA RUNOFF (CFS) = 7.39  
EFFECTIVE AREA (ACRES) = 26.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.1 PEAK FLOW RATE (CFS) = 64.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.32 FLOW VELOCITY (FEET/SEC.) = 12.25  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50608.00 = 2349.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50608.00 TO NODE 50609.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 422.00 DOWNSTREAM (FEET) = 297.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 708.00 CHANNEL SLOPE = 0.1766  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.899  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.94	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 78.45  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.23  
AVERAGE FLOW DEPTH (FEET) = 1.46 TRAVEL TIME (MIN.) = 0.96  
Tc (MIN.) = 15.26  
SUBAREA AREA (ACRES) = 11.94 SUBAREA RUNOFF (CFS) = 27.93  
EFFECTIVE AREA (ACRES) = 38.04 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.0 PEAK FLOW RATE (CFS) = 88.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.53 FLOW VELOCITY (FEET/SEC.) = 12.66  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50609.00 = 3057.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50609.00 TO NODE 50610.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 297.00 DOWNSTREAM (FEET) = 207.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1321.00 CHANNEL SLOPE = 0.0681  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.699  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.38	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 100.18  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.29

AVERAGE FLOW DEPTH (FEET) = 1.72 TRAVEL TIME (MIN.) = 1.95  
Tc (MIN.) = 17.21  
SUBAREA AREA (ACRES) = 10.38 SUBAREA RUNOFF (CFS) = 22.42  
EFFECTIVE AREA (ACRES) = 48.42 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 104.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.75 FLOW VELOCITY (FEET/SEC.) = 11.38  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50610.00 = 4378.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 17.21  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.699  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.17 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.17 SUBAREA RUNOFF (CFS) = 2.53  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 49.6 PEAK FLOW RATE (CFS) = 107.09

=====

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 49.6 TC (MIN.) = 17.21  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.000  
PEAK FLOW RATE (CFS) = 107.09

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END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 100 Yr \*  
\* From Node: 50700 To Node: 50716 \*  
\*\*\*\*\*

FILE NAME: 0610507Y.DAT  
TIME/DATE OF STUDY: 17:01 01/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.850
- 2) 10.00; 3.776
- 3) 15.00; 2.925
- 4) 20.00; 2.414
- 5) 25.00; 2.092
- 6) 30.00; 1.869
- 7) 40.00; 1.614
- 8) 50.00; 1.398
- 9) 60.00; 1.287
- 10) 90.00; 1.084
- 11) 120.00; 0.947
- 12) 180.00; 0.791
- 13) 360.00; 0.585
- 14) 1440.00; 0.255

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE/ WAY		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	60.0	30.0	0.020/0.020	0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020	0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020	0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020	0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020	0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
- \*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

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FLOW PROCESS FROM NODE 50700.00 TO NODE 50701.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00  
ELEVATION DATA: UPSTREAM(FEET) = 1121.00 DOWNSTREAM(FEET) = 870.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.572  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.784  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.18	0.30	1.000	0	7.57

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.74  
TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 0.74

\*\*\*\*\*

FLOW PROCESS FROM NODE 50701.00 TO NODE 50702.00 IS CODE = 51

-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 827.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.3386  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.632  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.78  
AVERAGE FLOW DEPTH(FEET) = 0.30 TRAVEL TIME(MIN.) = 0.37  
Tc(MIN.) = 7.94  
SUBAREA AREA(ACRES) = 0.42 SUBAREA RUNOFF(CFS) = 1.65  
EFFECTIVE AREA(ACRES) = 0.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 2.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 FLOW VELOCITY(FEET/SEC.) = 6.50  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50702.00 = 456.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50703.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	827.00	DOWNSTREAM(FEET) =	815.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	94.00	CHANNEL SLOPE =	0.1277
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	4.497		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.34	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.00

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.84

AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.32

Tc(MIN.) = 8.26

SUBAREA AREA(ACRES) = 0.34 SUBAREA RUNOFF(CFS) = 1.28

EFFECTIVE AREA(ACRES) = 0.94 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 3.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.49 FLOW VELOCITY(FEET/SEC.) = 5.05

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50703.00 = 550.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50704.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) =	815.00	DOWNSTREAM(FEET) =	800.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	169.00	CHANNEL SLOPE =	0.0888
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	4.268		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.72	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.64

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.10

AVERAGE FLOW DEPTH(FEET) = 0.66 TRAVEL TIME(MIN.) = 0.55

Tc(MIN.) = 8.81

SUBAREA AREA(ACRES) = 1.72 SUBAREA RUNOFF(CFS) = 6.15

EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 9.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.75 FLOW VELOCITY(FEET/SEC.) = 5.61

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50704.00 = 719.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50705.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) =	800.00	DOWNSTREAM(FEET) =	785.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	128.00	CHANNEL SLOPE =	0.1172
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	4.136		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.12	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.19

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.67

AVERAGE FLOW DEPTH(FEET) = 0.81 TRAVEL TIME(MIN.) = 0.32

Tc(MIN.) = 9.13

SUBAREA AREA(ACRES) = 2.12 SUBAREA RUNOFF(CFS) = 7.33

EFFECTIVE AREA(ACRES) = 4.79 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 16.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.88 FLOW VELOCITY(FEET/SEC.) = 7.11

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50705.00 = 847.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50705.00 TO NODE 50706.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) =	785.00	DOWNSTREAM(FEET) =	775.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	170.00	CHANNEL SLOPE =	0.0588
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.938		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.64	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.48

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.93

AVERAGE FLOW DEPTH(FEET) = 1.12 TRAVEL TIME(MIN.) = 0.48

Tc(MIN.) = 9.61

SUBAREA AREA(ACRES) = 3.64 SUBAREA RUNOFF(CFS) = 11.90

EFFECTIVE AREA(ACRES) = 8.42 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.4 PEAK FLOW RATE (CFS) = 27.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.22 FLOW VELOCITY (FEET/SEC.) = 6.22  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50706.00 = 1017.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50706.00 TO NODE 50707.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 775.00 DOWNSTREAM (FEET) = 772.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 162.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.735

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.65	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 34.76  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.28  
AVERAGE FLOW DEPTH (FEET) = 1.65 TRAVEL TIME (MIN.) = 0.63  
Tc (MIN.) = 10.24  
SUBAREA AREA (ACRES) = 4.65 SUBAREA RUNOFF (CFS) = 14.37  
EFFECTIVE AREA (ACRES) = 13.07 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 13.1 PEAK FLOW RATE (CFS) = 40.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.74 FLOW VELOCITY (FEET/SEC.) = 4.44  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50707.00 = 1179.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50707.00 TO NODE 50708.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 772.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 357.00 CHANNEL SLOPE = 0.0756  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.605

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.55	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 45.70  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.78  
AVERAGE FLOW DEPTH (FEET) = 1.40 TRAVEL TIME (MIN.) = 0.76  
Tc (MIN.) = 11.01

SUBAREA AREA (ACRES) = 3.55 SUBAREA RUNOFF (CFS) = 10.56  
EFFECTIVE AREA (ACRES) = 16.62 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 16.6 PEAK FLOW RATE (CFS) = 49.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.44 FLOW VELOCITY (FEET/SEC.) = 7.96  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50708.00 = 1536.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50708.00 TO NODE 50709.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 733.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 444.00 CHANNEL SLOPE = 0.0270  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.379

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.58	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 57.18  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.57  
AVERAGE FLOW DEPTH (FEET) = 1.85 TRAVEL TIME (MIN.) = 1.33  
Tc (MIN.) = 12.33  
SUBAREA AREA (ACRES) = 5.58 SUBAREA RUNOFF (CFS) = 15.47  
EFFECTIVE AREA (ACRES) = 22.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.2 PEAK FLOW RATE (CFS) = 61.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.90 FLOW VELOCITY (FEET/SEC.) = 5.70  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50709.00 = 1980.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50709.00 TO NODE 50710.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 733.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 467.00 CHANNEL SLOPE = 0.1242  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.250

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.17	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 67.07  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.27

AVERAGE FLOW DEPTH (FEET) = 1.48 TRAVEL TIME (MIN.) = 0.76  
Tc (MIN.) = 13.09  
SUBAREA AREA (ACRES) = 4.17 SUBAREA RUNOFF (CFS) = 11.08  
EFFECTIVE AREA (ACRES) = 26.38 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.4 PEAK FLOW RATE (CFS) = 70.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.50 FLOW VELOCITY (FEET/SEC.) = 10.40  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50710.00 = 2447.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50710.00 TO NODE 50711.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 619.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 516.00 CHANNEL SLOPE = 0.1085  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.114  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 21.41 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 97.14  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.76  
AVERAGE FLOW DEPTH (FEET) = 1.73 TRAVEL TIME (MIN.) = 0.80  
Tc (MIN.) = 13.89  
SUBAREA AREA (ACRES) = 21.41 SUBAREA RUNOFF (CFS) = 54.21  
EFFECTIVE AREA (ACRES) = 47.78 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 121.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.89 FLOW VELOCITY (FEET/SEC.) = 11.32  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50711.00 = 2963.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50711.00 TO NODE 50712.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 619.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 650.00 CHANNEL SLOPE = 0.0292  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.912  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.43 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 129.74  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.75  
AVERAGE FLOW DEPTH (FEET) = 2.22 TRAVEL TIME (MIN.) = 1.24  
Tc (MIN.) = 15.13  
SUBAREA AREA (ACRES) = 7.43 SUBAREA RUNOFF (CFS) = 17.46  
EFFECTIVE AREA (ACRES) = 55.21 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.2 PEAK FLOW RATE (CFS) = 129.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.22 FLOW VELOCITY (FEET/SEC.) = 8.75  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50712.00 = 3613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50713.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 794.00 CHANNEL SLOPE = 0.0907  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.817  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 36.47 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 171.10  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 14.34  
AVERAGE FLOW DEPTH (FEET) = 1.99 TRAVEL TIME (MIN.) = 0.92  
Tc (MIN.) = 16.05  
SUBAREA AREA (ACRES) = 36.47 SUBAREA RUNOFF (CFS) = 82.64  
EFFECTIVE AREA (ACRES) = 91.68 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 207.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.14 FLOW VELOCITY (FEET/SEC.) = 15.11  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50713.00 = 4407.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50713.00 TO NODE 50714.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 423.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1215.00 CHANNEL SLOPE = 0.0864  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.681  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.52 0.30 0.998 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.998  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 227.58  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 15.14  
 AVERAGE FLOW DEPTH(FEET) = 2.24 TRAVEL TIME(MIN.) = 1.34  
 Tc(MIN.) = 17.39  
 SUBAREA AREA(ACRES) = 18.52 SUBAREA RUNOFF(CFS) = 39.69  
 EFFECTIVE AREA(ACRES) = 110.22 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 110.2 PEAK FLOW RATE(CFS) = 236.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.27 FLOW VELOCITY(FEET/SEC.) = 15.29  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50714.00 = 5622.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50714.00 TO NODE 50715.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 319.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 768.00 CHANNEL SLOPE = 0.1354  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.609  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.31 0.30 0.993 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 241.67  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 18.22  
 AVERAGE FLOW DEPTH(FEET) = 2.10 TRAVEL TIME(MIN.) = 0.70  
 Tc(MIN.) = 18.09  
 SUBAREA AREA(ACRES) = 5.31 SUBAREA RUNOFF(CFS) = 11.05  
 EFFECTIVE AREA(ACRES) = 115.52 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 115.5 PEAK FLOW RATE(CFS) = 240.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.10 FLOW VELOCITY(FEET/SEC.) = 18.13  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50715.00 = 6390.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50715.00 TO NODE 50716.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 319.00 DOWNSTREAM(FEET) = 182.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1513.00 CHANNEL SLOPE = 0.0905  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.455  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 79.09 0.30 0.979 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 317.00  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 16.73  
 AVERAGE FLOW DEPTH(FEET) = 2.51 TRAVEL TIME(MIN.) = 1.51  
 Tc(MIN.) = 19.60  
 SUBAREA AREA(ACRES) = 79.09 SUBAREA RUNOFF(CFS) = 153.82  
 EFFECTIVE AREA(ACRES) = 194.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 194.6 PEAK FLOW RATE(CFS) = 377.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.68 FLOW VELOCITY(FEET/SEC.) = 17.50  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50716.00 = 7903.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50716.00 TO NODE 50716.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.60  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.455  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 42.18 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 42.18 SUBAREA RUNOFF(CFS) = 81.80  
 EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 236.8 PEAK FLOW RATE(CFS) = 459.67

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 236.8 TC(MIN.) = 19.60  
 EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.993  
 PEAK FLOW RATE(CFS) = 459.67

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 100 Yr \*  
\* From Node: 50800 To Node: 50811 \*  
\*\*\*\*\*

FILE NAME: 0610508Y.DAT  
TIME/DATE OF STUDY: 17:01 01/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.850
- 2) 10.00; 3.776
- 3) 15.00; 2.925
- 4) 20.00; 2.414
- 5) 25.00; 2.092
- 6) 30.00; 1.869
- 7) 40.00; 1.614
- 8) 50.00; 1.398
- 9) 60.00; 1.287
- 10) 90.00; 1.084
- 11) 120.00; 0.947
- 12) 180.00; 0.791
- 13) 360.00; 0.585
- 14) 1440.00; 0.255

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50800.00 TO NODE 50801.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00  
ELEVATION DATA: UPSTREAM(FEET) = 795.00 DOWNSTREAM(FEET) = 745.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.302  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.725  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.60	0.30	1.000	0	10.30

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.84  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50801.00 TO NODE 50802.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 725.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 245.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.585  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.35	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.79  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.98  
AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 0.82  
Tc(MIN.) = 11.12  
SUBAREA AREA(ACRES) = 3.35 SUBAREA RUNOFF(CFS) = 9.90  
EFFECTIVE AREA(ACRES) = 3.94 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 3.9 PEAK FLOW RATE(CFS) = 11.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.83 FLOW VELOCITY(FEET/SEC.) = 5.69  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50802.00 = 566.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50802.00 TO NODE 50803.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 725.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 325.00 CHANNEL SLOPE = 0.0769  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.427

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.52	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.81

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.81

AVERAGE FLOW DEPTH(FEET) = 0.89 TRAVEL TIME(MIN.) = 0.93

Tc(MIN.) = 12.05

SUBAREA AREA(ACRES) = 1.52 SUBAREA RUNOFF(CFS) = 4.29

EFFECTIVE AREA(ACRES) = 5.47 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 15.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.93 FLOW VELOCITY(FEET/SEC.) = 5.96

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50803.00 = 891.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50803.00 TO NODE 50804.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 652.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 594.00 CHANNEL SLOPE = 0.0808  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.177

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.12	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.32

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.75

AVERAGE FLOW DEPTH(FEET) = 1.07 TRAVEL TIME(MIN.) = 1.47

Tc(MIN.) = 13.52

SUBAREA AREA(ACRES) = 6.12 SUBAREA RUNOFF(CFS) = 15.85

EFFECTIVE AREA(ACRES) = 11.59 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 11.6 PEAK FLOW RATE(CFS) = 30.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.18 FLOW VELOCITY(FEET/SEC.) = 7.19

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50804.00 = 1485.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50804.00 TO NODE 50805.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 652.00 DOWNSTREAM(FEET) = 542.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 499.00 CHANNEL SLOPE = 0.2204  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.048

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.17	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 36.41

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.01

AVERAGE FLOW DEPTH(FEET) = 1.05 TRAVEL TIME(MIN.) = 0.76

Tc(MIN.) = 14.28

SUBAREA AREA(ACRES) = 5.17 SUBAREA RUNOFF(CFS) = 12.79

EFFECTIVE AREA(ACRES) = 16.76 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 41.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.10 FLOW VELOCITY(FEET/SEC.) = 11.35

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50805.00 = 1984.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50805.00 TO NODE 50806.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 542.00 DOWNSTREAM(FEET) = 450.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 650.00 CHANNEL SLOPE = 0.1415  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.887

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.22	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 47.55

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.93

AVERAGE FLOW DEPTH(FEET) = 1.26 TRAVEL TIME(MIN.) = 1.09

Tc(MIN.) = 15.37

SUBAREA AREA(ACRES) = 5.22 SUBAREA RUNOFF(CFS) = 12.16

EFFECTIVE AREA(ACRES) = 21.99 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 51.20

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.30 FLOW VELOCITY (FEET/SEC.) = 10.10  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50806.00 = 2634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50806.00 TO NODE 50807.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 450.00 DOWNSTREAM (FEET) = 400.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 639.00 CHANNEL SLOPE = 0.0782  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.763

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.83	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 68.75  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.73  
AVERAGE FLOW DEPTH (FEET) = 1.62 TRAVEL TIME (MIN.) = 1.22  
Tc (MIN.) = 16.59  
SUBAREA AREA (ACRES) = 15.83 SUBAREA RUNOFF (CFS) = 35.10  
EFFECTIVE AREA (ACRES) = 37.82 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 37.8 PEAK FLOW RATE (CFS) = 83.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.74 FLOW VELOCITY (FEET/SEC.) = 9.18  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50807.00 = 3273.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50807.00 TO NODE 50808.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 400.00 DOWNSTREAM (FEET) = 350.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 448.00 CHANNEL SLOPE = 0.1116  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.691

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 91.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.71  
AVERAGE FLOW DEPTH (FEET) = 1.69 TRAVEL TIME (MIN.) = 0.70  
Tc (MIN.) = 17.28

SUBAREA AREA (ACRES) = 7.46 SUBAREA RUNOFF (CFS) = 16.05  
EFFECTIVE AREA (ACRES) = 45.28 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 97.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.73 FLOW VELOCITY (FEET/SEC.) = 10.87  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50808.00 = 3721.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50808.00 TO NODE 50809.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 350.00 DOWNSTREAM (FEET) = 283.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 438.00 CHANNEL SLOPE = 0.1530  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.632

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.20	0.30	0.972	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 105.03  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.47  
AVERAGE FLOW DEPTH (FEET) = 1.68 TRAVEL TIME (MIN.) = 0.59  
Tc (MIN.) = 17.87  
SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 15.16  
EFFECTIVE AREA (ACRES) = 52.48 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 52.5 PEAK FLOW RATE (CFS) = 110.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.71 FLOW VELOCITY (FEET/SEC.) = 12.62  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50809.00 = 4159.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50809.00 TO NODE 50810.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 283.00 DOWNSTREAM (FEET) = 243.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 665.00 CHANNEL SLOPE = 0.0602  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.540

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	63.52	0.30	0.983	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.983  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 174.36  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.35

AVERAGE FLOW DEPTH (FEET) = 2.17 TRAVEL TIME (MIN.) = 0.90  
Tc (MIN.) = 18.77  
SUBAREA AREA (ACRES) = 63.52 SUBAREA RUNOFF (CFS) = 128.34  
EFFECTIVE AREA (ACRES) = 116.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 116.0 PEAK FLOW RATE (CFS) = 234.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.42 FLOW VELOCITY (FEET/SEC.) = 13.31  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50810.00 = 4824.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50810.00 TO NODE 50811.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 243.00 DOWNSTREAM (FEET) = 173.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1122.00 CHANNEL SLOPE = 0.0624  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.384

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 11.57 0.30 0.980 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 245.06  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.99  
AVERAGE FLOW DEPTH (FEET) = 2.73 TRAVEL TIME (MIN.) = 1.70  
Tc (MIN.) = 20.47  
SUBAREA AREA (ACRES) = 11.57 SUBAREA RUNOFF (CFS) = 21.76  
EFFECTIVE AREA (ACRES) = 127.57 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 127.6 PEAK FLOW RATE (CFS) = 239.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.70 FLOW VELOCITY (FEET/SEC.) = 10.93  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50811.00 = 5946.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 20.47  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.384  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 3.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 6.94  
EFFECTIVE AREA (ACRES) = 131.27 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 131.3 PEAK FLOW RATE (CFS) = 246.57

=====

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 131.3 TC (MIN.) = 20.47  
EFFECTIVE AREA (ACRES) = 131.27 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.988  
PEAK FLOW RATE (CFS) = 246.57

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 2 \*  
\* HYDROLOGIC ANALYSIS - 100-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E502XXCE.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.820
2)	6.000;	4.350
3)	7.000;	3.990
4)	8.000;	3.700
5)	9.000;	3.460
6)	10.000;	3.260
7)	11.000;	3.090
8)	12.000;	2.940
9)	13.000;	2.810
10)	14.000;	2.690
11)	15.000;	2.590
12)	20.000;	2.200
13)	25.000;	1.940
14)	30.000;	1.750
15)	40.000;	1.490
16)	50.000;	1.310
17)	60.000;	1.180
18)	90.000;	0.940
19)	120.000;	0.800
20)	180.000;	0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50200.00 TO NODE 50201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 497.00 DOWNSTREAM(FEET) = 365.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.563  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.565  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.30	1.000	95	8.56
NATURAL FAIR COVER "OPEN BRUSH"	-	0.60	0.30	1.000	95	8.56
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.20	0.30	1.000	95	8.56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 4.11  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 4.11

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50201.00 TO NODE 50202.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 365.00 DOWNSTREAM(FEET) = 335.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 259.00 CHANNEL SLOPE = 0.1158  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.11  
FLOW VELOCITY(FEET/SEC.) = 5.00 FLOW DEPTH(FEET) = 0.52  
TRAVEL TIME(MIN.) = 0.86  $T_c$ (MIN.) = 9.43  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50202.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50202.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.43  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.375  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 7.47  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 11.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50203.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 335.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.1020  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 11.35  
FLOW VELOCITY(FEET/SEC.) = 6.17 FLOW DEPTH(FEET) = 0.78  
TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 9.96  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50203.00 = 781.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50203.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.96  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.269  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 11.22  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 22.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50204.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 304.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0696  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 22.18  
FLOW VELOCITY(FEET/SEC.) = 6.27 FLOW DEPTH(FEET) = 1.09  
TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 10.38  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50204.00 = 939.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50204.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.38  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.196  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 11.38  
EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 33.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50205.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 304.00 DOWNSTREAM(FEET) = 234.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 487.00 CHANNEL SLOPE = 0.1437  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 33.01  
FLOW VELOCITY(FEET/SEC.) = 11.29 FLOW DEPTH(FEET) = 0.99  
TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 11.09  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50205.00 = 1426.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 11.09  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.076  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.100 -

USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.90 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 8.87  
 EFFECTIVE AREA(ACRES) = 16.10 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 40.52

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 11.09  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.076  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	4.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.850	-
USER-DEFINED	-	3.70	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.882  
 SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 31.88  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
 TOTAL AREA(ACRES) = 28.7 PEAK FLOW RATE(CFS) = 72.40

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 28.7 TC(MIN.) = 11.09  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.910  
 PEAK FLOW RATE(CFS) = 72.40

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
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Analysis prepared by:

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 3 \*  
\* HYDROLOGIC ANALYSIS - 100-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E503XXCE.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.820
2)	6.000;	4.350
3)	7.000;	3.990
4)	8.000;	3.700
5)	9.000;	3.460
6)	10.000;	3.260
7)	11.000;	3.090
8)	12.000;	2.940
9)	13.000;	2.810
10)	14.000;	2.690
11)	15.000;	2.590
12)	20.000;	2.200
13)	25.000;	1.940
14)	30.000;	1.750
15)	40.000;	1.490
16)	50.000;	1.310
17)	60.000;	1.180
18)	90.000;	0.940
19)	120.000;	0.800
20)	180.000;	0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	(FT)	(FT)	SIDE /	HEIGHT	WIDTH	LIP	HIKE	FACTOR
			SIDE /	(FT)	(FT)	(FT)	(FT)	(n)
			WAY					

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50300.00 TO NODE 50301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00  
ELEVATION DATA: UPSTREAM(FEET) = 1110.00 DOWNSTREAM(FEET) = 1035.00

$T_c = K * [(LENGTH^{**} 3.00) / (ELEVATION CHANGE)]^{**} 0.20$

SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.517

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.357

SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
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NATURAL FAIR COVER

"GRASS"	-	0.60	0.30	1.000	95	9.52
---------	---	------	------	-------	----	------

NATURAL FAIR COVER

"WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.52
------------------	---	------	------	-------	----	------

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000

SUBAREA RUNOFF(CFS) = 2.48

TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 2.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50301.00 TO NODE 50302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 960.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 225.00 CHANNEL SLOPE = 0.3333

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00

CHANNEL FLOW THRU SUBAREA(CFS) = 2.48

FLOW VELOCITY(FEET/SEC.) = 6.52 FLOW DEPTH(FEET) = 0.36

TRAVEL TIME(MIN.) = 0.57  $T_c$ (MIN.) = 10.09

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50302.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50302.00 TO NODE 50302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN) = 10.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.244
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.30    1.000   -
USER-DEFINED        -         1.00    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.10    SUBAREA RUNOFF(CFS) = 2.91
EFFECTIVE AREA(ACRES) = 2.00    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.0        PEAK FLOW RATE(CFS) = 5.30

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*****
FLOW PROCESS FROM NODE 50302.00 TO NODE 50303.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 84.00 CHANNEL SLOPE = 0.1190
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.30
FLOW VELOCITY(FEET/SEC.) = 5.34 FLOW DEPTH(FEET) = 0.58
TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 10.35
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50303.00 = 631.00 FEET.

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*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50303.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 10.35
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.200
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.30    1.000   -
USER-DEFINED        -         0.30    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.70    SUBAREA RUNOFF(CFS) = 1.83
EFFECTIVE AREA(ACRES) = 2.70    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.7        PEAK FLOW RATE(CFS) = 7.05

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```

*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50304.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 940.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 72.00 CHANNEL SLOPE = 0.1389
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

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MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.05
FLOW VELOCITY(FEET/SEC.) = 6.09 FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 10.55
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50304.00 = 703.00 FEET.

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*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50304.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.55
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.166
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.30    0.30    1.000   -
USER-DEFINED        -         0.90    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.20    SUBAREA RUNOFF(CFS) = 5.68
EFFECTIVE AREA(ACRES) = 4.90    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.9        PEAK FLOW RATE(CFS) = 12.64

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*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50305.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 940.00 DOWNSTREAM(FEET) = 890.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.2941
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 12.64
FLOW VELOCITY(FEET/SEC.) = 9.43 FLOW DEPTH(FEET) = 0.67
TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 10.85
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50305.00 = 873.00 FEET.

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*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.85
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.115
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00    0.30    1.000   -
USER-DEFINED        -         0.80    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.80    SUBAREA RUNOFF(CFS) = 7.09
EFFECTIVE AREA(ACRES) = 7.70    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 7.7        PEAK FLOW RATE(CFS) = 19.51

```

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*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50306.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 890.00 DOWNSTREAM(FEET) = 785.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 439.00 CHANNEL SLOPE = 0.2392
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 19.51
FLOW VELOCITY(FEET/SEC.) = 9.69 FLOW DEPTH(FEET) = 0.82
TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 11.61
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50306.00 = 1312.00 FEET.

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*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 11.61
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.999
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.80   0.30  1.000  -
USER-DEFINED        -         3.30   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 17.25
EFFECTIVE AREA(ACRES) = 14.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.8 PEAK FLOW RATE(CFS) = 35.95

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*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50307.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 737.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 213.00 CHANNEL SLOPE = 0.2254
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 35.95
FLOW VELOCITY(FEET/SEC.) = 11.03 FLOW DEPTH(FEET) = 1.04
TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 11.93
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50307.00 = 1525.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 11.93
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.951
SUBAREA LOSS RATE DATA(AMC II):

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```

DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00   0.30  1.000  -
USER-DEFINED        -         0.90   0.30  1.000  -
USER-DEFINED        -         0.20   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 7.40
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 42.70

```

```

*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50308.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 737.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 527.00 CHANNEL SLOPE = 0.2600
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 42.70
FLOW VELOCITY(FEET/SEC.) = 12.19 FLOW DEPTH(FEET) = 1.08
TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 12.65
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50308.00 = 2052.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.65
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.856
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         5.70   0.30  1.000  -
USER-DEFINED        -         1.00   0.30  1.000  -
USER-DEFINED        -         3.30   0.30  1.000  -
USER-DEFINED        -         0.40   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 23.92
EFFECTIVE AREA(ACRES) = 28.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 28.3 PEAK FLOW RATE(CFS) = 65.09

```

```

*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50309.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 555.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 561.00 CHANNEL SLOPE = 0.0802
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00

```

CHANNEL FLOW THRU SUBAREA(CFS) = 65.09  
FLOW VELOCITY(FEET/SEC.) = 8.67 FLOW DEPTH(FEET) = 1.58  
TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 13.73  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 2613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 13.73  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.723  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 6.76  
EFFECTIVE AREA(ACRES) = 31.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.4 PEAK FLOW RATE(CFS) = 68.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50310.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 555.00 DOWNSTREAM(FEET) = 509.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 401.00 CHANNEL SLOPE = 0.1147  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 68.47  
FLOW VELOCITY(FEET/SEC.) = 10.06 FLOW DEPTH(FEET) = 1.51  
TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 14.39  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50310.00 = 3014.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 14.39  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.651  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	7.60	0.30	1.000	-
USER-DEFINED	-	6.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 36.60

EFFECTIVE AREA(ACRES) = 48.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 48.7 PEAK FLOW RATE(CFS) = 103.04

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50311.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 509.00 DOWNSTREAM(FEET) = 395.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 685.00 CHANNEL SLOPE = 0.1664  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 103.04  
FLOW VELOCITY(FEET/SEC.) = 12.81 FLOW DEPTH(FEET) = 1.64  
TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 15.28  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50311.00 = 3699.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50311.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 15.28  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.568  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 19.19  
EFFECTIVE AREA(ACRES) = 58.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 58.1 PEAK FLOW RATE(CFS) = 118.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50312.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 383.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 216.00 CHANNEL SLOPE = 0.0556  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 118.59  
FLOW VELOCITY(FEET/SEC.) = 8.81 FLOW DEPTH(FEET) = 2.12  
TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 15.69  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50312.00 = 3915.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.69

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.536

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	18.40	0.30	1.000	-
USER-DEFINED	-	11.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 37.70 SUBAREA RUNOFF(CFS) = 75.87

EFFECTIVE AREA(ACRES) = 95.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 95.8 PEAK FLOW RATE(CFS) = 192.80

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.69

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.536

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 6.84  
EFFECTIVE AREA(ACRES) = 99.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 99.2 PEAK FLOW RATE(CFS) = 199.64

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50313.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 383.00 DOWNSTREAM(FEET) = 350.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 762.00 CHANNEL SLOPE = 0.0433  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 199.64  
FLOW VELOCITY(FEET/SEC.) = 9.10 FLOW DEPTH(FEET) = 2.70  
TRAVEL TIME(MIN.) = 1.40 Tc(MIN.) = 17.09  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50313.00 = 4677.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.09

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.427

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 12.06

EFFECTIVE AREA(ACRES) = 105.50 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 105.5 PEAK FLOW RATE(CFS) = 201.99

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.09

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.427

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 10.90 SUBAREA RUNOFF(CFS) = 20.87  
EFFECTIVE AREA(ACRES) = 116.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 116.4 PEAK FLOW RATE(CFS) = 222.86

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50314.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 318.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 957.00 CHANNEL SLOPE = 0.0334  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 222.86  
FLOW VELOCITY(FEET/SEC.) = 8.50 FLOW DEPTH(FEET) = 2.96  
TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 18.96  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50314.00 = 5634.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 18.96  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.281  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	3.70	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	10.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 21.80 SUBAREA RUNOFF(CFS) = 38.87  
 EFFECTIVE AREA(ACRES) = 138.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 138.2 PEAK FLOW RATE(CFS) = 246.40

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 18.96  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.281  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.80	0.30	1.000	-
USER-DEFINED	-	15.20	0.30	1.000	-
USER-DEFINED	-	5.90	0.30	1.000	-
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 34.70 SUBAREA RUNOFF(CFS) = 61.87  
 EFFECTIVE AREA(ACRES) = 172.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 172.9 PEAK FLOW RATE(CFS) = 308.27

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 18.96  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.281  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 1.43  
 EFFECTIVE AREA(ACRES) = 173.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 173.7 PEAK FLOW RATE(CFS) = 309.70

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50315.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 318.00 DOWNSTREAM(FEET) = 313.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00 CHANNEL SLOPE = 0.0179  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 309.70  
 FLOW VELOCITY(FEET/SEC.) = 7.31 FLOW DEPTH(FEET) = 3.76  
 TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 19.60  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50315.00 = 5914.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50315.00 TO NODE 50315.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.60  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.231  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	2.40	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 11.65  
 EFFECTIVE AREA(ACRES) = 180.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 180.4 PEAK FLOW RATE(CFS) = 313.56

\*\*\*\*\*

FLOW PROCESS FROM NODE 50315.00 TO NODE 50316.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 313.00 DOWNSTREAM(FEET) = 285.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 642.00 CHANNEL SLOPE = 0.0436  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 313.56  
 FLOW VELOCITY(FEET/SEC.) = 10.25 FLOW DEPTH(FEET) = 3.19  
 TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 20.64  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50316.00 = 6556.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 20.64  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.166  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 3.50 0.30 1.000 -  
USER-DEFINED - 1.00 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 2.20 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 12.26  
EFFECTIVE AREA(ACRES) = 187.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 187.7 PEAK FLOW RATE(CFS) = 315.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 20.64  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.166  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 1.000 -  
USER-DEFINED - 1.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 3.70  
EFFECTIVE AREA(ACRES) = 189.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 189.9 PEAK FLOW RATE(CFS) = 319.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50316.00 TO NODE 50317.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 282.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 448.00 CHANNEL SLOPE = 0.0067  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 319.01  
FLOW VELOCITY(FEET/SEC.) = 5.10 FLOW DEPTH(FEET) = 4.57  
TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 22.11  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50317.00 = 7004.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81  
-----

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.11  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.090  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.00 0.30 1.000 -  
USER-DEFINED - 2.90 0.30 1.000 -  
USER-DEFINED - 2.60 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 10.20 0.30 1.000 -  
USER-DEFINED - 42.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.997  
SUBAREA AREA(ACRES) = 59.70 SUBAREA RUNOFF(CFS) = 96.25  
EFFECTIVE AREA(ACRES) = 249.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 249.6 PEAK FLOW RATE(CFS) = 402.24

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.11  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.090  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 25.40 0.30 1.000 -  
USER-DEFINED - 17.50 0.30 1.000 -  
USER-DEFINED - 22.00 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 65.80 SUBAREA RUNOFF(CFS) = 106.03  
EFFECTIVE AREA(ACRES) = 315.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 315.4 PEAK FLOW RATE(CFS) = 508.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50317.00 TO NODE 50318.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 600.00 CHANNEL SLOPE = 0.0817  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 508.27  
FLOW VELOCITY(FEET/SEC.) = 14.61 FLOW DEPTH(FEET) = 3.41  
TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 22.79  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50318.00 = 7604.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81  
-----

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.79

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.055

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	0.100	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.839

SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 10.87

EFFECTIVE AREA(ACRES) = 322.10 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 322.1 PEAK FLOW RATE(CFS) = 509.04

\*\*\*\*\*

FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.79

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.055

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	5.00	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.935

SUBAREA AREA(ACRES) = 7.60 SUBAREA RUNOFF(CFS) = 12.14

EFFECTIVE AREA(ACRES) = 329.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 329.7 PEAK FLOW RATE(CFS) = 521.17

\*\*\*\*\*

FLOW PROCESS FROM NODE 50318.00 TO NODE 50319.00 IS CODE = 51

=====  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 233.00 DOWNSTREAM(FEET) = 228.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 201.00 CHANNEL SLOPE = 0.0249

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00

CHANNEL FLOW THRU SUBAREA(CFS) = 521.17

FLOW VELOCITY(FEET/SEC.) = 11.69 FLOW DEPTH(FEET) = 3.86

TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 23.08

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50319.00 = 7805.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.08

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.040

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 10.18

EFFECTIVE AREA(ACRES) = 336.00 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 336.0 PEAK FLOW RATE(CFS) = 526.93

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.08

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.040

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.994

SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 12.23

EFFECTIVE AREA(ACRES) = 343.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 343.8 PEAK FLOW RATE(CFS) = 539.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50320.00 IS CODE = 51

=====  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 228.00 DOWNSTREAM(FEET) = 214.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 809.00 CHANNEL SLOPE = 0.0173

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00

CHANNEL FLOW THRU SUBAREA(CFS) = 539.16

FLOW VELOCITY(FEET/SEC.) = 10.30 FLOW DEPTH(FEET) = 4.18



TRAVEL TIME (MIN.) = 1.31 Tc (MIN.) = 24.39  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50320.00 = 8614.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 24.39

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.972

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	4.80	0.30	0.850	-
USER-DEFINED	-	5.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.929

SUBAREA AREA (ACRES) = 11.40 SUBAREA RUNOFF (CFS) = 17.37

EFFECTIVE AREA (ACRES) = 355.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 355.2 PEAK FLOW RATE (CFS) = 539.16

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 24.39

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.972

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.90	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.854

SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 17.29

EFFECTIVE AREA (ACRES) = 366.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 366.4 PEAK FLOW RATE (CFS) = 552.75

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 366.4 TC (MIN.) = 24.39

EFFECTIVE AREA (ACRES) = 366.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.985

PEAK FLOW RATE (CFS) = 552.75

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 4 \*  
\* HYDROLOGIC ANALYSIS - 100-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E504XXCE.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.000; 4.820
- 2) 6.000; 4.350
- 3) 7.000; 3.990
- 4) 8.000; 3.700
- 5) 9.000; 3.460
- 6) 10.000; 3.260
- 7) 11.000; 3.090
- 8) 12.000; 2.940
- 9) 13.000; 2.810
- 10) 14.000; 2.690
- 11) 15.000; 2.590
- 12) 20.000; 2.200
- 13) 25.000; 1.940
- 14) 30.000; 1.750
- 15) 40.000; 1.490
- 16) 50.000; 1.310
- 17) 60.000; 1.180
- 18) 90.000; 0.940
- 19) 120.000; 0.800
- 20) 180.000; 0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.482  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.178  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.50	0.30	1.000	95	10.48

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.30  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.30  
FLOW VELOCITY(FEET/SEC.) = 4.97 FLOW DEPTH(FEET) = 0.29  
TRAVEL TIME(MIN.) = 0.88  $T_c$ (MIN.) = 11.36  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.36

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.036  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.98  
 EFFECTIVE AREA (ACRES) = 0.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 2.22

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 239.00 CHANNEL SLOPE = 0.4184  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 2.22  
 FLOW VELOCITY (FEET/SEC.) = 6.99 FLOW DEPTH (FEET) = 0.33  
 TRAVEL TIME (MIN.) = 0.57 Tc (MIN.) = 11.93  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50403.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 11.93  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.950  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.95  
 EFFECTIVE AREA (ACRES) = 1.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.3 PEAK FLOW RATE (CFS) = 3.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00 CHANNEL SLOPE = 0.7042  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 3.10

FLOW VELOCITY (FEET/SEC.) = 9.02 FLOW DEPTH (FEET) = 0.34  
 TRAVEL TIME (MIN.) = 0.13 Tc (MIN.) = 12.06  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50404.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.06  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.932  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 2.84  
 EFFECTIVE AREA (ACRES) = 2.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.5 PEAK FLOW RATE (CFS) = 5.92

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 145.00 CHANNEL SLOPE = 0.3448  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 5.92  
 FLOW VELOCITY (FEET/SEC.) = 8.18 FLOW DEPTH (FEET) = 0.49  
 TRAVEL TIME (MIN.) = 0.30 Tc (MIN.) = 12.36  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50405.00 TO NODE 50405.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.36  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.894  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.57  
 EFFECTIVE AREA (ACRES) = 3.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.6 PEAK FLOW RATE (CFS) = 8.40

```

*****
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 8.40
FLOW VELOCITY(FEET/SEC.) = 8.70 FLOW DEPTH(FEET) = 0.57
TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 12.66
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50406.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.66
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.854
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.30  1.000  -
USER-DEFINED        -         0.20   0.30  1.000  -
USER-DEFINED        -         0.80   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 2.76
EFFECTIVE AREA(ACRES) = 4.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 11.03

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.2193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 11.03
FLOW VELOCITY(FEET/SEC.) = 8.09 FLOW DEPTH(FEET) = 0.67
TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 13.13
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50407.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 13.13
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.794
SUBAREA LOSS RATE DATA(AMC II):

```

```

DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.50   0.30  1.000  -
USER-DEFINED        -         1.20   0.30  1.000  -
USER-DEFINED        -         1.70   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 14.37
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 25.15

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 325.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 490.00 CHANNEL SLOPE = 0.1531
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 25.15
FLOW VELOCITY(FEET/SEC.) = 8.74 FLOW DEPTH(FEET) = 0.98
TRAVEL TIME(MIN.) = 0.93 Tc(MIN.) = 14.06
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.06
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.684
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.30  1.000  -
USER-DEFINED        -         0.10   0.30  1.000  -
USER-DEFINED        -         0.60   0.30  1.000  -
USER-DEFINED        -         1.30   0.30  1.000  -
USER-DEFINED        -         0.50   0.30  1.000  -
USER-DEFINED        -         1.20   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 8.15
EFFECTIVE AREA(ACRES) = 15.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.0 PEAK FLOW RATE(CFS) = 32.18

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.06
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.684
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.93  
EFFECTIVE AREA(ACRES) = 15.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.9 PEAK FLOW RATE(CFS) = 34.11

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 34.11  
FLOW VELOCITY(FEET/SEC.) = 6.97 FLOW DEPTH(FEET) = 1.28  
TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 14.24  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.24  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.666  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	6.40	0.30	1.000	-
USER-DEFINED	-	6.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 14.80 SUBAREA RUNOFF(CFS) = 31.52  
EFFECTIVE AREA(ACRES) = 30.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.7 PEAK FLOW RATE(CFS) = 65.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.24  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.666  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.28  
EFFECTIVE AREA(ACRES) = 31.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.3 PEAK FLOW RATE(CFS) = 66.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 66.66  
FLOW VELOCITY(FEET/SEC.) = 8.69 FLOW DEPTH(FEET) = 1.60  
TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 14.43  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.43  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.647  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 13.52  
EFFECTIVE AREA(ACRES) = 37.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 37.7 PEAK FLOW RATE(CFS) = 79.62

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.43  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.647  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 1.27  
 EFFECTIVE AREA (ACRES) = 38.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 38.3 PEAK FLOW RATE (CFS) = 80.89

\*\*\*\*\*

FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 312.00 DOWNSTREAM (FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 566.00 CHANNEL SLOPE = 0.0530  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 80.89  
 FLOW VELOCITY (FEET/SEC.) = 7.87 FLOW DEPTH (FEET) = 1.85  
 TRAVEL TIME (MIN.) = 1.20 Tc (MIN.) = 15.63  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 15.63  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.541  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658  
 SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 10.54  
 EFFECTIVE AREA (ACRES) = 43.30 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 43.3 PEAK FLOW RATE (CFS) = 87.78

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 15.63  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.541  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

USER-DEFINED - 5.80 0.30 1.000 -  
 USER-DEFINED - 0.50 0.30 1.000 -  
 USER-DEFINED - 3.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 10.50 SUBAREA RUNOFF (CFS) = 21.17  
 EFFECTIVE AREA (ACRES) = 53.80 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 53.8 PEAK FLOW RATE (CFS) = 108.96

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 216.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 954.00 CHANNEL SLOPE = 0.0692  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 108.96  
 FLOW VELOCITY (FEET/SEC.) = 11.63 FLOW DEPTH (FEET) = 1.77  
 TRAVEL TIME (MIN.) = 1.37 Tc (MIN.) = 17.00  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 17.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.434  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875  
 SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 7.04  
 EFFECTIVE AREA (ACRES) = 57.40 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 57.4 PEAK FLOW RATE (CFS) = 110.83

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 17.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.434  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.30 0.30 1.000 -  
 USER-DEFINED - 9.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 20.36  
 EFFECTIVE AREA(ACRES) = 68.00 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 68.0 PEAK FLOW RATE(CFS) = 131.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.434  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.934  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 4.85  
 EFFECTIVE AREA(ACRES) = 70.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 70.5 PEAK FLOW RATE(CFS) = 136.04

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 70.5 TC(MIN.) = 17.00  
 EFFECTIVE AREA(ACRES) = 70.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.967  
 PEAK FLOW RATE(CFS) = 136.04

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 2 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 100-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P201XXCE.DAT  
TIME/DATE OF STUDY: 10:20 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.820
2)	6.000;	4.350
3)	7.000;	3.990
4)	8.000;	3.700
5)	9.000;	3.460
6)	10.000;	3.260
7)	11.000;	3.090
8)	12.000;	2.940
9)	13.000;	2.810
10)	14.000;	2.690
11)	15.000;	2.590
12)	20.000;	2.200
13)	25.000;	1.940
14)	30.000;	1.750
15)	40.000;	1.490
16)	50.000;	1.310
17)	60.000;	1.180
18)	90.000;	0.940
19)	120.000;	0.800
20)	180.000;	0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20100.00 TO NODE 20101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 830.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.230  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.414  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.30	1.000	95	9.23
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.23

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.68  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.68

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20101.00 TO NODE 20102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 276.00 CHANNEL SLOPE = 0.2899  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.68  
FLOW VELOCITY(FEET/SEC.) = 5.63 FLOW DEPTH(FEET) = 0.32  
TRAVEL TIME(MIN.) = 0.82  $T_c$ (MIN.) = 10.05  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20102.00 = 595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20102.00 TO NODE 20102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<



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=====
MAINLINE Tc(MIN) = 10.05
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.252
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -         0.80    0.30    1.000   -
USER-DEFINED          -         0.20    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.00    SUBAREA RUNOFF(CFS) = 2.66
EFFECTIVE AREA(ACRES) = 1.60    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6    PEAK FLOW RATE(CFS) = 4.25

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*****
FLOW PROCESS FROM NODE 20102.00 TO NODE 20103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.1863
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.25
FLOW VELOCITY(FEET/SEC.) = 6.01 FLOW DEPTH(FEET) = 0.49
TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 10.49
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20103.00 = 756.00 FEET.

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.49
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.176
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -         0.50    0.30    1.000   -
USER-DEFINED          -         0.10    0.30    1.000   -
USER-DEFINED          -         0.30    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90    SUBAREA RUNOFF(CFS) = 2.33
EFFECTIVE AREA(ACRES) = 2.50    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.5    PEAK FLOW RATE(CFS) = 6.47

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20104.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 690.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 64.00 CHANNEL SLOPE = 0.4688

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CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 6.47
FLOW VELOCITY(FEET/SEC.) = 9.45 FLOW DEPTH(FEET) = 0.48
TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 10.61
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20104.00 = 820.00 FEET.

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20104.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.61
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.157
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -         0.40    0.30    1.000   -
USER-DEFINED          -         3.30    0.30    1.000   -
USER-DEFINED          -         0.10    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 9.77
EFFECTIVE AREA(ACRES) = 6.30    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.3    PEAK FLOW RATE(CFS) = 16.20

```

```

*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20105.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 690.00 DOWNSTREAM(FEET) = 670.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 159.00 CHANNEL SLOPE = 0.1258
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 16.20
FLOW VELOCITY(FEET/SEC.) = 7.22 FLOW DEPTH(FEET) = 0.86
TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 10.97
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20105.00 = 979.00 FEET.

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*****
FLOW PROCESS FROM NODE 20105.00 TO NODE 20105.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.97
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.094
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -         0.20    0.30    1.000   -
USER-DEFINED          -         1.50    0.30    1.000   -
USER-DEFINED          -         2.20    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90    SUBAREA RUNOFF(CFS) = 9.81

```

EFFECTIVE AREA(ACRES) = 10.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 10.2 PEAK FLOW RATE(CFS) = 25.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 20105.00 TO NODE 20106.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 670.00 DOWNSTREAM(FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 192.00 CHANNEL SLOPE = 0.1042  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 25.65  
FLOW VELOCITY(FEET/SEC.) = 7.56 FLOW DEPTH(FEET) = 1.06  
TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 11.40  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20106.00 = 1171.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20106.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN) = 11.40  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.030  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.10 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 9.34  
EFFECTIVE AREA(ACRES) = 14.00 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 34.40

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20107.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 650.00 DOWNSTREAM(FEET) = 640.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 156.00 CHANNEL SLOPE = 0.0641  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 34.40  
FLOW VELOCITY(FEET/SEC.) = 6.79 FLOW DEPTH(FEET) = 1.30  
TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 11.78  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20107.00 = 1327.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20107.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 11.78  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.973

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.20 0.30 1.000 -  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 9.62  
EFFECTIVE AREA(ACRES) = 18.00 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 18.0 PEAK FLOW RATE(CFS) = 43.30

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FLOW PROCESS FROM NODE 20107.00 TO NODE 20108.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 640.00 DOWNSTREAM(FEET) = 609.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 512.00 CHANNEL SLOPE = 0.0605  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 43.30  
FLOW VELOCITY(FEET/SEC.) = 7.06 FLOW DEPTH(FEET) = 1.43  
TRAVEL TIME(MIN.) = 1.21 Tc(MIN.) = 12.99  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20108.00 = 1839.00 FEET.

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20108.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN) = 12.99  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.812  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.200 -  
USER-DEFINED - 1.50 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 6.12  
EFFECTIVE AREA(ACRES) = 20.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.7 PEAK FLOW RATE(CFS) = 46.81

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 600.00
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.42
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 46.81
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 13.17
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20109.00 = 2033.00 FEET.

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*****
FLOW PROCESS FROM NODE 20109.00 TO NODE 20109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 13.17
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.789
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -      0.70    0.30    0.200  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.72
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 48.11

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*****
FLOW PROCESS FROM NODE 20109.00 TO NODE 20110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 594.00
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.65
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 48.11
PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 13.69
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20110.00 = 2393.00 FEET.

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*****
FLOW PROCESS FROM NODE 20110.00 TO NODE 20110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 13.69
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.727
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -      0.30    0.30    0.100  -
USER-DEFINED         -      3.50    0.30    0.200  -
USER-DEFINED         -      2.70    0.30    1.000  -
USER-DEFINED         -      0.20    0.30    1.000  -
USER-DEFINED         -      1.20    0.30    1.000  -

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```

USER-DEFINED         -      0.30    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 18.74
EFFECTIVE AREA(ACRES) = 29.60 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 29.6 PEAK FLOW RATE(CFS) = 65.67

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*****
FLOW PROCESS FROM NODE 20110.00 TO NODE 20111.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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```

ELEVATION DATA: UPSTREAM(FEET) = 594.00 DOWNSTREAM(FEET) = 590.00
FLOW LENGTH(FEET) = 246.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.72
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 65.67
PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 14.01
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20111.00 = 2639.00 FEET.

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*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 14.01
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.689
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN

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```

USER-DEFINED         -      0.70    0.30    0.100  -
USER-DEFINED         -      2.10    0.30    0.200  -
USER-DEFINED         -      2.10    0.30    1.000  -
USER-DEFINED         -      0.60    0.30    1.000  -
USER-DEFINED         -      4.70    0.30    1.000  -
USER-DEFINED         -      0.90    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.792
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 24.49
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 89.13

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```

*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20112.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 580.00
FLOW LENGTH(FEET) = 628.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.49
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 89.13

```

PIPE TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 14.79  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20112.00 = 3267.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 14.79

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.611

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.200	-
USER-DEFINED	-	4.40	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	7.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.797

SUBAREA AREA(ACRES) = 15.20 SUBAREA RUNOFF(CFS) = 32.45

EFFECTIVE AREA(ACRES) = 55.90 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 55.9 PEAK FLOW RATE(CFS) = 118.74

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 14.79

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.611

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 5.02

EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 123.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20113.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 580.00 DOWNSTREAM(FEET) = 570.00

FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.65

ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 123.77  
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 15.34  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20113.00 = 3786.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.34

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.563

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.100	-
USER-DEFINED	-	4.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.877

SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 26.09

EFFECTIVE AREA(ACRES) = 70.90 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 147.35

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.34

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.563

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	1.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.787

SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 7.54

EFFECTIVE AREA(ACRES) = 74.50 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 74.5 PEAK FLOW RATE(CFS) = 154.89

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20114.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00

FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 12.07

ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 154.89  
PIPE TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 16.18  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20114.00 = 4393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 16.18  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.498  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.30 0.100 -  
USER-DEFINED - 4.00 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 0.50 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.747  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 16.17  
EFFECTIVE AREA(ACRES) = 82.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 82.4 PEAK FLOW RATE(CFS) = 166.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 16.18  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.498  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 1.000 -  
USER-DEFINED - 8.20 0.30 1.000 -  
USER-DEFINED - 3.20 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 3.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.932  
SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 34.94  
EFFECTIVE AREA(ACRES) = 99.90 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 99.9 PEAK FLOW RATE(CFS) = 201.61

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20115.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 560.00  
FLOW LENGTH(FEET) = 461.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 57.0 INCH PIPE IS 42.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.33  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 201.61  
PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 16.71  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20115.00 = 4854.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 16.71  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.456  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.60 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 0.100 -  
USER-DEFINED - 6.20 0.30 0.850 -  
USER-DEFINED - 2.20 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798  
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 25.54  
EFFECTIVE AREA(ACRES) = 112.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 112.7 PEAK FLOW RATE(CFS) = 223.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 16.71  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.456  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.36  
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 224.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20116.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 560.00 DOWNSTREAM(FEET) = 528.00  
FLOW LENGTH(FEET) = 219.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 38.86

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 224.75  
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 16.81  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20116.00 = 5073.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20116.00 TO NODE 20117.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	528.00	DOWNSTREAM(FEET) =	489.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	174.00	CHANNEL SLOPE =	0.2241
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH(FEET) =	3.00
CHANNEL FLOW THRU SUBAREA(CFS) =	224.75		
FLOW VELOCITY(FEET/SEC.) =	21.55	FLOW DEPTH(FEET) =	1.86
TRAVEL TIME(MIN.) =	0.13	Tc(MIN.) =	16.94
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20117.00 =	5247.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 16.94  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.438  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.910  
SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 4.87  
EFFECTIVE AREA(ACRES) = 115.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 115.9 PEAK FLOW RATE(CFS) = 227.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 16.94  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.438  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.200	-
USER-DEFINED	-	3.30	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	6.50	0.30	1.000	-

USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.855  
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 25.14  
EFFECTIVE AREA(ACRES) = 128.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 128.7 PEAK FLOW RATE(CFS) = 252.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 16.94  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.438  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 9.84  
EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 133.8 PEAK FLOW RATE(CFS) = 262.78

-----  
END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 133.8 TC(MIN.) = 16.94  
EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.854  
PEAK FLOW RATE(CFS) = 262.78

-----  
END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S31 \*  
\* Rational Method Hydrology Analysis - 100-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S31.DAT  
TIME/DATE OF STUDY: 15:40 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.800
- 2) 10.00; 3.258
- 3) 15.00; 2.590
- 4) 20.00; 2.201
- 5) 25.00; 1.940
- 6) 30.00; 1.740
- 7) 40.00; 1.487
- 8) 50.00; 1.310
- 9) 60.00; 1.150
- 10) 90.00; 0.940
- 11) 120.00; 0.798
- 12) 180.00; 0.647
- 13) 360.00; 0.452
- 14) 1440.00; 0.187

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13100.00 TO NODE 13101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.58  
ELEVATION DATA: UPSTREAM(FEET) = 1069.66 DOWNSTREAM(FEET) = 969.92

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.312  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.779  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.94	0.30	1.000	0	8.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.94  
TOTAL AREA(ACRES) = 0.94 PEAK FLOW RATE(CFS) = 2.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13101.00 TO NODE 13102.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 969.92 DOWNSTREAM(FEET) = 807.20  
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.89 CHANNEL SLOPE = 0.2444  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.28  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.174  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.67	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.92  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.79  
AVERAGE FLOW DEPTH(FEET) = 0.26 TRAVEL TIME(MIN.) = 2.32  
Tc(MIN.) = 10.63  
SUBAREA AREA(ACRES) = 7.67 SUBAREA RUNOFF(CFS) = 19.84  
EFFECTIVE AREA(ACRES) = 8.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 22.27  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:



DEPTH(FEET) = 0.36 FLOW VELOCITY(FEET/SEC.) = 5.85  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13102.00 = 948.47 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13102.00 TO NODE 13103.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 807.20 DOWNSTREAM(FEET) = 769.94  
CHANNEL LENGTH THRU SUBAREA(FEET) = 691.01 CHANNEL SLOPE = 0.0539  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.88  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.841

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	20.65	0.30	0.999	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.96

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.62

AVERAGE FLOW DEPTH(FEET) = 0.85 TRAVEL TIME(MIN.) = 2.49

Tc(MIN.) = 13.12

SUBAREA AREA(ACRES) = 20.65 SUBAREA RUNOFF(CFS) = 47.24

EFFECTIVE AREA(ACRES) = 29.26 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 29.3 PEAK FLOW RATE(CFS) = 66.93

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.06 FLOW VELOCITY(FEET/SEC.) = 5.23

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13103.00 = 1639.48 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 769.94 DOWNSTREAM(FEET) = 693.88

FLOW LENGTH(FEET) = 1563.10 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000

DEPTH OF FLOW IN 36.0 INCH PIPE IS 17.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 19.54

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 66.93

PIPE TRAVEL TIME(MIN.) = 1.33 Tc(MIN.) = 14.45

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13104.00 = 3202.58 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.45

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.663

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	28.00	0.30	0.750	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750

SUBAREA AREA(ACRES) = 28.00 SUBAREA RUNOFF(CFS) = 61.45

EFFECTIVE AREA(ACRES) = 57.26 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88

TOTAL AREA(ACRES) = 57.3 PEAK FLOW RATE(CFS) = 123.69

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 693.88 DOWNSTREAM(FEET) = 645.69

FLOW LENGTH(FEET) = 1068.98 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.57

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 123.69

PIPE TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 15.28

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13105.00 = 4271.56 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.28

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.568

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	35.28	0.30	0.867	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867

SUBAREA AREA(ACRES) = 35.28 SUBAREA RUNOFF(CFS) = 73.30

EFFECTIVE AREA(ACRES) = 92.54 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87

TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 192.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 645.69 DOWNSTREAM(FEET) = 608.48

FLOW LENGTH(FEET) = 1127.55 MANNING'S N = 0.013

DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.41

ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 192.10

PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 16.16  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.16  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.500  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 37.68 0.30 0.889 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.889  
SUBAREA AREA(ACRES) = 37.68 SUBAREA RUNOFF(CFS) = 75.74  
EFFECTIVE AREA(ACRES) = 130.22 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 130.2 PEAK FLOW RATE(CFS) = 262.15

\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 15.1

>>>>DEFINE MEMORY BANK # 2 <<<<

PEAK FLOWRATE TABLE FILE NAME: S30.DNA  
MEMORY BANK # 2 DEFINED AS FOLLOWS:  
STREAM Q Tc Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (ACRES) NODE  
1 2413.49 36.12 0.30( 0.24) 0.81 1996.3 13000.00  
2 2345.31 38.13 0.30( 0.24) 0.81 2016.1 13010.00  
TOTAL AREA(ACRES) = 2016.1

\*\*\*\*\*

FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 14.0

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:

STREAM Q Tc Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (ACRES) NODE  
1 2413.49 36.12 0.30( 0.24) 0.81 1996.3 13000.00  
2 2345.31 38.13 0.30( 0.24) 0.81 2016.1 13010.00  
TOTAL AREA(ACRES) = 2016.1

\*\*\*\*\*

FLOW PROCESS FROM NODE 13026.00 TO NODE 13106.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 662.66 DOWNSTREAM(FEET) = 608.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 3098.88 CHANNEL SLOPE = 0.0175  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.22  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.484  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 75.28 0.30 0.755 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2456.09  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.80  
AVERAGE FLOW DEPTH(FEET) = 3.22 TRAVEL TIME(MIN.) = 4.03  
Tc(MIN.) = 40.16  
SUBAREA AREA(ACRES) = 75.28 SUBAREA RUNOFF(CFS) = 85.20  
EFFECTIVE AREA(ACRES) = 2071.57 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 2091.4 PEAK FLOW RATE(CFS) = 2413.49  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.19 FLOW VELOCITY(FEET/SEC.) = 12.72  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 2413.49 40.16 1.484 0.30( 0.24) 0.80 2071.6 13000.00  
2 2345.31 42.21 1.448 0.30( 0.24) 0.80 2091.4 13010.00  
NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 2413.49 Tc(MIN.) = 40.16  
AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA(ACRES) = 2071.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 2413.49 40.16 1.484 0.30( 0.24) 0.80 2071.6 13000.00  
2 2345.31 42.21 1.448 0.30( 0.24) 0.80 2091.4 13010.00  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 262.15 16.16 2.500 0.30( 0.26) 0.88 130.2 13100.00  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2027.04	16.16	2.500	0.30 ( 0.24)	0.81	963.6	13100.00
2	2556.54	40.16	1.484	0.30 ( 0.24)	0.81	2201.8	13000.00
3	2484.13	42.21	1.448	0.30 ( 0.24)	0.81	2221.6	13010.00
TOTAL AREA (ACRES) =		2221.6					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 2556.54 Tc (MIN.) = 40.159  
EFFECTIVE AREA (ACRES) = 2201.79 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA (ACRES) = 2221.6  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13106.00 TO NODE 13107.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 608.48 DOWNSTREAM (FEET) = 584.29  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1650.20 CHANNEL SLOPE = 0.0147  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.55

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.445

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	190.45	0.30	0.755	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2660.95

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.39

AVERAGE FLOW DEPTH (FEET) = 3.54 TRAVEL TIME (MIN.) = 2.22

Tc (MIN.) = 42.38

SUBAREA AREA (ACRES) = 190.45 SUBAREA RUNOFF (CFS) = 208.83

EFFECTIVE AREA (ACRES) = 2392.24 AREA-AVERAGED Fm (INCH/HR) = 0.24

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80

TOTAL AREA (ACRES) = 2412.1 PEAK FLOW RATE (CFS) = 2591.55

GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 3.49 FLOW VELOCITY (FEET/SEC.) = 12.27

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13107.00 = 20924.84 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2155.27	18.52	2.316	0.30 ( 0.24)	0.80	1154.1	13100.00
2	2591.55	42.38	1.445	0.30 ( 0.24)	0.80	2392.2	13000.00
3	2534.07	44.45	1.408	0.30 ( 0.24)	0.80	2412.1	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 2591.55 Tc (MIN.) = 42.38

AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA (ACRES) = 2392.24

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13107.00 TO NODE 13108.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 584.29 DOWNSTREAM (FEET) = 563.78  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1061.67 CHANNEL SLOPE = 0.0193  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.34

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.422

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	314.12	0.30	0.939	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.939

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2752.76

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.74

AVERAGE FLOW DEPTH (FEET) = 3.34 TRAVEL TIME (MIN.) = 1.29

Tc (MIN.) = 43.67

SUBAREA AREA (ACRES) = 314.12 SUBAREA RUNOFF (CFS) = 322.40

EFFECTIVE AREA (ACRES) = 2706.35 AREA-AVERAGED Fm (INCH/HR) = 0.25

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82

TOTAL AREA (ACRES) = 2726.2 PEAK FLOW RATE (CFS) = 2865.04

GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 3.42 FLOW VELOCITY (FEET/SEC.) = 13.93

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13108.00 = 21986.51 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2592.23	19.86	2.212	0.30 ( 0.25)	0.83	1468.2	13100.00
2	2865.04	43.67	1.422	0.30 ( 0.25)	0.82	2706.4	13000.00
3	2796.44	45.74	1.385	0.30 ( 0.25)	0.82	2726.2	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 2865.04 Tc (MIN.) = 43.67

AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2706.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13108.00 TO NODE 13109.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 563.78 DOWNSTREAM (FEET) = 541.61  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1657.28 CHANNEL SLOPE = 0.0134  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.87  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.383  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 203.63 0.30 0.785 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.785  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2970.19  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.45  
 AVERAGE FLOW DEPTH (FEET) = 3.87 TRAVEL TIME (MIN.) = 2.22  
 Tc (MIN.) = 45.89  
 SUBAREA AREA (ACRES) = 203.63 SUBAREA RUNOFF (CFS) = 210.29  
 EFFECTIVE AREA (ACRES) = 2909.98 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 2929.8 PEAK FLOW RATE (CFS) = 2979.98  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.88 FLOW VELOCITY (FEET/SEC.) = 12.47  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13109.00 = 23643.79 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 2770.45 22.14 2.089 0.30 ( 0.25) 0.83 1671.8 13100.00  
 2 2979.98 45.89 1.383 0.30 ( 0.25) 0.82 2910.0 13000.00  
 3 2903.13 47.98 1.346 0.30 ( 0.24) 0.82 2929.8 13010.00  
 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 2979.98 Tc (MIN.) = 45.89  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2909.98

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13109.00 TO NODE 13110.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 541.61 DOWNSTREAM (FEET) = 509.94  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 2016.96 CHANNEL SLOPE = 0.0157  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.81  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.339  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 283.06 0.30 0.791 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.791  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3120.25  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.36  
 AVERAGE FLOW DEPTH (FEET) = 3.80 TRAVEL TIME (MIN.) = 2.52  
 Tc (MIN.) = 48.40  
 SUBAREA AREA (ACRES) = 283.06 SUBAREA RUNOFF (CFS) = 280.55

EFFECTIVE AREA (ACRES) = 3193.04 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3212.9 PEAK FLOW RATE (CFS) = 3144.25  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.82 FLOW VELOCITY (FEET/SEC.) = 13.39  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13110.00 = 25660.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 3007.72 24.69 1.956 0.30 ( 0.25) 0.82 1954.9 13100.00  
 2 3144.25 48.40 1.339 0.30 ( 0.24) 0.81 3193.0 13000.00  
 3 3058.44 50.52 1.302 0.30 ( 0.24) 0.81 3212.9 13010.00  
 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 3144.25 Tc (MIN.) = 48.40  
 AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA (ACRES) = 3193.04

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13110.00 TO NODE 13111.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 509.94 DOWNSTREAM (FEET) = 461.07  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 3058.95 CHANNEL SLOPE = 0.0160  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.89  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.276  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 248.05 0.30 0.783 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3260.46  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.63  
 AVERAGE FLOW DEPTH (FEET) = 3.88 TRAVEL TIME (MIN.) = 3.74  
 Tc (MIN.) = 52.14  
 SUBAREA AREA (ACRES) = 248.05 SUBAREA RUNOFF (CFS) = 232.42  
 EFFECTIVE AREA (ACRES) = 3441.09 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3460.9 PEAK FLOW RATE (CFS) = 3196.96  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.84 FLOW VELOCITY (FEET/SEC.) = 13.53  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13111.00 = 28719.70 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	3085.76	28.46	1.802	0.30 ( 0.25)	0.82	2203.0 13100.00
2	3196.96	52.14	1.276	0.30 ( 0.24)	0.81	3441.1 13000.00
3	3108.17	54.30	1.241	0.30 ( 0.24)	0.81	3460.9 13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 3196.96 Tc(MIN.) = 52.14  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3441.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 13111.00 TO NODE 13112.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 461.07 DOWNSTREAM(FEET) = 452.77  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1781.78 CHANNEL SLOPE = 0.0047  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 5.50  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.223

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	179.91	0.30	0.694	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.694  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3279.11  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.96  
 AVERAGE FLOW DEPTH(FEET) = 5.50 TRAVEL TIME(MIN.) = 3.32  
 Tc(MIN.) = 55.46

SUBAREA AREA(ACRES) = 179.91 SUBAREA RUNOFF(CFS) = 164.29  
 EFFECTIVE AREA(ACRES) = 3621.00 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3640.9 PEAK FLOW RATE(CFS) = 3196.96  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 5.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 5.43 FLOW VELOCITY(FEET/SEC.) = 8.89  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13112.00 = 30501.48 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3114.11	31.80	1.694	0.30 ( 0.24)	0.81	2382.9	13100.00
2	3196.96	55.46	1.223	0.30 ( 0.24)	0.81	3621.0	13000.00
3	3108.17	57.64	1.188	0.30 ( 0.24)	0.81	3640.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 3196.96 Tc(MIN.) = 55.46  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3621.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 13112.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 452.77 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1625.01 CHANNEL SLOPE = 0.0155  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.92  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.191

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	155.96	0.30	0.836	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.836  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3262.93  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.49  
 AVERAGE FLOW DEPTH(FEET) = 3.92 TRAVEL TIME(MIN.) = 2.01  
 Tc(MIN.) = 57.47

SUBAREA AREA(ACRES) = 155.96 SUBAREA RUNOFF(CFS) = 131.93  
 EFFECTIVE AREA(ACRES) = 3776.96 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3796.8 PEAK FLOW RATE(CFS) = 3223.67  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.89 FLOW VELOCITY(FEET/SEC.) = 13.45  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13222.00 = 32126.49 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3200.10	33.81	1.643	0.30 ( 0.24)	0.81	2538.8	13100.00
2	3223.67	57.47	1.191	0.30 ( 0.24)	0.81	3777.0	13000.00
3	3120.61	59.66	1.155	0.30 ( 0.24)	0.81	3796.8	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 3223.67 Tc(MIN.) = 57.47  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3776.96

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 3796.8 TC(MIN.) = 57.47  
 EFFECTIVE AREA(ACRES) = 3776.96 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.808  
 PEAK FLOW RATE(CFS) = 3223.67

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3200.10	33.81	1.643	0.30 ( 0.24)	0.81	2538.8	13100.00
2	3223.67	57.47	1.191	0.30 ( 0.24)	0.81	3777.0	13000.00
3	3120.61	59.66	1.155	0.30 ( 0.24)	0.81	3796.8	13010.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S32 \*  
\* Rational Method Hydrology Analysis - 100-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S32.DAT  
TIME/DATE OF STUDY: 15:41 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.800
- 2) 10.00; 3.258
- 3) 15.00; 2.590
- 4) 20.00; 2.201
- 5) 25.00; 1.940
- 6) 30.00; 1.740
- 7) 40.00; 1.487
- 8) 50.00; 1.310
- 9) 60.00; 1.150
- 10) 90.00; 0.940
- 11) 120.00; 0.798
- 12) 180.00; 0.647
- 13) 360.00; 0.452
- 14) 1440.00; 0.187

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13200.00 TO NODE 13201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 298.57  
ELEVATION DATA: UPSTREAM(FEET) = 1069.04 DOWNSTREAM(FEET) = 1005.76

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.440  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.67	0.30	1.000	0	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.89  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 1.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13201.00 TO NODE 13202.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.76 DOWNSTREAM(FEET) = 896.98  
CHANNEL LENGTH THRU SUBAREA(FEET) = 747.55 CHANNEL SLOPE = 0.1455  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.29  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.892  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.64  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.74  
AVERAGE FLOW DEPTH(FEET) = 0.27 TRAVEL TIME(MIN.) = 3.33  
Tc(MIN.) = 12.74  
SUBAREA AREA(ACRES) = 7.42 SUBAREA RUNOFF(CFS) = 17.31  
EFFECTIVE AREA(ACRES) = 8.09 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.1 PEAK FLOW RATE(CFS) = 18.87  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 FLOW VELOCITY(FEET/SEC.) = 4.66  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13202.00 = 1046.12 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 896.98 DOWNSTREAM(FEET) = 840.27  
FLOW LENGTH(FEET) = 1789.59 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 10.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.83  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 18.87  
PIPE TRAVEL TIME(MIN.) = 2.52 Tc(MIN.) = 15.26  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13203.00 = 2835.71 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.26  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.570  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.89 0.30 0.731 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.731  
SUBAREA AREA(ACRES) = 38.89 SUBAREA RUNOFF(CFS) = 82.27  
EFFECTIVE AREA(ACRES) = 46.98 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
TOTAL AREA(ACRES) = 47.0 PEAK FLOW RATE(CFS) = 98.80

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 840.27 DOWNSTREAM(FEET) = 782.97  
FLOW LENGTH(FEET) = 992.54 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 21.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.90  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 98.80  
PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 15.98  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13204.00 = 3828.25 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.98  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.514  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 83.09 0.30 0.645 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645  
SUBAREA AREA(ACRES) = 83.09 SUBAREA RUNOFF(CFS) = 173.51  
EFFECTIVE AREA(ACRES) = 130.07 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 130.1 PEAK FLOW RATE(CFS) = 269.93

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 782.97 DOWNSTREAM(FEET) = 692.52  
FLOW LENGTH(FEET) = 2046.57 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.93  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 269.93  
PIPE TRAVEL TIME(MIN.) = 1.32 Tc(MIN.) = 17.30  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13205.00 = 5874.82 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.30  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.411  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 88.51 0.30 0.679 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.679  
SUBAREA AREA(ACRES) = 88.51 SUBAREA RUNOFF(CFS) = 175.85  
EFFECTIVE AREA(ACRES) = 218.58 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 218.6 PEAK FLOW RATE(CFS) = 433.79

\*\*\*\*\*

FLOW PROCESS FROM NODE 13205.00 TO NODE 13206.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 692.52 DOWNSTREAM(FEET) = 605.24  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2704.69 CHANNEL SLOPE = 0.0323  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.23  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.129



SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	163.73	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 571.91  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.07  
AVERAGE FLOW DEPTH(FEET) = 3.16 TRAVEL TIME(MIN.) = 4.07  
Tc(MIN.) = 21.37  
SUBAREA AREA(ACRES) = 163.73 SUBAREA RUNOFF(CFS) = 275.87  
EFFECTIVE AREA(ACRES) = 382.31 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 382.3 PEAK FLOW RATE(CFS) = 654.22  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.39 FLOW VELOCITY(FEET/SEC.) = 11.50  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13206.00 = 8579.51 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13206.00 TO NODE 13207.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 761.07  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.08  
AVERAGE FLOW DEPTH(FEET) = 4.13 TRAVEL TIME(MIN.) = 4.10  
Tc(MIN.) = 25.47  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 213.59  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 796.14  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.22

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 761.07  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.08  
AVERAGE FLOW DEPTH(FEET) = 4.13 TRAVEL TIME(MIN.) = 4.10  
Tc(MIN.) = 25.47  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 213.59  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 796.14  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 4.22 FLOW VELOCITY(FEET/SEC.) = 10.22  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13207.00 = 11058.66 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 883.29  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.96  
AVERAGE FLOW DEPTH(FEET) = 4.07 TRAVEL TIME(MIN.) = 2.42  
Tc(MIN.) = 27.89  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 174.28  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 924.71  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.17

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 883.29  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.96  
AVERAGE FLOW DEPTH(FEET) = 4.07 TRAVEL TIME(MIN.) = 2.42  
Tc(MIN.) = 27.89  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 174.28  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 924.71  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 4.17 FLOW VELOCITY(FEET/SEC.) = 12.10  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 27.89  
RAINFALL INTENSITY(INCH/HR) = 1.82  
AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.81  
EFFECTIVE STREAM AREA(ACRES) = 649.28  
TOTAL STREAM AREA(ACRES) = 649.28  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 924.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13210.00 TO NODE 13211.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.51  
ELEVATION DATA: UPSTREAM(FEET) = 949.80 DOWNSTREAM(FEET) = 828.64

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.525  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.713  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"OPEN BRUSH" - 1.96 0.30 1.000 0 8.53  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 6.02  
TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 6.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13211.00 TO NODE 13212.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 828.64 DOWNSTREAM(FEET) = 767.94  
CHANNEL LENGTH THRU SUBAREA(FEET) = 652.49 CHANNEL SLOPE = 0.0930  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.50

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.111

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.95	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.22

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.22

AVERAGE FLOW DEPTH(FEET) = 0.46 TRAVEL TIME(MIN.) = 2.58

Tc(MIN.) = 11.10

SUBAREA AREA(ACRES) = 11.95 SUBAREA RUNOFF(CFS) = 30.23

EFFECTIVE AREA(ACRES) = 13.91 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 35.19

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 5.04

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13212.00 = 967.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13212.00 TO NODE 13213.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 767.94 DOWNSTREAM(FEET) = 706.43  
CHANNEL LENGTH THRU SUBAREA(FEET) = 967.91 CHANNEL SLOPE = 0.0635  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.03

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.717

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 27.07 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 64.75  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.48  
AVERAGE FLOW DEPTH(FEET) = 0.99 TRAVEL TIME(MIN.) = 2.94  
Tc(MIN.) = 14.05  
SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 58.90  
EFFECTIVE AREA(ACRES) = 40.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 41.0 PEAK FLOW RATE(CFS) = 89.16  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.19 FLOW VELOCITY(FEET/SEC.) = 6.07

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13213.00 = 1934.91 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13213.00 TO NODE 13214.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 706.43 DOWNSTREAM(FEET) = 659.31  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.11 CHANNEL SLOPE = 0.0497  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.42

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.456

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	18.09	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 106.73

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.91

AVERAGE FLOW DEPTH(FEET) = 1.41 TRAVEL TIME(MIN.) = 2.67

Tc(MIN.) = 16.72

SUBAREA AREA(ACRES) = 18.09 SUBAREA RUNOFF(CFS) = 35.11

EFFECTIVE AREA(ACRES) = 59.07 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 114.64

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.47 FLOW VELOCITY(FEET/SEC.) = 6.04

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13214.00 = 2883.02 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13214.00 TO NODE 13215.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 659.31 DOWNSTREAM(FEET) = 628.91  
CHANNEL LENGTH THRU SUBAREA(FEET) = 970.24 CHANNEL SLOPE = 0.0313  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.16

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.242

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	71.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 177.12

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.87

AVERAGE FLOW DEPTH(FEET) = 2.12 TRAVEL TIME(MIN.) = 2.75

Tc(MIN.) = 19.47

SUBAREA AREA(ACRES) = 71.42 SUBAREA RUNOFF(CFS) = 124.83

EFFECTIVE AREA(ACRES) = 130.49 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 130.5 PEAK FLOW RATE(CFS) = 228.07

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.43 FLOW VELOCITY(FEET/SEC.) = 6.32

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13215.00 = 3853.26 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13215.00 TO NODE 13216.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 628.91 DOWNSTREAM(FEET) = 598.39  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.63 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.57

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.108

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	36.33	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 257.64

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.68

AVERAGE FLOW DEPTH(FEET) = 2.55 TRAVEL TIME(MIN.) = 2.30

Tc(MIN.) = 21.78

SUBAREA AREA(ACRES) = 36.33 SUBAREA RUNOFF(CFS) = 59.13

EFFECTIVE AREA(ACRES) = 166.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 166.8 PEAK FLOW RATE(CFS) = 271.50

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.63 FLOW VELOCITY(FEET/SEC.) = 6.77

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13216.00 = 4775.89 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13216.00 TO NODE 13217.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 598.39 DOWNSTREAM(FEET) = 568.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.40 CHANNEL SLOPE = 0.0470  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.55

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.038

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	42.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 304.76

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.93

AVERAGE FLOW DEPTH(FEET) = 2.55 TRAVEL TIME(MIN.) = 1.34

Tc(MIN.) = 23.11

SUBAREA AREA(ACRES) = 42.51 SUBAREA RUNOFF(CFS) = 66.51

EFFECTIVE AREA(ACRES) = 209.33 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 209.3 PEAK FLOW RATE(CFS) = 327.53

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.64 FLOW VELOCITY(FEET/SEC.) = 8.10

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13217.00 = 5412.29 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 568.48 DOWNSTREAM(FEET) = 505.65  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1896.50 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.16

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.846

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	73.24	0.30	0.951	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.951  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 378.98  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.44  
 AVERAGE FLOW DEPTH(FEET) = 3.13 TRAVEL TIME(MIN.) = 4.25  
 Tc(MIN.) = 27.36  
 SUBAREA AREA(ACRES) = 73.24 SUBAREA RUNOFF(CFS) = 102.85  
 EFFECTIVE AREA(ACRES) = 282.57 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 282.6 PEAK FLOW RATE(CFS) = 394.05  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.19 FLOW VELOCITY(FEET/SEC.) = 7.53  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13220.00 = 7308.79 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 27.36  
 RAINFALL INTENSITY(INCH/HR) = 1.85  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.99  
 EFFECTIVE STREAM AREA(ACRES) = 282.57  
 TOTAL STREAM AREA(ACRES) = 282.57  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 394.05

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	924.71	27.89	1.825	0.30( 0.24)	0.81	649.3	13200.00
2	394.05	27.36	1.846	0.30( 0.30)	0.99	282.6	13210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1313.36	27.36	1.846	0.30( 0.26)	0.86	919.6	13210.00
2	1313.40	27.89	1.825	0.30( 0.26)	0.86	931.8	13200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1313.40 Tc(MIN.) = 27.89  
 EFFECTIVE AREA(ACRES) = 931.85 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA(ACRES) = 931.8  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13220.00 TO NODE 13221.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 505.65 DOWNSTREAM(FEET) = 478.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1949.14 CHANNEL SLOPE = 0.0137  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 5.31  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.729

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 108.50 0.30 0.637 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.637  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1388.48  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.70  
 AVERAGE FLOW DEPTH(FEET) = 5.31 TRAVEL TIME(MIN.) = 2.56  
 Tc(MIN.) = 30.44

SUBAREA AREA(ACRES) = 108.50 SUBAREA RUNOFF(CFS) = 150.16  
 EFFECTIVE AREA(ACRES) = 1040.35 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA(ACRES) = 1040.3 PEAK FLOW RATE(CFS) = 1383.25  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 5.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 5.29 FLOW VELOCITY(FEET/SEC.) = 12.70  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13221.00 = 14742.35 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1380.36	29.92	1.743	0.30( 0.25)	0.84	1028.1	13210.00
2	1383.25	30.44	1.729	0.30( 0.25)	0.84	1040.3	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1383.25 Tc(MIN.) = 30.44  
 AREA-AVERAGED Fm(INCH/HR) = 0.25 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.84 EFFECTIVE AREA(ACRES) = 1040.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13221.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 478.94 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2078.70 CHANNEL SLOPE = 0.0247  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 4.67  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.674

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 87.26 0.30 0.699 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.699  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1440.74  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 15.94  
 AVERAGE FLOW DEPTH (FEET) = 4.67 TRAVEL TIME (MIN.) = 2.17  
 Tc (MIN.) = 32.62  
 SUBAREA AREA (ACRES) = 87.26 SUBAREA RUNOFF (CFS) = 114.98  
 EFFECTIVE AREA (ACRES) = 1127.61 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA (ACRES) = 1127.6 PEAK FLOW RATE (CFS) = 1446.69  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 4.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 4.68 FLOW VELOCITY (FEET/SEC.) = 15.96  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13222.00 = 16821.05 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1444.32	32.09	1.687	0.30 (0.25)	0.83	1115.4	13210.00
2	1446.69	32.62	1.674	0.30 (0.25)	0.83	1127.6	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1446.69 Tc (MIN.) = 32.62  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.83 EFFECTIVE AREA (ACRES) = 1127.61

=====  
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1127.6 TC (MIN.) = 32.62  
 EFFECTIVE AREA (ACRES) = 1127.61 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.828  
 PEAK FLOW RATE (CFS) = 1446.69

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1444.32	32.09	1.687	0.30 (0.25)	0.83	1115.4	13210.00
2	1446.69	32.62	1.674	0.30 (0.25)	0.83	1127.6	13200.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S35 \*  
\* Rational Method Hydrology Analysis - 100-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S35.DAT  
TIME/DATE OF STUDY: 15:41 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.800
- 2) 10.00; 3.258
- 3) 15.00; 2.590
- 4) 20.00; 2.201
- 5) 25.00; 1.940
- 6) 30.00; 1.740
- 7) 40.00; 1.487
- 8) 50.00; 1.310
- 9) 60.00; 1.150
- 10) 90.00; 0.940
- 11) 120.00; 0.798
- 12) 180.00; 0.647
- 13) 360.00; 0.452
- 14) 1440.00; 0.187

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.00 TO NODE 13500.50 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 548.43  
ELEVATION DATA: UPSTREAM(FEET) = 1183.47 DOWNSTREAM(FEET) = 1065.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.997  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	5.11	0.30	1.000	0	11.96

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 12.40  
TOTAL AREA(ACRES) = 5.11 PEAK FLOW RATE(CFS) = 12.40

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.50 TO NODE 13501.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1033.15  
CHANNEL LENGTH THRU SUBAREA(FEET) = 431.71 CHANNEL SLOPE = 0.0738  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.52  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.756  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.87	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.22  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.98  
AVERAGE FLOW DEPTH(FEET) = 0.51 TRAVEL TIME(MIN.) = 1.81  
Tc(MIN.) = 13.76  
SUBAREA AREA(ACRES) = 8.87 SUBAREA RUNOFF(CFS) = 19.60  
EFFECTIVE AREA(ACRES) = 13.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 30.90  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 4.47  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13501.00 = 980.14 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13501.00 TO NODE 13502.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1033.15 DOWNSTREAM(FEET) = 990.26  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.63 CHANNEL SLOPE = 0.0452  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.93  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.406

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.82	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 46.88  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.39  
AVERAGE FLOW DEPTH(FEET) = 0.91 TRAVEL TIME(MIN.) = 3.60  
Tc(MIN.) = 17.37

SUBAREA AREA(ACRES) = 16.82 SUBAREA RUNOFF(CFS) = 31.88  
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 58.38  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.03 FLOW VELOCITY(FEET/SEC.) = 4.72  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13502.00 = 1928.77 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13502.00 TO NODE 13503.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.26 DOWNSTREAM(FEET) = 956.06  
CHANNEL LENGTH THRU SUBAREA(FEET) = 940.98 CHANNEL SLOPE = 0.0363  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.50  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.180

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	46.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 97.35  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.16  
AVERAGE FLOW DEPTH(FEET) = 1.46 TRAVEL TIME(MIN.) = 3.04

Tc(MIN.) = 20.41  
SUBAREA AREA(ACRES) = 46.02 SUBAREA RUNOFF(CFS) = 77.86  
EFFECTIVE AREA(ACRES) = 76.82 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 76.8 PEAK FLOW RATE(CFS) = 129.97  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.71 FLOW VELOCITY(FEET/SEC.) = 5.65  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13503.00 = 2869.75 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13503.00 TO NODE 13504.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 956.06 DOWNSTREAM(FEET) = 889.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2131.31 CHANNEL SLOPE = 0.0312  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.13  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.879

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	58.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 171.61  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.81  
AVERAGE FLOW DEPTH(FEET) = 2.09 TRAVEL TIME(MIN.) = 6.12  
Tc(MIN.) = 26.52

SUBAREA AREA(ACRES) = 58.46 SUBAREA RUNOFF(CFS) = 83.08  
EFFECTIVE AREA(ACRES) = 135.28 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 135.3 PEAK FLOW RATE(CFS) = 192.25  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.22 FLOW VELOCITY(FEET/SEC.) = 6.01  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13504.00 = 5001.06 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13504.00 TO NODE 13505.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 889.48 DOWNSTREAM(FEET) = 848.10  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1661.97 CHANNEL SLOPE = 0.0249  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.58

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.707  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	49.30	0.30	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 223.48  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.79  
 AVERAGE FLOW DEPTH (FEET) = 2.55 TRAVEL TIME (MIN.) = 4.78  
 Tc (MIN.) = 31.30  
 SUBAREA AREA (ACRES) = 49.30 SUBAREA RUNOFF (CFS) = 62.43  
 EFFECTIVE AREA (ACRES) = 184.58 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 184.6 PEAK FLOW RATE (CFS) = 233.74  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.62  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.62 FLOW VELOCITY (FEET/SEC.) = 5.85  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.00 = 6663.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13505.00 TO NODE 13505.50 IS CODE = 56

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 848.10 DOWNSTREAM (FEET) = 811.10  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1234.61 CHANNEL SLOPE = 0.0300  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.63  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.626  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.35	0.30	0.811	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.811  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 258.23  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.44  
 AVERAGE FLOW DEPTH (FEET) = 2.63 TRAVEL TIME (MIN.) = 3.19  
 Tc (MIN.) = 34.50  
 SUBAREA AREA (ACRES) = 39.35 SUBAREA RUNOFF (CFS) = 48.97  
 EFFECTIVE AREA (ACRES) = 223.93 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 223.9 PEAK FLOW RATE (CFS) = 269.28  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.69  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.69 FLOW VELOCITY (FEET/SEC.) = 6.51  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.50 = 7897.64 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13505.50 TO NODE 13506.00 IS CODE = 56

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 811.10 DOWNSTREAM (FEET) = 781.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1415.98 CHANNEL SLOPE = 0.0213  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.12  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.526  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	54.33	0.30	0.738	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.738  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 301.17  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.95  
 AVERAGE FLOW DEPTH (FEET) = 3.12 TRAVEL TIME (MIN.) = 3.97  
 Tc (MIN.) = 38.46  
 SUBAREA AREA (ACRES) = 54.33 SUBAREA RUNOFF (CFS) = 63.78  
 EFFECTIVE AREA (ACRES) = 278.26 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
 TOTAL AREA (ACRES) = 278.3 PEAK FLOW RATE (CFS) = 312.81  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.18  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.18 FLOW VELOCITY (FEET/SEC.) = 6.02  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.00 = 9313.62 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13506.50 IS CODE = 56

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 781.00 DOWNSTREAM (FEET) = 743.17  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1542.62 CHANNEL SLOPE = 0.0245  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.24  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.444  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	61.33	0.30	0.783	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 346.19  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.51  
 AVERAGE FLOW DEPTH (FEET) = 3.23 TRAVEL TIME (MIN.) = 3.95  
 Tc (MIN.) = 42.41  
 SUBAREA AREA (ACRES) = 61.33 SUBAREA RUNOFF (CFS) = 66.75  
 EFFECTIVE AREA (ACRES) = 339.59 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90



TOTAL AREA (ACRES) = 339.6 PEAK FLOW RATE (CFS) = 359.16  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.29  
  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.29 FLOW VELOCITY (FEET/SEC.) = 6.58  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.50 = 10856.24 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.50 TO NODE 13520.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 743.17 DOWNSTREAM (FEET) = 717.04  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1370.93 CHANNEL SLOPE = 0.0191  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.62  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.378  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.86	0.30	0.848	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.848  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 379.32  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.09  
 AVERAGE FLOW DEPTH (FEET) = 3.61 TRAVEL TIME (MIN.) = 3.75  
 Tc (MIN.) = 46.16  
 SUBAREA AREA (ACRES) = 39.86 SUBAREA RUNOFF (CFS) = 40.31  
 EFFECTIVE AREA (ACRES) = 379.45 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
 TOTAL AREA (ACRES) = 379.5 PEAK FLOW RATE (CFS) = 379.26  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.61 FLOW VELOCITY (FEET/SEC.) = 6.09  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 46.16  
 RAINFALL INTENSITY (INCH/HR) = 1.38  
 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.89  
 EFFECTIVE STREAM AREA (ACRES) = 379.45  
 TOTAL STREAM AREA (ACRES) = 379.45  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 379.26

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13510.00 TO NODE 13511.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

ELEVATION DATA: UPSTREAM (FEET) = 1216.90 DOWNSTREAM (FEET) = 1022.78

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.615  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.642  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	6.66	0.30	1.000	0	14.62

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 14.04  
 TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 14.04

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13511.00 TO NODE 13512.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1022.78 DOWNSTREAM (FEET) = 954.27  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1027.63 CHANNEL SLOPE = 0.0667  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.74  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.332  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.30	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 37.36  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.63  
 AVERAGE FLOW DEPTH (FEET) = 0.71 TRAVEL TIME (MIN.) = 3.70  
 Tc (MIN.) = 18.31  
 SUBAREA AREA (ACRES) = 25.40 SUBAREA RUNOFF (CFS) = 46.46  
 EFFECTIVE AREA (ACRES) = 32.06 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 58.64  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.92 FLOW VELOCITY (FEET/SEC.) = 5.38  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13512.00 = 1931.31 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13512.00 TO NODE 13513.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 954.27 DOWNSTREAM(FEET) = 872.45
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.42 CHANNEL SLOPE = 0.0425
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.72
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.007

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 90.23 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 128.25

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.93

AVERAGE FLOW DEPTH(FEET) = 1.63 TRAVEL TIME(MIN.) = 5.41

Tc(MIN.) = 23.72

SUBAREA AREA(ACRES) = 90.23 SUBAREA RUNOFF(CFS) = 138.59

EFFECTIVE AREA(ACRES) = 122.29 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 122.3 PEAK FLOW RATE(CFS) = 187.83

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.01 FLOW VELOCITY(FEET/SEC.) = 6.66

LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13513.00 = 3857.73 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13513.00 TO NODE 13514.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 872.45 DOWNSTREAM(FEET) = 813.12
CHANNEL LENGTH THRU SUBAREA(FEET) = 1895.66 CHANNEL SLOPE = 0.0313
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.77
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.802

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 135.65 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 279.68

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.69

AVERAGE FLOW DEPTH(FEET) = 2.71 TRAVEL TIME(MIN.) = 4.72

Tc(MIN.) = 28.45

SUBAREA AREA(ACRES) = 135.65 SUBAREA RUNOFF(CFS) = 183.39

EFFECTIVE AREA(ACRES) = 257.94 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 257.9 PEAK FLOW RATE(CFS) = 348.72
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.04 FLOW VELOCITY(FEET/SEC.) = 7.13

LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13514.00 = 5753.39 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13514.00 TO NODE 13515.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 813.12 DOWNSTREAM(FEET) = 773.74
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.15 CHANNEL SLOPE = 0.0204
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.75
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.652

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 109.30 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 415.27

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.40

AVERAGE FLOW DEPTH(FEET) = 3.72 TRAVEL TIME(MIN.) = 5.01

Tc(MIN.) = 33.46

SUBAREA AREA(ACRES) = 109.30 SUBAREA RUNOFF(CFS) = 133.04

EFFECTIVE AREA(ACRES) = 367.24 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 367.2 PEAK FLOW RATE(CFS) = 447.01

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.86 FLOW VELOCITY(FEET/SEC.) = 6.54

LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13515.00 = 7679.54 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 773.74 DOWNSTREAM(FEET) = 717.04
CHANNEL LENGTH THRU SUBAREA(FEET) = 2279.49 CHANNEL SLOPE = 0.0249
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.22

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.524

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 231.44 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 574.62  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.52  
 AVERAGE FLOW DEPTH(FEET) = 4.17 TRAVEL TIME(MIN.) = 5.05  
 Tc(MIN.) = 38.51  
 SUBAREA AREA(ACRES) = 231.44 SUBAREA RUNOFF(CFS) = 255.05  
 EFFECTIVE AREA(ACRES) = 598.68 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 598.7 PEAK FLOW RATE(CFS) = 659.77  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 4.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 4.47 FLOW VELOCITY(FEET/SEC.) = 7.80  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13520.00 = 9959.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 38.51  
 RAINFALL INTENSITY(INCH/HR) = 1.52  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 598.68  
 TOTAL STREAM AREA(ACRES) = 598.68  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 659.77

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	379.26	46.16	1.378	0.30( 0.27)	0.89	379.5	13500.00
2	659.77	38.51	1.524	0.30( 0.30)	1.00	598.7	13510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1017.88	38.51	1.524	0.30( 0.29)	0.96	915.3	13510.00
2	960.16	46.16	1.378	0.30( 0.29)	0.96	978.1	13500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 1017.88 Tc(MIN.) = 38.51  
 EFFECTIVE AREA(ACRES) = 915.25 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 978.1  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.00 TO NODE 13520.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 717.04 DOWNSTREAM(FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2019.22 CHANNEL SLOPE = 0.0084  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.86  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.428  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1116.96  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.00  
 AVERAGE FLOW DEPTH(FEET) = 3.84 TRAVEL TIME(MIN.) = 4.81  
 Tc(MIN.) = 43.32  
 SUBAREA AREA(ACRES) = 193.31 SUBAREA RUNOFF(CFS) = 198.12  
 EFFECTIVE AREA(ACRES) = 1108.56 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 1171.4 PEAK FLOW RATE(CFS) = 1136.73  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.88 FLOW VELOCITY(FEET/SEC.) = 7.04  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.50 = 14246.39 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1136.73	43.32	1.428	0.30( 0.29)	0.96	1108.6	13510.00
2	1060.17	51.07	1.293	0.30( 0.29)	0.96	1171.4	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1136.73 Tc(MIN.) = 43.32  
 AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 1108.56

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.50 TO NODE 13521.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 661.95  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1622.36 CHANNEL SLOPE = 0.0235  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.02  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.381  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -        129.79      0.30        0.897       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1201.70  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.20  
 AVERAGE FLOW DEPTH(FEET) = 3.02    TRAVEL TIME(MIN.) = 2.65  
 Tc(MIN.) = 45.97  
 SUBAREA AREA(ACRES) = 129.79        SUBAREA RUNOFF(CFS) = 129.94  
 EFFECTIVE AREA(ACRES) = 1238.35    AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 1301.2        PEAK FLOW RATE(CFS) = 1220.02  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.04    FLOW VELOCITY(FEET/SEC.) = 10.25  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13521.00 = 15868.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1220.02	45.97	1.381	0.30( 0.29)	0.96	1238.4	13510.00
2	1128.89	53.78	1.250	0.30( 0.29)	0.95	1301.2	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1220.02    Tc(MIN.) = 45.97  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96    EFFECTIVE AREA(ACRES) = 1238.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13521.00 TO NODE 13522.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 661.95    DOWNSTREAM(FEET) = 632.19  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2746.01    CHANNEL SLOPE = 0.0108  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.99  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.284  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	278.60	0.30	0.905	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1347.00  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.09  
 AVERAGE FLOW DEPTH(FEET) = 3.97    TRAVEL TIME(MIN.) = 5.66  
 Tc(MIN.) = 51.63  
 SUBAREA AREA(ACRES) = 278.60        SUBAREA RUNOFF(CFS) = 253.95  
 EFFECTIVE AREA(ACRES) = 1516.95    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.95  
 TOTAL AREA(ACRES) = 1579.8        PEAK FLOW RATE(CFS) = 1365.67  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040

\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.00  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 4.00    FLOW VELOCITY(FEET/SEC.) = 8.12  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13522.00 = 18614.76 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1365.67	51.63	1.284	0.30( 0.28)	0.95	1517.0	13510.00
2	1241.97	59.58	1.157	0.30( 0.28)	0.94	1579.8	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1365.67    Tc(MIN.) = 51.63  
 AREA-AVERAGED Fm(INCH/HR) = 0.28    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.95    EFFECTIVE AREA(ACRES) = 1516.95

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1579.8    TC(MIN.) = 51.63  
 EFFECTIVE AREA(ACRES) = 1516.95    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.947  
 PEAK FLOW RATE(CFS) = 1365.67

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1365.67	51.63	1.284	0.30( 0.28)	0.95	1517.0	13510.00
2	1241.97	59.58	1.157	0.30( 0.28)	0.94	1579.8	13500.00

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2012 Advanced Engineering Software (aes)  
Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 2-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P02EVAA.DAT  
TIME/DATE OF STUDY: 14:35 11/14/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.806
- 2) 10.00; 1.204
- 3) 15.00; 0.925
- 4) 20.00; 0.762
- 5) 25.00; 0.659
- 6) 30.00; 0.585
- 7) 40.00; 0.504
- 8) 50.00; 0.447
- 9) 60.00; 0.390
- 10) 90.00; 0.330
- 11) 120.00; 0.270
- 12) 180.00; 0.210
- 13) 360.00; 0.150
- 14) 1200.00; 0.080

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE/ WAY		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 571.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.305  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.528  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	-	0.80	0.60	0.200	0	7.31

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 1.01  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 1.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.528  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.60	0.200	-
USER-DEFINED	-	1.00	0.60	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.170  
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 4.24  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 5.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.528  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.60	0.200	-
USER-DEFINED	-	1.00	0.60	0.100	-

USER-DEFINED - 2.60 0.60 0.200 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA (ACRES) = 2.60 SUBAREA RUNOFF (CFS) = 3.30  
 EFFECTIVE AREA (ACRES) = 6.70 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.19  
 TOTAL AREA (ACRES) = 6.7 PEAK FLOW RATE (CFS) = 8.55

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 571.00 DOWNSTREAM ELEVATION (FEET) = 530.50  
 STREET LENGTH (FEET) = 1215.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.22  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.35  
 HALFSTREET FLOOD WIDTH (FEET) = 10.74  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.17  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.48  
 STREET FLOW TRAVEL TIME (MIN.) = 4.85 Tc (MIN.) = 12.16

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.084

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.200	-
USER-DEFINED	-	2.40	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.135  
 SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 3.34  
 EFFECTIVE AREA (ACRES) = 10.40 AREA-AVERAGED Fm (INCH/HR) = 0.10  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA (ACRES) = 10.4 PEAK FLOW RATE (CFS) = 9.20

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.35 HALFSTREET FLOOD WIDTH (FEET) = 10.27  
 FLOW VELOCITY (FEET/SEC.) = 4.05 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.40  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1542.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 12.16  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.084  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.40	0.60	0.200	-
USER-DEFINED	-	18.20	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.119  
 SUBAREA AREA (ACRES) = 22.60 SUBAREA RUNOFF (CFS) = 20.58  
 EFFECTIVE AREA (ACRES) = 33.00 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.13  
 TOTAL AREA (ACRES) = 33.0 PEAK FLOW RATE (CFS) = 29.79

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 12.16  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.084  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.20	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198  
 SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 5.47  
 EFFECTIVE AREA (ACRES) = 39.30 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA (ACRES) = 39.3 PEAK FLOW RATE (CFS) = 35.25

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 530.50 DOWNSTREAM (FEET) = 522.00  
 FLOW LENGTH (FEET) = 837.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.2 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.04  
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 35.25  
 PIPE TRAVEL TIME (MIN.) = 1.54 Tc (MIN.) = 13.70  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2379.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 13.70  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.997  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

USER-DEFINED - 15.30 0.60 0.100 -  
 USER-DEFINED - 0.70 0.60 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.133  
 SUBAREA AREA(ACRES) = 16.00 SUBAREA RUNOFF(CFS) = 13.22  
 EFFECTIVE AREA(ACRES) = 55.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA(ACRES) = 55.3 PEAK FLOW RATE(CFS) = 45.43

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 522.00 DOWNSTREAM(FEET) = 473.00  
 FLOW LENGTH(FEET) = 568.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 21.84  
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 45.43  
 PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 14.13  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2947.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.13  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.973  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	0.500	-
USER-DEFINED	-	0.50	0.60	0.100	-
USER-DEFINED	-	13.00	0.60	0.850	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.820  
 SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 6.89  
 EFFECTIVE AREA(ACRES) = 71.20 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 71.2 PEAK FLOW RATE(CFS) = 51.11

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 127.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 435.00  
 FLOW LENGTH(FEET) = 588.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.74  
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 51.11  
 PIPE TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 14.63

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 100.00 TO NODE 121.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 574.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.392  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	-	0.60	0.60	0.200	0	8.44

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 0.69  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.69

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 574.00 DOWNSTREAM ELEVATION(FEET) = 557.00  
 STREET LENGTH(FEET) = 221.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.14  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.30  
 HALFSTREET FLOOD WIDTH(FEET) = 7.78  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.54  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.67  
 STREET FLOW TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 9.10  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.312  
 SUBAREA LOSS RATE DATA(AMC II):



DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.200	-
USER-DEFINED	-	7.90	0.60	0.200	-
USER-DEFINED	-	4.10	0.60	0.400	-
USER-DEFINED	-	2.20	0.60	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.257  
SUBAREA AREA (ACRES) = 14.30 SUBAREA RUNOFF (CFS) = 14.90  
EFFECTIVE AREA (ACRES) = 14.90 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.26  
TOTAL AREA (ACRES) = 14.9 PEAK FLOW RATE (CFS) = 15.54

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.35 HALFSTREET FLOOD WIDTH (FEET) = 10.74  
FLOW VELOCITY (FEET/SEC.) = 6.35 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.25  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 551.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 557.00 DOWNSTREAM ELEVATION (FEET) = 527.00  
STREET LENGTH (FEET) = 317.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 19.79  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.37  
HALFSTREET FLOOD WIDTH (FEET) = 11.45  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.26  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.66  
STREET FLOW TRAVEL TIME (MIN.) = 0.73 Tc (MIN.) = 9.83  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.224

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED	-	0.20	0.60	0.320	-
USER-DEFINED	-	4.50	0.60	0.400	-
USER-DEFINED	-	0.70	0.60	0.200	-
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	3.50	0.60	0.350	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.352  
SUBAREA AREA (ACRES) = 9.30 SUBAREA RUNOFF (CFS) = 8.48  
EFFECTIVE AREA (ACRES) = 24.20 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.29

TOTAL AREA (ACRES) = 24.2 PEAK FLOW RATE (CFS) = 22.85

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.38 HALFSTREET FLOOD WIDTH (FEET) = 12.23  
FLOW VELOCITY (FEET/SEC.) = 7.47 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.85  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 123.00 = 868.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 527.00 DOWNSTREAM ELEVATION (FEET) = 496.00  
STREET LENGTH (FEET) = 315.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.70  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.40  
HALFSTREET FLOOD WIDTH (FEET) = 13.24  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.87  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.14  
STREET FLOW TRAVEL TIME (MIN.) = 0.67 Tc (MIN.) = 10.50  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.176

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED	-	2.90	0.60	0.400	-
USER-DEFINED	-	1.40	0.60	0.350	-
USER-DEFINED	-	4.00	0.60	0.400	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	2.70	0.60	0.350	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387  
SUBAREA AREA (ACRES) = 11.40 SUBAREA RUNOFF (CFS) = 9.68  
EFFECTIVE AREA (ACRES) = 35.60 AREA-AVERAGED Fm (INCH/HR) = 0.19  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.32  
TOTAL AREA (ACRES) = 35.6 PEAK FLOW RATE (CFS) = 31.49

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.41 HALFSTREET FLOOD WIDTH (FEET) = 13.95  
FLOW VELOCITY (FEET/SEC.) = 8.16 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.36  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 124.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 10.50  
RAINFALL INTENSITY(INCH/HR) = 1.18  
AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.32  
EFFECTIVE STREAM AREA(ACRES) = 35.60  
TOTAL STREAM AREA(ACRES) = 35.60  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 31.49

\*\*\*\*\*  
FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 317.00  
ELEVATION DATA: UPSTREAM(FEET) = 699.00 DOWNSTREAM(FEET) = 610.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.111  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.311  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"OPEN BRUSH" - 1.50 0.60 1.000 0 9.11  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.96  
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 0.96

\*\*\*\*\*  
FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 575.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 206.00 CHANNEL SLOPE = 0.1699  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.222  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.80 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.75  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.65  
AVERAGE FLOW DEPTH(FEET) = 0.35 TRAVEL TIME(MIN.) = 0.74  
Tc(MIN.) = 9.85  
SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 1.57  
EFFECTIVE AREA(ACRES) = 4.30 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.3 PEAK FLOW RATE(CFS) = 2.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.40 FLOW VELOCITY(FEET/SEC.) = 5.03  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 523.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 548.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.1350  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.175  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.30 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.26  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.96  
AVERAGE FLOW DEPTH(FEET) = 0.47 TRAVEL TIME(MIN.) = 0.67  
Tc(MIN.) = 10.52  
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 1.71  
EFFECTIVE AREA(ACRES) = 7.60 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.6 PEAK FLOW RATE(CFS) = 3.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.50 FLOW VELOCITY(FEET/SEC.) = 5.23  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 723.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 548.00 DOWNSTREAM(FEET) = 524.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 318.00 CHANNEL SLOPE = 0.0755  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.107  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.30 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.46  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.35  
AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 1.22  
Tc(MIN.) = 11.74

SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 1.05  
EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 4.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.59 FLOW VELOCITY (FEET/SEC.) = 4.32  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 1041.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 524.00 DOWNSTREAM (FEET) = 515.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 94.00 CHANNEL SLOPE = 0.0957  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.089

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.33

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.97

AVERAGE FLOW DEPTH (FEET) = 0.60 TRAVEL TIME (MIN.) = 0.32

Tc (MIN.) = 12.06

SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 1.63

EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 5.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.62 FLOW VELOCITY (FEET/SEC.) = 5.15

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 1135.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 507.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 207.00 CHANNEL SLOPE = 0.0386  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.039

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.63

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.86

AVERAGE FLOW DEPTH (FEET) = 0.81 TRAVEL TIME (MIN.) = 0.89  
Tc (MIN.) = 12.95  
SUBAREA AREA (ACRES) = 8.30 SUBAREA RUNOFF (CFS) = 3.28  
EFFECTIVE AREA (ACRES) = 21.90 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 21.9 PEAK FLOW RATE (CFS) = 8.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.85 FLOW VELOCITY (FEET/SEC.) = 3.98

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 1342.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 507.00 DOWNSTREAM (FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 338.00 CHANNEL SLOPE = 0.0207  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.946

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	0.400	-
USER-DEFINED	-	13.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.91

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.35

AVERAGE FLOW DEPTH (FEET) = 1.04 TRAVEL TIME (MIN.) = 1.68

Tc (MIN.) = 14.63

SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 4.48

EFFECTIVE AREA (ACRES) = 36.00 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 36.0 PEAK FLOW RATE (CFS) = 11.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.06 FLOW VELOCITY (FEET/SEC.) = 3.38

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 1680.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 137.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 500.00 DOWNSTREAM (FEET) = 496.00  
FLOW LENGTH (FEET) = 726.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 14.9 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.50

ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 11.30

PIPE TRAVEL TIME (MIN.) = 2.20 Tc (MIN.) = 16.83

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

```

*****
FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 16.83
RAINFALL INTENSITY(INCH/HR) = 0.87
AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 36.00
TOTAL STREAM AREA(ACRES) = 36.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.30

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 31.49 10.50 1.176 0.60( 0.19) 0.32 35.6 100.00
2 11.30 16.83 0.865 0.60( 0.60) 1.00 36.0 130.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 42.79 10.50 1.176 0.60( 0.35) 0.58 58.1 100.00
2 32.82 16.83 0.865 0.60( 0.40) 0.66 71.6 130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 42.79 Tc(MIN.) = 10.50
EFFECTIVE AREA(ACRES) = 58.05 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 71.6
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

*****
FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 444.00
FLOW LENGTH(FEET) = 888.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.46
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 42.79
PIPE TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 11.30
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 125.00 = 3294.00 FEET.

*****
FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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*****
MAINLINE Tc(MIN.) = 11.30
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.132
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.60 0.400 -
USER-DEFINED - 7.50 0.60 0.400 -
USER-DEFINED - 0.10 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.407
SUBAREA AREA(ACRES) = 8.60 SUBAREA RUNOFF(CFS) = 6.87
EFFECTIVE AREA(ACRES) = 66.65 AREA-AVERAGED Fm(INCH/HR) = 0.34
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.56
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 47.73

*****
FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 444.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 27.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.18
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 47.73
PIPE TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 12.50
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 12.50
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.065
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.30 0.60 0.200 -
USER-DEFINED - 0.70 0.60 0.400 -
USER-DEFINED - 0.90 0.60 0.100 -
USER-DEFINED - 0.60 0.60 0.350 -
USER-DEFINED - 0.40 0.60 0.200 -
USER-DEFINED - 0.20 0.60 0.400 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.225
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 5.94
EFFECTIVE AREA(ACRES) = 73.75 AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 87.3 PEAK FLOW RATE(CFS) = 49.66

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

```

=====
MAINLINE Tc(MIN.) = 12.50
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.065
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.60     0.100    -
USER-DEFINED        -         0.10     0.60     0.350    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225
SUBAREA AREA(ACRES) = 0.20    SUBAREA RUNOFF(CFS) = 0.17
EFFECTIVE AREA(ACRES) = 73.95  AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 87.5    PEAK FLOW RATE(CFS) = 49.82

```

```

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1
-----

```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

```

=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.50
RAINFALL INTENSITY(INCH/HR) = 1.06
AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.53
EFFECTIVE STREAM AREA(ACRES) = 73.95
TOTAL STREAM AREA(ACRES) = 87.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 49.82

```

```

*****
FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21
-----

```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

```

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 557.00  DOWNSTREAM(FEET) = 546.00

```

```

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.105
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.673
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS   Tc
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          -         0.50     0.60     0.100    0    6.11
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 0.73
TOTAL AREA(ACRES) = 0.50    PEAK FLOW RATE(CFS) = 0.73

```

```

*****
FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62
-----

```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

```

UPSTREAM ELEVATION(FEET) = 546.00  DOWNSTREAM ELEVATION(FEET) = 488.00
STREET LENGTH(FEET) = 671.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

```

```

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

```

```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

```

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.70

```

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.24
HALFSTREET FLOOD WIDTH(FEET) = 4.16
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.31
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.26
STREET FLOW TRAVEL TIME(MIN.) = 2.10  Tc(MIN.) = 8.21

```

```

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.420
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50     0.60     0.200    -
USER-DEFINED        -         0.90     0.60     0.100    -
USER-DEFINED        -         3.90     0.60     0.350    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
SUBAREA AREA(ACRES) = 5.30    SUBAREA RUNOFF(CFS) = 5.93
EFFECTIVE AREA(ACRES) = 5.80  AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 5.8    PEAK FLOW RATE(CFS) = 6.54

```

```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.28  HALFSTREET FLOOD WIDTH(FEET) = 6.59
FLOW VELOCITY(FEET/SEC.) = 5.62  DEPTH*VELOCITY(FT*FT/SEC.) = 1.58
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1001.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 8.21
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.420
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         14.60    0.60     0.200    -
USER-DEFINED        -         1.10     0.60     0.100    -
USER-DEFINED        -         4.30     0.60     0.350    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.227
SUBAREA AREA(ACRES) = 20.00    SUBAREA RUNOFF(CFS) = 23.10
EFFECTIVE AREA(ACRES) = 25.80  AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 25.8    PEAK FLOW RATE(CFS) = 29.65

```

```

*****
FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 488.00 DOWNSTREAM ELEVATION(FEET) = 460.00
STREET LENGTH(FEET) = 371.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.03
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.45
HALFSTREET FLOOD WIDTH(FEET) = 15.82
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.62
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 3.39
STREET FLOW TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 9.02
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.322
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.60 0.200 -
USER-DEFINED - 10.00 0.60 0.200 -
USER-DEFINED - 1.70 0.60 0.200 -
USER-DEFINED - 0.50 0.60 0.100 -
USER-DEFINED - 1.00 0.60 0.350 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.207
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 14.77
EFFECTIVE AREA(ACRES) = 39.50 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 39.5 PEAK FLOW RATE(CFS) = 42.14

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.68
FLOW VELOCITY(FEET/SEC.) = 7.87 DEPTH*VELOCITY(FT*FT/SEC.) = 3.62
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1372.00 FEET.

*****
FLOW PROCESS FROM NODE 113.00 TO NODE 126.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.29

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```

ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 42.14
PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 9.53
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 1872.00 FEET.

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 9.53
RAINFALL INTENSITY(INCH/HR) = 1.26
AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.23
EFFECTIVE STREAM AREA(ACRES) = 39.50
TOTAL STREAM AREA(ACRES) = 39.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 42.14

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 49.82 12.50 1.065 0.60( 0.32) 0.53 74.0 100.00
1 34.30 18.98 0.795 0.60( 0.36) 0.60 87.5 130.00
2 42.14 9.53 1.260 0.60( 0.14) 0.23 39.5 110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 90.08 9.53 1.260 0.60( 0.24) 0.40 95.9 110.00
2 84.63 12.50 1.065 0.60( 0.25) 0.42 113.5 100.00
3 59.01 18.98 0.795 0.60( 0.29) 0.48 127.0 130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 90.08 Tc(MIN.) = 9.53
EFFECTIVE AREA(ACRES) = 95.91 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 127.0
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 435.00
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.35
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.08

```

PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 9.97  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.97  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.208  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.60 0.200 -  
USER-DEFINED - 5.10 0.60 0.400 -  
USER-DEFINED - 0.30 0.60 0.100 -  
USER-DEFINED - 0.10 0.60 0.850 -  
USER-DEFINED - 0.80 0.60 0.200 -  
USER-DEFINED - 0.80 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.366  
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 6.94  
EFFECTIVE AREA(ACRES) = 103.71 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.40  
TOTAL AREA(ACRES) = 134.8 PEAK FLOW RATE(CFS) = 90.31

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.97  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.208  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.10 0.60 0.400 -  
USER-DEFINED - 0.30 0.60 0.100 -  
USER-DEFINED - 1.50 0.60 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 3.95  
EFFECTIVE AREA(ACRES) = 108.61 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 139.7 PEAK FLOW RATE(CFS) = 94.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\*\*\*\* MAIN STREAM CONFLUENCE DATA \*\*\*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 94.26 9.97 1.208 0.60( 0.24) 0.41 108.6 110.00  
2 89.30 12.93 1.040 0.60( 0.25) 0.42 126.2 100.00  
3 61.92 19.47 0.779 0.60( 0.29) 0.48 139.7 130.00

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 51.11 14.63 0.946 0.60( 0.18) 0.29 71.2 100.00  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 140.95 9.97 1.208 0.60( 0.22) 0.37 157.1 110.00  
2 140.05 12.93 1.040 0.60( 0.23) 0.38 189.1 100.00  
3 133.31 14.63 0.946 0.60( 0.23) 0.39 200.9 100.00  
4 102.00 19.47 0.779 0.60( 0.25) 0.42 210.9 130.00  
TOTAL AREA(ACRES) = 210.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 140.95 Tc(MIN.) = 9.967  
EFFECTIVE AREA(ACRES) = 157.12 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 210.9  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 370.00  
FLOW LENGTH(FEET) = 500.20 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 21.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 33.67  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 140.95  
PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 10.22  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.10 = 4750.20 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.10 TO NODE 127.20 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 353.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 595.30 CHANNEL SLOPE = 0.0218  
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.079  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.60 0.100 -  
USER-DEFINED - 0.10 0.60 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 142.60

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.91  
 AVERAGE FLOW DEPTH (FEET) = 0.57 TRAVEL TIME (MIN.) = 2.02  
 Tc (MIN.) = 12.23  
 SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 3.30  
 EFFECTIVE AREA (ACRES) = 160.72 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA (ACRES) = 214.5 PEAK FLOW RATE (CFS) = 140.95  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.56 FLOW VELOCITY (FEET/SEC.) = 4.91  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.20 = 5345.50 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.20 TO NODE 127.30 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 353.00 DOWNSTREAM (FEET) = 340.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 476.00 CHANNEL SLOPE = 0.0273  
 CHANNEL BASE (FEET) = 50.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.50  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.995

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 142.30  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.27  
 AVERAGE FLOW DEPTH (FEET) = 0.53 TRAVEL TIME (MIN.) = 1.51  
 Tc (MIN.) = 13.74

SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 2.69  
 EFFECTIVE AREA (ACRES) = 163.92 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36  
 TOTAL AREA (ACRES) = 217.7 PEAK FLOW RATE (CFS) = 140.95  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.52 FLOW VELOCITY (FEET/SEC.) = 5.27  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.30 = 5821.50 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.30 TO NODE 13569.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 340.00 DOWNSTREAM (FEET) = 338.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 506.00 CHANNEL SLOPE = 0.0040  
 CHANNEL BASE (FEET) = 150.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.50  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.823

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.100	-

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.80 0.60 0.100 -  
 USER-DEFINED - 0.60 0.60 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 142.12  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 1.92  
 AVERAGE FLOW DEPTH (FEET) = 0.49 TRAVEL TIME (MIN.) = 4.40  
 Tc (MIN.) = 18.14

SUBAREA AREA (ACRES) = 3.40 SUBAREA RUNOFF (CFS) = 2.33  
 EFFECTIVE AREA (ACRES) = 167.32 AREA-AVERAGED Fm (INCH/HR) = 0.21  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.35  
 TOTAL AREA (ACRES) = 221.1 PEAK FLOW RATE (CFS) = 140.95  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.49 FLOW VELOCITY (FEET/SEC.) = 1.92  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 13569.00 = 6327.50 FEET.

END OF STUDY SUMMARY:  
 TOTAL AREA (ACRES) = 221.1 TC (MIN.) = 18.14  
 EFFECTIVE AREA (ACRES) = 167.32 AREA-AVERAGED Fm (INCH/HR) = 0.21  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.355  
 PEAK FLOW RATE (CFS) = 140.95

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	140.95	18.14	0.823	0.60 ( 0.21)	0.35	167.3	110.00
2	140.05	21.10	0.739	0.60 ( 0.22)	0.37	199.3	100.00
3	133.31	22.95	0.701	0.60 ( 0.22)	0.37	211.1	100.00
4	102.00	28.72	0.604	0.60 ( 0.24)	0.40	221.1	130.00

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 2-YR ULTIMATE EV DECEMBER 2013 MCHANDOO/TMULI \*  
\*\*\*\*\*

FILE NAME: 2P02EVBB.DAT  
TIME/DATE OF STUDY: 16:38 12/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.819
- 2) 10.00; 1.213
- 3) 15.00; 0.930
- 4) 20.00; 0.765
- 5) 25.00; 0.661
- 6) 30.00; 0.587
- 7) 40.00; 0.505
- 8) 50.00; 0.448
- 9) 60.00; 0.390
- 10) 90.00; 0.336
- 11) 120.00; 0.281
- 12) 180.00; 0.227
- 13) 360.00; 0.170
- 14) 1200.00; 0.116

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00  
ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 543.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.596  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.504  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.80	0.60	0.100	56	7.60

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 1.04  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 1.04

\*\*\*\*\*  
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 543.00 DOWNSTREAM ELEVATION(FEET) = 523.00  
STREET LENGTH(FEET) = 502.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.91  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.33  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.86  
STREET FLOW TRAVEL TIME(MIN.) = 1.93 Tc(MIN.) = 9.53  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.270

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.200	-
USER-DEFINED	-	1.30	0.60	0.100	-

USER-DEFINED - 0.30 0.60 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.261  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 1.80  
 EFFECTIVE AREA(ACRES) = 2.60 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 2.68

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.24 HALFSTREET FLOOD WIDTH(FEET) = 4.14  
 FLOW VELOCITY(FEET/SEC.) = 3.71 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.89  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 810.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.53  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.270  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	1.40	0.60	0.100	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.53  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 4.20

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 523.00 DOWNSTREAM ELEVATION(FEET) = 468.00  
 STREET LENGTH(FEET) = 987.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.69  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.29  
 HALFSTREET FLOOD WIDTH(FEET) = 6.48  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.67  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.34  
 STREET FLOW TRAVEL TIME(MIN.) = 3.52 Tc(MIN.) = 13.05  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.040  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.50	0.60	0.500	-
USER-DEFINED	-	2.40	0.60	0.100	-
USER-DEFINED	-	1.30	0.60	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.426  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 2.97  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 6.34

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 6.89  
 FLOW VELOCITY(FEET/SEC.) = 4.77 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.41  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 1797.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 468.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.38  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.30  
 HALFSTREET FLOOD WIDTH(FEET) = 7.91  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.91  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.49  
 STREET FLOW TRAVEL TIME(MIN.) = 3.32 Tc(MIN.) = 16.37  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.885

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.500	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.60	0.60	0.500	-
USER-DEFINED	-	1.90	0.60	0.100	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 2.08  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 7.27

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.84
FLOW VELOCITY(FEET/SEC.) = 4.89 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.48
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2774.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.37

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.885

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.30 0.60 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 0.33

EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36

TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 7.60

\*\*\*\*\*

FLOW PROCESS FROM NODE 204.00 TO NODE 218.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 343.00

STREET LENGTH(FEET) = 1228.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.47

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.32

HALFSTREET FLOOD WIDTH(FEET) = 8.72

AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.86

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.55

STREET FLOW TRAVEL TIME(MIN.) = 4.22 Tc(MIN.) = 20.59

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 0.500 -

USER-DEFINED - 0.50 0.60 0.100 -

USER-DEFINED - 0.40 0.60 1.000 -

USER-DEFINED - 0.70 0.60 0.500 -

USER-DEFINED - 1.50 0.60 0.100 -
USER-DEFINED - 0.80 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 1.74
EFFECTIVE AREA(ACRES) = 16.60 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 16.6 PEAK FLOW RATE(CFS) = 7.85

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 8.41
FLOW VELOCITY(FEET/SEC.) = 4.76 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.49
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.59

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.20 0.60 0.500 -

USER-DEFINED - 0.10 0.60 0.100 -

USER-DEFINED - 0.20 0.60 0.500 -

USER-DEFINED - 0.10 0.60 0.100 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450

SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 0.70

EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.23

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.39

TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 8.54

\*\*\*\*\*

FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 20.59

RAINFALL INTENSITY(INCH/HR) = 0.75

AREA-AVERAGED Fm(INCH/HR) = 0.23

AREA-AVERAGED Fp(INCH/HR) = 0.60

AREA-AVERAGED Ap = 0.39

EFFECTIVE STREAM AREA(ACRES) = 18.20

TOTAL STREAM AREA(ACRES) = 18.20

PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.54

\*\*\*\*\*

FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 268.00

ELEVATION DATA: UPSTREAM(FEET) = 514.00 DOWNSTREAM(FEET) = 511.50

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.724  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.489

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	-	2.30	0.60	0.500	56	9.27
APARTMENTS	-	0.40	0.60	0.200	56	7.72

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.456  
SUBAREA RUNOFF(CFS) = 2.95  
TOTAL AREA(ACRES) = 2.70 PEAK FLOW RATE(CFS) = 2.95

\*\*\*\*\*  
FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 511.50 DOWNSTREAM ELEVATION(FEET) = 503.00  
STREET LENGTH(FEET) = 503.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.85  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 9.72  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.82  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.95  
STREET FLOW TRAVEL TIME(MIN.) = 2.97 Tc(MIN.) = 10.70  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.174

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	0.60	0.60	0.200	-
USER-DEFINED	-	6.20	0.60	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.475  
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 5.76  
EFFECTIVE AREA(ACRES) = 9.90 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.47  
TOTAL AREA(ACRES) = 9.9 PEAK FLOW RATE(CFS) = 7.95

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.21  
FLOW VELOCITY(FEET/SEC.) = 3.02 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.10  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 771.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.70  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.174  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	0.200	-
USER-DEFINED	-	0.30	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.350	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.281  
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 1.18  
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 9.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 503.00 DOWNSTREAM ELEVATION(FEET) = 476.00  
STREET LENGTH(FEET) = 423.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.57  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 8.91  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.30  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.71  
STREET FLOW TRAVEL TIME(MIN.) = 1.33 Tc(MIN.) = 12.03  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.098

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.350	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.454  
SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 0.89  
EFFECTIVE AREA (ACRES) = 12.40 AREA-AVERAGED Fm (INCH/HR) = 0.27  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.45  
TOTAL AREA (ACRES) = 12.4 PEAK FLOW RATE (CFS) = 9.26

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.32 HALFSTREET FLOOD WIDTH (FEET) = 8.78  
FLOW VELOCITY (FEET/SEC.) = 5.24 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.68  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.03  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.098  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.60 0.200 -  
USER-DEFINED - 0.20 0.60 0.500 -  
USER-DEFINED - 0.30 0.60 0.100 -  
USER-DEFINED - 3.30 0.60 0.350 -  
USER-DEFINED - 0.20 0.60 0.200 -  
USER-DEFINED - 0.40 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.332  
SUBAREA AREA (ACRES) = 4.90 SUBAREA RUNOFF (CFS) = 3.97  
EFFECTIVE AREA (ACRES) = 17.30 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.42  
TOTAL AREA (ACRES) = 17.3 PEAK FLOW RATE (CFS) = 13.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.03  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.098  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.40 0.60 0.100 -  
USER-DEFINED - 8.10 0.60 0.350 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.276  
SUBAREA AREA (ACRES) = 11.50 SUBAREA RUNOFF (CFS) = 9.65  
EFFECTIVE AREA (ACRES) = 28.80 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36  
TOTAL AREA (ACRES) = 28.8 PEAK FLOW RATE (CFS) = 22.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 476.00 DOWNSTREAM ELEVATION (FEET) = 460.00  
STREET LENGTH (FEET) = 789.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 22.88

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.47  
HALFSTREET FLOOD WIDTH (FEET) = 16.99  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.13  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.92  
STREET FLOW TRAVEL TIME (MIN.) = 3.19 Tc (MIN.) = 15.21  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.923  
SUBAREA AREA (ACRES) = 0.00 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 28.80 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36  
TOTAL AREA (ACRES) = 28.8 PEAK FLOW RATE (CFS) = 22.88  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.47 HALFSTREET FLOOD WIDTH (FEET) = 16.99  
FLOW VELOCITY (FEET/SEC.) = 4.13 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.92  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1983.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 15.21  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.923  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.00 0.60 0.500 -  
USER-DEFINED - 6.40 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 14.40 SUBAREA RUNOFF (CFS) = 8.07  
EFFECTIVE AREA (ACRES) = 43.20 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.41  
TOTAL AREA (ACRES) = 43.2 PEAK FLOW RATE (CFS) = 26.41

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 460.00 DOWNSTREAM ELEVATION (FEET) = 419.00  
STREET LENGTH (FEET) = 529.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.45  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.41  
HALFSTREET FLOOD WIDTH (FEET) = 13.87  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.18  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.95  
STREET FLOW TRAVEL TIME (MIN.) = 1.23 Tc (MIN.) = 16.44

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.882  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.20 0.60 0.500 -  
USER-DEFINED - 2.80 0.60 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 2.10  
EFFECTIVE AREA (ACRES) = 47.20 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.41  
TOTAL AREA (ACRES) = 47.2 PEAK FLOW RATE (CFS) = 26.93

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.41 HALFSTREET FLOOD WIDTH (FEET) = 13.71  
FLOW VELOCITY (FEET/SEC.) = 7.19 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.93  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 2512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.44  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.882  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.60 0.500 -  
USER-DEFINED - 4.10 0.60 0.500 -  
USER-DEFINED - 0.70 0.60 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 2.94  
EFFECTIVE AREA (ACRES) = 52.80 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.42  
TOTAL AREA (ACRES) = 52.8 PEAK FLOW RATE (CFS) = 29.86

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.44  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.882  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.60 0.500 -  
USER-DEFINED - 4.10 0.60 0.500 -  
USER-DEFINED - 2.50 0.60 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 3.93  
EFFECTIVE AREA (ACRES) = 60.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43  
TOTAL AREA (ACRES) = 60.3 PEAK FLOW RATE (CFS) = 33.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 419.00 DOWNSTREAM ELEVATION (FEET) = 405.00  
STREET LENGTH (FEET) = 174.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 33.80  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.43  
HALFSTREET FLOOD WIDTH (FEET) = 15.04  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.63  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.29  
STREET FLOW TRAVEL TIME (MIN.) = 0.38 Tc (MIN.) = 16.82

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.870  
SUBAREA AREA (ACRES) = 0.00 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 60.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43  
TOTAL AREA (ACRES) = 60.3 PEAK FLOW RATE (CFS) = 33.80  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.43 HALFSTREET FLOOD WIDTH (FEET) = 15.04  
FLOW VELOCITY (FEET/SEC.) = 7.63 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.29  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 2686.00 FEET.

```

*****
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 372.00
FLOW LENGTH(FEET) = 395.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.97
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 33.80
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 17.15
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 3081.00 FEET.
*****
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.15
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.859
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.60 0.500 -
USER-DEFINED - 1.00 0.60 0.500 -
USER-DEFINED - 1.00 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 1.11
EFFECTIVE AREA(ACRES) = 62.50 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 62.5 PEAK FLOW RATE(CFS) = 33.80
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.15
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.859
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.60 0.500 -
USER-DEFINED - 6.90 0.60 0.500 -
USER-DEFINED - 0.20 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 5.33
EFFECTIVE AREA(ACRES) = 73.10 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 73.1 PEAK FLOW RATE(CFS) = 38.97
*****
FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 343.00
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.70
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 38.97
PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 17.76
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 3688.00 FEET.
*****
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.76
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.839
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.60 0.500 -
USER-DEFINED - 0.40 0.60 0.400 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.443
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.36
EFFECTIVE AREA(ACRES) = 73.80 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 73.8 PEAK FLOW RATE(CFS) = 38.97
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 17.76
RAINFALL INTENSITY(INCH/HR) = 0.84
AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.44
EFFECTIVE STREAM AREA(ACRES) = 73.80
TOTAL STREAM AREA(ACRES) = 73.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 38.97
** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 8.54 20.59 0.753 0.60( 0.23) 0.39 18.2 200.00
2 38.97 17.76 0.839 0.60( 0.27) 0.44 73.8 210.00
*****
RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

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\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	47.51	17.76	0.839	0.60 ( 0.26)	0.43	89.5	210.00
2	41.64	20.59	0.753	0.60 ( 0.26)	0.43	92.0	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 47.51 Tc(MIN.) = 17.76  
EFFECTIVE AREA(ACRES) = 89.50 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 92.0  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 343.00 DOWNSTREAM(FEET) = 326.50  
FLOW LENGTH(FEET) = 734.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.25  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 47.51  
PIPE TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 18.68  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 219.00 = 4736.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.68

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.809

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	0.30	0.60	0.400	-
USER-DEFINED	-	0.60	0.60	0.100	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.90	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 1.25  
EFFECTIVE AREA(ACRES) = 92.40 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 94.9 PEAK FLOW RATE(CFS) = 47.51

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.68

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.809

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.31  
EFFECTIVE AREA(ACRES) = 93.00 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 95.5 PEAK FLOW RATE(CFS) = 47.51

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 326.50 DOWNSTREAM(FEET) = 325.00  
FLOW LENGTH(FEET) = 161.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.29  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 47.51  
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 18.97  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 220.00 = 4897.00 FEET.

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FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.97

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.799

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.90	0.60	0.500	-
USER-DEFINED	-	3.60	0.60	0.400	-
USER-DEFINED	-	18.40	0.60	0.500	-
USER-DEFINED	-	4.30	0.60	0.400	-
USER-DEFINED	-	0.50	0.60	0.500	-
USER-DEFINED	-	6.90	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462  
SUBAREA AREA(ACRES) = 38.60 SUBAREA RUNOFF(CFS) = 18.14  
EFFECTIVE AREA(ACRES) = 131.60 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 134.1 PEAK FLOW RATE(CFS) = 63.04

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 245.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 315.00
FLOW LENGTH(FEET) = 1019.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 26.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.42
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 63.04
PIPE TRAVEL TIME(MIN.) = 1.63 Tc(MIN.) = 20.60
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

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FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 20.60
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap      SCS
LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.40    0.60    0.400   -
USER-DEFINED         -         0.40    0.60    0.100   -
USER-DEFINED         -         0.30    0.60    1.000   -
USER-DEFINED         -         0.40    0.60    0.400   -
USER-DEFINED         -         0.40    0.60    0.100   -
USER-DEFINED         -         1.00    0.60    0.400   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 1.37
EFFECTIVE AREA(ACRES) = 134.50 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 137.0 PEAK FLOW RATE(CFS) = 63.04
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 20.60
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap      SCS
LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.90    0.60    0.100   -
USER-DEFINED         -         0.20    0.60    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.264
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 0.59
EFFECTIVE AREA(ACRES) = 135.60 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 138.1 PEAK FLOW RATE(CFS) = 63.04
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN.) = 20.60
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap      SCS
LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         1.10    0.60    0.500   -
USER-DEFINED         -         0.30    0.60    0.400   -
USER-DEFINED         -         0.10    0.60    0.100   -
USER-DEFINED         -         0.30    0.60    0.500   -
USER-DEFINED         -         1.40    0.60    0.400   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.434
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 1.42
EFFECTIVE AREA(ACRES) = 138.80 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 141.3 PEAK FLOW RATE(CFS) = 63.04
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<
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*****
FLOW PROCESS FROM NODE 220.50 TO NODE 221.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH(FEET) = 251.00
ELEVATION DATA: UPSTREAM(FEET) = 551.00 DOWNSTREAM(FEET) = 547.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.785
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.239
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap      SCS  Tc
LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE"    -         3.10    0.60    0.200   56   9.79
RESIDENTIAL
"1 DWELLING/ACRE"    -         3.10    0.60    0.100   56   9.79
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.150
SUBAREA RUNOFF(CFS) = 6.41
TOTAL AREA(ACRES) = 6.20 PEAK FLOW RATE(CFS) = 6.41

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*****
FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 542.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0130
CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.000

```

MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 5.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.132  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.200	-
USER-DEFINED	-	3.70	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.163  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.60  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.92  
 AVERAGE FLOW DEPTH (FEET) = 0.21 TRAVEL TIME (MIN.) = 1.64  
 Tc (MIN.) = 11.43  
 SUBAREA AREA (ACRES) = 4.70 SUBAREA RUNOFF (CFS) = 4.38  
 EFFECTIVE AREA (ACRES) = 10.90 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.16  
 TOTAL AREA (ACRES) = 10.9 PEAK FLOW RATE (CFS) = 10.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.23 FLOW VELOCITY (FEET/SEC.) = 4.17  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 222.00 = 637.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<<

=====

UPSTREAM ELEVATION (FEET) = 542.00 DOWNSTREAM ELEVATION (FEET) = 531.00  
 STREET LENGTH (FEET) = 1146.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.44  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.46  
 HALFSTREET FLOOD WIDTH (FEET) = 16.84  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.83  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.31  
 STREET FLOW TRAVEL TIME (MIN.) = 6.74 Tc (MIN.) = 18.17  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.825

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.50	0.60	0.200	-
USER-DEFINED	-	2.90	0.60	0.200	-
USER-DEFINED	-	0.70	0.60	0.100	-
USER-DEFINED	-	2.60	0.60	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.292  
 SUBAREA AREA (ACRES) = 17.70 SUBAREA RUNOFF (CFS) = 10.36  
 EFFECTIVE AREA (ACRES) = 28.60 AREA-AVERAGED Fm (INCH/HR) = 0.14  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 28.6 PEAK FLOW RATE (CFS) = 17.54

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.48 HALFSTREET FLOOD WIDTH (FEET) = 17.77  
 FLOW VELOCITY (FEET/SEC.) = 2.91 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.40  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 223.00 = 1783.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 62

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<<

=====

UPSTREAM ELEVATION (FEET) = 531.00 DOWNSTREAM ELEVATION (FEET) = 520.00  
 STREET LENGTH (FEET) = 702.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 20.95  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.47  
 HALFSTREET FLOOD WIDTH (FEET) = 17.30  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.65  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.72  
 STREET FLOW TRAVEL TIME (MIN.) = 3.20 Tc (MIN.) = 21.37  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.736

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	0.200	-
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	6.40	0.60	0.200	-
USER-DEFINED	-	3.70	0.60	0.100	-
USER-DEFINED	-	0.70	0.60	0.350	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175  
 SUBAREA AREA (ACRES) = 12.00 SUBAREA RUNOFF (CFS) = 6.82  
 EFFECTIVE AREA (ACRES) = 40.60 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.22  
 TOTAL AREA (ACRES) = 40.6 PEAK FLOW RATE (CFS) = 22.07

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.48 HALFSTREET FLOOD WIDTH (FEET) = 17.62  
 FLOW VELOCITY (FEET/SEC.) = 3.72 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.78  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 224.00 = 2485.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 463.00
FLOW LENGTH(FEET) = 1760.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.54
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 22.07
PIPE TRAVEL TIME(MIN.) = 2.34 Tc(MIN.) = 23.71
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 225.00 = 4245.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.71
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.688
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.20 0.60 0.200 -
USER-DEFINED - 0.10 0.60 0.500 -
USER-DEFINED - 0.30 0.60 0.350 -
USER-DEFINED - 6.80 0.60 0.200 -
USER-DEFINED - 0.10 0.60 0.500 -
USER-DEFINED - 2.00 0.60 0.350 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.235
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 5.66
EFFECTIVE AREA(ACRES) = 52.10 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 52.1 PEAK FLOW RATE(CFS) = 25.95

\*\*\*\*\*

FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.71
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.688
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.40 0.60 0.500 -
USER-DEFINED - 0.90 0.60 0.350 -
USER-DEFINED - 5.20 0.60 0.500 -
USER-DEFINED - 0.80 0.60 0.350 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.481
SUBAREA AREA(ACRES) = 13.30 SUBAREA RUNOFF(CFS) = 4.78
EFFECTIVE AREA(ACRES) = 65.40 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.28

TOTAL AREA(ACRES) = 65.4 PEAK FLOW RATE(CFS) = 30.73

\*\*\*\*\*

FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 425.00
FLOW LENGTH(FEET) = 639.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.07
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 30.73
PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 24.34
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 226.00 = 4884.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 226.00 TO NODE 226.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.34
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.675
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.90 0.60 0.200 -
USER-DEFINED - 2.90 0.60 0.500 -
USER-DEFINED - 6.30 0.60 0.200 -
USER-DEFINED - 6.00 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 7.60
EFFECTIVE AREA(ACRES) = 83.50 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.29
TOTAL AREA(ACRES) = 83.5 PEAK FLOW RATE(CFS) = 37.56

\*\*\*\*\*

FLOW PROCESS FROM NODE 226.00 TO NODE 243.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 653.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.55
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 37.56
PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 25.00
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 243.00 = 5537.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 25.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.661  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.60	0.200	-
USER-DEFINED	-	1.60	0.60	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
 SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 1.93  
 EFFECTIVE AREA(ACRES) = 88.00 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 88.0 PEAK FLOW RATE(CFS) = 38.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 25.00  
 RAINFALL INTENSITY(INCH/HR) = 0.66  
 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.29  
 EFFECTIVE STREAM AREA(ACRES) = 88.00  
 TOTAL STREAM AREA(ACRES) = 88.00  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 38.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 547.50

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.751  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.364  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
APARTMENTS	-	0.60	0.60	0.200	56	8.75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 0.67  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.67

\*\*\*\*\*

FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 547.50 DOWNSTREAM(FEET) = 541.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 802.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 3.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.093  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.200	-
USER-DEFINED	-	5.90	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.52  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.96  
 AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 3.37  
 Tc(MIN.) = 12.13  
 SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 5.66  
 EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 6.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.82 FLOW VELOCITY(FEET/SEC.) = 4.59  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1132.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 541.00 DOWNSTREAM(FEET) = 533.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 849.00 CHANNEL SLOPE = 0.0094  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.953  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	14.90	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.19  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.71  
 AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 2.48  
 Tc(MIN.) = 14.60  
 SUBAREA AREA(ACRES) = 14.90 SUBAREA RUNOFF(CFS) = 11.97  
 EFFECTIVE AREA(ACRES) = 21.60 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 21.6 PEAK FLOW RATE(CFS) = 17.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.18 FLOW VELOCITY(FEET/SEC.) = 6.24  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1981.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 14.60
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.953
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.60    0.400    -
USER-DEFINED        -         0.20    0.60    0.200    -
USER-DEFINED        -         1.80    0.60    0.100    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.124
SUBAREA AREA(ACRES) = 2.10    SUBAREA RUNOFF(CFS) = 1.66
EFFECTIVE AREA(ACRES) = 23.70  AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.11
TOTAL AREA(ACRES) = 23.7    PEAK FLOW RATE(CFS) = 18.97

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*****
FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN.) = 14.60
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.953
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.60    0.100    -
USER-DEFINED        -         0.10    0.60    0.400    -
USER-DEFINED        -         1.30    0.60    0.100    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.117
SUBAREA AREA(ACRES) = 1.80    SUBAREA RUNOFF(CFS) = 1.43
EFFECTIVE AREA(ACRES) = 25.50  AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.11
TOTAL AREA(ACRES) = 25.5    PEAK FLOW RATE(CFS) = 20.40

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*****
FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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```

ELEVATION DATA: UPSTREAM(FEET) = 537.00 DOWNSTREAM(FEET) = 510.00
FLOW LENGTH(FEET) = 513.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.62
ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.40
PIPE TRAVEL TIME(MIN.) = 0.58    Tc(MIN.) = 15.19
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2494.00 FEET.

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.19
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.924

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         9.40    0.60    0.400    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.40    SUBAREA RUNOFF(CFS) = 5.79
EFFECTIVE AREA(ACRES) = 34.90  AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 34.9    PEAK FLOW RATE(CFS) = 25.52

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN.) = 15.19
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.924
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70    0.60    0.200    -
USER-DEFINED        -         2.50    0.60    0.400    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.356
SUBAREA AREA(ACRES) = 3.20    SUBAREA RUNOFF(CFS) = 2.05
EFFECTIVE AREA(ACRES) = 38.10  AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 38.1    PEAK FLOW RATE(CFS) = 27.57

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 478.00
FLOW LENGTH(FEET) = 474.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.60
ESTIMATED PIPE DIAMETER(INCH) = 21.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 27.57
PIPE TRAVEL TIME(MIN.) = 0.45    Tc(MIN.) = 15.64
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 2968.00 FEET.

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*****
FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.64
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.909
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.70    0.60    0.200    -
USER-DEFINED        -         1.60    0.60    0.400    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

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SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297  
SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 2.17  
EFFECTIVE AREA (ACRES) = 41.40 AREA-AVERAGED Fm (INCH/HR) = 0.12  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.21  
TOTAL AREA (ACRES) = 41.4 PEAK FLOW RATE (CFS) = 29.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	478.00	DOWNSTREAM (FEET) =	471.00
FLOW LENGTH (FEET) =	473.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	27.0 INCH PIPE IS	18.6 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	10.02		
ESTIMATED PIPE DIAMETER (INCH) =	27.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	29.23		
PIPE TRAVEL TIME (MIN.) =	0.79	Tc (MIN.) =	16.42
LONGEST FLOWPATH FROM NODE	230.00 TO NODE	236.00 =	3441.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.42  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.883  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.60	0.200	-
USER-DEFINED	-	7.10	0.60	0.400	-
USER-DEFINED	-	2.70	0.60	0.200	-
USER-DEFINED	-	1.10	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
SUBAREA AREA (ACRES) = 12.30 SUBAREA RUNOFF (CFS) = 7.74  
EFFECTIVE AREA (ACRES) = 53.70 AREA-AVERAGED Fm (INCH/HR) = 0.14  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.23  
TOTAL AREA (ACRES) = 53.7 PEAK FLOW RATE (CFS) = 36.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.42  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.883  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.60	0.200	-
USER-DEFINED	-	5.40	0.60	0.500	-
USER-DEFINED	-	1.00	0.60	0.400	-
USER-DEFINED	-	0.60	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.378

SUBAREA AREA (ACRES) = 9.90 SUBAREA RUNOFF (CFS) = 5.85  
EFFECTIVE AREA (ACRES) = 63.60 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.25  
TOTAL AREA (ACRES) = 63.6 PEAK FLOW RATE (CFS) = 41.86

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	471.00	DOWNSTREAM (FEET) =	468.00
FLOW LENGTH (FEET) =	283.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	33.0 INCH PIPE IS	22.5 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	9.68		
ESTIMATED PIPE DIAMETER (INCH) =	33.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	41.86		
PIPE TRAVEL TIME (MIN.) =	0.49	Tc (MIN.) =	16.91
LONGEST FLOWPATH FROM NODE	230.00 TO NODE	237.00 =	3724.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.91  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.867  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.10	0.60	0.200	-
USER-DEFINED	-	0.60	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.218  
SUBAREA AREA (ACRES) = 6.70 SUBAREA RUNOFF (CFS) = 4.44  
EFFECTIVE AREA (ACRES) = 70.30 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.25  
TOTAL AREA (ACRES) = 70.3 PEAK FLOW RATE (CFS) = 45.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	468.00	DOWNSTREAM (FEET) =	461.00
FLOW LENGTH (FEET) =	698.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	33.0 INCH PIPE IS	24.5 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	9.58		
ESTIMATED PIPE DIAMETER (INCH) =	33.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	45.38		
PIPE TRAVEL TIME (MIN.) =	1.21	Tc (MIN.) =	18.12
LONGEST FLOWPATH FROM NODE	230.00 TO NODE	238.00 =	4422.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN.) = 18.12
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.827
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         8.40     0.60     0.200    -
USER-DEFINED        -         0.60     0.60     0.500    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.220
SUBAREA AREA(ACRES) = 9.00      SUBAREA RUNOFF(CFS) = 5.63
EFFECTIVE AREA(ACRES) = 79.30   AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 79.3      PEAK FLOW RATE(CFS) = 48.47

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*****
FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 18.12
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.827
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.10     0.60     0.200    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 2.10      SUBAREA RUNOFF(CFS) = 1.34
EFFECTIVE AREA(ACRES) = 81.40   AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 81.4      PEAK FLOW RATE(CFS) = 49.80

```

```

*****
FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31
-----

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 461.00 DOWNSTREAM(FEET) = 440.00
FLOW LENGTH(FEET) = 582.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.87
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 49.80
PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 18.73
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 5004.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 18.73
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.807
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN

```

```

USER-DEFINED        -         5.00     0.60     0.200    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 5.00      SUBAREA RUNOFF(CFS) = 3.09
EFFECTIVE AREA(ACRES) = 86.40   AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 86.4      PEAK FLOW RATE(CFS) = 51.42

```

```

*****
FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31
-----

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 418.00
FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.47
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 51.42
PIPE TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 19.44
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 5654.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 19.44
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.784
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         5.30     0.60     0.200    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 5.30      SUBAREA RUNOFF(CFS) = 3.17
EFFECTIVE AREA(ACRES) = 91.70   AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 91.7      PEAK FLOW RATE(CFS) = 52.79

```

```

*****
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 19.44
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.784
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20     0.60     0.200    -
USER-DEFINED        -         0.20     0.60     0.100    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186
SUBAREA AREA(ACRES) = 1.40      SUBAREA RUNOFF(CFS) = 0.85
EFFECTIVE AREA(ACRES) = 93.10   AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24

```



TOTAL AREA (ACRES) = 93.1 PEAK FLOW RATE (CFS) = 53.63

\*\*\*\*\*  
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====
MAINLINE Tc (MIN.) = 19.44
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.784
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.20 0.60 0.200 -
USER-DEFINED - 0.70 0.60 0.600 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA (ACRES) = 1.90 SUBAREA RUNOFF (CFS) = 0.98
EFFECTIVE AREA (ACRES) = 95.00 AREA-AVERAGED Fm (INCH/HR) = 0.14
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 95.0 PEAK FLOW RATE (CFS) = 54.62

\*\*\*\*\*
FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM (FEET) = 418.00 DOWNSTREAM (FEET) = 404.00
FLOW LENGTH (FEET) = 1279.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.46
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 54.62
PIPE TRAVEL TIME (MIN.) = 2.04 Tc (MIN.) = 21.47
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 241.00 = 6933.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====
MAINLINE Tc (MIN.) = 21.47
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.734
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.10 0.60 0.200 -
USER-DEFINED - 1.20 0.60 0.100 -
USER-DEFINED - 6.30 0.60 0.850 -
USER-DEFINED - 4.60 0.60 0.600 -
USER-DEFINED - 1.60 0.60 0.200 -
USER-DEFINED - 4.00 0.60 0.100 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA (ACRES) = 18.80 SUBAREA RUNOFF (CFS) = 7.47
EFFECTIVE AREA (ACRES) = 113.80 AREA-AVERAGED Fm (INCH/HR) = 0.17
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.28
TOTAL AREA (ACRES) = 113.8 PEAK FLOW RATE (CFS) = 57.88

\*\*\*\*\*
FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====
MAINLINE Tc (MIN.) = 21.47
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.734
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.90 0.60 0.850 -
USER-DEFINED - 10.80 0.60 0.600 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.666
SUBAREA AREA (ACRES) = 14.70 SUBAREA RUNOFF (CFS) = 4.43
EFFECTIVE AREA (ACRES) = 128.50 AREA-AVERAGED Fm (INCH/HR) = 0.20
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.33
TOTAL AREA (ACRES) = 128.5 PEAK FLOW RATE (CFS) = 62.30

\*\*\*\*\*
FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM (FEET) = 404.00 DOWNSTREAM (FEET) = 403.00
FLOW LENGTH (FEET) = 66.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 12.24
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 62.30
PIPE TRAVEL TIME (MIN.) = 0.09 Tc (MIN.) = 21.56
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 6999.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====
MAINLINE Tc (MIN.) = 21.56
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.732
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.60 0.200 -
USER-DEFINED - 16.40 0.60 0.200 -
USER-DEFINED - 1.30 0.60 0.100 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.193
SUBAREA AREA (ACRES) = 19.10 SUBAREA RUNOFF (CFS) = 10.60
EFFECTIVE AREA (ACRES) = 147.60 AREA-AVERAGED Fm (INCH/HR) = 0.19
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31
TOTAL AREA (ACRES) = 147.6 PEAK FLOW RATE (CFS) = 72.69

\*\*\*\*\*
FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 1270.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.46
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 72.69
PIPE TRAVEL TIME(MIN.) = 2.24 Tc(MIN.) = 23.80
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 23.80
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.686
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.00   0.60  0.200 -
USER-DEFINED        -         2.00   0.60  0.850 -
USER-DEFINED        -         2.80   0.60  0.200 -
USER-DEFINED        -         1.50   0.60  0.100 -
USER-DEFINED        -         0.10   0.60  0.350 -
USER-DEFINED        -         1.10   0.60  0.850 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.421
SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 3.31
EFFECTIVE AREA(ACRES) = 156.10 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 156.1 PEAK FLOW RATE(CFS) = 72.69
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1
-----

```

```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====

```

```

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 23.80
RAINFALL INTENSITY(INCH/HR) = 0.69
AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA(ACRES) = 156.10
TOTAL STREAM AREA(ACRES) = 156.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 72.69

```

```

** CONFLUENCE DATA **
STREAM   Q   Tc  Intensity  Fp(Fm)   Ap   Ae  HEADWATER
NUMBER  (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1       38.47 25.00 0.661 0.60( 0.18) 0.29 88.0 220.50
2       72.69 23.80 0.686 0.60( 0.19) 0.32 156.1 230.00

```

```

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

```

```

** PEAK FLOW RATE TABLE **
STREAM   Q   Tc  Intensity  Fp(Fm)   Ap   Ae  HEADWATER
NUMBER  (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1       111.15 23.80 0.686 0.60( 0.18) 0.31 239.9 230.00
2       107.52 25.00 0.661 0.60( 0.18) 0.31 244.1 220.50

```

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 111.15 Tc(MIN.) = 23.80
EFFECTIVE AREA(ACRES) = 239.90 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 244.1
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 243.00 TO NODE 244.00 IS CODE = 31
-----

```

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 394.00 DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 849.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.03
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 111.15
PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 24.39
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 244.00 = 9118.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 244.00 TO NODE 244.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

```

MAINLINE Tc(MIN.) = 24.39
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.674
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.60  0.200 -
USER-DEFINED        -         1.70   0.60  0.500 -
USER-DEFINED        -         0.30   0.60  0.850 -
USER-DEFINED        -         0.80   0.60  0.500 -
USER-DEFINED        -         0.10   0.60  0.850 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.537
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 0.95
EFFECTIVE AREA(ACRES) = 242.90 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 247.1 PEAK FLOW RATE(CFS) = 111.15
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 244.00 TO NODE 245.00 IS CODE = 31
-----

```

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 315.00
FLOW LENGTH(FEET) = 777.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.30
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 111.15
PIPE TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 25.10
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 25.10
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.660
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.60 0.500 -
USER-DEFINED - 0.20 0.60 0.850 -
USER-DEFINED - 0.20 0.60 0.500 -
USER-DEFINED - 0.10 0.60 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631
SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 0.20
EFFECTIVE AREA(ACRES) = 243.70 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 247.9 PEAK FLOW RATE(CFS) = 111.15
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 11
-----
>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<
=====

```

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	111.15	25.10	0.660	0.60( 0.19)	0.31	243.7	230.00
2	107.52	26.30	0.642	0.60( 0.19)	0.31	247.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	63.04	20.60	0.753	0.60( 0.26)	0.44	138.8	210.00
2	55.57	23.54	0.691	0.60( 0.26)	0.44	141.3	200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	172.21	20.60	0.753	0.60( 0.22)	0.36	338.8	210.00

2	166.72	23.54	0.691	0.60( 0.22)	0.36	369.9	200.00
3	162.60	25.10	0.660	0.60( 0.22)	0.36	385.0	230.00
4	156.65	26.30	0.642	0.60( 0.21)	0.36	389.2	220.50

TOTAL AREA(ACRES) = 389.2

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 172.21 Tc(MIN.) = 20.597
EFFECTIVE AREA(ACRES) = 338.80 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 389.2
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 12
-----

```

```

>>>>CLEAR MEMORY BANK # 3 <<<<
=====
*****
FLOW PROCESS FROM NODE 245.00 TO NODE 246.00 IS CODE = 31
-----

```

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 306.00
FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 37.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.39
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 172.21
PIPE TRAVEL TIME(MIN.) = 0.67 Tc(MIN.) = 21.27
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 246.00 = 10514.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 21.27
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.739
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.90 0.60 0.500 -
USER-DEFINED - 0.30 0.60 0.400 -
USER-DEFINED - 2.50 0.60 0.500 -
USER-DEFINED - 0.70 0.60 0.400 -
USER-DEFINED - 9.10 0.60 0.350 -
USER-DEFINED - 2.80 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.410
SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 7.23
EFFECTIVE AREA(ACRES) = 355.10 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 405.5 PEAK FLOW RATE(CFS) = 172.21
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.27  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.739  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.60	0.60	0.400	-
USER-DEFINED	-	7.40	0.60	0.350	-
USER-DEFINED	-	0.30	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.375  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 4.30  
 EFFECTIVE AREA(ACRES) = 364.40 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA(ACRES) = 414.8 PEAK FLOW RATE(CFS) = 172.21  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 246.00 TO NODE 247.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 306.00 DOWNSTREAM(FEET) = 300.00  
 FLOW LENGTH(FEET) = 185.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.93  
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 172.21  
 PIPE TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 21.41  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 247.00 = 10699.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.41  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.736  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.400	-
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	1.30	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.413  
 SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 0.88  
 EFFECTIVE AREA(ACRES) = 366.40 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA(ACRES) = 416.8 PEAK FLOW RATE(CFS) = 172.21  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.41  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.736  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.80	0.60	0.400	-
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.365  
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 1.21  
 EFFECTIVE AREA(ACRES) = 369.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA(ACRES) = 419.4 PEAK FLOW RATE(CFS) = 172.21  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 247.00 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 271.00  
 FLOW LENGTH(FEET) = 859.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.78  
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 172.21  
 PIPE TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 22.10  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.10  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.721  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	0.400	-
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	2.60	0.60	0.400	-
USER-DEFINED	-	1.00	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356  
 SUBAREA AREA(ACRES) = 4.80 SUBAREA RUNOFF(CFS) = 2.19

EFFECTIVE AREA (ACRES) = 373.80 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
TOTAL AREA (ACRES) = 424.2 PEAK FLOW RATE (CFS) = 172.21  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 22.10  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.721  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.60 0.400 -  
USER-DEFINED - 0.30 0.60 0.100 -  
USER-DEFINED - 0.10 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.367  
SUBAREA AREA (ACRES) = 0.90 SUBAREA RUNOFF (CFS) = 0.41  
EFFECTIVE AREA (ACRES) = 374.70 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
TOTAL AREA (ACRES) = 425.1 PEAK FLOW RATE (CFS) = 172.21  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 22.10  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.721  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.500 -  
USER-DEFINED - 0.70 0.60 0.400 -  
USER-DEFINED - 2.20 0.60 0.500 -  
USER-DEFINED - 1.80 0.60 0.400 -  
USER-DEFINED - 0.20 0.60 0.350 -  
USER-DEFINED - 3.20 0.60 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.466  
SUBAREA AREA (ACRES) = 8.20 SUBAREA RUNOFF (CFS) = 3.26  
EFFECTIVE AREA (ACRES) = 382.90 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
TOTAL AREA (ACRES) = 433.3 PEAK FLOW RATE (CFS) = 172.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 22.10  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.721  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 5.70 0.60 0.400 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400  
SUBAREA AREA (ACRES) = 5.70 SUBAREA RUNOFF (CFS) = 2.47  
EFFECTIVE AREA (ACRES) = 388.60 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
TOTAL AREA (ACRES) = 439.0 PEAK FLOW RATE (CFS) = 174.72

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 22.10  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.721  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 6.40 0.60 1.000 -  
USER-DEFINED - 1.40 0.60 1.000 -  
USER-DEFINED - 0.60 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 0.92  
EFFECTIVE AREA (ACRES) = 397.00 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.38  
TOTAL AREA (ACRES) = 447.4 PEAK FLOW RATE (CFS) = 175.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
ELEVATION DATA: UPSTREAM (FEET) = 413.04 DOWNSTREAM (FEET) = 405.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.928  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.585  
SUBAREA Tc AND LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
CONDOMINIUMS - 0.20 0.60 0.350 56 7.70  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" - 0.10 0.60 0.200 56 6.93  
CONDOMINIUMS - 0.10 0.60 0.350 56 7.70  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.312  
SUBAREA RUNOFF (CFS) = 0.50  
TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 0.50

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*****
FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 405.00 DOWNSTREAM ELEVATION(FEET) = 385.00
STREET LENGTH(FEET) = 587.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.84
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.21
HALFSTREET FLOOD WIDTH(FEET) = 2.41
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.75
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.77
STREET FLOW TRAVEL TIME(MIN.) = 2.61 Tc(MIN.) = 9.54
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.269
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.20 0.60 0.100 -
USER-DEFINED - 0.60 0.60 0.350 -
USER-DEFINED - 0.10 0.60 0.850 -
USER-DEFINED - 0.10 0.60 0.200 -
USER-DEFINED - 0.30 0.60 0.100 -
USER-DEFINED - 0.40 0.60 0.350 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.224
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 2.76
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 3.15

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 5.47
FLOW VELOCITY(FEET/SEC.) = 3.41 DEPTH*VELOCITY(FT*FT/SEC.) = 0.89
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 917.00 FEET.

*****
FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 385.00 DOWNSTREAM(FEET) = 378.50
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

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DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.24
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.15
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 9.87
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1079.00 FEET.

*****
FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.87
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.229
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.10 0.60 0.100 -
USER-DEFINED - 1.30 0.60 0.100 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 2.53
EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.18
TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 5.56

*****
FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 378.50 DOWNSTREAM(FEET) = 348.50
FLOW LENGTH(FEET) = 637.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.25
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.56
PIPE TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 10.90
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 1716.00 FEET.

*****
FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.90
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.162
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.60 0.500 -
USER-DEFINED - 1.70 0.60 0.100 -
USER-DEFINED - 1.00 0.60 0.350 -
USER-DEFINED - 0.10 0.60 0.500 -
USER-DEFINED - 0.70 0.60 0.100 -
USER-DEFINED - 0.40 0.60 0.350 -

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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.240  
 SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 4.12  
 EFFECTIVE AREA(ACRES) = 10.00 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.20  
 TOTAL AREA(ACRES) = 10.0 PEAK FLOW RATE(CFS) = 9.35

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 348.50 DOWNSTREAM(FEET) = 306.00  
 FLOW LENGTH(FEET) = 944.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.60  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 9.35  
 PIPE TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 12.26  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.26  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.085

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.60	0.500	-
USER-DEFINED	-	0.40	0.60	0.400	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	1.50	0.60	0.500	-
USER-DEFINED	-	1.90	0.60	0.400	-
USER-DEFINED	-	2.00	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
 SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 5.76  
 EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.16  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.27  
 TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 14.42

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.26  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.085

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.40	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.100	-

USER-DEFINED - 6.70 0.60 0.200 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.199  
 SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 9.73  
 EFFECTIVE AREA(ACRES) = 28.50 AREA-AVERAGED Fm(INCH/HR) = 0.14  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 28.5 PEAK FLOW RATE(CFS) = 24.15

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.26  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.085  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 1.35  
 EFFECTIVE AREA(ACRES) = 31.60 AREA-AVERAGED Fm(INCH/HR) = 0.19  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 25.51

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 12.26  
 RAINFALL INTENSITY(INCH/HR) = 1.09  
 AREA-AVERAGED Fm(INCH/HR) = 0.19  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.31  
 EFFECTIVE STREAM AREA(ACRES) = 31.60  
 TOTAL STREAM AREA(ACRES) = 31.60  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 25.51

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 400.00 TO NODE 420.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 300.40  
 ELEVATION DATA: UPSTREAM(FEET) = 312.80 DOWNSTREAM(FEET) = 310.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.115  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.441  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.50	0.60	0.100	56	8.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 0.62  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.62

\*\*\*\*\*  
FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 307.00  
STREET LENGTH(FEET) = 266.50 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 67.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 62.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.93

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.25

HALFSTREET FLOOD WIDTH(FEET) = 5.27

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.15

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.55

STREET FLOW TRAVEL TIME(MIN.) = 2.06 Tc(MIN.) = 10.18

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.203

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.62

EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.06

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 1.13

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 6.12

FLOW VELOCITY(FEET/SEC.) = 2.20 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.59

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.00 = 566.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.00 TO NODE 421.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 307.00 DOWNSTREAM(FEET) = 305.50

FLOW LENGTH(FEET) = 105.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 4.23  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 1.13  
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 10.59  
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.10 = 671.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
=====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 10.59

RAINFALL INTENSITY(INCH/HR) = 1.18

AREA-AVERAGED Fm(INCH/HR) = 0.06

AREA-AVERAGED Fp(INCH/HR) = 0.60

AREA-AVERAGED Ap = 0.10

EFFECTIVE STREAM AREA(ACRES) = 1.10

TOTAL STREAM AREA(ACRES) = 1.10

PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.13

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	25.51	12.26	1.085	0.60( 0.19)	0.31	31.6	300.00
2	1.13	10.59	1.180	0.60( 0.06)	0.10	1.1	400.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	25.49	10.59	1.180	0.60( 0.18)	0.31	28.4	400.00
2	26.54	12.26	1.085	0.60( 0.18)	0.31	32.7	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 26.54 Tc(MIN.) = 12.26

EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31

TOTAL AREA(ACRES) = 32.7

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 426.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 305.50 DOWNSTREAM(FEET) = 301.00

FLOW LENGTH(FEET) = 261.40 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.19

ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 26.54

PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 12.69



LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.10 = 2921.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.69  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.061  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.15  
 EFFECTIVE AREA(ACRES) = 32.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 32.9 PEAK FLOW RATE(CFS) = 26.54  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.20 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 289.00  
 FLOW LENGTH(FEET) = 448.56 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.28  
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 26.54  
 PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 13.29  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.20 = 3369.96 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.20 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.29  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.027  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.400	-
USER-DEFINED	-	0.30	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 0.35  
 EFFECTIVE AREA(ACRES) = 33.40 AREA-AVERAGED Fm(INCH/HR) = 0.19  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 33.4 PEAK FLOW RATE(CFS) = 26.54  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.30 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 289.00 DOWNSTREAM(FEET) = 282.00  
 FLOW LENGTH(FEET) = 260.45 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.30  
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 26.54  
 PIPE TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 13.65  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.30 = 3630.41 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.30 TO NODE 426.30 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.65  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.007  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.400	-
USER-DEFINED	-	0.80	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 0.76  
 EFFECTIVE AREA(ACRES) = 34.50 AREA-AVERAGED Fm(INCH/HR) = 0.19  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 34.5 PEAK FLOW RATE(CFS) = 26.54  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.30 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 271.00  
 FLOW LENGTH(FEET) = 411.44 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.28  
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 26.54  
 PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 14.21  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 14.21  
 RAINFALL INTENSITY(INCH/HR) = 0.97  
 AREA-AVERAGED Fm(INCH/HR) = 0.19

AREA-AVERAGED Fp (INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.31  
EFFECTIVE STREAM AREA (ACRES) = 34.50  
TOTAL STREAM AREA (ACRES) = 34.50  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 26.54

\*\*\*\*\*  
FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----

INITIAL SUBAREA FLOW-LENGTH (FEET) = 233.60  
ELEVATION DATA: UPSTREAM (FEET) = 306.50 DOWNSTREAM (FEET) = 301.80

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.882  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.712

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.60	0.100	56	5.88
COMMERCIAL	-	0.20	0.60	0.100	56	5.88

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF (CFS) = 0.59

TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 0.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 426.00 TO NODE 427.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 301.80 DOWNSTREAM ELEVATION (FEET) = 294.00  
STREET LENGTH (FEET) = 478.70 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 51.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 0.99

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.25

HALFSTREET FLOOD WIDTH (FEET) = 5.25

AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.29

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.58

STREET FLOW TRAVEL TIME (MIN.) = 3.48 Tc (MIN.) = 9.36

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.290

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN

USER-DEFINED - 0.20 0.60 0.100 -  
USER-DEFINED - 0.50 0.60 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 0.78  
EFFECTIVE AREA (ACRES) = 1.10 AREA-AVERAGED Fm (INCH/HR) = 0.06  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 1.22

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.27 HALFSTREET FLOOD WIDTH (FEET) = 6.15

FLOW VELOCITY (FEET/SEC.) = 2.36 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.63

LONGEST FLOWPATH FROM NODE 425.00 TO NODE 427.00 = 712.30 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 427.00 TO NODE 428.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 294.00 DOWNSTREAM ELEVATION (FEET) = 286.00  
STREET LENGTH (FEET) = 300.80 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 55.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.46

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.26

HALFSTREET FLOOD WIDTH (FEET) = 5.91

AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.97

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.79

STREET FLOW TRAVEL TIME (MIN.) = 1.69 Tc (MIN.) = 11.05

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.154

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA (ACRES) = 0.50 SUBAREA RUNOFF (CFS) = 0.49

EFFECTIVE AREA (ACRES) = 1.60 AREA-AVERAGED Fm (INCH/HR) = 0.06

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10

TOTAL AREA (ACRES) = 1.6 PEAK FLOW RATE (CFS) = 1.57

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.27 HALFSTREET FLOOD WIDTH (FEET) = 6.24

FLOW VELOCITY (FEET/SEC.) = 2.99 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.81

LONGEST FLOWPATH FROM NODE 425.00 TO NODE 428.00 = 1013.10 FEET.

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*****
FLOW PROCESS FROM NODE 428.00 TO NODE 429.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STANDARD CURB SECTION USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 286.00 DOWNSTREAM ELEVATION(FEET) = 276.00
STREET LENGTH(FEET) = 242.40 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.76
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.26
HALFSTREET FLOOD WIDTH(FEET) = 5.70
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.73
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.97
STREET FLOW TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 12.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.092
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.40 0.60 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.37
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 1.86

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 6.02
FLOW VELOCITY(FEET/SEC.) = 3.69 DEPTH*VELOCITY(FT*FT/SEC.) = 0.98
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 429.00 = 1255.50 FEET.

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*****
FLOW PROCESS FROM NODE 429.00 TO NODE 429.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 12.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.092
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.60 0.400 -
USER-DEFINED - 1.50 0.60 0.400 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 1.53

```

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EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 3.39

```

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*****
FLOW PROCESS FROM NODE 429.00 TO NODE 248.00 IS CODE = 31
-----

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 273.00
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.58
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.39
PIPE TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 12.35
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 248.00 = 1355.50 FEET.

```

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*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1
-----

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====

```

```

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 12.35
RAINFALL INTENSITY(INCH/HR) = 1.08
AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.25
EFFECTIVE STREAM AREA(ACRES) = 4.00
TOTAL STREAM AREA(ACRES) = 4.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.39

```

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	25.49	12.55	1.069	0.60( 0.19)	0.31	30.2	400.00
1	26.54	14.21	0.975	0.60( 0.19)	0.31	34.5	300.00
2	3.39	12.35	1.080	0.60( 0.15)	0.25	4.0	425.00

```

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

```

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	28.79	12.35	1.080	0.60( 0.18)	0.30	33.7	425.00
2	28.84	12.55	1.069	0.60( 0.18)	0.30	34.2	400.00
3	29.55	14.21	0.975	0.60( 0.18)	0.31	38.5	300.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 29.55 Tc(MIN.) = 14.21
EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31

```

TOTAL AREA (ACRES) = 38.5  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 11

-----  
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\*\*\*\*  
\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	28.79	12.35	1.080	0.60 ( 0.18)	0.30	33.7	425.00
2	28.84	12.55	1.069	0.60 ( 0.18)	0.30	34.2	400.00
3	29.55	14.21	0.975	0.60 ( 0.18)	0.31	38.5	300.00

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	175.64	22.10	0.721	0.60 ( 0.23)	0.38	397.0	210.00
2	166.96	25.06	0.660	0.60 ( 0.23)	0.38	428.1	200.00
3	164.10	26.63	0.637	0.60 ( 0.23)	0.38	443.2	230.00
4	158.68	27.84	0.619	0.60 ( 0.22)	0.38	447.4	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	198.55	12.35	1.080	0.60 ( 0.22)	0.37	255.6	425.00
2	199.04	12.55	1.069	0.60 ( 0.22)	0.37	259.6	400.00
3	200.69	14.21	0.975	0.60 ( 0.22)	0.37	293.6	300.00
4	195.72	22.10	0.721	0.60 ( 0.23)	0.38	435.5	210.00
5	184.76	25.06	0.660	0.60 ( 0.22)	0.37	466.6	200.00
6	181.03	26.63	0.637	0.60 ( 0.22)	0.37	481.7	230.00
7	174.95	27.84	0.619	0.60 ( 0.22)	0.37	485.9	220.50

TOTAL AREA (ACRES) = 485.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 200.69 Tc (MIN.) = 14.206  
EFFECTIVE AREA (ACRES) = 293.65 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
TOTAL AREA (ACRES) = 485.9  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 12

-----  
>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 249.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 271.00 DOWNSTREAM (FEET) = 261.00

FLOW LENGTH (FEET) = 345.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.5 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 20.78  
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 200.69  
PIPE TRAVEL TIME (MIN.) = 0.28 Tc (MIN.) = 14.48  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 10

-----  
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 429.00 TO NODE 430.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
ELEVATION DATA: UPSTREAM (FEET) = 271.00 DOWNSTREAM (FEET) = 262.70

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.459  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.642  
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.60	0.100	56	6.46
COMMERCIAL	-	0.40	0.60	0.100	56	6.46

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF (CFS) = 0.85  
TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 0.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

-----  
UPSTREAM ELEVATION (FEET) = 262.70 DOWNSTREAM ELEVATION (FEET) = 258.98  
STREET LENGTH (FEET) = 345.60 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 51.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.19

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.28

HALFSTREET FLOOD WIDTH (FEET) = 6.94  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.96  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.55  
 STREET FLOW TRAVEL TIME (MIN.) = 2.94 Tc (MIN.) = 9.40  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.286  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.50	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 0.66  
 EFFECTIVE AREA (ACRES) = 1.20 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 1.2 PEAK FLOW RATE (CFS) = 1.32

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.29 HALFSTREET FLOOD WIDTH (FEET) = 7.44  
 FLOW VELOCITY (FEET/SEC.) = 1.99 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.58  
 LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.00 = 675.60 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.00 TO NODE 431.10 IS CODE = 31  
 -----

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 258.98 DOWNSTREAM (FEET) = 258.00  
 FLOW LENGTH (FEET) = 91.03 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.4 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.02  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 1.32  
 PIPE TRAVEL TIME (MIN.) = 0.38 Tc (MIN.) = 9.77  
 LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.10 = 766.63 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
 -----

>>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 9.77  
 RAINFALL INTENSITY (INCH/HR) = 1.24  
 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.10  
 EFFECTIVE STREAM AREA (ACRES) = 1.20  
 TOTAL STREAM AREA (ACRES) = 1.20  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 1.32

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 410.00 TO NODE 440.00 IS CODE = 21  
 -----

>>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 299.70  
 ELEVATION DATA: UPSTREAM (FEET) = 312.69 DOWNSTREAM (FEET) = 310.80

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.196  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.432  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.40	0.60	0.100	56	8.20

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 0.49  
 TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 0.49

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 61  
 -----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>> (STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 310.80 DOWNSTREAM ELEVATION (FEET) = 306.50  
 STREET LENGTH (FEET) = 299.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 55.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 0.70  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.23  
 HALFSTREET FLOOD WIDTH (FEET) = 3.83  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.17  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.50  
 STREET FLOW TRAVEL TIME (MIN.) = 2.29 Tc (MIN.) = 10.49  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.185

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.41  
 EFFECTIVE AREA (ACRES) = 0.80 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 0.8 PEAK FLOW RATE (CFS) = 0.81

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.24 HALFSTREET FLOOD WIDTH (FEET) = 4.58

FLOW VELOCITY(FEET/SEC.) = 2.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.52  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 441.00 = 598.70 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 306.50 DOWNSTREAM ELEVATION(FEET) = 299.00  
STREET LENGTH(FEET) = 341.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.08  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.25  
HALFSTREET FLOOD WIDTH(FEET) = 4.95  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.68  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.66  
STREET FLOW TRAVEL TIME(MIN.) = 2.13 Tc(MIN.) = 12.61

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.065

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.54  
EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.06  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 1.27

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 5.65  
FLOW VELOCITY(FEET/SEC.) = 2.71 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.71  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 442.00 = 940.30 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 299.00 DOWNSTREAM ELEVATION(FEET) = 288.50  
STREET LENGTH(FEET) = 390.10 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.50  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.27  
HALFSTREET FLOOD WIDTH(FEET) = 5.95  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.03  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.81  
STREET FLOW TRAVEL TIME(MIN.) = 2.14 Tc(MIN.) = 14.76  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.944

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.48  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.06  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 1.59

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 6.25  
FLOW VELOCITY(FEET/SEC.) = 3.02 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.82  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 443.00 = 1330.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 443.00 TO NODE 444.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 288.50 DOWNSTREAM ELEVATION(FEET) = 281.00  
STREET LENGTH(FEET) = 272.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.74  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.28  
HALFSTREET FLOOD WIDTH(FEET) = 6.54  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.11  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.86

STREET FLOW TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 16.22  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.890  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.60 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.30  
 EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 1.79

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.28 HALFSTREET FLOOD WIDTH(FEET) = 6.74  
 FLOW VELOCITY(FEET/SEC.) = 3.08 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.86  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 444.00 = 1603.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 444.00 TO NODE 445.00 IS CODE = 61  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 281.00 DOWNSTREAM ELEVATION(FEET) = 268.10  
 STREET LENGTH(FEET) = 462.90 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.03  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.29  
 HALFSTREET FLOOD WIDTH(FEET) = 7.24  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.16  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.91  
 STREET FLOW TRAVEL TIME(MIN.) = 2.44 Tc(MIN.) = 18.66  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.809

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.70 0.60 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.47  
 EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 2.09

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 7.34

FLOW VELOCITY(FEET/SEC.) = 3.20 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.92  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 445.00 = 2065.90 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 445.00 TO NODE 446.00 IS CODE = 61  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 268.10 DOWNSTREAM ELEVATION(FEET) = 257.00  
 STREET LENGTH(FEET) = 532.90 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.39  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.31  
 HALFSTREET FLOOD WIDTH(FEET) = 8.60  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.90  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.90  
 STREET FLOW TRAVEL TIME(MIN.) = 3.06 Tc(MIN.) = 21.72  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.729

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.60 0.100 -  
 USER-DEFINED - 0.60 0.60 0.100 -  
 USER-DEFINED - 0.30 0.60 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 0.60  
 EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 2.47

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 8.71  
 FLOW VELOCITY(FEET/SEC.) = 2.94 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.92  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 446.00 = 2598.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 446.00 TO NODE 431.10 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 257.00 DOWNSTREAM(FEET) = 256.50  
 FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.4 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 3.64  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 2.47  
 PIPE TRAVEL TIME (MIN.) = 0.46 Tc (MIN.) = 22.17  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
 -----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 22.17  
 RAINFALL INTENSITY (INCH/HR) = 0.72  
 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.10  
 EFFECTIVE STREAM AREA (ACRES) = 4.10  
 TOTAL STREAM AREA (ACRES) = 4.10  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 2.47

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1.32	9.77	1.241	0.60 (0.06)	0.10	1.2	429.00
2	2.47	22.17	0.720	0.60 (0.06)	0.10	4.1	410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3.27	9.77	1.241	0.60 (0.06)	0.10	3.0	429.00
2	3.21	22.17	0.720	0.60 (0.06)	0.10	5.3	410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 3.27 Tc (MIN.) = 9.77  
 EFFECTIVE AREA (ACRES) = 3.01 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 5.3  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 249.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 -----

ELEVATION DATA: UPSTREAM (FEET) = 258.00 DOWNSTREAM (FEET) = 257.00  
 FLOW LENGTH (FEET) = 230.42 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.0 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 3.71  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 3.27

PIPE TRAVEL TIME (MIN.) = 1.03 Tc (MIN.) = 10.81  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<  
 =====

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3.27	10.81	1.167	0.60 (0.06)	0.10	3.0	429.00
2	3.21	23.21	0.698	0.60 (0.06)	0.10	5.3	410.00

LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	198.55	12.63	1.064	0.60 (0.22)	0.37	255.6	425.00
2	199.04	12.83	1.053	0.60 (0.22)	0.37	259.6	400.00
3	200.69	14.48	0.959	0.60 (0.22)	0.37	293.6	300.00
4	195.72	22.38	0.715	0.60 (0.23)	0.38	435.5	210.00
5	184.76	25.35	0.656	0.60 (0.22)	0.37	466.6	200.00
6	181.03	26.92	0.633	0.60 (0.22)	0.37	481.7	230.00
7	174.95	28.12	0.615	0.60 (0.22)	0.37	485.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	194.02	10.81	1.167	0.60 (0.22)	0.37	221.7	429.00
2	201.81	12.63	1.064	0.60 (0.22)	0.37	258.9	425.00
3	202.30	12.83	1.053	0.60 (0.22)	0.37	263.0	400.00
4	203.94	14.48	0.959	0.60 (0.22)	0.37	297.3	300.00
5	198.94	22.38	0.715	0.60 (0.22)	0.37	440.6	210.00
6	195.86	23.21	0.698	0.60 (0.22)	0.37	449.5	410.00
7	187.76	25.35	0.656	0.60 (0.22)	0.37	471.9	200.00
8	183.91	26.92	0.633	0.60 (0.22)	0.37	487.0	230.00
9	177.74	28.12	0.615	0.60 (0.22)	0.37	491.2	220.50

TOTAL AREA (ACRES) = 491.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 203.94 Tc (MIN.) = 14.483  
 EFFECTIVE AREA (ACRES) = 297.33 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA (ACRES) = 491.2  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 491.2 TC (MIN.) = 14.48  
 EFFECTIVE AREA (ACRES) = 297.33 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.369  
 PEAK FLOW RATE (CFS) = 203.94

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	194.02	10.81	1.167	0.60	( 0.22)	0.37	221.7	429.00
2	201.81	12.63	1.064	0.60	( 0.22)	0.37	258.9	425.00
3	202.30	12.83	1.053	0.60	( 0.22)	0.37	263.0	400.00
4	203.94	14.48	0.959	0.60	( 0.22)	0.37	297.3	300.00
5	198.94	22.38	0.715	0.60	( 0.22)	0.37	440.6	210.00
6	195.86	23.21	0.698	0.60	( 0.22)	0.37	449.5	410.00
7	187.76	25.35	0.656	0.60	( 0.22)	0.37	471.9	200.00
8	183.91	26.92	0.633	0.60	( 0.22)	0.37	487.0	230.00
9	177.74	28.12	0.615	0.60	( 0.22)	0.37	491.2	220.50

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=====  
END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

FILE NAME: 0506101G.DAT
TIME/DATE OF STUDY: 12:42 04/15/2013

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 1.580
2) 6.00; 1.430
3) 7.00; 1.310
4) 8.00; 1.210
5) 9.00; 1.130
6) 10.00; 1.060
7) 11.00; 1.010
8) 12.00; 0.960
9) 13.00; 0.920
10) 14.00; 0.880
11) 15.00; 0.840
12) 20.00; 0.720
13) 25.00; 0.630
14) 30.00; 0.570
15) 40.00; 0.480
16) 50.00; 0.420
17) 60.00; 0.380
18) 90.00; 0.300
19) 120.00; 0.260
20) 180.00; 0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

Table with 10 columns: NO., HALF-WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-SIDE, PARK-/SIDE/WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), GUTTER LIP (FT), GUTTER HIKE (FT), MANNING FACTOR (n). Rows 1-4.

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10100.00 TO NODE 10101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00
ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 820.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.606
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.088
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"GRASS" - 0.10 0.60 1.000 98 9.61
NATURAL FAIR COVER
"OPEN BRUSH" - 0.30 0.60 1.000 98 9.61
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.18
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 0.18

\*\*\*\*\*

FLOW PROCESS FROM NODE 10101.00 TO NODE 10102.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 790.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 152.00 CHANNEL SLOPE = 0.1974
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.18
FLOW VELOCITY(FEET/SEC.) = 2.68 FLOW DEPTH(FEET) = 0.15
TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 10.55
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10102.00 = 479.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10102.00 TO NODE 10102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.55
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.032
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.50      0.60      1.000      -
USER-DEFINED  -        0.30      0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.80  SUBAREA RUNOFF (CFS) = 0.31
EFFECTIVE AREA (ACRES) = 1.20  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.2  PEAK FLOW RATE (CFS) = 0.47

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FLOW PROCESS FROM NODE 10102.00 TO NODE 10103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 790.00  DOWNSTREAM(FEET) = 762.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00  CHANNEL SLOPE = 0.1400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.47
FLOW VELOCITY(FEET/SEC.) = 3.10  FLOW DEPTH(FEET) = 0.22
TRAVEL TIME(MIN.) = 1.08  Tc(MIN.) = 11.63
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10103.00 = 679.00 FEET.

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FLOW PROCESS FROM NODE 10103.00 TO NODE 10103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.63
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.979
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.40  0.60  1.000  -
USER-DEFINED      -        0.80  0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.20  SUBAREA RUNOFF (CFS) = 0.41
EFFECTIVE AREA (ACRES) = 2.40  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 2.4  PEAK FLOW RATE (CFS) = 0.82

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 762.00  DOWNSTREAM(FEET) = 754.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 124.00  CHANNEL SLOPE = 0.0645
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.82
FLOW VELOCITY(FEET/SEC.) = 2.70  FLOW DEPTH(FEET) = 0.32
TRAVEL TIME(MIN.) = 0.76  Tc(MIN.) = 12.39
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10104.00 = 803.00 FEET.

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.39
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.944
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.70  0.60  1.000  -
USER-DEFINED      -        1.10  0.60  1.000  -
USER-DEFINED      -        0.10  0.60  1.000  -
USER-DEFINED      -        0.40  0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 0.71
EFFECTIVE AREA (ACRES) = 4.70  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.7  PEAK FLOW RATE (CFS) = 1.46

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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ELEVATION DATA: UPSTREAM(FEET) = 754.00  DOWNSTREAM(FEET) = 740.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00  CHANNEL SLOPE = 0.0255
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.46
FLOW VELOCITY(FEET/SEC.) = 2.20  FLOW DEPTH(FEET) = 0.47
TRAVEL TIME(MIN.) = 4.17  Tc(MIN.) = 16.56
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10105.00 = 1353.00 FEET.

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 16.56
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.803
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        3.40  0.60  1.000  -
USER-DEFINED      -        0.60  0.60  1.000  -
USER-DEFINED      -        6.00  0.60  1.000  -
USER-DEFINED      -        0.60  0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 10.60  SUBAREA RUNOFF (CFS) = 1.93
EFFECTIVE AREA (ACRES) = 15.30  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 15.3  PEAK FLOW RATE (CFS) = 2.79

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10106.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 740.00 DOWNSTREAM(FEET) = 623.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 929.00 CHANNEL SLOPE = 0.1259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.79
FLOW VELOCITY(FEET/SEC.) = 4.69 FLOW DEPTH(FEET) = 0.45
TRAVEL TIME(MIN.) = 3.30 Tc(MIN.) = 19.86
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10106.00 = 2282.00 FEET.

*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10106.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.86
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.723
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 10.40 0.60 1.000 -
USER-DEFINED - 0.40 0.60 1.000 -
USER-DEFINED - 4.50 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 1.72
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 3.42

*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 592.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 417.00 CHANNEL SLOPE = 0.0743
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.42
FLOW VELOCITY(FEET/SEC.) = 4.04 FLOW DEPTH(FEET) = 0.53
TRAVEL TIME(MIN.) = 1.72 Tc(MIN.) = 21.58
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10107.00 = 2699.00 FEET.

*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10107.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 21.58

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* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.691
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.60 1.000 -
USER-DEFINED - 0.60 0.60 1.000 -
USER-DEFINED - 5.10 0.60 1.000 -
USER-DEFINED - 1.10 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
USER-DEFINED - 2.30 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 0.78
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 3.42
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 592.00 DOWNSTREAM(FEET) = 590.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0333
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.42
FLOW VELOCITY(FEET/SEC.) = 3.01 FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 21.92
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10108.00 = 2759.00 FEET.

*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 21.92
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.686
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.60 1.000 -
USER-DEFINED - 1.10 0.60 1.000 -
USER-DEFINED - 7.00 0.60 1.000 -
USER-DEFINED - 0.40 0.60 1.000 -
USER-DEFINED - 7.50 0.60 1.000 -
USER-DEFINED - 1.80 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 1.40
EFFECTIVE AREA(ACRES) = 58.40 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.4 PEAK FLOW RATE(CFS) = 4.50

*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81

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=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 21.92  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.686  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.02  
EFFECTIVE AREA(ACRES) = 58.60 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 58.6 PEAK FLOW RATE(CFS) = 4.52

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10108.00 TO NODE 10109.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 526.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 973.00 CHANNEL SLOPE = 0.0658  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
FLOW VELOCITY(FEET/SEC.) = 4.11 FLOW DEPTH(FEET) = 0.61  
TRAVEL TIME(MIN.) = 3.95 Tc(MIN.) = 25.86  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10109.00 = 3732.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10109.00 TO NODE 10109.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 25.86  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.620  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 16.40 0.60 1.000 -  
USER-DEFINED - 0.60 0.60 1.000 -  
USER-DEFINED - 3.00 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 0.36  
EFFECTIVE AREA(ACRES) = 78.60 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 78.6 PEAK FLOW RATE(CFS) = 4.52  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10109.00 TO NODE 10110.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 526.00 DOWNSTREAM(FEET) = 455.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1045.00 CHANNEL SLOPE = 0.0679  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
FLOW VELOCITY(FEET/SEC.) = 4.19 FLOW DEPTH(FEET) = 0.60  
TRAVEL TIME(MIN.) = 4.16 Tc(MIN.) = 30.03  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10110.00 = 4777.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10110.00 TO NODE 10110.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 30.03  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.570  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.00 0.60 1.000 -  
USER-DEFINED - 0.50 0.60 1.000 -  
USER-DEFINED - 31.60 0.60 1.000 -  
USER-DEFINED - 1.60 0.60 1.000 -  
USER-DEFINED - 0.40 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 35.10 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 113.70 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 113.7 PEAK FLOW RATE(CFS) = 4.52  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10110.00 TO NODE 10111.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 675.00 CHANNEL SLOPE = 0.0667  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
FLOW VELOCITY(FEET/SEC.) = 4.19 FLOW DEPTH(FEET) = 0.60  
TRAVEL TIME(MIN.) = 2.69 Tc(MIN.) = 32.71  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10111.00 = 5452.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10111.00 TO NODE 10111.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 32.71  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.546

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.40	0.60	1.000	-
USER-DEFINED	-	6.00	0.60	1.000	-
USER-DEFINED	-	24.80	0.60	1.000	-
USER-DEFINED	-	0.90	0.60	1.000	-
USER-DEFINED	-	4.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 43.20 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 156.90 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 156.9 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10111.00 TO NODE 10112.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 405.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 143.00 CHANNEL SLOPE = 0.0350  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
 FLOW VELOCITY(FEET/SEC.) = 3.24 FLOW DEPTH(FEET) = 0.68  
 TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 33.45  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10112.00 = 5595.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10112.00 TO NODE 10112.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 33.45  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.539  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	7.90	0.60	1.000	-
USER-DEFINED	-	25.90	0.60	1.000	-
USER-DEFINED	-	19.30	0.60	1.000	-
USER-DEFINED	-	2.10	0.60	1.000	-
USER-DEFINED	-	0.90	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 56.20 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 213.10 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 213.1 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10112.00 TO NODE 10113.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 363.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1642.00 CHANNEL SLOPE = 0.0256  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
 FLOW VELOCITY(FEET/SEC.) = 2.90 FLOW DEPTH(FEET) = 0.72  
 TRAVEL TIME(MIN.) = 9.42 Tc(MIN.) = 42.87  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10113.00 = 7237.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10113.00 TO NODE 10113.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 42.87  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.463  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.60	1.000	-
USER-DEFINED	-	33.10	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 35.40 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 248.50 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 248.5 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10113.00 TO NODE 10114.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 363.00 DOWNSTREAM(FEET) = 340.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 918.00 CHANNEL SLOPE = 0.0251  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
 FLOW VELOCITY(FEET/SEC.) = 2.89 FLOW DEPTH(FEET) = 0.72

TRAVEL TIME(MIN.) = 5.30 Tc(MIN.) = 48.17  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10114.00 = 8155.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 48.17  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.431  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.30 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 10.10 0.60 1.000 -  
USER-DEFINED - 17.70 0.60 1.000 -  
USER-DEFINED - 52.90 0.60 1.000 -  
USER-DEFINED - 1.00 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 83.10 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 331.60 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 331.6 PEAK FLOW RATE(CFS) = 4.52  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 48.17  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.431  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 333.10 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 333.1 PEAK FLOW RATE(CFS) = 4.52  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10115.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 301.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1467.00 CHANNEL SLOPE = 0.0266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
FLOW VELOCITY(FEET/SEC.) = 2.95 FLOW DEPTH(FEET) = 0.71  
TRAVEL TIME(MIN.) = 8.28 Tc(MIN.) = 56.45  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10115.00 = 9622.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10115.00 TO NODE 10115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 56.45  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.394  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.60 0.60 1.000 -  
USER-DEFINED - 24.30 0.60 1.000 -  
USER-DEFINED - 47.70 0.60 1.000 -  
USER-DEFINED - 9.80 0.60 1.000 -  
USER-DEFINED - 1.60 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 94.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 427.10 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 427.1 PEAK FLOW RATE(CFS) = 4.52  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10115.00 TO NODE 10116.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 272.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1696.00 CHANNEL SLOPE = 0.0171  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
FLOW VELOCITY(FEET/SEC.) = 2.51 FLOW DEPTH(FEET) = 0.78  
TRAVEL TIME(MIN.) = 11.28 Tc(MIN.) = 67.73  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10116.00 = 11318.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 67.73  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.359  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.60 1.000 -  
 USER-DEFINED - 4.90 0.60 1.000 -  
 USER-DEFINED - 4.10 0.60 1.000 -  
 USER-DEFINED - 0.40 0.60 1.000 -  
 USER-DEFINED - 32.00 0.60 1.000 -  
 USER-DEFINED - 3.80 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 45.60 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 472.70 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 472.7 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81  
 -----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 67.73  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.359  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.00 0.60 1.000 -  
 USER-DEFINED - 7.70 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 9.70 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 482.40 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 482.4 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10116.00 TO NODE 10117.00 IS CODE = 51  
 -----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 272.00 DOWNSTREAM(FEET) = 252.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 878.00 CHANNEL SLOPE = 0.0228  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.52

FLOW VELOCITY(FEET/SEC.) = 2.79 FLOW DEPTH(FEET) = 0.74  
 TRAVEL TIME(MIN.) = 5.25 Tc(MIN.) = 72.99  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10117.00 = 12196.00 FEET.

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FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81  
 -----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 72.99  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.345  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.60 0.850 -  
 USER-DEFINED - 0.60 0.60 1.000 -  
 USER-DEFINED - 0.90 0.60 1.000 -  
 USER-DEFINED - 0.90 0.60 1.000 -  
 USER-DEFINED - 8.20 0.60 1.000 -  
 USER-DEFINED - 1.10 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 0.03  
 EFFECTIVE AREA(ACRES) = 494.70 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 494.7 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81  
 -----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 72.99  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.345  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.60 0.850 -  
 USER-DEFINED - 14.60 0.60 1.000 -  
 USER-DEFINED - 6.10 0.60 1.000 -  
 USER-DEFINED - 0.20 0.60 1.000 -  
 USER-DEFINED - 3.50 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 25.00 SUBAREA RUNOFF(CFS) = 0.03  
 EFFECTIVE AREA(ACRES) = 519.70 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 519.7 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE



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FLOW PROCESS FROM NODE 10117.00 TO NODE 10118.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 252.00 DOWNSTREAM(FEET) = 249.00
FLOW LENGTH(FEET) = 280.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.64
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.52
PIPE TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 73.81
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10118.00 = 12476.00 FEET.

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FLOW PROCESS FROM NODE 10118.00 TO NODE 10119.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 249.00 DOWNSTREAM(FEET) = 240.00
FLOW LENGTH(FEET) = 892.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.52
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.52
PIPE TRAVEL TIME(MIN.) = 2.69 Tc(MIN.) = 76.51
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10119.00 = 13368.00 FEET.

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FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 76.51
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.336
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.60 0.100 -
USER-DEFINED - 1.00 0.60 0.600 -
USER-DEFINED - 0.80 0.60 0.850 -
USER-DEFINED - 0.90 0.60 1.000 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.706
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 0.32
EFFECTIVE AREA(ACRES) = 523.30 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 523.3 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 76.51
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.336
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.80 0.60 1.000 -
USER-DEFINED - 1.20 0.60 0.100 -
USER-DEFINED - 9.60 0.60 0.600 -
USER-DEFINED - 1.00 0.60 0.850 -
USER-DEFINED - 0.80 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.627
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 1.53
EFFECTIVE AREA(ACRES) = 536.90 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 536.9 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 76.51
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.336
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 537.00 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 537.0 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10119.00 TO NODE 10120.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 240.00 DOWNSTREAM(FEET) = 239.00
FLOW LENGTH(FEET) = 120.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.14
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.52
PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 76.89
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10120.00 = 13488.00 FEET.

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FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 76.89
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.335
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.20 0.60 0.100 -
USER-DEFINED - 0.20 0.60 0.850 -
USER-DEFINED - 0.90 0.60 0.100 -
USER-DEFINED - 0.30 0.60 1.000 -
USER-DEFINED - 2.80 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.657
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 0.58
EFFECTIVE AREA(ACRES) = 542.60 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 542.6 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 76.89
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.335
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.50 0.60 0.100 -
USER-DEFINED - 0.20 0.60 0.600 -
USER-DEFINED - 0.10 0.60 0.850 -
USER-DEFINED - 2.90 0.60 1.000 -
USER-DEFINED - 0.40 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.717
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 0.44
EFFECTIVE AREA(ACRES) = 547.70 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 547.7 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 76.89
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.335
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 1.00 0.60 1.000 -
USER-DEFINED - 2.70 0.60 1.000 -
USER-DEFINED - 11.20 0.60 1.000 -
USER-DEFINED - 0.70 0.60 1.000 -
USER-DEFINED - 0.10 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 563.50 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 563.5 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 10120.00 TO NODE 10121.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 239.00 DOWNSTREAM(FEET) = 213.00
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.05
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.52
PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 77.12
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10121.00 = 13682.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10121.00 TO NODE 10122.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 213.00 DOWNSTREAM(FEET) = 176.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 995.00 CHANNEL SLOPE = 0.0372
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52
FLOW VELOCITY(FEET/SEC.) = 3.31 FLOW DEPTH(FEET) = 0.67
TRAVEL TIME(MIN.) = 5.01 Tc(MIN.) = 82.13
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10122.00 = 14677.00 FEET.

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FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 82.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.321
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        0.10      0.60      1.000      -
USER-DEFINED          -        1.40      0.60      1.000      -
USER-DEFINED          -        0.20      0.60      1.000      -
USER-DEFINED          -        0.40      0.60      1.000      -
USER-DEFINED          -        4.80      0.60      1.000      -
USER-DEFINED          -        0.40      0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 570.80 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 570.8 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----

```

```

MAINLINE Tc(MIN.) = 82.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.321
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        2.80      0.60      1.000      -
USER-DEFINED          -        3.30      0.60      1.000      -
USER-DEFINED          -        1.40      0.60      1.000      -
USER-DEFINED          -        3.00      0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 581.30 AREA-AVERAGED Fm(INCH/HR) = 0.59

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AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 581.3 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 82.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.321
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        0.30      0.60      1.000      -
USER-DEFINED          -        3.30      0.60      1.000      -
USER-DEFINED          -        0.10      0.60      1.000      -
USER-DEFINED          -        0.60      0.60      1.000      -
USER-DEFINED          -        3.50      0.60      1.000      -
USER-DEFINED          -        0.10      0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 589.20 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 589.2 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 82.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.321
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        1.80      0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 591.00 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 591.0 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF STUDY SUMMARY:

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TOTAL AREA (ACRES) = 591.0 TC (MIN.) = 82.13  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED Fm (INCH/HR) = 0.59  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.984  
PEAK FLOW RATE (CFS) = 4.52

=====  
=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2007 Advanced Engineering Software (aes)  
Ver. 13.4 Release Date: 01/25/2007 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506102G.DAT  
TIME/DATE OF STUDY: 14:02 01/08/2009  
=====

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:  
=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.596
- 2) 10.00; 1.064
- 3) 15.00; 0.843
- 4) 20.00; 0.715
- 5) 25.00; 0.629
- 6) 30.00; 0.560
- 7) 40.00; 0.480
- 8) 50.00; 0.423
- 9) 60.00; 0.371
- 10) 90.00; 0.302
- 11) 120.00; 0.256
- 12) 180.00; 0.208
- 13) 360.00; 0.142
- 14) 1440.00; 0.060

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10200.00 TO NODE 10201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 293.00  
ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 617.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.991

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.065

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						

"3-4 DWELLINGS/ACRE" - 0.73 0.60 0.600 0 9.99

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600

SUBAREA RUNOFF(CFS) = 0.46

TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 0.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10201.00 TO NODE 10202.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 617.00 DOWNSTREAM ELEVATION(FEET) = 613.00  
STREET LENGTH(FEET) = 323.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.70

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.23

HALFSTREET FLOOD WIDTH(FEET) = 3.83

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.08

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.49

STREET FLOW TRAVEL TIME(MIN.) = 2.59 Tc(MIN.) = 12.58

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.950

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED					

- 0.88 0.60 0.600 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 0.47  
EFFECTIVE AREA(ACRES) = 1.62 AREA-AVERAGED Fm(INCH/HR) = 0.36  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 0.86

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.25 HALFSTREET FLOOD WIDTH(FEET) = 4.71  
FLOW VELOCITY(FEET/SEC.) = 2.09 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.53  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10202.00 = 616.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10202.00 TO NODE 10203.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 613.00 DOWNSTREAM ELEVATION(FEET) = 594.00  
STREET LENGTH(FEET) = 613.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.23  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.24  
HALFSTREET FLOOD WIDTH(FEET) = 4.32  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.28  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.80  
STREET FLOW TRAVEL TIME(MIN.) = 3.12 Tc(MIN.) = 15.70  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.825

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.82 0.60 0.614 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.614  
SUBAREA AREA(ACRES) = 1.82 SUBAREA RUNOFF(CFS) = 0.75  
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.36  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 1.43

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 4.93  
FLOW VELOCITY(FEET/SEC.) = 3.30 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.85  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10203.00 = 1229.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10203.00 TO NODE 10204.00 IS CODE = 63  
-----

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 594.00 DOWNSTREAM ELEVATION(FEET) = 578.00  
STREET LENGTH(FEET) = 433.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.63  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.26  
HALFSTREET FLOOD WIDTH(FEET) = 5.09  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.64  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.95  
STREET FLOW TRAVEL TIME(MIN.) = 1.98 Tc(MIN.) = 17.68  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.774

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.21 0.60 0.655 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.655  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 0.41  
EFFECTIVE AREA(ACRES) = 4.64 AREA-AVERAGED Fm(INCH/HR) = 0.37  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 1.68

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 5.20  
FLOW VELOCITY(FEET/SEC.) = 3.66 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.96  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10204.00 = 1662.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 578.00 DOWNSTREAM(FEET) = 575.00  
FLOW LENGTH(FEET) = 147.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.40  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 1.68  
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 18.14  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10205.00 = 1809.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.14
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.763
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
    LAND USE         GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         3.61     0.60    0.917   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917
SUBAREA AREA(ACRES) = 3.61     SUBAREA RUNOFF(CFS) = 0.69
EFFECTIVE AREA(ACRES) = 8.25   AREA-AVERAGED Fm(INCH/HR) = 0.45
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.75
TOTAL AREA(ACRES) = 8.3       PEAK FLOW RATE(CFS) = 2.32

*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 563.00
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.01
ESTIMATED PIPE DIAMETER(INCH) = 18.00     NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.32
PIPE TRAVEL TIME(MIN.) = 1.57     Tc(MIN.) = 19.70
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10206.00 = 2374.00 FEET.

*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.70
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.723
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
    LAND USE         GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         4.75     0.60    0.669   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.669
SUBAREA AREA(ACRES) = 4.75     SUBAREA RUNOFF(CFS) = 1.37
EFFECTIVE AREA(ACRES) = 13.00  AREA-AVERAGED Fm(INCH/HR) = 0.43
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 13.0       PEAK FLOW RATE(CFS) = 3.40

*****
FLOW PROCESS FROM NODE 10206.00 TO NODE 10207.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 563.00 DOWNSTREAM(FEET) = 547.00
FLOW LENGTH(FEET) = 599.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.29
ESTIMATED PIPE DIAMETER(INCH) = 18.00     NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.40
PIPE TRAVEL TIME(MIN.) = 1.37     Tc(MIN.) = 21.07
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10207.00 = 2973.00 FEET.

*****
FLOW PROCESS FROM NODE 10206.10 TO NODE 10207.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 21.07
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.697
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
    LAND USE         GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         4.59     0.60    0.664   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.664
SUBAREA AREA(ACRES) = 4.59     SUBAREA RUNOFF(CFS) = 1.23
EFFECTIVE AREA(ACRES) = 17.58  AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 17.6       PEAK FLOW RATE(CFS) = 4.33

*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 516.00
FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.87
ESTIMATED PIPE DIAMETER(INCH) = 18.00     NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.33
PIPE TRAVEL TIME(MIN.) = 1.01     Tc(MIN.) = 22.08
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10208.00 = 3573.00 FEET.

*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.08
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.679
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
    LAND USE         GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         3.60     0.60    0.697   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.697
SUBAREA AREA(ACRES) = 3.60     SUBAREA RUNOFF(CFS) = 0.85

```

EFFECTIVE AREA(ACRES) = 21.18 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 21.2 PEAK FLOW RATE(CFS) = 4.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 516.00 DOWNSTREAM(FEET) = 480.00  
FLOW LENGTH(FEET) = 604.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.77  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 4.90  
PIPE TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 23.02  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10209.00 = 4177.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.02  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.663  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.21 0.60 0.645 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645  
SUBAREA AREA(ACRES) = 8.21 SUBAREA RUNOFF(CFS) = 2.04  
EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 6.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 438.00  
FLOW LENGTH(FEET) = 678.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.89  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 6.63  
PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 23.97  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10210.00 = 4855.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 23.97  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.647

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.49 0.60 0.986 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA(ACRES) = 10.49 SUBAREA RUNOFF(CFS) = 0.52  
EFFECTIVE AREA(ACRES) = 39.89 AREA-AVERAGED Fm(INCH/HR) = 0.46  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.77  
TOTAL AREA(ACRES) = 39.9 PEAK FLOW RATE(CFS) = 6.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 280.00  
FLOW LENGTH(FEET) = 2662.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.75  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 6.72  
PIPE TRAVEL TIME(MIN.) = 3.78 Tc(MIN.) = 27.75  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10211.00 = 7517.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 27.75  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.591  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.00 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 49.89 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 49.9 PEAK FLOW RATE(CFS) = 6.72  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<



ELEVATION DATA: UPSTREAM(FEET) = 280.00 DOWNSTREAM(FEET) = 176.00  
FLOW LENGTH(FEET) = 935.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.72  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 6.72  
PIPE TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 28.80  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10212.00 = 8452.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 28.80  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.576  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.37 0.60 0.926 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.926  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 18.37 SUBAREA RUNOFF(CFS) = 0.71  
EFFECTIVE AREA(ACRES) = 68.26 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 68.3 PEAK FLOW RATE(CFS) = 6.72  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10212.00 TO NODE 10242.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 176.00 DOWNSTREAM(FEET) = 169.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00 CHANNEL SLOPE = 0.0211  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.555  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.97 0.60 0.970 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.73  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.99  
AVERAGE FLOW DEPTH(FEET) = 0.87 TRAVEL TIME(MIN.) = 1.85  
Tc(MIN.) = 30.66  
SUBAREA AREA(ACRES) = 1.97 SUBAREA RUNOFF(CFS) = 0.03

EFFECTIVE AREA(ACRES) = 70.23 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 6.72  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.87 FLOW VELOCITY(FEET/SEC.) = 2.98  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10220.00 TO NODE 10221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 308.00 DOWNSTREAM(FEET) = 300.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.111  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.840  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"GRASS" - 1.03 0.60 1.000 0 15.11  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.22  
TOTAL AREA(ACRES) = 1.03 PEAK FLOW RATE(CFS) = 0.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10221.10 TO NODE 10222.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<

\*\*\*\*\*  
UPSTREAM ELEVATION(FEET) = 300.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.38  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.51  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.29  
STREET FLOW TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 16.22  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.812  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.64	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 0.31  
EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 0.51

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00  
FLOW VELOCITY(FEET/SEC.) = 6.51 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.29  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10222.00 = 764.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10221.20 TO NODE 10222.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 16.22  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.812  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.12	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.12 SUBAREA RUNOFF(CFS) = 0.59  
EFFECTIVE AREA(ACRES) = 5.78 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 1.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10222.10 TO NODE 10223.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<

\*\*\*\*\*  
UPSTREAM ELEVATION(FEET) = 261.00 DOWNSTREAM ELEVATION(FEET) = 208.00  
STREET LENGTH(FEET) = 622.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.24  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.34  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.26  
STREET FLOW TRAVEL TIME(MIN.) = 1.64 Tc(MIN.) = 17.86  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.770  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.75	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 0.27  
EFFECTIVE AREA(ACRES) = 7.54 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.5 PEAK FLOW RATE(CFS) = 1.15

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00  
FLOW VELOCITY(FEET/SEC.) = 6.34 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.26  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10223.00 = 1386.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10222.20 TO NODE 10223.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 17.86  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.770  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.91	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.91 SUBAREA RUNOFF(CFS) = 1.21  
EFFECTIVE AREA(ACRES) = 15.45 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 2.36

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.10 TO NODE 10224.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<

\*\*\*\*\*  
UPSTREAM ELEVATION(FEET) = 208.00 DOWNSTREAM ELEVATION(FEET) = 204.00  
STREET LENGTH(FEET) = 758.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020  
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.40  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.71  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.53  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.48  
STREET FLOW TRAVEL TIME(MIN.) = 8.27 Tc(MIN.) = 26.13

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.613  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.70 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 0.06  
EFFECTIVE AREA(ACRES) = 20.15 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.1 PEAK FLOW RATE(CFS) = 2.36  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 7.66  
FLOW VELOCITY(FEET/SEC.) = 1.52 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.47  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10224.00 = 2144.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.20 TO NODE 10224.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 26.13  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.613  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.21 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 0.01  
EFFECTIVE AREA(ACRES) = 21.35 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 2.36  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 204.00 DOWNSTREAM(FEET) = 201.00  
FLOW LENGTH(FEET) = 422.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.08  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 2.36  
PIPE TRAVEL TIME(MIN.) = 1.72 Tc(MIN.) = 27.85  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10225.00 = 2566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 27.85  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.590  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.81 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 4.81 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 26.17 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 26.2 PEAK FLOW RATE(CFS) = 2.36  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 201.00 DOWNSTREAM(FEET) = 197.00  
FLOW LENGTH(FEET) = 799.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.60  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 2.36  
PIPE TRAVEL TIME(MIN.) = 3.70 Tc(MIN.) = 31.55  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10238.00 = 3365.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 31.55  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.548  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 4.24 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 4.24 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 30.41 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 30.4 PEAK FLOW RATE(CFS) = 2.36  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 31.55  
 RAINFALL INTENSITY(INCH/HR) = 0.55  
 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 30.41  
 TOTAL STREAM AREA(ACRES) = 30.41  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.36

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10230.00 TO NODE 10231.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 276.00  
 ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 390.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.944  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.496

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
AGRICULTURAL POOR COVER "FALLOW"	-	0.95	0.60	1.000	0	5.94

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 0.77  
 TOTAL AREA(ACRES) = 0.95 PEAK FLOW RATE(CFS) = 0.77

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10231.10 TO NODE 10232.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 390.00 DOWNSTREAM(FEET) = 301.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 394.00 CHANNEL SLOPE = 0.2259  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.382

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.68	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.36  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.13  
 AVERAGE FLOW DEPTH(FEET) = 0.27 TRAVEL TIME(MIN.) = 1.07  
 Tc(MIN.) = 7.01  
 SUBAREA AREA(ACRES) = 1.68 SUBAREA RUNOFF(CFS) = 1.18  
 EFFECTIVE AREA(ACRES) = 2.63 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 1.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.31 FLOW VELOCITY(FEET/SEC.) = 6.51  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10232.00 = 670.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10231.20 TO NODE 10232.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 7.01  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.382  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.38	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 6.38 SUBAREA RUNOFF(CFS) = 4.49  
 EFFECTIVE AREA(ACRES) = 9.01 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 9.0 PEAK FLOW RATE(CFS) = 6.34

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10232.00 TO NODE 10233.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 4 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 301.00 DOWNSTREAM ELEVATION(FEET) = 277.00  
 STREET LENGTH(FEET) = 341.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.61

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.40  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.30  
HALFSTREET FLOOD WIDTH(FEET) = 7.05  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.38  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.61  
STREET FLOW TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 8.07  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.269

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 2.11  
EFFECTIVE AREA(ACRES) = 12.52 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 12.5 PEAK FLOW RATE(CFS) = 7.54

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.10  
FLOW VELOCITY(FEET/SEC.) = 5.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.63  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10233.00 = 1011.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10233.10 TO NODE 10234.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 277.00 DOWNSTREAM ELEVATION(FEET) = 226.00  
STREET LENGTH(FEET) = 682.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.43  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.46  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.65  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.74  
STREET FLOW TRAVEL TIME(MIN.) = 2.01 Tc(MIN.) = 10.08  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.060  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.27 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.27 SUBAREA RUNOFF(CFS) = 1.77  
EFFECTIVE AREA(ACRES) = 16.78 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 7.54  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.00  
FLOW VELOCITY(FEET/SEC.) = 5.55 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.65  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10234.00 = 1693.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10233.20 TO NODE 10234.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 10.08  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.060  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 15.60 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 6.46  
EFFECTIVE AREA(ACRES) = 32.38 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 13.42

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10234.10 TO NODE 10235.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 3 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 226.00 DOWNSTREAM ELEVATION(FEET) = 205.00  
STREET LENGTH(FEET) = 759.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.13  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.40  
HALFSTREET FLOOD WIDTH(FEET) = 12.09

AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.28  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.71  
 STREET FLOW TRAVEL TIME (MIN.) = 2.96 Tc (MIN.) = 13.04  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.930  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.74	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 4.74 SUBAREA RUNOFF (CFS) = 1.41  
 EFFECTIVE AREA (ACRES) = 37.13 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 37.1 PEAK FLOW RATE (CFS) = 13.42  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.39 HALFSTREET FLOOD WIDTH (FEET) = 11.81  
 FLOW VELOCITY (FEET/SEC.) = 4.24 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.67  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10235.00 = 2452.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10234.20 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.04  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.930  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.02	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 8.02 SUBAREA RUNOFF (CFS) = 2.38  
 EFFECTIVE AREA (ACRES) = 45.15 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 45.1 PEAK FLOW RATE (CFS) = 13.42  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10234.30 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.04  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.930  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.62	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.62 SUBAREA RUNOFF (CFS) = 0.78  
 EFFECTIVE AREA (ACRES) = 47.76 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 14.18

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10235.00 TO NODE 10236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 205.00 DOWNSTREAM (FEET) = 201.00  
 FLOW LENGTH (FEET) = 489.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.2 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 6.74  
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 14.18  
 PIPE TRAVEL TIME (MIN.) = 1.21 Tc (MIN.) = 14.25  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10236.00 = 2941.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10235.10 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.25  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.876  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.89	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.89 SUBAREA RUNOFF (CFS) = 0.72  
 EFFECTIVE AREA (ACRES) = 50.65 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 50.7 PEAK FLOW RATE (CFS) = 14.18  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10235.20 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.25  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.876  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.84	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 4.84 SUBAREA RUNOFF (CFS) = 1.20  
 EFFECTIVE AREA (ACRES) = 55.49 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 14.18  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 201.00 DOWNSTREAM(FEET) = 199.00
FLOW LENGTH(FEET) = 278.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.41
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 14.18
PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 14.97
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10237.00 = 3219.00 FEET.

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*****
FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.97
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.844
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      1.62     0.60     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.62 SUBAREA RUNOFF(CFS) = 0.36
EFFECTIVE AREA(ACRES) = 57.11 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 57.1 PEAK FLOW RATE(CFS) = 14.18
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 197.00
FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.86
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 14.18
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 15.95
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN.) = 15.95
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.819
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      1.38     0.60     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.38 SUBAREA RUNOFF(CFS) = 0.27

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EFFECTIVE AREA(ACRES) = 58.49 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 14.18
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1
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```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====

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```

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 15.95
RAINFALL INTENSITY(INCH/HR) = 0.82
AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 58.49
TOTAL STREAM AREA(ACRES) = 58.49
PEAK FLOW RATE(CFS) AT CONFLUENCE = 14.18

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** CONFLUENCE DATA **

```

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2.36	31.55	0.548	0.60( 0.60)	1.00	30.4	10220.00
2	14.18	15.95	0.819	0.60( 0.60)	1.00	58.5	10230.00

```

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

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** PEAK FLOW RATE TABLE **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	15.96	15.95	0.819	0.60( 0.60)	1.00	73.9	10230.00
2	2.36	31.55	0.548	0.60( 0.60)	1.00	88.9	10220.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

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```

PEAK FLOW RATE(CFS) = 15.96 Tc(MIN.) = 15.95
EFFECTIVE AREA(ACRES) = 73.87 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 88.9
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

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*****
FLOW PROCESS FROM NODE 10238.00 TO NODE 10239.00 IS CODE = 31
-----

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```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 197.00 DOWNSTREAM(FEET) = 193.00
FLOW LENGTH(FEET) = 753.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.90
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 15.96
PIPE TRAVEL TIME(MIN.) = 2.13 Tc(MIN.) = 18.08
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10239.00 = 4317.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10238.10 TO NODE 10239.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.08
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.744
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
  LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -      2.22    0.60    0.916  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.72    SUBAREA RUNOFF(CFS) = 0.40
EFFECTIVE AREA(ACRES) = 76.59  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 91.6    PEAK FLOW RATE(CFS) = 15.96
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 10238.20 TO NODE 10239.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.08
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.744
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
  LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -     34.37    0.60    0.991  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991
SUBAREA AREA(ACRES) = 34.37    SUBAREA RUNOFF(CFS) = 5.25
EFFECTIVE AREA(ACRES) = 110.95  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 126.0    PEAK FLOW RATE(CFS) = 16.57

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```

*****
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 193.00  DOWNSTREAM(FEET) = 191.00
FLOW LENGTH(FEET) = 301.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.33
ESTIMATED PIPE DIAMETER(INCH) = 24.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 16.57
PIPE TRAVEL TIME(MIN.) = 0.79    Tc(MIN.) = 18.87
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10240.00 = 4618.00 FEET.
*****
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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```

MAINLINE Tc(MIN.) = 18.87
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.744
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
  LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -      2.22    0.60    0.916  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.916
SUBAREA AREA(ACRES) = 2.22    SUBAREA RUNOFF(CFS) = 0.39
EFFECTIVE AREA(ACRES) = 113.18  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 128.2    PEAK FLOW RATE(CFS) = 16.57
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10240.00 TO NODE 10241.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 191.00  DOWNSTREAM(FEET) = 180.00
FLOW LENGTH(FEET) = 150.00  MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.05
ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 16.57
PIPE TRAVEL TIME(MIN.) = 0.16    Tc(MIN.) = 19.03
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10241.00 = 4768.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10241.00 TO NODE 10242.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 180.00  DOWNSTREAM(FEET) = 169.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 267.00  CHANNEL SLOPE = 0.0412
CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.721
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
  LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -      2.16    0.60    0.958  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.72
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.97
AVERAGE FLOW DEPTH(FEET) = 0.97  TRAVEL TIME(MIN.) = 0.75
Tc(MIN.) = 19.77
SUBAREA AREA(ACRES) = 2.16    SUBAREA RUNOFF(CFS) = 0.28
EFFECTIVE AREA(ACRES) = 115.34  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 130.4    PEAK FLOW RATE(CFS) = 16.57
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:



DEPTH(FEET) = 0.96 FLOW VELOCITY(FEET/SEC.) = 5.94  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 11

-----  
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\*\*\*\*  
\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	16.57	19.77	0.721	0.60( 0.60)	0.99	115.3	10230.00
2	2.36	37.69	0.498	0.60( 0.60)	1.00	130.4	10220.00

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\*\*\*\*  
\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	6.72	30.66	0.555	0.60( 0.51)	0.85	70.2	10200.00

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	23.29	19.77	0.721	0.60( 0.57)	0.95	160.6	10230.00
2	14.66	30.66	0.555	0.60( 0.56)	0.94	194.7	10200.00
3	8.40	37.69	0.498	0.60( 0.57)	0.94	200.6	10220.00

TOTAL AREA(ACRES) = 200.6

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 23.29 Tc(MIN.) = 19.772  
EFFECTIVE AREA(ACRES) = 160.63 AREA-AVERAGED Fm(INCH/HR) = 0.57  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 200.6  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 12

-----  
>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10256.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 169.00 DOWNSTREAM(FEET) = 163.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 315.00 CHANNEL SLOPE = 0.0190  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.700

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.10	0.60	0.995	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.72

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.89

AVERAGE FLOW DEPTH(FEET) = 1.27 TRAVEL TIME(MIN.) = 1.07

Tc(MIN.) = 20.85

SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 0.85

EFFECTIVE AREA(ACRES) = 169.74 AREA-AVERAGED Fm(INCH/HR) = 0.57

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96

TOTAL AREA(ACRES) = 209.7 PEAK FLOW RATE(CFS) = 23.29

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.26 FLOW VELOCITY(FEET/SEC.) = 4.86

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10243.00 TO NODE 10256.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 20.85

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.700

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.01	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 7.01 SUBAREA RUNOFF(CFS) = 0.63

EFFECTIVE AREA(ACRES) = 176.74 AREA-AVERAGED Fm(INCH/HR) = 0.57

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96

TOTAL AREA(ACRES) = 216.7 PEAK FLOW RATE(CFS) = 23.29

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 20.85

RAINFALL INTENSITY(INCH/HR) = 0.70

AREA-AVERAGED Fm(INCH/HR) = 0.57

AREA-AVERAGED Fp(INCH/HR) = 0.60

AREA-AVERAGED Ap = 0.96

EFFECTIVE STREAM AREA(ACRES) = 176.74

TOTAL STREAM AREA(ACRES) = 216.71

PEAK FLOW RATE(CFS) AT CONFLUENCE = 23.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10250.00 TO NODE 10251.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 284.00

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 243.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.802  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.797

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "WOODLAND,GRASS"	-	1.04	0.60	1.000	0	16.80

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.18  
TOTAL AREA(ACRES) = 1.04 PEAK FLOW RATE(CFS) = 0.18

\*\*\*\*\*

FLOW PROCESS FROM NODE 10251.00 TO NODE 10252.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 243.00 DOWNSTREAM ELEVATION(FEET) = 240.00  
STREET LENGTH(FEET) = 301.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.28  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.17  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.43  
STREET FLOW TRAVEL TIME(MIN.) = 2.31 Tc(MIN.) = 19.12  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.738

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.47	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 0.18  
EFFECTIVE AREA(ACRES) = 2.51 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 0.31

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00  
FLOW VELOCITY(FEET/SEC.) = 2.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.43  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10252.00 = 585.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10252.00 TO NODE 10253.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 240.00 DOWNSTREAM ELEVATION(FEET) = 234.00  
STREET LENGTH(FEET) = 544.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.44  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.28  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.45  
STREET FLOW TRAVEL TIME(MIN.) = 3.98 Tc(MIN.) = 23.09  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.662

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.60 SUBAREA RUNOFF(CFS) = 0.26  
EFFECTIVE AREA(ACRES) = 7.12 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 0.40

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00  
FLOW VELOCITY(FEET/SEC.) = 2.28 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.45  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10253.00 = 1129.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 234.00 DOWNSTREAM(FEET) = 219.00  
FLOW LENGTH(FEET) = 362.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 1.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.53  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 0.40

PIPE TRAVEL TIME(MIN.) = 1.33 Tc(MIN.) = 24.42  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10254.00 = 1491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 24.42  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.639  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.55 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 0.30  
EFFECTIVE AREA(ACRES) = 15.66 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.7 PEAK FLOW RATE(CFS) = 0.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10254.00 TO NODE 10255.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 219.00 DOWNSTREAM(FEET) = 182.00  
FLOW LENGTH(FEET) = 716.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 1.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.39  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 0.55  
PIPE TRAVEL TIME(MIN.) = 2.21 Tc(MIN.) = 26.64  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10255.00 = 2207.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10255.00 TO NODE 10256.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 182.00 DOWNSTREAM(FEET) = 163.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.0833  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.591  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 13.88 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.55  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.36

AVERAGE FLOW DEPTH(FEET) = 0.23 TRAVEL TIME(MIN.) = 1.13  
Tc(MIN.) = 27.77  
SUBAREA AREA(ACRES) = 13.88 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 29.54 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 29.5 PEAK FLOW RATE(CFS) = 0.55  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.23 FLOW VELOCITY(FEET/SEC.) = 3.36  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10256.00 = 2435.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 27.77  
RAINFALL INTENSITY(INCH/HR) = 0.59  
AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 29.54  
TOTAL STREAM AREA(ACRES) = 29.54  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 0.55

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	23.29	20.85	0.700	0.60( 0.57)	0.96	176.7	10230.00
1	14.66	31.87	0.545	0.60( 0.57)	0.95	210.8	10200.00
1	8.40	39.09	0.487	0.60( 0.57)	0.95	216.7	10220.00
2	0.55	27.77	0.591	0.60( 0.60)	1.00	29.5	10250.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	23.78	20.85	0.700	0.60( 0.58)	0.96	198.9	10230.00
2	18.42	27.77	0.591	0.60( 0.57)	0.96	227.7	10250.00
3	15.17	31.87	0.545	0.60( 0.57)	0.95	240.4	10200.00
4	8.86	39.09	0.487	0.60( 0.57)	0.95	246.3	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 23.78 Tc(MIN.) = 20.85  
EFFECTIVE AREA(ACRES) = 198.92 AREA-AVERAGED Fm(INCH/HR) = 0.58  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96  
TOTAL AREA(ACRES) = 246.3  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

-----  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 246.3 TC (MIN.) = 20.85  
 EFFECTIVE AREA (ACRES) = 198.92 AREA-AVERAGED Fm (INCH/HR) = 0.58  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.962  
 PEAK FLOW RATE (CFS) = 23.78

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	23.78	20.85	0.700	0.60 ( 0.58)	0.96	198.9	10230.00
2	18.42	27.77	0.591	0.60 ( 0.57)	0.96	227.7	10250.00
3	15.17	31.87	0.545	0.60 ( 0.57)	0.95	240.4	10200.00
4	8.86	39.09	0.487	0.60 ( 0.57)	0.95	246.3	10220.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506103G.DAT  
TIME/DATE OF STUDY: 12:45 04/15/2013  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 1.580
- 2) 6.00; 1.430
- 3) 7.00; 1.310
- 4) 8.00; 1.210
- 5) 9.00; 1.130
- 6) 10.00; 1.060
- 7) 11.00; 1.010
- 8) 12.00; 0.960
- 9) 13.00; 0.920
- 10) 14.00; 0.880
- 11) 15.00; 0.840
- 12) 20.00; 0.720
- 13) 25.00; 0.630
- 14) 30.00; 0.570
- 15) 40.00; 0.480
- 16) 50.00; 0.420
- 17) 60.00; 0.380
- 18) 90.00; 0.300
- 19) 120.00; 0.260
- 20) 180.00; 0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10300.00 TO NODE 10301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 627.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 5.147  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.558  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "5-7 DWELLINGS/ACRE"	-	1.20	0.60	0.500	95	5.15

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.500  
 SUBAREA RUNOFF(CFS) = 1.36  
 TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 1.36

\*\*\*\*\*

FLOW PROCESS FROM NODE 10301.00 TO NODE 10302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 510.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.2609  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.36  
 FLOW VELOCITY(FEET/SEC.) = 5.22 FLOW DEPTH(FEET) = 0.29  
 TRAVEL TIME(MIN.) = 0.37  $T_c$ (MIN.) = 5.51  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10302.00 = 443.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10302.00 TO NODE 10302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 5.51  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.503  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.60	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 1.62  
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 2.92

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10302.00 TO NODE 10303.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 467.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.2575  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.92  
FLOW VELOCITY(FEET/SEC.) = 6.10 FLOW DEPTH(FEET) = 0.40  
TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 5.97  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10303.00 = 610.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10303.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.97  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.434  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 2.25  
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 5.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10304.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 467.00 DOWNSTREAM(FEET) = 446.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 5.00  
FLOW VELOCITY(FEET/SEC.) = 6.26 FLOW DEPTH(FEET) = 0.52  
TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 6.28  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10304.00 = 725.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10304.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.28  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.397  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.60 0.500 -  
USER-DEFINED - 0.40 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 2.26  
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.32  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 7.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10305.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 446.00 DOWNSTREAM(FEET) = 366.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 423.00 CHANNEL SLOPE = 0.1891  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.10  
FLOW VELOCITY(FEET/SEC.) = 6.92 FLOW DEPTH(FEET) = 0.58  
TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 7.30  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10305.00 = 1148.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10305.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 7.30  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.280  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.60 0.500 -  
USER-DEFINED - 1.30 0.60 1.000 -  
USER-DEFINED - 1.50 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.912  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 2.24  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.39  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.65  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 8.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10306.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 300.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 574.00 CHANNEL SLOPE = 0.1150  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.58  
 FLOW VELOCITY(FEET/SEC.) = 5.98 FLOW DEPTH(FEET) = 0.69  
 TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 8.89  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10306.00 = 1722.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10306.00 TO NODE 10306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 8.89  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.138  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	2.80	0.60	1.000	-
USER-DEFINED	-	0.50	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
 SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 1.77  
 EFFECTIVE AREA(ACRES) = 14.30 AREA-AVERAGED Fm(INCH/HR) = 0.44  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 14.3 PEAK FLOW RATE(CFS) = 8.98

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10306.00 TO NODE 10307.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 293.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.0350  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.98  
 FLOW VELOCITY(FEET/SEC.) = 3.86 FLOW DEPTH(FEET) = 0.88  
 TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 9.76  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10307.00 = 1922.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10307.00 TO NODE 10307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 9.76  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.077  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.30  
 EFFECTIVE AREA(ACRES) = 15.00 AREA-AVERAGED Fm(INCH/HR) = 0.45  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.75  
 TOTAL AREA(ACRES) = 15.0 PEAK FLOW RATE(CFS) = 8.98  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10307.00 TO NODE 10308.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 293.00 DOWNSTREAM(FEET) = 276.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.0850  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.98  
 FLOW VELOCITY(FEET/SEC.) = 6.70 FLOW DEPTH(FEET) = 0.67  
 TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 10.25  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10308.00 = 2122.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10308.00 TO NODE 10308.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 10.25  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.047  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.60	1.000	-
USER-DEFINED	-	8.50	0.60	0.500	-
USER-DEFINED	-	3.80	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.696  
 SUBAREA AREA(ACRES) = 14.00 SUBAREA RUNOFF(CFS) = 7.93  
 EFFECTIVE AREA(ACRES) = 29.00 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA(ACRES) = 29.0 PEAK FLOW RATE(CFS) = 16.02

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10308.00 TO NODE 10309.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 250.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 600.00 CHANNEL SLOPE = 0.0433  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 16.02  
 FLOW VELOCITY(FEET/SEC.) = 6.03 FLOW DEPTH(FEET) = 0.94  
 TRAVEL TIME(MIN.) = 1.66 Tc(MIN.) = 11.91  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10309.00 = 2722.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.91

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.964

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.00	0.60	0.600	-
USER-DEFINED	-	1.80	0.60	0.850	-
USER-DEFINED	-	1.40	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	3.40	0.60	0.500	-
USER-DEFINED	-	2.10	0.60	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.662

SUBAREA AREA(ACRES) = 15.40 SUBAREA RUNOFF(CFS) = 7.86

EFFECTIVE AREA(ACRES) = 44.40 AREA-AVERAGED Fm(INCH/HR) = 0.42

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.70

TOTAL AREA(ACRES) = 44.4 PEAK FLOW RATE(CFS) = 21.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.91

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.964

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.60	0.850	-
USER-DEFINED	-	8.80	0.60	1.000	-
USER-DEFINED	-	3.50	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.967

SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 5.47

EFFECTIVE AREA(ACRES) = 60.20 AREA-AVERAGED Fm(INCH/HR) = 0.46

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.77

TOTAL AREA(ACRES) = 60.2 PEAK FLOW RATE(CFS) = 27.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 250.00 DOWNSTREAM(FEET) = 208.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 1021.00 CHANNEL SLOPE = 0.0411

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00

CHANNEL FLOW THRU SUBAREA(CFS) = 27.19

FLOW VELOCITY(FEET/SEC.) = 6.77 FLOW DEPTH(FEET) = 1.16

TRAVEL TIME(MIN.) = 2.51 Tc(MIN.) = 14.43

LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10310.00 = 3743.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.43

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.863

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	4.00	0.60	0.600	-
USER-DEFINED	-	1.80	0.60	0.850	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.668

SUBAREA AREA(ACRES) = 6.60 SUBAREA RUNOFF(CFS) = 2.75

EFFECTIVE AREA(ACRES) = 66.80 AREA-AVERAGED Fm(INCH/HR) = 0.46

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.76

TOTAL AREA(ACRES) = 66.8 PEAK FLOW RATE(CFS) = 27.19

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.43

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.863

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.500	-
USER-DEFINED	-	8.00	0.60	0.600	-
USER-DEFINED	-	7.10	0.60	0.850	-
USER-DEFINED	-	8.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA(ACRES) = 23.50 SUBAREA RUNOFF(CFS) = 7.92

EFFECTIVE AREA(ACRES) = 90.30 AREA-AVERAGED Fm(INCH/HR) = 0.46

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.77

TOTAL AREA(ACRES) = 90.3 PEAK FLOW RATE(CFS) = 32.36

\*\*\*\*\*

FLOW PROCESS FROM NODE 10310.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 208.00 DOWNSTREAM(FEET) = 189.00

FLOW LENGTH(FEET) = 1595.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 9.52

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 32.36

PIPE TRAVEL TIME(MIN.) = 2.79 Tc(MIN.) = 17.22



LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10335.00 = 5338.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 17.22
RAINFALL INTENSITY(INCH/HR) = 0.79
AREA-AVERAGED Fm(INCH/HR) = 0.46
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.77
EFFECTIVE STREAM AREA(ACRES) = 90.30
TOTAL STREAM AREA(ACRES) = 90.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 32.36

\*\*\*\*\*

FLOW PROCESS FROM NODE 10320.00 TO NODE 10321.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 671.00 DOWNSTREAM(FEET) = 622.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.795
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.461

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.00 0.60 0.500 95 5.79
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 1.04
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 1.04

\*\*\*\*\*

FLOW PROCESS FROM NODE 10321.00 TO NODE 10322.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 622.00 DOWNSTREAM(FEET) = 599.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 227.00 CHANNEL SLOPE = 0.1013
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.04
FLOW VELOCITY(FEET/SEC.) = 4.23 FLOW DEPTH(FEET) = 0.29
TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 6.69
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10322.00 = 557.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10322.00 TO NODE 10322.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.69
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.347
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.60 0.500 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.32
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 2.26

\*\*\*\*\*

FLOW PROCESS FROM NODE 10322.00 TO NODE 10323.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 599.00 DOWNSTREAM(FEET) = 539.00
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 2.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.39
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.26
PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 6.85
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10323.00 = 719.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10323.00 TO NODE 10323.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.85
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.327
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.60 0.500 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 0.46
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 2.68

\*\*\*\*\*

FLOW PROCESS FROM NODE 10323.00 TO NODE 10324.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 539.00 DOWNSTREAM(FEET) = 530.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 97.00 CHANNEL SLOPE = 0.0928
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.68  
FLOW VELOCITY (FEET/SEC.) = 4.18 FLOW DEPTH (FEET) = 0.46  
TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 7.24  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10324.00 = 816.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10324.00 TO NODE 10324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 7.24  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.286  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.80 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 1.60  
EFFECTIVE AREA (ACRES) = 4.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 4.7 PEAK FLOW RATE (CFS) = 4.17

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10324.00 TO NODE 10325.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 530.00 DOWNSTREAM (FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 210.00 CHANNEL SLOPE = 0.1429  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.17  
FLOW VELOCITY (FEET/SEC.) = 5.42 FLOW DEPTH (FEET) = 0.51  
TRAVEL TIME (MIN.) = 0.65 Tc (MIN.) = 7.89  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10325.00 = 1026.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10325.00 TO NODE 10325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 7.89  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.221  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 1.70 SUBAREA RUNOFF (CFS) = 1.41  
EFFECTIVE AREA (ACRES) = 6.40 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 6.4 PEAK FLOW RATE (CFS) = 5.31

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10326.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 500.00 DOWNSTREAM (FEET) = 460.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 345.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 5.31  
FLOW VELOCITY (FEET/SEC.) = 5.31 FLOW DEPTH (FEET) = 0.58  
TRAVEL TIME (MIN.) = 1.08 Tc (MIN.) = 8.97  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10326.00 = 1371.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10326.00 TO NODE 10326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.97  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.132  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.90 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 1.90 SUBAREA RUNOFF (CFS) = 1.42  
EFFECTIVE AREA (ACRES) = 8.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 8.3 PEAK FLOW RATE (CFS) = 6.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10326.00 TO NODE 10327.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 460.00 DOWNSTREAM (FEET) = 430.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 263.00 CHANNEL SLOPE = 0.1141  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 6.22  
FLOW VELOCITY (FEET/SEC.) = 5.51 FLOW DEPTH (FEET) = 0.61  
TRAVEL TIME (MIN.) = 0.80 Tc (MIN.) = 9.76  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10327.00 = 1634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.76  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.077  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.60 0.500 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 2.87  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 8.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10328.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 375.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 437.00 CHANNEL SLOPE = 0.1259  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 8.67  
FLOW VELOCITY(FEET/SEC.) = 7.68 FLOW DEPTH(FEET) = 0.61  
TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 10.71  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10328.00 = 2071.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10328.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 10.71  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.024  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.60 0.500 -  
USER-DEFINED - 1.20 0.60 0.850 -  
USER-DEFINED - 0.90 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.772  
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 1.62  
EFFECTIVE AREA(ACRES) = 15.60 AREA-AVERAGED Fm(INCH/HR) = 0.33  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 15.6 PEAK FLOW RATE(CFS) = 9.70

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10329.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 375.00 DOWNSTREAM(FEET) = 372.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 224.00 CHANNEL SLOPE = 0.0134  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.70  
FLOW VELOCITY(FEET/SEC.) = 3.42 FLOW DEPTH(FEET) = 0.97  
TRAVEL TIME(MIN.) = 1.09 Tc(MIN.) = 11.80  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10329.00 = 2295.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10329.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 11.80  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.970  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.20 0.60 0.500 -  
USER-DEFINED - 1.40 0.60 0.850 -  
USER-DEFINED - 0.60 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.571  
SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 6.33  
EFFECTIVE AREA(ACRES) = 26.80 AREA-AVERAGED Fm(INCH/HR) = 0.34  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 26.8 PEAK FLOW RATE(CFS) = 15.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10329.00 TO NODE 10330.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 300.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 452.00 CHANNEL SLOPE = 0.1593  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 15.26  
FLOW VELOCITY(FEET/SEC.) = 9.76 FLOW DEPTH(FEET) = 0.72  
TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 12.57  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10330.00 = 2747.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10330.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 12.57  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.937  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.60 0.850 -  
USER-DEFINED - 4.20 0.60 0.500 -  
USER-DEFINED - 2.50 0.60 0.850 -  
USER-DEFINED - 0.60 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.673  
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 3.74  
EFFECTIVE AREA(ACRES) = 34.60 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 34.6 PEAK FLOW RATE(CFS) = 18.21

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10331.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 295.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 182.00 CHANNEL SLOPE = 0.0275
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 18.21
FLOW VELOCITY(FEET/SEC.) = 5.22 FLOW DEPTH(FEET) = 1.08
TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 13.16
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10331.00 = 2929.00 FEET.

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FLOW PROCESS FROM NODE 10331.00 TO NODE 10331.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.16
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.914
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.70   0.60  0.850 -
USER-DEFINED        -        11.30   0.60  0.500 -
USER-DEFINED        -         0.20   0.60  0.600 -
USER-DEFINED        -         4.20   0.60  0.850 -
USER-DEFINED        -         1.60   0.60  1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.652
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 8.94
EFFECTIVE AREA(ACRES) = 53.60 AREA-AVERAGED Fm(INCH/HR) = 0.37
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 53.6 PEAK FLOW RATE(CFS) = 26.43

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*****
FLOW PROCESS FROM NODE 10331.00 TO NODE 10332.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 295.00 DOWNSTREAM(FEET) = 245.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.00 CHANNEL SLOPE = 0.0542
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 26.43
FLOW VELOCITY(FEET/SEC.) = 7.44 FLOW DEPTH(FEET) = 1.09
TRAVEL TIME(MIN.) = 2.07 Tc(MIN.) = 15.22
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10332.00 = 3851.00 FEET.

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*****
FLOW PROCESS FROM NODE 10332.00 TO NODE 10332.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.22
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.835
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS

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LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.60  0.850 -
USER-DEFINED        -         1.40   0.60  0.500 -
USER-DEFINED        -        15.40   0.60  0.850 -
USER-DEFINED        -         8.60   0.60  1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.881
SUBAREA AREA(ACRES) = 25.60 SUBAREA RUNOFF(CFS) = 7.05
EFFECTIVE AREA(ACRES) = 79.20 AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 79.2 PEAK FLOW RATE(CFS) = 29.67

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*****
FLOW PROCESS FROM NODE 10332.00 TO NODE 10333.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 199.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 564.00 CHANNEL SLOPE = 0.0816
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 29.67
FLOW VELOCITY(FEET/SEC.) = 8.87 FLOW DEPTH(FEET) = 1.06
TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 16.28
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10333.00 = 4415.00 FEET.

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*****
FLOW PROCESS FROM NODE 10333.00 TO NODE 10333.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.28
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.809
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.50   0.60  0.500 -
USER-DEFINED        -         0.50   0.60  0.850 -
USER-DEFINED        -         0.60   0.60  0.500 -
USER-DEFINED        -         5.70   0.60  0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.761
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 2.63
EFFECTIVE AREA(ACRES) = 87.50 AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 87.5 PEAK FLOW RATE(CFS) = 30.49

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*****
FLOW PROCESS FROM NODE 10333.00 TO NODE 10334.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 195.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 454.00 CHANNEL SLOPE = 0.0088
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 4.00

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CHANNEL FLOW THRU SUBAREA(CFS) = 30.49  
 FLOW VELOCITY(FEET/SEC.) = 3.90 FLOW DEPTH(FEET) = 1.61  
 TRAVEL TIME(MIN.) = 1.94 Tc(MIN.) = 18.22  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10334.00 = 4869.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10334.00 TO NODE 10334.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 18.22  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.763  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.10 0.60 0.800 -  
 USER-DEFINED - 2.60 0.60 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835  
 SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 0.87  
 EFFECTIVE AREA(ACRES) = 91.20 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.71  
 TOTAL AREA(ACRES) = 91.2 PEAK FLOW RATE(CFS) = 30.49  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10334.00 TO NODE 10335.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 195.00 DOWNSTREAM(FEET) = 189.00  
 FLOW LENGTH(FEET) = 1291.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 6.51  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 30.49  
 PIPE TRAVEL TIME(MIN.) = 3.31 Tc(MIN.) = 21.53  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 21.53  
 RAINFALL INTENSITY(INCH/HR) = 0.69  
 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.71  
 EFFECTIVE STREAM AREA(ACRES) = 91.20  
 TOTAL STREAM AREA(ACRES) = 91.20  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 30.49

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	32.36	17.22	0.787	0.60( 0.46)	0.77	90.3	10300.00
2	30.49	21.53	0.693	0.60( 0.43)	0.71	91.2	10320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	62.85	17.22	0.787	0.60( 0.45)	0.75	163.2	10300.00
2	53.38	21.53	0.693	0.60( 0.44)	0.74	181.5	10320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 62.85 Tc(MIN.) = 17.22  
 EFFECTIVE AREA(ACRES) = 163.24 AREA-AVERAGED Fm(INCH/HR) = 0.45  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.75  
 TOTAL AREA(ACRES) = 181.5  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10335.00 TO NODE 10336.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 189.00 DOWNSTREAM(FEET) = 188.00  
 FLOW LENGTH(FEET) = 103.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 26.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.37  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 62.85  
 PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 17.38  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10336.00 = 6263.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10336.00 TO NODE 10337.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 180.00  
 FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.22  
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 62.85  
 PIPE TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 17.59  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10337.00 = 6475.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10337.00 TO NODE 10338.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 161.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 872.00 CHANNEL SLOPE = 0.0218  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 62.85  
FLOW VELOCITY (FEET/SEC.) = 6.55 FLOW DEPTH (FEET) = 1.79  
TRAVEL TIME (MIN.) = 2.22 Tc (MIN.) = 19.81  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10338.00 = 7347.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 19.81  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.725  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.60 0.850 -  
USER-DEFINED - 0.80 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 1.000 -  
USER-DEFINED - 1.30 0.60 1.000 -  
USER-DEFINED - 0.90 0.60 0.850 -  
USER-DEFINED - 0.20 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.943  
SUBAREA AREA (ACRES) = 4.20 SUBAREA RUNOFF (CFS) = 0.60  
EFFECTIVE AREA (ACRES) = 167.44 AREA-AVERAGED Fm (INCH/HR) = 0.45  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 185.7 PEAK FLOW RATE (CFS) = 62.85  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 19.81  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.725  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.60 1.000 -  
USER-DEFINED - 4.60 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 0.56  
EFFECTIVE AREA (ACRES) = 172.44 AREA-AVERAGED Fm (INCH/HR) = 0.45  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 190.7 PEAK FLOW RATE (CFS) = 62.85  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10339.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 161.00 DOWNSTREAM (FEET) = 159.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 328.00 CHANNEL SLOPE = 0.0061  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 62.85  
FLOW VELOCITY (FEET/SEC.) = 4.06 FLOW DEPTH (FEET) = 2.27  
TRAVEL TIME (MIN.) = 1.35 Tc (MIN.) = 21.15  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10339.00 = 7675.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 21.15  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.699  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.60 0.850 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 0.20 0.60 1.000 -  
USER-DEFINED - 0.40 0.60 0.500 -  
USER-DEFINED - 2.30 0.60 0.850 -  
USER-DEFINED - 0.40 0.60 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.767  
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 1.49  
EFFECTIVE AREA (ACRES) = 179.34 AREA-AVERAGED Fm (INCH/HR) = 0.45  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 62.85  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 21.15  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.699  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.60 0.500 -  
USER-DEFINED - 6.30 0.60 0.850 -  
USER-DEFINED - 0.20 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 2.20 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.876  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 1.44  
EFFECTIVE AREA (ACRES) = 188.54 AREA-AVERAGED Fm (INCH/HR) = 0.46  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 206.8 PEAK FLOW RATE (CFS) = 62.85  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10390.00 IS CODE = 51

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-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 159.00 DOWNSTREAM(FEET) = 155.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 782.00 CHANNEL SLOPE = 0.0051
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 62.85
FLOW VELOCITY(FEET/SEC.) = 3.80 FLOW DEPTH(FEET) = 2.35
TRAVEL TIME(MIN.) = 3.43 Tc(MIN.) = 24.58
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 24.58
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.638
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.30     0.60     0.800   -
USER-DEFINED        -         3.70     0.60     0.850   -
USER-DEFINED        -         0.10     0.60     1.000   -
USER-DEFINED        -         2.10     0.60     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.901
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 0.54
EFFECTIVE AREA(ACRES) = 194.74 AREA-AVERAGED Fm(INCH/HR) = 0.46
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 213.0 PEAK FLOW RATE(CFS) = 62.85
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
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*****
FLOW PROCESS FROM NODE 10340.00 TO NODE 10341.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

```

```

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 585.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.581
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.031
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS   Tc
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE"  -         0.10     0.60     0.800   95  10.58

```

```

PUBLIC PARK - 0.50 0.60 0.850 95 10.90
AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW" - 0.40 0.60 1.000 95 21.09
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA RUNOFF(CFS) = 0.44
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 0.44

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*****
FLOW PROCESS FROM NODE 10341.00 TO NODE 10342.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====

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```

UPSTREAM ELEVATION(FEET) = 585.00 DOWNSTREAM ELEVATION(FEET) = 570.00
STREET LENGTH(FEET) = 250.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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```

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

```

```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

```

```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.85
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.32
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.05
STREET FLOW TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 11.36
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.992
SUBAREA LOSS RATE DATA(AMC II):

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```

DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70     0.60     0.800   -
USER-DEFINED        -         1.40     0.60     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 0.82
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.55
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 1.22

```

```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00
FLOW VELOCITY(FEET/SEC.) = 5.32 DEPTH*VELOCITY(FT*FT/SEC.) = 1.05
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10342.00 = 558.00 FEET.

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*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
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```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

```

```

=====
UPSTREAM ELEVATION(FEET) = 570.00  DOWNSTREAM ELEVATION(FEET) = 560.00
STREET LENGTH(FEET) = 415.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.65
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.22
HALFSTREET FLOOD WIDTH(FEET) = 2.89
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.02
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.65
STREET FLOW TRAVEL TIME(MIN.) = 2.29  Tc(MIN.) = 13.65
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.894
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -  1.20  0.60  0.800  -
USER-DEFINED  -  1.20  0.60  0.850  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.825
SUBAREA AREA(ACRES) = 2.40  SUBAREA RUNOFF(CFS) = 0.86
EFFECTIVE AREA(ACRES) = 5.50  AREA-AVERAGED Fm(INCH/HR) = 0.53
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 5.5  PEAK FLOW RATE(CFS) = 1.81

```

```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.23  HALFSTREET FLOOD WIDTH(FEET) = 3.45
FLOW VELOCITY(FEET/SEC.) = 2.93  DEPTH*VELOCITY(FT*FT/SEC.) = 0.67
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10343.00 = 973.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10343.00 TO NODE 10344.00 IS CODE = 63
-----

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```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
-----

```

```

UPSTREAM ELEVATION(FEET) = 560.00  DOWNSTREAM ELEVATION(FEET) = 550.00
STREET LENGTH(FEET) = 616.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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```

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

```

```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.18
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.26
HALFSTREET FLOOD WIDTH(FEET) = 5.12
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.41
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.63
STREET FLOW TRAVEL TIME(MIN.) = 4.26  Tc(MIN.) = 17.92
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.770
SUBAREA LOSS RATE DATA(AMC II):

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```

DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -  2.10  0.60  0.800  -
USER-DEFINED  -  0.80  0.60  0.850  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814
SUBAREA AREA(ACRES) = 2.90  SUBAREA RUNOFF(CFS) = 0.74
EFFECTIVE AREA(ACRES) = 8.40  AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.86
TOTAL AREA(ACRES) = 8.4  PEAK FLOW RATE(CFS) = 1.93

```

```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.25  HALFSTREET FLOOD WIDTH(FEET) = 4.67
FLOW VELOCITY(FEET/SEC.) = 2.37  DEPTH*VELOCITY(FT*FT/SEC.) = 0.60
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10344.00 = 1589.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 10344.00 TO NODE 10345.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
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```

UPSTREAM ELEVATION(FEET) = 550.00  DOWNSTREAM ELEVATION(FEET) = 510.00
STREET LENGTH(FEET) = 474.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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```

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

```

```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.28
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.31
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.25
STREET FLOW TRAVEL TIME(MIN.) = 1.25  Tc(MIN.) = 19.17
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.740
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN

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USER-DEFINED          -      2.80      0.60      0.800      -
USER-DEFINED          -      0.20      0.60      0.850      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803
SUBAREA AREA(ACRES) =      3.00      SUBAREA RUNOFF(CFS) =      0.70
EFFECTIVE AREA(ACRES) =      11.40      AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) =      11.4      PEAK FLOW RATE(CFS) =      2.40

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00
FLOW VELOCITY(FEET/SEC.) = 6.31 DEPTH*VELOCITY(FT*FT/SEC.) = 1.25
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10345.00 = 2063.00 FEET.

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*****
FLOW PROCESS FROM NODE 10345.00 TO NODE 10346.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 510.00 DOWNSTREAM ELEVATION(FEET) = 484.00
STREET LENGTH(FEET) = 231.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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```

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.54

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.67
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.28
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.44
STREET FLOW TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 19.70
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.727
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -      2.40      0.60      0.800      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 0.53
EFFECTIVE AREA(ACRES) = 13.80 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 13.8 PEAK FLOW RATE(CFS) = 2.81

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00
FLOW VELOCITY(FEET/SEC.) = 7.28 DEPTH*VELOCITY(FT*FT/SEC.) = 1.44
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10346.00 = 2294.00 FEET.

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*****
FLOW PROCESS FROM NODE 10346.00 TO NODE 10347.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 484.00 DOWNSTREAM ELEVATION(FEET) = 378.00
STREET LENGTH(FEET) = 995.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.55

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.18
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.09
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.41
STREET FLOW TRAVEL TIME(MIN.) = 2.34 Tc(MIN.) = 22.04
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.683
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -      4.10      0.60      0.800      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 0.75
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.83
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 3.01

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00
FLOW VELOCITY(FEET/SEC.) = 7.09 DEPTH*VELOCITY(FT*FT/SEC.) = 1.41
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10347.00 = 3289.00 FEET.

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*****
FLOW PROCESS FROM NODE 10347.00 TO NODE 10348.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 378.00 DOWNSTREAM ELEVATION(FEET) = 303.00
STREET LENGTH(FEET) = 751.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.56

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.62  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.23  
HALFSTREET FLOOD WIDTH(FEET) = 3.35  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.01  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.35  
STREET FLOW TRAVEL TIME(MIN.) = 2.08 Tc(MIN.) = 24.12  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.646

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.20 0.60 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 1.22  
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 3.63

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.23 HALFSTREET FLOOD WIDTH(FEET) = 3.40  
FLOW VELOCITY(FEET/SEC.) = 5.96 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.35  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10348.00 = 4040.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10348.00 TO NODE 10349.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 303.00 DOWNSTREAM ELEVATION(FEET) = 252.00  
STREET LENGTH(FEET) = 607.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.23  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.25  
HALFSTREET FLOOD WIDTH(FEET) = 4.46  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.44  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.35  
STREET FLOW TRAVEL TIME(MIN.) = 1.86 Tc(MIN.) = 25.98  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.618

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.30 0.60 0.800 -  
USER-DEFINED - 3.00 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.815  
SUBAREA AREA(ACRES) = 10.30 SUBAREA RUNOFF(CFS) = 1.20  
EFFECTIVE AREA(ACRES) = 36.40 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 36.4 PEAK FLOW RATE(CFS) = 4.18

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.25 HALFSTREET FLOOD WIDTH(FEET) = 4.46  
FLOW VELOCITY(FEET/SEC.) = 5.38 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.33  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10349.00 = 4647.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10349.00 TO NODE 10350.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 252.00 DOWNSTREAM ELEVATION(FEET) = 246.00  
STREET LENGTH(FEET) = 224.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.92  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.36  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.36  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.03  
STREET FLOW TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 27.09  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.605

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 12.60 0.60 0.800 -  
USER-DEFINED - 0.50 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.802  
SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 1.46  
EFFECTIVE AREA(ACRES) = 49.50 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 49.5 PEAK FLOW RATE(CFS) = 5.21

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 7.56  
FLOW VELOCITY(FEET/SEC.) = 3.42 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.06  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10350.00 = 4871.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10350.00 TO NODE 10351.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	246.00	DOWNSTREAM(FEET) =	237.00
FLOW LENGTH(FEET) =	519.00	MANNING'S N =	0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO	18.000		
DEPTH OF FLOW IN 18.0 INCH PIPE IS	7.9 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	7.00		
ESTIMATED PIPE DIAMETER(INCH) =	18.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	5.21		
PIPE TRAVEL TIME(MIN.) =	1.24	Tc(MIN.) =	28.32
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10351.00 =	5390.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10351.00 TO NODE 10351.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	28.32				
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.590				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	5.60	0.60	0.800	-
USER-DEFINED	-	0.70	0.60	0.850	-
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =	0.60				
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =	0.784				
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;					
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.					
SUBAREA AREA(ACRES) =	6.50	SUBAREA RUNOFF(CFS) =	0.75		
EFFECTIVE AREA(ACRES) =	56.00	AREA-AVERAGED Fm(INCH/HR) =	0.49		
AREA-AVERAGED Fp(INCH/HR) =	0.60	AREA-AVERAGED Ap =	0.81		
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;					
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.					
TOTAL AREA(ACRES) =	56.0	PEAK FLOW RATE(CFS) =	5.65		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10351.00 TO NODE 10352.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	237.00	DOWNSTREAM(FEET) =	230.00
FLOW LENGTH(FEET) =	675.00	MANNING'S N =	0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO	18.000		
DEPTH OF FLOW IN 18.0 INCH PIPE IS	9.6 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	5.89		
ESTIMATED PIPE DIAMETER(INCH) =	18.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	5.65		
PIPE TRAVEL TIME(MIN.) =	1.91	Tc(MIN.) =	30.23

LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10352.00 = 6065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	30.23				
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.568				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	1.00	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	0.800	-
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =	0.60				
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =	0.300				
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;					
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.					
SUBAREA AREA(ACRES) =	1.40	SUBAREA RUNOFF(CFS) =	0.50		
EFFECTIVE AREA(ACRES) =	57.40	AREA-AVERAGED Fm(INCH/HR) =	0.48		
AREA-AVERAGED Fp(INCH/HR) =	0.60	AREA-AVERAGED Ap =	0.80		
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;					
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.					
TOTAL AREA(ACRES) =	57.4	PEAK FLOW RATE(CFS) =	5.94		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	30.23				
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.568				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.80	0.60	0.100	-
USER-DEFINED	-	9.40	0.60	0.800	-
USER-DEFINED	-	1.10	0.60	0.850	-
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =	0.60				
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =	0.755				
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;					
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.					
SUBAREA AREA(ACRES) =	11.30	SUBAREA RUNOFF(CFS) =	1.41		
EFFECTIVE AREA(ACRES) =	68.70	AREA-AVERAGED Fm(INCH/HR) =	0.47		
AREA-AVERAGED Fp(INCH/HR) =	0.60	AREA-AVERAGED Ap =	0.79		
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;					
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.					
TOTAL AREA(ACRES) =	68.7	PEAK FLOW RATE(CFS) =	7.35		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10352.00 TO NODE 10353.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	230.00	DOWNSTREAM(FEET) =	180.00
FLOW LENGTH(FEET) =	301.00	MANNING'S N =	0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO	18.000		

DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.44  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 7.35  
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 30.52  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10353.00 = 6366.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10353.00 TO NODE 10353.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 30.52  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.565  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.100 -  
USER-DEFINED - 6.00 0.60 0.800 -  
USER-DEFINED - 1.30 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.799  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 0.76  
EFFECTIVE AREA(ACRES) = 76.10 AREA-AVERAGED Fm(INCH/HR) = 0.47  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.79  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 76.1 PEAK FLOW RATE(CFS) = 8.07

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10353.00 TO NODE 10354.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 172.00  
FLOW LENGTH(FEET) = 458.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.83  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 8.07  
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 31.50  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10354.00 = 6824.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10354.00 TO NODE 10390.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 172.00 DOWNSTREAM(FEET) = 155.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00 CHANNEL SLOPE = 0.0411  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 8.07

FLOW VELOCITY(FEET/SEC.) = 4.98 FLOW DEPTH(FEET) = 0.74  
TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 32.88  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 32.88  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.544  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.60 0.100 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 0.100 -  
USER-DEFINED - 0.90 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 0.47  
EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.47  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.78  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 8.24

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 32.88  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.544  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.60 1.000 -  
USER-DEFINED - 0.60 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 0.850 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 0.100 -  
USER-DEFINED - 2.10 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.964  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 0.07  
EFFECTIVE AREA(ACRES) = 81.90 AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.79  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 81.9 PEAK FLOW RATE(CFS) = 8.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 32.88  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.544  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.50 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 84.40 AREA-AVERAGED Fm(INCH/HR) = 0.48  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 84.4 PEAK FLOW RATE(CFS) = 8.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	8.30	32.88	0.544	0.60( 0.48)	0.80	84.4	10340.00

LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	62.85	24.58	0.638	0.60( 0.46)	0.77	194.7	10300.00
2	53.38	29.19	0.580	0.60( 0.46)	0.76	213.0	10320.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	71.16	24.58	0.638	0.60( 0.47)	0.78	257.8	10300.00
2	61.23	29.19	0.580	0.60( 0.46)	0.77	287.9	10320.00
3	58.40	32.88	0.544	0.60( 0.46)	0.77	297.4	10340.00

TOTAL AREA(ACRES) = 297.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 71.16 Tc(MIN.) = 24.578  
 EFFECTIVE AREA(ACRES) = 257.82 AREA-AVERAGED Fm(INCH/HR) = 0.47  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA(ACRES) = 297.4  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10360.00 TO NODE 10361.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 337.00 DOWNSTREAM(FEET) = 292.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.697  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.025  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 NATURAL FAIR COVER  
 "WOODLAND,GRASS" - 0.30 0.60 1.000 95 10.70  
 NATURAL FAIR COVER  
 "GRASS" - 0.50 0.60 1.000 95 10.70  
 NATURAL FAIR COVER  
 "WOODLAND,GRASS" - 0.10 0.60 1.000 95 10.70  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 0.34  
 TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 0.34

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10361.00 TO NODE 10362.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 292.00 DOWNSTREAM(FEET) = 290.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 199.00 CHANNEL SLOPE = 0.0101  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 0.34  
 FLOW VELOCITY(FEET/SEC.) = 1.34 FLOW DEPTH(FEET) = 0.29  
 TRAVEL TIME(MIN.) = 2.48 Tc(MIN.) = 13.17  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10362.00 = 529.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10362.00 TO NODE 10362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 13.17  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.913  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.90	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 0.32  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 0.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10362.00 TO NODE 10363.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 290.00 DOWNSTREAM(FEET) = 288.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.57  
FLOW VELOCITY(FEET/SEC.) = 1.72 FLOW DEPTH(FEET) = 0.33  
TRAVEL TIME(MIN.) = 1.42 Tc(MIN.) = 14.60  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10363.00 = 676.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10363.00 TO NODE 10363.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 14.60  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.856  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	0.80	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 0.57  
EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 1.04

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10363.00 TO NODE 10364.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 288.00 DOWNSTREAM(FEET) = 286.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.04

FLOW VELOCITY(FEET/SEC.) = 1.99 FLOW DEPTH(FEET) = 0.42  
TRAVEL TIME(MIN.) = 1.23 Tc(MIN.) = 15.83  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10364.00 = 823.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10364.00 TO NODE 10364.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 15.83  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.820  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	1.40	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 0.39  
EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 1.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10364.00 TO NODE 10365.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 286.00 DOWNSTREAM(FEET) = 284.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.29  
FLOW VELOCITY(FEET/SEC.) = 1.71 FLOW DEPTH(FEET) = 0.50  
TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 18.24  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10365.00 = 1071.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10365.00 TO NODE 10365.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 18.24  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.762  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	1.000	-
USER-DEFINED	-	1.80	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	0.50	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 0.54

EFFECTIVE AREA (ACRES) = 9.80 AREA-AVERAGED Fm (INCH/HR) = 0.59  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 9.8 PEAK FLOW RATE (CFS) = 1.50

\*\*\*\*\*

FLOW PROCESS FROM NODE 10365.00 TO NODE 10366.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 284.00 DOWNSTREAM (FEET) = 282.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 248.00 CHANNEL SLOPE = 0.0081  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 1.50  
FLOW VELOCITY (FEET/SEC.) = 1.77 FLOW DEPTH (FEET) = 0.53  
TRAVEL TIME (MIN.) = 2.34 Tc (MIN.) = 20.57  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10366.00 = 1319.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10366.00 TO NODE 10366.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 20.57  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.710  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.850 -  
USER-DEFINED - 3.20 0.60 1.000 -  
USER-DEFINED - 2.30 0.60 1.000 -  
USER-DEFINED - 0.20 0.60 0.850 -  
USER-DEFINED - 2.70 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.995  
SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 0.86  
EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.59  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 1.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 10366.00 TO NODE 10367.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 279.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 292.00 CHANNEL SLOPE = 0.0103  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 1.90  
FLOW VELOCITY (FEET/SEC.) = 2.06 FLOW DEPTH (FEET) = 0.55  
TRAVEL TIME (MIN.) = 2.36 Tc (MIN.) = 22.93  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10367.00 = 1611.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10367.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 22.93  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.667  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.60 0.850 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 1.10 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 0.850 -  
USER-DEFINED - 0.10 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.972  
SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 0.12  
EFFECTIVE AREA (ACRES) = 19.90 AREA-AVERAGED Fm (INCH/HR) = 0.59  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 19.9 PEAK FLOW RATE (CFS) = 1.90  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10368.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 279.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 378.00 CHANNEL SLOPE = 0.0079  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 1.90  
FLOW VELOCITY (FEET/SEC.) = 1.86 FLOW DEPTH (FEET) = 0.58  
TRAVEL TIME (MIN.) = 3.38 Tc (MIN.) = 26.31  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10368.00 = 1989.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10368.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 26.31  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.614  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.60 0.850 -  
USER-DEFINED - 0.90 0.60 1.000 -  
USER-DEFINED - 0.90 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.973  
SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 0.06  
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.59  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 1.90  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10369.00 IS CODE = 51

-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 247.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 229.00 CHANNEL SLOPE = 0.1266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.90  
FLOW VELOCITY(FEET/SEC.) = 5.28 FLOW DEPTH(FEET) = 0.35  
TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 27.04  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10369.00 = 2218.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10369.00 IS CODE = 81

-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----

MAINLINE Tc(MIN.) = 27.04  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.606  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	9.70	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	1.40	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.996  
SUBAREA AREA(ACRES) = 11.60 SUBAREA RUNOFF(CFS) = 0.08  
EFFECTIVE AREA(ACRES) = 33.70 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 33.7 PEAK FLOW RATE(CFS) = 1.90  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10370.00 IS CODE = 51

-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 247.00 DOWNSTREAM(FEET) = 226.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 179.00 CHANNEL SLOPE = 0.1173  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.90  
FLOW VELOCITY(FEET/SEC.) = 5.05 FLOW DEPTH(FEET) = 0.35  
TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 27.63  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10370.00 = 2397.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10370.00 TO NODE 10370.00 IS CODE = 81

-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----

MAINLINE Tc(MIN.) = 27.63  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.598

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	3.60	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	5.60	0.60	1.000	-
USER-DEFINED	-	1.50	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.997  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 0.02  
EFFECTIVE AREA(ACRES) = 44.80 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 44.8 PEAK FLOW RATE(CFS) = 1.90  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10370.00 TO NODE 10371.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 226.00 DOWNSTREAM(FEET) = 188.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 434.00 CHANNEL SLOPE = 0.0876  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.90  
FLOW VELOCITY(FEET/SEC.) = 4.60 FLOW DEPTH(FEET) = 0.37  
TRAVEL TIME(MIN.) = 1.57 Tc(MIN.) = 29.20  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10371.00 = 2831.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10371.00 TO NODE 10371.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 29.20  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.580  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	1.20	0.60	0.850	-
USER-DEFINED	-	1.60	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	7.20	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.958  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 10.70 SUBAREA RUNOFF(CFS) = 0.23  
EFFECTIVE AREA(ACRES) = 55.50 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99



\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 1.90  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10371.00 TO NODE 10389.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 157.00  
 FLOW LENGTH(FEET) = 1918.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.16  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 1.90  
 PIPE TRAVEL TIME(MIN.) = 6.20 Tc(MIN.) = 35.40  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 35.40  
 RAINFALL INTENSITY(INCH/HR) = 0.52  
 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.99  
 EFFECTIVE STREAM AREA(ACRES) = 55.50  
 TOTAL STREAM AREA(ACRES) = 55.50  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.90

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10380.00 TO NODE 10381.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 241.00  
 ELEVATION DATA: UPSTREAM(FEET) = 275.00 DOWNSTREAM(FEET) = 273.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.110  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.299

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.60	0.100	95	7.11
PUBLIC PARK	-	1.10	0.60	0.850	95	11.30

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.735  
 SUBAREA RUNOFF(CFS) = 1.00  
 TOTAL AREA(ACRES) = 1.30 PEAK FLOW RATE(CFS) = 1.00

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10381.00 TO NODE 10382.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 273.00 DOWNSTREAM ELEVATION(FEET) = 271.00  
 STREET LENGTH(FEET) = 238.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.52

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.26  
 HALFSTREET FLOOD WIDTH(FEET) = 5.03  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.72  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.44  
 STREET FLOW TRAVEL TIME(MIN.) = 2.31 Tc(MIN.) = 9.42  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.100

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	1.40	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.718  
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 1.03  
 EFFECTIVE AREA(ACRES) = 3.00 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 1.80

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 5.66  
 FLOW VELOCITY(FEET/SEC.) = 1.76 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.48  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10382.00 = 479.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10382.00 TO NODE 10383.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 271.00 DOWNSTREAM ELEVATION(FEET) = 268.00  
 STREET LENGTH(FEET) = 357.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.69  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.30  
 HALFSTREET FLOOD WIDTH(FEET) = 7.28  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.87  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.57  
 STREET FLOW TRAVEL TIME(MIN.) = 3.18 Tc(MIN.) = 12.60  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.936

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.500	-
USER-DEFINED	-	1.30	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.452  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 1.80  
 EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.35  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 3.15

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 7.91  
 FLOW VELOCITY(FEET/SEC.) = 1.93 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.61  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10383.00 = 836.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10383.00 TO NODE 10384.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 268.00 DOWNSTREAM ELEVATION(FEET) = 264.00  
 STREET LENGTH(FEET) = 473.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.07  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.34  
 HALFSTREET FLOOD WIDTH(FEET) = 8.97

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.05  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.69  
 STREET FLOW TRAVEL TIME(MIN.) = 3.85 Tc(MIN.) = 16.45  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.805

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	3.00	0.60	0.500	-
USER-DEFINED	-	0.60	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 1.84  
 EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.34  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.57  
 TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 4.29

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 9.22  
 FLOW VELOCITY(FEET/SEC.) = 2.06 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.71  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10384.00 = 1309.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10384.00 TO NODE 10385.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 264.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
 STREET LENGTH(FEET) = 463.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.22  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.37  
 HALFSTREET FLOOD WIDTH(FEET) = 10.74  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.94  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.72  
 STREET FLOW TRAVEL TIME(MIN.) = 3.97 Tc(MIN.) = 20.42  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.712

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	0.600	-
USER-DEFINED	-	0.30	0.60	0.600	-
USER-DEFINED	-	0.60	0.60	0.850	-

USER-DEFINED - 0.30 0.60 0.500 -  
 USER-DEFINED - 4.00 0.60 0.600 -  
 USER-DEFINED - 0.80 0.60 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.650  
 SUBAREA AREA (ACRES) = 6.40 SUBAREA RUNOFF (CFS) = 1.86  
 EFFECTIVE AREA (ACRES) = 16.70 AREA-AVERAGED Fm (INCH/HR) = 0.36  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA (ACRES) = 16.7 PEAK FLOW RATE (CFS) = 5.28

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 10.82  
 FLOW VELOCITY (FEET/SEC.) = 1.94 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.73  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10385.00 = 1772.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10385.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 20.42  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.712  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.500	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.07  
 EFFECTIVE AREA (ACRES) = 16.90 AREA-AVERAGED Fm (INCH/HR) = 0.36  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA (ACRES) = 16.9 PEAK FLOW RATE (CFS) = 5.36

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10386.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 261.00 DOWNSTREAM (FEET) = 200.00  
 FLOW LENGTH (FEET) = 712.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.2 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.59  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 5.36  
 PIPE TRAVEL TIME (MIN.) = 0.94 Tc (MIN.) = 21.36  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10386.00 = 2484.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 21.36  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.695  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.500	-

LAND USE	GROUP	ACRES	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.561  
 SUBAREA AREA (ACRES) = 1.40 SUBAREA RUNOFF (CFS) = 0.45  
 EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.36  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 5.55

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 21.36  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.695  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.600	-
USER-DEFINED	-	1.70	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.544  
 SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 1.36  
 EFFECTIVE AREA (ACRES) = 22.40 AREA-AVERAGED Fm (INCH/HR) = 0.35  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA (ACRES) = 22.4 PEAK FLOW RATE (CFS) = 6.92

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 21.36  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.695  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.600	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	0.70	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.850	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223  
 SUBAREA AREA (ACRES) = 3.50 SUBAREA RUNOFF (CFS) = 1.77  
 EFFECTIVE AREA (ACRES) = 25.90 AREA-AVERAGED Fm (INCH/HR) = 0.32  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.54

TOTAL AREA (ACRES) = 25.9 PEAK FLOW RATE (CFS) = 8.69

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 21.36

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.695

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	1.70	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.228

SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 1.01

EFFECTIVE AREA (ACRES) = 27.90 AREA-AVERAGED Fm (INCH/HR) = 0.31

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.52

TOTAL AREA (ACRES) = 27.9 PEAK FLOW RATE (CFS) = 9.69

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 21.36

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.695

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.50	0.60	0.850	-
USER-DEFINED	-	2.10	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.225

SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 1.51

EFFECTIVE AREA (ACRES) = 30.90 AREA-AVERAGED Fm (INCH/HR) = 0.29

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.49

TOTAL AREA (ACRES) = 30.9 PEAK FLOW RATE (CFS) = 11.20

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 21.36

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.695

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.60	0.100	-
USER-DEFINED	-	1.50	0.60	0.600	-
USER-DEFINED	-	1.70	0.60	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.204

SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 3.71

EFFECTIVE AREA (ACRES) = 38.10 AREA-AVERAGED Fm (INCH/HR) = 0.26

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43

TOTAL AREA (ACRES) = 38.1 PEAK FLOW RATE (CFS) = 14.92

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10387.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 200.00 DOWNSTREAM (FEET) = 163.00

FLOW LENGTH (FEET) = 1145.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.5 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 11.34

ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 14.92

PIPE TRAVEL TIME (MIN.) = 1.68 Tc (MIN.) = 23.05

LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10387.00 = 3629.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 23.05

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.665

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	0.100	-
USER-DEFINED	-	23.80	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.80	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	0.100	-
USER-DEFINED	-	6.90	0.60	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.830

SUBAREA AREA (ACRES) = 32.90 SUBAREA RUNOFF (CFS) = 4.95

EFFECTIVE AREA (ACRES) = 71.00 AREA-AVERAGED Fm (INCH/HR) = 0.37

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.62

TOTAL AREA (ACRES) = 71.0 PEAK FLOW RATE (CFS) = 18.83

\*\*\*\*\*

FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 23.05

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.665

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	1.20	0.60	0.100	-
USER-DEFINED	-	1.70	0.60	0.850	-

USER-DEFINED - 0.30 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.641  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 0.96  
EFFECTIVE AREA(ACRES) = 74.80 AREA-AVERAGED Fm(INCH/HR) = 0.37  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 74.8 PEAK FLOW RATE(CFS) = 19.79

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10388.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 163.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.42  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 19.79  
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 23.25  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10388.00 = 3779.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 23.25  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.662  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.80 0.60 0.100 -  
USER-DEFINED - 0.40 0.60 0.400 -  
USER-DEFINED - 0.60 0.60 0.850 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 2.90  
EFFECTIVE AREA(ACRES) = 80.90 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 80.9 PEAK FLOW RATE(CFS) = 22.45

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 23.25  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.662  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.100 -

USER-DEFINED - 10.70 0.60 0.400 -  
USER-DEFINED - 2.30 0.60 0.850 -  
USER-DEFINED - 0.50 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 1.000 -  
USER-DEFINED - 0.70 0.60 0.400 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.502  
SUBAREA AREA(ACRES) = 14.60 SUBAREA RUNOFF(CFS) = 4.74  
EFFECTIVE AREA(ACRES) = 95.50 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 95.5 PEAK FLOW RATE(CFS) = 27.19

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 23.25  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.662  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.60 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.10  
EFFECTIVE AREA(ACRES) = 96.20 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 96.2 PEAK FLOW RATE(CFS) = 27.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10389.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 158.00 DOWNSTREAM(FEET) = 157.00  
FLOW LENGTH(FEET) = 51.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.84  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 27.28  
PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 23.33  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10389.00 = 3830.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 23.33  
RAINFALL INTENSITY(INCH/HR) = 0.66  
AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.58

EFFECTIVE STREAM AREA(ACRES) = 96.20  
TOTAL STREAM AREA(ACRES) = 96.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 27.28

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1.90	35.40	0.521	0.60( 0.59)	0.99	55.5	10360.00
2	27.28	23.33	0.660	0.60( 0.35)	0.58	96.2	10380.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	28.86	23.33	0.660	0.60( 0.41)	0.69	132.8	10380.00
2	21.06	35.40	0.521	0.60( 0.44)	0.73	151.7	10360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 28.86 Tc (MIN.) = 23.33  
EFFECTIVE AREA(ACRES) = 132.77 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 151.7  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10390.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 157.00 DOWNSTREAM(FEET) = 155.00  
FLOW LENGTH(FEET) = 312.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.21  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 28.86  
PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 24.05  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc(MIN.) = 24.05  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.647

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	3.10	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	5.70	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.997  
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 0.42  
EFFECTIVE AREA(ACRES) = 142.27 AREA-AVERAGED Fm(INCH/HR) = 0.43  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.71  
TOTAL AREA(ACRES) = 161.2 PEAK FLOW RATE(CFS) = 28.86  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc(MIN.) = 24.05

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.647

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.20	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 0.09

EFFECTIVE AREA(ACRES) = 144.47 AREA-AVERAGED Fm(INCH/HR) = 0.43

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.71

TOTAL AREA(ACRES) = 163.4 PEAK FLOW RATE(CFS) = 28.86

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
-----

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	28.86	24.05	0.647	0.60( 0.43)	0.71	144.5	10380.00
2	21.06	36.17	0.514	0.60( 0.45)	0.75	163.4	10360.00

LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	71.16	24.58	0.638	0.60( 0.47)	0.78	257.8	10300.00
2	61.23	29.19	0.580	0.60( 0.46)	0.77	287.9	10320.00
3	58.40	32.88	0.544	0.60( 0.46)	0.77	297.4	10340.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	100.02	24.05	0.647	0.60( 0.45)	0.75	396.7	10380.00
2	99.68	24.58	0.638	0.60( 0.45)	0.75	403.1	10300.00
3	86.78	29.19	0.580	0.60( 0.45)	0.76	440.4	10320.00
4	81.58	32.88	0.544	0.60( 0.46)	0.76	455.7	10340.00
5	76.28	36.17	0.514	0.60( 0.46)	0.76	460.8	10360.00

TOTAL AREA(ACRES) = 460.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 100.02 Tc(MIN.) = 24.048  
 EFFECTIVE AREA(ACRES) = 396.74 AREA-AVERAGED Fm(INCH/HR) = 0.45  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.75  
 TOTAL AREA(ACRES) = 460.8  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

=====  
 END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 460.8 TC(MIN.) = 24.05  
 EFFECTIVE AREA(ACRES) = 396.74 AREA-AVERAGED Fm(INCH/HR)= 0.45  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.754  
 PEAK FLOW RATE(CFS) = 100.02

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	100.02	24.05	0.647	0.60( 0.45)	0.75	396.7	10380.00
2	99.68	24.58	0.638	0.60( 0.45)	0.75	403.1	10300.00
3	86.78	29.19	0.580	0.60( 0.45)	0.76	440.4	10320.00
4	81.58	32.88	0.544	0.60( 0.46)	0.76	455.7	10340.00
5	76.28	36.17	0.514	0.60( 0.46)	0.76	460.8	10360.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

FILE NAME: 0506104G.DAT
TIME/DATE OF STUDY: 12:47 04/15/2013

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 1.580
2) 6.00; 1.430
3) 7.00; 1.310
4) 8.00; 1.210
5) 9.00; 1.130
6) 10.00; 1.060
7) 11.00; 1.010
8) 12.00; 0.960
9) 13.00; 0.920
10) 14.00; 0.880
11) 15.00; 0.840
12) 20.00; 0.720
13) 25.00; 0.630
14) 30.00; 0.570
15) 40.00; 0.480
16) 50.00; 0.420
17) 60.00; 0.380
18) 90.00; 0.300
19) 120.00; 0.260
20) 180.00; 0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

Table with columns: NO., HALF WIDTH (FT), CROWN CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-SIDE, PARK-/SIDE/WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), LIP HIKE (FT), GEOMETRIES (FT), MANNING FACTOR (n). Rows 1-4.

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10400.00 TO NODE 10401.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 540.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.434
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.378
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
PUBLIC PARK - 0.50 0.60 0.850 95 6.43
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA RUNOFF(CFS) = 0.39
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 10401.00 TO NODE 10402.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 500.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.3419
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.39
FLOW VELOCITY(FEET/SEC.) = 4.09 FLOW DEPTH(FEET) = 0.18
TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 6.91
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10402.00 = 424.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10402.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 6.91
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.321
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.60 0.850 -
USER-DEFINED - 0.30 0.60 1.000 -



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.940  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 0.34  
EFFECTIVE AREA(ACRES) = 1.00 AREA-AVERAGED Fm(INCH/HR) = 0.54  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 0.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10402.00 TO NODE 10403.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.2439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.71  
FLOW VELOCITY(FEET/SEC.) = 4.31 FLOW DEPTH(FEET) = 0.23  
TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 7.39  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10403.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10403.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 7.39  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.271  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.60 0.850 -  
USER-DEFINED - 0.40 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 0.58  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.54  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.91  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 1.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10404.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 420.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 266.00 CHANNEL SLOPE = 0.1880  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.25  
FLOW VELOCITY(FEET/SEC.) = 4.38 FLOW DEPTH(FEET) = 0.31  
TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 8.40  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10404.00 = 813.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10404.00 IS CODE = 81  
-----

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

-----  
MAINLINE Tc(MIN.) = 8.40  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.178  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.60 0.850 -  
USER-DEFINED - 0.20 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.863  
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 1.37  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.53  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 2.45

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10405.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 370.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 289.00 CHANNEL SLOPE = 0.1730  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.45  
FLOW VELOCITY(FEET/SEC.) = 5.12 FLOW DEPTH(FEET) = 0.40  
TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 9.34  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10405.00 = 1102.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10405.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 9.34  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.106  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.60 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 2.15  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.52  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 4.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10406.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 367.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 23.00 CHANNEL SLOPE = 0.1304  
-----

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.33  
FLOW VELOCITY (FEET/SEC.) = 5.30 FLOW DEPTH (FEET) = 0.52  
TRAVEL TIME (MIN.) = 0.07 Tc (MIN.) = 9.41  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10406.00 = 1125.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.41  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.101  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 1.12  
EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.52  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 5.41

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 367.00 DOWNSTREAM (FEET) = 344.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 214.00 CHANNEL SLOPE = 0.1075  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 5.41  
FLOW VELOCITY (FEET/SEC.) = 5.17 FLOW DEPTH (FEET) = 0.59  
TRAVEL TIME (MIN.) = 0.69 Tc (MIN.) = 10.10  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10407.00 = 1339.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.10  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.055  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 0.98  
EFFECTIVE AREA (ACRES) = 12.30 AREA-AVERAGED Fm (INCH/HR) = 0.52  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 5.96

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 344.00 DOWNSTREAM (FEET) = 327.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 919.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 5.96  
FLOW VELOCITY (FEET/SEC.) = 3.44 FLOW DEPTH (FEET) = 0.76  
TRAVEL TIME (MIN.) = 4.45 Tc (MIN.) = 14.55  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10408.00 = 2258.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10408.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 14.55  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.858  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.800 -  
USER-DEFINED - 7.90 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.849  
SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 2.51  
EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.51  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 6.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 327.00 DOWNSTREAM (FEET) = 314.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 807.00 CHANNEL SLOPE = 0.0161  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 6.29  
FLOW VELOCITY (FEET/SEC.) = 3.29 FLOW DEPTH (FEET) = 0.80  
TRAVEL TIME (MIN.) = 4.09 Tc (MIN.) = 18.64  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10409.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10409.00 TO NODE 10409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 18.64  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.753  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

```

LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        6.90     0.60      0.800      -
USER-DEFINED  -        5.70     0.60      0.850      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.823
SUBAREA AREA (ACRES) = 12.60  SUBAREA RUNOFF (CFS) = 2.94
EFFECTIVE AREA (ACRES) = 32.90  AREA-AVERAGED Fm (INCH/HR) = 0.51
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.84
TOTAL AREA (ACRES) = 32.9  PEAK FLOW RATE (CFS) = 7.30

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*****
FLOW PROCESS FROM NODE 10409.00 TO NODE 10410.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 314.00  DOWNSTREAM(FEET) = 266.00
FLOW LENGTH(FEET) = 213.00  MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.41
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.30
PIPE TRAVEL TIME(MIN.) = 0.18  Tc(MIN.) = 18.83
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10410.00 = 3278.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10410.00 TO NODE 10411.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 266.00  DOWNSTREAM(FEET) = 170.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1470.00  CHANNEL SLOPE = 0.0653
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.30
FLOW VELOCITY(FEET/SEC.) = 5.74  FLOW DEPTH(FEET) = 0.65
TRAVEL TIME(MIN.) = 4.27  Tc(MIN.) = 23.10
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10411.00 = 4748.00 FEET.

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*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10411.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN.) = 23.10
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.664
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.60     0.60   0.100  -
USER-DEFINED      -        0.10     0.60   0.850  -
USER-DEFINED      -        0.40     0.60   0.100  -
USER-DEFINED      -        6.60     0.60   0.800  -
USER-DEFINED      -        0.80     0.60   0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.723

```

```

SUBAREA AREA(ACRES) = 8.50  SUBAREA RUNOFF(CFS) = 1.76
EFFECTIVE AREA(ACRES) = 41.40  AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.82
TOTAL AREA(ACRES) = 41.4  PEAK FLOW RATE(CFS) = 7.30
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10412.00 IS CODE = 31
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```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 170.00  DOWNSTREAM(FEET) = 161.00
FLOW LENGTH(FEET) = 1129.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.62
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.30
PIPE TRAVEL TIME(MIN.) = 3.35  Tc(MIN.) = 26.45
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10412.00 = 5877.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10412.00 TO NODE 10413.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 161.00  DOWNSTREAM(FEET) = 141.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 360.00  CHANNEL SLOPE = 0.0556
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.30
FLOW VELOCITY(FEET/SEC.) = 5.45  FLOW DEPTH(FEET) = 0.67
TRAVEL TIME(MIN.) = 1.10  Tc(MIN.) = 27.55
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10413.00 = 6237.00 FEET.

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*****
FLOW PROCESS FROM NODE 10413.00 TO NODE 10413.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 27.55
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.599
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        1.20     0.60   0.100  -
USER-DEFINED      -        0.40     0.60   0.850  -
USER-DEFINED      -        0.30     0.60   0.100  -
USER-DEFINED      -        0.10     0.60   0.850  -
USER-DEFINED      -        0.90     0.60   1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.509
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 2.90  SUBAREA RUNOFF(CFS) = 0.77
EFFECTIVE AREA(ACRES) = 44.30  AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.80

```

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED  $F_p$ ;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 44.3 PEAK FLOW RATE (CFS) = 7.30  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 44.3 TC (MIN.) = 27.55  
EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.48  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.60 AREA-AVERAGED  $A_p$  = 0.798  
PEAK FLOW RATE (CFS) = 7.30

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

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FILE NAME: 0506105N.DAT  
TIME/DATE OF STUDY: 12:50 04/15/2013  
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--\*TIME-OF-CONCENTRATION MODEL\*--  
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5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET

as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

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FLOW PROCESS FROM NODE 10500.00 TO NODE 10501.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.10      0.60       1.000      -
USER-DEFINED  -        0.80      0.60       1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 0.29
EFFECTIVE AREA (ACRES) = 1.40  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.4  PEAK FLOW RATE (CFS) = 0.45

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*****
FLOW PROCESS FROM NODE 10502.00 TO NODE 10503.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1025.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 193.00  CHANNEL SLOPE = 0.1295
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.45
FLOW VELOCITY(FEET/SEC.) = 2.99  FLOW DEPTH(FEET) = 0.22
TRAVEL TIME(MIN.) = 1.07  Tc(MIN.) = 13.13
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10503.00 = 700.00 FEET.

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10503.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.915
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.50   0.60  1.000  -
USER-DEFINED      -        1.80   0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 0.65
EFFECTIVE AREA (ACRES) = 3.70  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 3.7  PEAK FLOW RATE (CFS) = 1.05

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10504.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1025.00  DOWNSTREAM(FEET) = 1020.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00  CHANNEL SLOPE = 0.0151
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.05
FLOW VELOCITY(FEET/SEC.) = 2.03  FLOW DEPTH(FEET) = 0.41
TRAVEL TIME(MIN.) = 2.72  Tc(MIN.) = 15.85
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10504.00 = 1032.00 FEET.

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10504.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.85
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.820
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.10   0.60  1.000  -
USER-DEFINED      -        0.80   0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 0.18
EFFECTIVE AREA (ACRES) = 4.60  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.6  PEAK FLOW RATE (CFS) = 1.05
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10505.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1020.00  DOWNSTREAM(FEET) = 975.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 397.00  CHANNEL SLOPE = 0.1134
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.05
FLOW VELOCITY(FEET/SEC.) = 4.30  FLOW DEPTH(FEET) = 0.29
TRAVEL TIME(MIN.) = 1.54  Tc(MIN.) = 17.39
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10505.00 = 1429.00 FEET.

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10505.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 17.39
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.783
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.20   0.60  1.000  -
USER-DEFINED      -        1.20   0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.40  SUBAREA RUNOFF (CFS) = 0.23
EFFECTIVE AREA (ACRES) = 6.00  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.0  PEAK FLOW RATE (CFS) = 1.05
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10505.00 TO NODE 10506.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 905.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 334.00 CHANNEL SLOPE = 0.2096
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.05
FLOW VELOCITY(FEET/SEC.) = 5.39 FLOW DEPTH(FEET) = 0.25
TRAVEL TIME(MIN.) = 1.03 Tc(MIN.) = 18.42
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10506.00 = 1763.00 FEET.

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10506.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.42
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.758
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         6.10     0.60     1.000   -
USER-DEFINED        -         3.70     0.60     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 1.39
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 2.25

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10507.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 790.00 CHANNEL SLOPE = 0.0380
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.25
FLOW VELOCITY(FEET/SEC.) = 2.83 FLOW DEPTH(FEET) = 0.51
TRAVEL TIME(MIN.) = 4.65 Tc(MIN.) = 23.07
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10507.00 = 2553.00 FEET.

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10507.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 23.07
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.665
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.70     0.60     1.000   -

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USER-DEFINED        -         6.30     0.60     1.000   -
USER-DEFINED        -         0.30     0.60     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 0.54
EFFECTIVE AREA(ACRES) = 25.10 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 2.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10508.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 755.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.25
FLOW VELOCITY(FEET/SEC.) = 4.16 FLOW DEPTH(FEET) = 0.42
TRAVEL TIME(MIN.) = 4.49 Tc(MIN.) = 27.56
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10508.00 = 3673.00 FEET.

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10508.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 27.56
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.599
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.80     0.60     1.000   -
USER-DEFINED        -        11.10     0.60     1.000   -
USER-DEFINED        -         3.10     0.60     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 40.10 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 2.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10509.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 755.00 DOWNSTREAM(FEET) = 533.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1578.00 CHANNEL SLOPE = 0.1407

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CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.25  
FLOW VELOCITY (FEET/SEC.) = 4.65 FLOW DEPTH (FEET) = 0.40  
TRAVEL TIME (MIN.) = 5.66 Tc (MIN.) = 33.22  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10509.00 = 5251.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10509.00 TO NODE 10509.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 33.22

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.541

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.80	0.60	1.000	-
USER-DEFINED	-	11.40	0.60	1.000	-
USER-DEFINED	-	1.10	0.60	1.000	-
USER-DEFINED	-	8.30	0.60	1.000	-
USER-DEFINED	-	38.10	0.60	1.000	-
USER-DEFINED	-	8.70	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA (ACRES) = 77.40 SUBAREA RUNOFF (CFS) = 0.00

EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 2.25

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10509.00 TO NODE 10510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 415.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1236.00 CHANNEL SLOPE = 0.0955  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.25  
FLOW VELOCITY (FEET/SEC.) = 4.01 FLOW DEPTH (FEET) = 0.43  
TRAVEL TIME (MIN.) = 5.13 Tc (MIN.) = 38.35  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10510.00 = 6487.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10510.00 TO NODE 10510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 38.35

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.495

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	30.10	0.60	1.000	-
USER-DEFINED	-	15.30	0.60	1.000	-
USER-DEFINED	-	2.00	0.60	1.000	-
USER-DEFINED	-	11.30	0.60	1.000	-
USER-DEFINED	-	5.10	0.60	1.000	-
USER-DEFINED	-	1.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA (ACRES) = 64.90 SUBAREA RUNOFF (CFS) = 0.00

EFFECTIVE AREA (ACRES) = 182.40 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 182.4 PEAK FLOW RATE (CFS) = 2.25

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10510.00 TO NODE 10511.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 302.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1161.00 CHANNEL SLOPE = 0.0973  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.25  
FLOW VELOCITY (FEET/SEC.) = 4.01 FLOW DEPTH (FEET) = 0.43  
TRAVEL TIME (MIN.) = 4.82 Tc (MIN.) = 43.18  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10511.00 = 7648.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10511.00 TO NODE 10511.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 43.18

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.461

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.50	0.60	1.000	-
USER-DEFINED	-	10.80	0.60	1.000	-
USER-DEFINED	-	1.10	0.60	1.000	-
USER-DEFINED	-	22.10	0.60	1.000	-
USER-DEFINED	-	4.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA (ACRES) = 54.80 SUBAREA RUNOFF (CFS) = 0.00

EFFECTIVE AREA (ACRES) = 237.20 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;



\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 237.2 PEAK FLOW RATE (CFS) = 2.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10511.00 TO NODE 10512.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) =	302.00	DOWNSTREAM (FEET) =	190.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	1644.00	CHANNEL SLOPE =	0.0681
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	4.00
CHANNEL FLOW THRU SUBAREA (CFS) =	2.25		
FLOW VELOCITY (FEET/SEC.) =	3.53	FLOW DEPTH (FEET) =	0.46
TRAVEL TIME (MIN.) =	7.76	Tc (MIN.) =	50.94
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10512.00 =	9292.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10512.00 TO NODE 10512.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc (MIN.) =	50.94				
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.416				
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.50	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	1.70	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	14.20	0.60	1.000	-
USER-DEFINED	-	2.80	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA (ACRES) = 19.50 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 256.70 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 256.7 PEAK FLOW RATE (CFS) = 2.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10512.00 TO NODE 10513.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	190.00	DOWNSTREAM (FEET) =	183.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	86.00	CHANNEL SLOPE =	0.0814
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	4.00
CHANNEL FLOW THRU SUBAREA (CFS) =	2.25		

FLOW VELOCITY (FEET/SEC.) = 3.78 FLOW DEPTH (FEET) = 0.45  
TRAVEL TIME (MIN.) = 0.38 Tc (MIN.) = 51.32  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10513.00 = 9378.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) =	51.32				
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.415				
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	1.30	0.60	1.000	-
USER-DEFINED	-	29.90	0.60	1.000	-
USER-DEFINED	-	11.90	0.60	1.000	-
USER-DEFINED	-	1.70	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA (ACRES) = 45.50 SUBAREA RUNOFF (CFS) = 0.24  
EFFECTIVE AREA (ACRES) = 302.20 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 302.2 PEAK FLOW RATE (CFS) = 2.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) =	51.32				
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.415				
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	9.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA (ACRES) = 9.30 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 311.50 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 311.5 PEAK FLOW RATE (CFS) = 2.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10513.00 TO NODE 10514.00 IS CODE = 31  
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 171.00
FLOW LENGTH(FEET) = 1209.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.54
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.25
PIPE TRAVEL TIME(MIN.) = 4.43 Tc(MIN.) = 55.75
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10514.00 = 10587.00 FEET.

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FLOW PROCESS FROM NODE 10514.00 TO NODE 10514.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 55.75
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.397
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.60 0.100 -
USER-DEFINED - 0.40 0.60 1.000 -
USER-DEFINED - 1.70 0.60 0.100 -
USER-DEFINED - 31.30 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 33.60 SUBAREA RUNOFF(CFS) = 0.61
EFFECTIVE AREA(ACRES) = 345.10 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 345.1 PEAK FLOW RATE(CFS) = 2.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10515.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 171.00 DOWNSTREAM(FEET) = 165.00
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.66
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.25
PIPE TRAVEL TIME(MIN.) = 2.02 Tc(MIN.) = 57.78
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10515.00 = 11152.00 FEET.

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*****
FLOW PROCESS FROM NODE 10515.00 TO NODE 10515.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 57.78
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.389
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.60 0.850 -
USER-DEFINED - 1.30 0.60 0.100 -
USER-DEFINED - 0.90 0.60 0.850 -
USER-DEFINED - 15.30 0.60 0.100 -
USER-DEFINED - 1.10 0.60 0.850 -
USER-DEFINED - 0.10 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.202
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 5.36
EFFECTIVE AREA(ACRES) = 364.30 AREA-AVERAGED Fm(INCH/HR) = 0.57
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 364.3 PEAK FLOW RATE(CFS) = 6.18

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*****
FLOW PROCESS FROM NODE 10515.00 TO NODE 10525.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00
FLOW LENGTH(FEET) = 709.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.91
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 6.18
PIPE TRAVEL TIME(MIN.) = 2.00 Tc(MIN.) = 59.78
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

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*****
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 59.78
RAINFALL INTENSITY(INCH/HR) = 0.38
AREA-AVERAGED Fm(INCH/HR) = 0.57
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.95
EFFECTIVE STREAM AREA(ACRES) = 364.30
TOTAL STREAM AREA(ACRES) = 364.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.18

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*****
FLOW PROCESS FROM NODE 10520.00 TO NODE 10521.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 289.00  
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 180.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.311  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.279

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.30	0.60	0.100	95	7.31
PUBLIC PARK	-	1.20	0.60	0.850	95	11.62

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.700

SUBAREA RUNOFF(CFS) = 1.16

TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 1.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 10521.00 TO NODE 10522.00 IS CODE = 63

-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 180.00 DOWNSTREAM ELEVATION(FEET) = 176.00  
STREET LENGTH(FEET) = 408.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.95  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.27  
HALFSTREET FLOOD WIDTH(FEET) = 5.66  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.92  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.52  
STREET FLOW TRAVEL TIME(MIN.) = 3.55 Tc(MIN.) = 10.86  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.017

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	0.100	-
USER-DEFINED	-	0.60	0.60	0.850	-
USER-DEFINED	-	0.60	0.60	0.100	-
USER-DEFINED	-	0.80	0.60	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520

SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 1.59

EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.35

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 2.39

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 6.47  
FLOW VELOCITY(FEET/SEC.) = 1.97 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.57  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10522.00 = 697.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10522.00 TO NODE 10523.00 IS CODE = 63

-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 176.00 DOWNSTREAM ELEVATION(FEET) = 173.00  
STREET LENGTH(FEET) = 333.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.42  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 9.22  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.13  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.73  
STREET FLOW TRAVEL TIME(MIN.) = 2.61 Tc(MIN.) = 13.47  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.901

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	0.100	-
USER-DEFINED	-	4.70	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.600	-
USER-DEFINED	-	0.10	0.60	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.109

SUBAREA AREA(ACRES) = 5.40 SUBAREA RUNOFF(CFS) = 4.06

EFFECTIVE AREA(ACRES) = 9.40 AREA-AVERAGED Fm(INCH/HR) = 0.19

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31

TOTAL AREA(ACRES) = 9.4 PEAK FLOW RATE(CFS) = 6.04

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.66  
FLOW VELOCITY(FEET/SEC.) = 2.28 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.85  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10523.00 = 1030.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10523.00 TO NODE 10523.00 IS CODE = 81

-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 13.47  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.901  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	1.90	0.60	0.850	-
USER-DEFINED	-	0.80	0.60	0.100	-
USER-DEFINED	-	4.80	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	4.90	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785  
 SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 4.92  
 EFFECTIVE AREA(ACRES) = 22.10 AREA-AVERAGED Fm(INCH/HR) = 0.35  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA(ACRES) = 22.1 PEAK FLOW RATE(CFS) = 10.96

\*\*\*\*\*

FLOW PROCESS FROM NODE 10523.00 TO NODE 10524.00 IS CODE = 31

-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 173.00 DOWNSTREAM(FEET) = 165.00  
 FLOW LENGTH(FEET) = 736.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.05  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 10.96  
 PIPE TRAVEL TIME(MIN.) = 1.74 Tc(MIN.) = 15.21  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10524.00 = 1766.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10524.00 TO NODE 10524.00 IS CODE = 81

-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 15.21  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.835  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.90	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.308  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 1.05  
 EFFECTIVE AREA(ACRES) = 23.90 AREA-AVERAGED Fm(INCH/HR) = 0.34  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.56  
 TOTAL AREA(ACRES) = 23.9 PEAK FLOW RATE(CFS) = 10.96  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10524.00 TO NODE 10525.00 IS CODE = 31

-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
 FLOW LENGTH(FEET) = 623.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.14  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 10.96  
 PIPE TRAVEL TIME(MIN.) = 1.45 Tc(MIN.) = 16.66  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10525.00 = 2389.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 81

-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 16.66  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.800  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	6.80	0.60	0.850	-
USER-DEFINED	-	0.90	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
 SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 2.36  
 EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.39  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.64  
 TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 12.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 16.66  
 RAINFALL INTENSITY(INCH/HR) = 0.80  
 AREA-AVERAGED Fm(INCH/HR) = 0.39  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.64  
 EFFECTIVE STREAM AREA(ACRES) = 33.00  
 TOTAL STREAM AREA(ACRES) = 33.00  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.30

\*\*\*\*\*

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	6.18	59.78	0.381	0.60( 0.57)	0.95	364.3	10500.00
2	12.30	16.66	0.800	0.60( 0.39)	0.64	33.0	10520.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	18.48	16.66	0.800	0.60( 0.53)	0.88	134.6	10520.00
2	10.21	59.78	0.381	0.60( 0.56)	0.93	397.3	10500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 18.48 Tc(MIN.) = 16.66  
EFFECTIVE AREA(ACRES) = 134.56 AREA-AVERAGED Fm(INCH/HR) = 0.53  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 397.3  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10525.00 TO NODE 10526.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 158.00 DOWNSTREAM(FEET) = 148.00  
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 28.99  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 18.48  
PIPE TRAVEL TIME(MIN.) = 0.02 Tc(MIN.) = 16.68  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10526.00 = 11891.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10526.00 TO NODE 10527.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 148.00 DOWNSTREAM(FEET) = 135.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 296.00 CHANNEL SLOPE = 0.0439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 18.48  
FLOW VELOCITY(FEET/SEC.) = 6.30 FLOW DEPTH(FEET) = 0.99  
TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 17.46  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10527.00 = 12187.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.46  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.781  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 0.30 0.60 1.000 -  
USER-DEFINED - 0.80 0.60 1.000 -  
USER-DEFINED - 0.20 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 0.23  
EFFECTIVE AREA(ACRES) = 135.96 AREA-AVERAGED Fm(INCH/HR) = 0.53  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 398.7 PEAK FLOW RATE(CFS) = 31.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.46  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.781  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.100 -  
USER-DEFINED - 1.10 0.60 1.000 -  
USER-DEFINED - 0.40 0.60 1.000 -  
USER-DEFINED - 1.10 0.60 1.000 -  
USER-DEFINED - 2.20 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.982  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 0.85  
EFFECTIVE AREA(ACRES) = 140.86 AREA-AVERAGED Fm(INCH/HR) = 0.53  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 403.6 PEAK FLOW RATE(CFS) = 32.00

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 403.6 TC(MIN.) = 17.46  
EFFECTIVE AREA(ACRES) = 140.86 AREA-AVERAGED Fm(INCH/HR) = 0.53  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.881  
PEAK FLOW RATE(CFS) = 32.00

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	32.00	17.46	0.781	0.60( 0.53)	0.88	140.9	10520.00
2	10.21	60.70	0.378	0.60( 0.56)	0.93	403.6	10500.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506106G.DAT  
TIME/DATE OF STUDY: 12:52 04/15/2013  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 1.580
- 2) 6.00; 1.430
- 3) 7.00; 1.310
- 4) 8.00; 1.210
- 5) 9.00; 1.130
- 6) 10.00; 1.060
- 7) 11.00; 1.010
- 8) 12.00; 0.960
- 9) 13.00; 0.920
- 10) 14.00; 0.880
- 11) 15.00; 0.840
- 12) 20.00; 0.720
- 13) 25.00; 0.630
- 14) 30.00; 0.570
- 15) 40.00; 0.480
- 16) 50.00; 0.420
- 17) 60.00; 0.380
- 18) 90.00; 0.300
- 19) 120.00; 0.260
- 20) 180.00; 0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10600.00 TO NODE 10601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 311.00  
ELEVATION DATA: UPSTREAM(FEET) = 166.00 DOWNSTREAM(FEET) = 164.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.602  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.030  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	-	0.50	0.60	0.500	95	10.60
PUBLIC PARK	-	0.60	0.60	0.850	95	13.16

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.691  
 SUBAREA RUNOFF(CFS) = 0.61  
 TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 0.61

\*\*\*\*\*

FLOW PROCESS FROM NODE 10601.00 TO NODE 10602.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 164.00 DOWNSTREAM ELEVATION(FEET) = 162.00  
STREET LENGTH(FEET) = 220.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.20  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.24  
HALFSTREET FLOOD WIDTH(FEET) = 3.84  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.78

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.42  
 STREET FLOW TRAVEL TIME (MIN.) = 2.06 Tc (MIN.) = 12.66  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.933  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	1.80	0.60	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.517  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 1.18  
 EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.35  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 1.69

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.26 HALFSTREET FLOOD WIDTH (FEET) = 5.28  
 FLOW VELOCITY (FEET/SEC.) = 1.81 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.48  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10602.00 = 531.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10602.00 TO NODE 10603.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 162.00 DOWNSTREAM ELEVATION (FEET) = 159.00  
 STREET LENGTH (FEET) = 328.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.59  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.30  
 HALFSTREET FLOOD WIDTH (FEET) = 6.91  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.94  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.58  
 STREET FLOW TRAVEL TIME (MIN.) = 2.81 Tc (MIN.) = 15.48  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.829

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.60	0.500	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	2.40	0.60	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527  
 SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 1.80

EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.33  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 3.19

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.31 HALFSTREET FLOOD WIDTH (FEET) = 7.78  
 FLOW VELOCITY (FEET/SEC.) = 2.01 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.63  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10603.00 = 859.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10603.00 TO NODE 10604.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 159.00 DOWNSTREAM ELEVATION (FEET) = 155.00  
 STREET LENGTH (FEET) = 465.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.66  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.35  
 HALFSTREET FLOOD WIDTH (FEET) = 9.53  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.12  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.74  
 STREET FLOW TRAVEL TIME (MIN.) = 3.66 Tc (MIN.) = 19.13  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.741

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.60	0.500	-
USER-DEFINED	-	0.40	0.60	0.850	-
USER-DEFINED	-	3.00	0.60	0.500	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.513  
 SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 2.92  
 EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.32  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 5.55

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 10.35  
 FLOW VELOCITY (FEET/SEC.) = 2.20 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.80  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10604.00 = 1324.00 FEET.



```

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10604.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 19.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.741
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.60  0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.10   SUBAREA RUNOFF(CFS) = 0.02
EFFECTIVE AREA(ACRES) = 14.70   AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 14.7   PEAK FLOW RATE(CFS) = 5.57

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10605.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 155.00   DOWNSTREAM(FEET) = 140.00
FLOW LENGTH(FEET) = 214.00   MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.84
ESTIMATED PIPE DIAMETER(INCH) = 18.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.57
PIPE TRAVEL TIME(MIN.) = 0.30   Tc(MIN.) = 19.43
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10605.00 = 1538.00 FEET.

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10605.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 19.43
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.734
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20   0.60  0.100  -
USER-DEFINED        -         1.70   0.60  0.100  -
USER-DEFINED        -        10.20   0.60  0.800  -
USER-DEFINED        -         2.90   0.60  0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.682
SUBAREA AREA(ACRES) = 16.00   SUBAREA RUNOFF(CFS) = 4.67
EFFECTIVE AREA(ACRES) = 30.70   AREA-AVERAGED Fm(INCH/HR) = 0.37
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 30.7   PEAK FLOW RATE(CFS) = 10.15

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10606.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 140.00   DOWNSTREAM(FEET) = 133.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00   CHANNEL SLOPE = 0.0400
CHANNEL BASE(FEET) = 0.00   "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.15
FLOW VELOCITY(FEET/SEC.) = 5.21   FLOW DEPTH(FEET) = 0.81
TRAVEL TIME(MIN.) = 0.56   Tc(MIN.) = 19.99
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10606.00 = 1713.00 FEET.

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 19.99
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.720
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.60  0.500  -
USER-DEFINED        -         0.30   0.60  0.850  -
USER-DEFINED        -         0.10   0.60  1.000  -
USER-DEFINED        -         1.10   0.60  1.000  -
USER-DEFINED        -         0.10   0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 1.80   SUBAREA RUNOFF(CFS) = 0.27
EFFECTIVE AREA(ACRES) = 32.50   AREA-AVERAGED Fm(INCH/HR) = 0.38
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 32.5   PEAK FLOW RATE(CFS) = 10.15
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 19.99
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.720
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40   0.60  0.850  -
USER-DEFINED        -         1.20   0.60  1.000  -
USER-DEFINED        -         0.10   0.60  1.000  -
USER-DEFINED        -         1.80   0.60  1.000  -
USER-DEFINED        -         0.10   0.60  0.850  -
USER-DEFINED        -         0.20   0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980
SUBAREA AREA(ACRES) = 3.80   SUBAREA RUNOFF(CFS) = 0.45
EFFECTIVE AREA(ACRES) = 36.30   AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.66
TOTAL AREA(ACRES) = 36.3   PEAK FLOW RATE(CFS) = 10.50

```

\*\*\*\*\*

FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 19.99

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.720

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.06

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.40

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.67

TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 10.57

=====  
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 36.9 TC(MIN.) = 19.99

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR)= 0.40

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.670

PEAK FLOW RATE(CFS) = 10.57

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 2 Yr \*  
\* From Node: 50100 To Node: 50167 \*  
\*\*\*\*\*

FILE NAME: 0610501T.DAT  
TIME/DATE OF STUDY: 08:39 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.864
- 2) 10.00; 1.243
- 3) 15.00; 0.947
- 4) 20.00; 0.775
- 5) 25.00; 0.668
- 6) 30.00; 0.592
- 7) 40.00; 0.510
- 8) 50.00; 0.453
- 9) 60.00; 0.412
- 10) 90.00; 0.349
- 11) 120.00; 0.305
- 12) 180.00; 0.256
- 13) 360.00; 0.189
- 14) 1440.00; 0.083

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50100.00 TO NODE 50101.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00  
ELEVATION DATA: UPSTREAM(FEET) = 1072.00 DOWNSTREAM(FEET) = 1063.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.598  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.971  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.60	0.60	1.000	0	14.60

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.20  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50101.00 TO NODE 50102.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1063.00 DOWNSTREAM(FEET) = 975.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 273.00 CHANNEL SLOPE = 0.3223  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.918  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.29	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.63  
AVERAGE FLOW DEPTH(FEET) = 0.15 TRAVEL TIME(MIN.) = 1.25  
Tc(MIN.) = 15.85  
SUBAREA AREA(ACRES) = 0.29 SUBAREA RUNOFF(CFS) = 0.08  
EFFECTIVE AREA(ACRES) = 0.90 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 0.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.16 FLOW VELOCITY(FEET/SEC.) = 3.55  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50102.00 = 597.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50102.00 TO NODE 50103.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	975.00	DOWNSTREAM(FEET) =	948.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	111.00	CHANNEL SLOPE =	0.2432
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.898		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.22	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.29

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.28

AVERAGE FLOW DEPTH(FEET) = 0.17 TRAVEL TIME(MIN.) = 0.56

Tc(MIN.) = 16.41

SUBAREA AREA(ACRES) = 0.22 SUBAREA RUNOFF(CFS) = 0.06

EFFECTIVE AREA(ACRES) = 1.12 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 0.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.17 FLOW VELOCITY(FEET/SEC.) = 3.44

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50103.00 = 708.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50103.00 TO NODE 50104.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	948.00	DOWNSTREAM(FEET) =	914.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	136.00	CHANNEL SLOPE =	0.2500
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.877		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.37

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.61

AVERAGE FLOW DEPTH(FEET) = 0.19 TRAVEL TIME(MIN.) = 0.63

Tc(MIN.) = 17.04

SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 0.15

EFFECTIVE AREA(ACRES) = 1.71 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 0.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.19 FLOW VELOCITY(FEET/SEC.) = 3.80

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50104.00 = 844.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50104.00 TO NODE 50105.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	914.00	DOWNSTREAM(FEET) =	895.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	52.00	CHANNEL SLOPE =	0.3654
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.871		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.73	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.64

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.78

AVERAGE FLOW DEPTH(FEET) = 0.21 TRAVEL TIME(MIN.) = 0.18

Tc(MIN.) = 17.22

SUBAREA AREA(ACRES) = 1.73 SUBAREA RUNOFF(CFS) = 0.42

EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 0.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.23 FLOW VELOCITY(FEET/SEC.) = 5.20

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50105.00 = 896.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50106.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	895.00	DOWNSTREAM(FEET) =	835.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	280.00	CHANNEL SLOPE =	0.2143
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.836		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.24

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.60

AVERAGE FLOW DEPTH(FEET) = 0.30 TRAVEL TIME(MIN.) = 1.02

Tc(MIN.) = 18.24

SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 0.81

EFFECTIVE AREA(ACRES) = 7.24 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 7.2 PEAK FLOW RATE (CFS) = 1.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.32 FLOW VELOCITY (FEET/SEC.) = 4.91  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50106.00 = 1176.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50106.00 TO NODE 50107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 835.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 413.00 CHANNEL SLOPE = 0.2179  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.791

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.53	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.93  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.31  
AVERAGE FLOW DEPTH (FEET) = 0.35 TRAVEL TIME (MIN.) = 1.30  
Tc (MIN.) = 19.54

SUBAREA AREA (ACRES) = 4.53 SUBAREA RUNOFF (CFS) = 0.78  
EFFECTIVE AREA (ACRES) = 11.77 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.8 PEAK FLOW RATE (CFS) = 2.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.36 FLOW VELOCITY (FEET/SEC.) = 5.34  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50107.00 = 1589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50107.00 TO NODE 50108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 302.00 CHANNEL SLOPE = 0.2318  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.766

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.76	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.46  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.72  
AVERAGE FLOW DEPTH (FEET) = 0.38 TRAVEL TIME (MIN.) = 0.88  
Tc (MIN.) = 20.42

SUBAREA AREA (ACRES) = 5.76 SUBAREA RUNOFF (CFS) = 0.86  
EFFECTIVE AREA (ACRES) = 17.54 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.5 PEAK FLOW RATE (CFS) = 2.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.39 FLOW VELOCITY (FEET/SEC.) = 5.87  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50108.00 = 1891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50108.00 TO NODE 50109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 655.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 81.00 CHANNEL SLOPE = 0.2469  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.762

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.77	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.78  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.51  
AVERAGE FLOW DEPTH (FEET) = 0.44 TRAVEL TIME (MIN.) = 0.21  
Tc (MIN.) = 20.62

SUBAREA AREA (ACRES) = 15.77 SUBAREA RUNOFF (CFS) = 2.30  
EFFECTIVE AREA (ACRES) = 33.31 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 33.3 PEAK FLOW RATE (CFS) = 4.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.48 FLOW VELOCITY (FEET/SEC.) = 6.92  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50109.00 = 1972.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 655.00 DOWNSTREAM (FEET) = 590.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 379.00 CHANNEL SLOPE = 0.1715  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.740

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.53	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.58  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.23

AVERAGE FLOW DEPTH(FEET) = 0.55 TRAVEL TIME(MIN.) = 1.01  
Tc(MIN.) = 21.64  
SUBAREA AREA(ACRES) = 11.53 SUBAREA RUNOFF(CFS) = 1.45  
EFFECTIVE AREA(ACRES) = 44.84 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 44.8 PEAK FLOW RATE(CFS) = 5.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.55 FLOW VELOCITY(FEET/SEC.) = 6.31  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50110.00 = 2351.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50110.00 TO NODE 50111.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 570.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 340.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.713

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	27.15	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.03

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.43

AVERAGE FLOW DEPTH(FEET) = 0.73 TRAVEL TIME(MIN.) = 1.28

Tc(MIN.) = 22.92

SUBAREA AREA(ACRES) = 27.15 SUBAREA RUNOFF(CFS) = 2.75

EFFECTIVE AREA(ACRES) = 71.99 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 72.0 PEAK FLOW RATE(CFS) = 7.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.74 FLOW VELOCITY(FEET/SEC.) = 4.48

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50111.00 = 2691.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50111.00 TO NODE 50112.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 567.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 403.00 CHANNEL SLOPE = 0.0074  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.652

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	66.68	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.94  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.17  
AVERAGE FLOW DEPTH(FEET) = 1.17 TRAVEL TIME(MIN.) = 3.10  
Tc(MIN.) = 26.02  
SUBAREA AREA(ACRES) = 66.68 SUBAREA RUNOFF(CFS) = 3.15  
EFFECTIVE AREA(ACRES) = 138.68 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 138.7 PEAK FLOW RATE(CFS) = 7.30  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.09 FLOW VELOCITY(FEET/SEC.) = 2.06

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50112.00 = 3094.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50112.00 TO NODE 50140.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 26.02

RAINFALL INTENSITY(INCH/HR) = 0.65

AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60

AREA-AVERAGED Ap = 1.00

EFFECTIVE STREAM AREA(ACRES) = 138.68

TOTAL STREAM AREA(ACRES) = 138.68

PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50120.00 TO NODE 50121.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00

ELEVATION DATA: UPSTREAM(FEET) = 1068.00 DOWNSTREAM(FEET) = 968.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.018

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.365

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	-	0.29	0.60	1.000	0	9.02

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF(CFS) = 0.20

TOTAL AREA(ACRES) = 0.29 PEAK FLOW RATE(CFS) = 0.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50121.00 TO NODE 50122.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 968.00 DOWNSTREAM(FEET) = 916.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 242.00 CHANNEL SLOPE = 0.2149  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.231  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.55	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.35  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.41  
 AVERAGE FLOW DEPTH(FEET) = 0.19 TRAVEL TIME(MIN.) = 1.18  
 Tc(MIN.) = 10.20  
 SUBAREA AREA(ACRES) = 0.55 SUBAREA RUNOFF(CFS) = 0.31  
 EFFECTIVE AREA(ACRES) = 0.83 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 0.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.21 FLOW VELOCITY(FEET/SEC.) = 3.62  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50122.00 = 566.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50122.00 TO NODE 50123.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 916.00 DOWNSTREAM(FEET) = 906.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 111.00 CHANNEL SLOPE = 0.0901  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.192  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.68	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.66  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.83  
 AVERAGE FLOW DEPTH(FEET) = 0.28 TRAVEL TIME(MIN.) = 0.65  
 Tc(MIN.) = 10.85  
 SUBAREA AREA(ACRES) = 0.68 SUBAREA RUNOFF(CFS) = 0.36  
 EFFECTIVE AREA(ACRES) = 1.51 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 1.5 PEAK FLOW RATE(CFS) = 0.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.30 FLOW VELOCITY(FEET/SEC.) = 2.98  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50123.00 = 677.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50123.00 TO NODE 50124.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 ELEVATION DATA: UPSTREAM(FEET) = 906.00 DOWNSTREAM(FEET) = 903.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0500  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.169  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.96  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.52  
 AVERAGE FLOW DEPTH(FEET) = 0.36 TRAVEL TIME(MIN.) = 0.40  
 Tc(MIN.) = 11.25  
 SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 0.30  
 EFFECTIVE AREA(ACRES) = 2.10 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 2.1 PEAK FLOW RATE(CFS) = 1.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.37 FLOW VELOCITY(FEET/SEC.) = 2.61  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50124.00 = 737.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50124.00 TO NODE 50125.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 903.00 DOWNSTREAM(FEET) = 901.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 29.00 CHANNEL SLOPE = 0.0690  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.160  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.44	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.44  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.12  
 AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 0.15  
 Tc(MIN.) = 11.41  
 SUBAREA AREA(ACRES) = 1.44 SUBAREA RUNOFF(CFS) = 0.73  
 EFFECTIVE AREA(ACRES) = 3.54 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 3.5 PEAK FLOW RATE(CFS) = 1.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.42 FLOW VELOCITY(FEET/SEC.) = 3.33  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50125.00 = 766.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50125.00 TO NODE 50126.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) =	901.00	DOWNSTREAM(FEET) =	889.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	130.00	CHANNEL SLOPE =	0.0923
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.128		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.69	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.42  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.04  
AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.54  
Tc(MIN.) = 11.94  
SUBAREA AREA(ACRES) = 2.69 SUBAREA RUNOFF(CFS) = 1.28  
EFFECTIVE AREA(ACRES) = 6.23 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 6.2 PEAK FLOW RATE(CFS) = 2.96

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.48 FLOW VELOCITY(FEET/SEC.) = 4.23  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50126.00 = 896.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50126.00 TO NODE 50127.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) =	889.00	DOWNSTREAM(FEET) =	855.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	231.00	CHANNEL SLOPE =	0.1472
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.085		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.18	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.44  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.23  
AVERAGE FLOW DEPTH(FEET) = 0.47 TRAVEL TIME(MIN.) = 0.74  
Tc(MIN.) = 12.68  
SUBAREA AREA(ACRES) = 2.18 SUBAREA RUNOFF(CFS) = 0.95  
EFFECTIVE AREA(ACRES) = 8.41 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 3.67

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.48 FLOW VELOCITY(FEET/SEC.) = 5.36  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50127.00 = 1127.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50127.00 TO NODE 50128.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) =	855.00	DOWNSTREAM(FEET) =	793.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	211.00	CHANNEL SLOPE =	0.2938
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.056		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.70	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.84  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.36  
AVERAGE FLOW DEPTH(FEET) = 0.47 TRAVEL TIME(MIN.) = 0.48  
Tc(MIN.) = 13.16  
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 2.34  
EFFECTIVE AREA(ACRES) = 14.11 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.1 PEAK FLOW RATE(CFS) = 5.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.50 FLOW VELOCITY(FEET/SEC.) = 7.71  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50128.00 = 1338.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50128.00 TO NODE 50129.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) =	793.00	DOWNSTREAM(FEET) =	708.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	353.00	CHANNEL SLOPE =	0.2408
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.011		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.99	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.64  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.65  
AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 0.77  
Tc(MIN.) = 13.92  
SUBAREA AREA(ACRES) = 9.99 SUBAREA RUNOFF(CFS) = 3.70  
EFFECTIVE AREA(ACRES) = 24.10 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 8.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.61 FLOW VELOCITY(FEET/SEC.) = 8.05



LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50129.00 = 1691.00 FEET.

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FLOW PROCESS FROM NODE 50129.00 TO NODE 50130.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 708.00 DOWNSTREAM(FEET) = 571.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 735.00 CHANNEL SLOPE = 0.1864
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.929
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 13.71 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.95
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.63
AVERAGE FLOW DEPTH(FEET) = 0.69 TRAVEL TIME(MIN.) = 1.60
Tc(MIN.) = 15.53
SUBAREA AREA(ACRES) = 13.71 SUBAREA RUNOFF(CFS) = 4.06
EFFECTIVE AREA(ACRES) = 37.82 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 11.20

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.70 FLOW VELOCITY(FEET/SEC.) = 7.68
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50130.00 = 2426.00 FEET.

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FLOW PROCESS FROM NODE 50130.00 TO NODE 50131.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 571.00 DOWNSTREAM(FEET) = 566.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 709.00 CHANNEL SLOPE = 0.0071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.762
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.71 0.60 0.986 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.82
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.33
AVERAGE FLOW DEPTH(FEET) = 1.36 TRAVEL TIME(MIN.) = 5.08
Tc(MIN.) = 20.61
SUBAREA AREA(ACRES) = 20.71 SUBAREA RUNOFF(CFS) = 3.18
EFFECTIVE AREA(ACRES) = 58.52 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 11.20
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.29 FLOW VELOCITY(FEET/SEC.) = 2.26
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50131.00 = 3135.00 FEET.

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FLOW PROCESS FROM NODE 50132.00 TO NODE 50131.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.61
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.762
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 154.02 0.60 0.949 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 154.02 SUBAREA RUNOFF(CFS) = 26.73
EFFECTIVE AREA(ACRES) = 212.54 AREA-AVERAGED Fm(INCH/HR) = 0.58
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 212.5 PEAK FLOW RATE(CFS) = 35.44

\*\*\*\*\*

FLOW PROCESS FROM NODE 50131.00 TO NODE 50140.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 20.61
RAINFALL INTENSITY(INCH/HR) = 0.76
AREA-AVERAGED Fm(INCH/HR) = 0.58
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 212.54
TOTAL STREAM AREA(ACRES) = 212.54
PEAK FLOW RATE(CFS) AT CONFLUENCE = 35.44

\*\* CONFLUENCE DATA \*\*
Table with 7 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*
Table with 7 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 42.74 Tc(MIN.) = 20.61
EFFECTIVE AREA(ACRES) = 322.40 AREA-AVERAGED Fm(INCH/HR) = 0.58

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.97  
TOTAL AREA (ACRES) = 351.2  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50140.00 = 3135.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 566.00 DOWNSTREAM(FEET) = 416.00  
FLOW LENGTH(FEET) = 376.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 38.29  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 42.74  
PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 20.77  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50141.00 = 3511.00 FEET.

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FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.77  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.759  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 48.73 0.60 0.922 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.922  
SUBAREA AREA(ACRES) = 48.73 SUBAREA RUNOFF(CFS) = 9.01  
EFFECTIVE AREA(ACRES) = 371.13 AREA-AVERAGED Fm(INCH/HR) = 0.58  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 400.0 PEAK FLOW RATE(CFS) = 59.48

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FLOW PROCESS FROM NODE 50141.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 416.00 DOWNSTREAM(FEET) = 404.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 972.00 CHANNEL SLOPE = 0.0123  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.676  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.56 0.60 0.610 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.610  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 60.53  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.23  
AVERAGE FLOW DEPTH(FEET) = 2.18 TRAVEL TIME(MIN.) = 3.83  
Tc(MIN.) = 24.60

SUBAREA AREA(ACRES) = 7.56 SUBAREA RUNOFF(CFS) = 2.11  
EFFECTIVE AREA(ACRES) = 378.69 AREA-AVERAGED Fm(INCH/HR) = 0.58  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96  
TOTAL AREA(ACRES) = 407.5 PEAK FLOW RATE(CFS) = 59.48  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.17 FLOW VELOCITY(FEET/SEC.) = 4.21  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50162.00 = 4483.00 FEET.

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FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 24.60  
RAINFALL INTENSITY(INCH/HR) = 0.68  
AREA-AVERAGED Fm(INCH/HR) = 0.58  
AREA-AVERAGED Fp(INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.96  
EFFECTIVE STREAM AREA(ACRES) = 378.69  
TOTAL STREAM AREA(ACRES) = 407.52  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 59.48

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FLOW PROCESS FROM NODE 50150.00 TO NODE 50151.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00  
ELEVATION DATA: UPSTREAM(FEET) = 1076.00 DOWNSTREAM(FEET) = 988.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.235  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.338  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"CHAPARRAL,BROADLEAF" - 0.46 0.60 1.000 0 9.23  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.30  
TOTAL AREA(ACRES) = 0.46 PEAK FLOW RATE(CFS) = 0.30

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FLOW PROCESS FROM NODE 50151.00 TO NODE 50152.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 988.00 DOWNSTREAM(FEET) = 938.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 220.00 CHANNEL SLOPE = 0.2273  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.231  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.60	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 0.47  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.80  
 AVERAGE FLOW DEPTH (FEET) = 0.20 TRAVEL TIME (MIN.) = 0.97  
 Tc (MIN.) = 10.20  
 SUBAREA AREA (ACRES) = 0.59 SUBAREA RUNOFF (CFS) = 0.33  
 EFFECTIVE AREA (ACRES) = 1.04 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.0 PEAK FLOW RATE (CFS) = 0.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.22 FLOW VELOCITY (FEET/SEC.) = 3.94  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50152.00 = 543.00 FEET.

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 FLOW PROCESS FROM NODE 50152.00 TO NODE 50153.00 IS CODE = 51

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 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 938.00 DOWNSTREAM (FEET) = 904.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 218.00 CHANNEL SLOPE = 0.1560  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.174  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.13	0.60	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 0.89  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.79  
 AVERAGE FLOW DEPTH (FEET) = 0.28 TRAVEL TIME (MIN.) = 0.96  
 Tc (MIN.) = 11.16  
 SUBAREA AREA (ACRES) = 1.13 SUBAREA RUNOFF (CFS) = 0.59  
 EFFECTIVE AREA (ACRES) = 2.18 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.2 PEAK FLOW RATE (CFS) = 1.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.30 FLOW VELOCITY (FEET/SEC.) = 4.10  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50153.00 = 761.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50153.00 TO NODE 50154.00 IS CODE = 51

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 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 904.00 DOWNSTREAM (FEET) = 881.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 212.00 CHANNEL SLOPE = 0.1085

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.122  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.00	0.60	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.83  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.97  
 AVERAGE FLOW DEPTH (FEET) = 0.39 TRAVEL TIME (MIN.) = 0.89  
 Tc (MIN.) = 12.05  
 SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 1.41  
 EFFECTIVE AREA (ACRES) = 5.18 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.2 PEAK FLOW RATE (CFS) = 2.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.44 FLOW VELOCITY (FEET/SEC.) = 4.23  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50154.00 = 973.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50154.00 TO NODE 50155.00 IS CODE = 51

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 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 881.00 DOWNSTREAM (FEET) = 877.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 158.00 CHANNEL SLOPE = 0.0253  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.063  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.60	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.23  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.66  
 AVERAGE FLOW DEPTH (FEET) = 0.64 TRAVEL TIME (MIN.) = 0.99  
 Tc (MIN.) = 13.04  
 SUBAREA AREA (ACRES) = 3.81 SUBAREA RUNOFF (CFS) = 1.59  
 EFFECTIVE AREA (ACRES) = 8.99 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.0 PEAK FLOW RATE (CFS) = 3.75

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.67 FLOW VELOCITY (FEET/SEC.) = 2.75  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50155.00 = 1131.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50155.00 TO NODE 50156.00 IS CODE = 51

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 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 877.00 DOWNSTREAM(FEET) = 875.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 195.00 CHANNEL SLOPE = 0.0103  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.969  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.32 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.30  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.05  
AVERAGE FLOW DEPTH(FEET) = 0.84 TRAVEL TIME(MIN.) = 1.59  
Tc(MIN.) = 14.63  
SUBAREA AREA(ACRES) = 3.32 SUBAREA RUNOFF(CFS) = 1.10  
EFFECTIVE AREA(ACRES) = 12.31 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 4.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.82 FLOW VELOCITY(FEET/SEC.) = 2.02  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50156.00 = 1326.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50156.00 TO NODE 50157.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 850.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 424.00 CHANNEL SLOPE = 0.0590  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.899  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.78 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.60  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.98  
AVERAGE FLOW DEPTH(FEET) = 0.62 TRAVEL TIME(MIN.) = 1.78  
Tc(MIN.) = 16.40  
SUBAREA AREA(ACRES) = 3.78 SUBAREA RUNOFF(CFS) = 1.02  
EFFECTIVE AREA(ACRES) = 16.09 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 4.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.61 FLOW VELOCITY(FEET/SEC.) = 3.94  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50157.00 = 1750.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50157.00 TO NODE 50158.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 835.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0949  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.881  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 11.22 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.75  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.06  
AVERAGE FLOW DEPTH(FEET) = 0.62 TRAVEL TIME(MIN.) = 0.52  
Tc(MIN.) = 16.92  
SUBAREA AREA(ACRES) = 11.22 SUBAREA RUNOFF(CFS) = 2.84  
EFFECTIVE AREA(ACRES) = 27.31 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 27.3 PEAK FLOW RATE(CFS) = 6.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.66 FLOW VELOCITY(FEET/SEC.) = 5.27  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50158.00 = 1908.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50158.00 TO NODE 50159.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 835.00 DOWNSTREAM(FEET) = 680.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 721.00 CHANNEL SLOPE = 0.2150  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.827  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 20.87 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.05  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.64  
AVERAGE FLOW DEPTH(FEET) = 0.63 TRAVEL TIME(MIN.) = 1.57  
Tc(MIN.) = 18.50  
SUBAREA AREA(ACRES) = 20.87 SUBAREA RUNOFF(CFS) = 4.26  
EFFECTIVE AREA(ACRES) = 48.18 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 48.2 PEAK FLOW RATE(CFS) = 9.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.65 FLOW VELOCITY(FEET/SEC.) = 7.87  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50159.00 = 2629.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50159.00 TO NODE 50160.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 680.00 DOWNSTREAM(FEET) = 558.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 874.00 CHANNEL SLOPE = 0.1396
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.763
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 32.02 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.21
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.04
AVERAGE FLOW DEPTH(FEET) = 0.76 TRAVEL TIME(MIN.) = 2.07
Tc(MIN.) = 20.57
SUBAREA AREA(ACRES) = 32.02 SUBAREA RUNOFF(CFS) = 4.70
EFFECTIVE AREA(ACRES) = 80.20 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 11.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.75 FLOW VELOCITY(FEET/SEC.) = 6.97
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50160.00 = 3503.00 FEET.

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*****
FLOW PROCESS FROM NODE 50160.00 TO NODE 50161.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 558.00 DOWNSTREAM(FEET) = 463.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1013.00 CHANNEL SLOPE = 0.0938
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.703
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 13.52 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.41
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.05
AVERAGE FLOW DEPTH(FEET) = 0.83 TRAVEL TIME(MIN.) = 2.79
Tc(MIN.) = 23.36
SUBAREA AREA(ACRES) = 13.52 SUBAREA RUNOFF(CFS) = 1.26
EFFECTIVE AREA(ACRES) = 93.72 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 93.7 PEAK FLOW RATE(CFS) = 11.78
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.81 FLOW VELOCITY(FEET/SEC.) = 6.05
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50161.00 = 4516.00 FEET.

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*****
FLOW PROCESS FROM NODE 50161.00 TO NODE 50162.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 404.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1126.00 CHANNEL SLOPE = 0.0524
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.634
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 19.35 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.08
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.86
AVERAGE FLOW DEPTH(FEET) = 0.91 TRAVEL TIME(MIN.) = 3.86
Tc(MIN.) = 27.22
SUBAREA AREA(ACRES) = 19.35 SUBAREA RUNOFF(CFS) = 0.60
EFFECTIVE AREA(ACRES) = 113.07 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.1 PEAK FLOW RATE(CFS) = 11.78
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.90 FLOW VELOCITY(FEET/SEC.) = 4.81
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

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*****
FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 27.22
RAINFALL INTENSITY(INCH/HR) = 0.63
AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 113.07
TOTAL STREAM AREA(ACRES) = 113.07
PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.78

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** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 59.48 24.60 0.676 0.60( 0.58) 0.96 378.7 50120.00
1 24.30 30.98 0.584 0.60( 0.58) 0.96 407.5 50100.00
2 11.78 27.22 0.634 0.60( 0.60) 1.00 113.1 50150.00

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RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

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\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	71.25	24.60	0.676	0.60 ( 0.58)	0.97	480.9	50120.00
2	56.82	27.22	0.634	0.60 ( 0.58)	0.97	503.6	50150.00
3	24.29	30.98	0.584	0.60 ( 0.58)	0.97	520.6	50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 71.25 Tc(MIN.) = 24.60  
EFFECTIVE AREA(ACRES) = 480.89 AREA-AVERAGED Fm(INCH/HR) = 0.58  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 520.6  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50162.00 TO NODE 50163.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 378.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1158.00 CHANNEL SLOPE = 0.0225  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.621

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	151.93	0.60	0.990	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 73.21  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.56  
AVERAGE FLOW DEPTH(FEET) = 2.10 TRAVEL TIME(MIN.) = 3.47  
Tc(MIN.) = 28.08  
SUBAREA AREA(ACRES) = 151.93 SUBAREA RUNOFF(CFS) = 3.72  
EFFECTIVE AREA(ACRES) = 632.82 AREA-AVERAGED Fm(INCH/HR) = 0.58  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 672.5 PEAK FLOW RATE(CFS) = 71.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.08 FLOW VELOCITY(FEET/SEC.) = 5.50  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50163.00 = 6800.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50163.00 TO NODE 50164.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 378.00 DOWNSTREAM(FEET) = 356.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 886.00 CHANNEL SLOPE = 0.0248  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.587  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	177.01	0.60	0.989	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.989  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 71.77  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.74  
AVERAGE FLOW DEPTH(FEET) = 2.04 TRAVEL TIME(MIN.) = 2.57  
Tc(MIN.) = 30.65  
SUBAREA AREA(ACRES) = 177.01 SUBAREA RUNOFF(CFS) = 1.03  
EFFECTIVE AREA(ACRES) = 809.83 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 849.5 PEAK FLOW RATE(CFS) = 71.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.04 FLOW VELOCITY(FEET/SEC.) = 5.71  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50164.00 = 7686.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50164.00 TO NODE 50165.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 356.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1762.00 CHANNEL SLOPE = 0.0233  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.544

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	155.27	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 71.25  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.58  
AVERAGE FLOW DEPTH(FEET) = 2.06 TRAVEL TIME(MIN.) = 5.26  
Tc(MIN.) = 35.91  
SUBAREA AREA(ACRES) = 155.27 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 965.10 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 1004.8 PEAK FLOW RATE(CFS) = 71.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.06 FLOW VELOCITY(FEET/SEC.) = 5.58  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50165.00 = 9448.00 FEET.

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FLOW PROCESS FROM NODE 50165.00 TO NODE 50166.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 284.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 893.00 CHANNEL SLOPE = 0.0347
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.525
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE          GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      50.24    0.60    0.997    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 71.29
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.50
AVERAGE FLOW DEPTH(FEET) = 1.91 TRAVEL TIME(MIN.) = 2.29
Tc(MIN.) = 38.20
SUBAREA AREA(ACRES) = 50.24 SUBAREA RUNOFF(CFS) = 0.07
EFFECTIVE AREA(ACRES) = 1015.34 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 1055.0 PEAK FLOW RATE(CFS) = 71.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.91 FLOW VELOCITY(FEET/SEC.) = 6.50
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50166.00 = 10341.00 FEET.

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FLOW PROCESS FROM NODE 50166.00 TO NODE 50167.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 240.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00 CHANNEL SLOPE = 0.0437
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.507
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE          GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      8.36    0.60    0.892    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.892
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 71.46
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.08
AVERAGE FLOW DEPTH(FEET) = 1.83 TRAVEL TIME(MIN.) = 2.37
Tc(MIN.) = 40.57

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SUBAREA AREA(ACRES) = 8.36 SUBAREA RUNOFF(CFS) = 0.41
EFFECTIVE AREA(ACRES) = 1023.70 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 1063.4 PEAK FLOW RATE(CFS) = 71.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.83 FLOW VELOCITY(FEET/SEC.) = 7.06
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50167.00 = 11349.00 FEET.

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=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 1063.4 TC(MIN.) = 40.57
EFFECTIVE AREA(ACRES) = 1023.70 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.981
PEAK FLOW RATE(CFS) = 71.25

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\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	71.25	40.57	0.507	0.60 (0.59)	0.98	1023.7	50120.00
2	56.82	44.15	0.487	0.60 (0.59)	0.98	1046.4	50150.00
3	24.29	51.88	0.446	0.60 (0.59)	0.98	1063.4	50100.00

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END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 2 Yr \*  
\* From Node: 50500 To Node: 50513 \*  
\*\*\*\*\*

FILE NAME: 0610505T.DAT  
TIME/DATE OF STUDY: 08:40 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.820
- 2) 10.00; 1.213
- 3) 15.00; 0.930
- 4) 20.00; 0.765
- 5) 25.00; 0.661
- 6) 30.00; 0.587
- 7) 40.00; 0.505
- 8) 50.00; 0.448
- 9) 60.00; 0.406
- 10) 90.00; 0.341
- 11) 120.00; 0.297
- 12) 180.00; 0.248
- 13) 360.00; 0.181
- 14) 1440.00; 0.079

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50500.00 TO NODE 50501.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 1122.00 DOWNSTREAM(FEET) = 980.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.501  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.395  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.67	0.60	1.000	0	8.50

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.48  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 0.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50501.00 TO NODE 50502.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 832.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 500.00 CHANNEL SLOPE = 0.2960  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.195  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.83	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.70  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.59  
AVERAGE FLOW DEPTH(FEET) = 0.23 TRAVEL TIME(MIN.) = 1.82  
Tc(MIN.) = 10.32  
SUBAREA AREA(ACRES) = 0.83 SUBAREA RUNOFF(CFS) = 0.45  
EFFECTIVE AREA(ACRES) = 1.50 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.5 PEAK FLOW RATE(CFS) = 0.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.24 FLOW VELOCITY(FEET/SEC.) = 4.69  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50502.00 = 830.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50502.00 TO NODE 50503.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	832.00	DOWNSTREAM(FEET) =	779.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	255.00	CHANNEL SLOPE =	0.2078
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.148		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.76	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.73

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.04

AVERAGE FLOW DEPTH(FEET) = 0.34 TRAVEL TIME(MIN.) = 0.84

Tc(MIN.) = 11.16

SUBAREA AREA(ACRES) = 3.76 SUBAREA RUNOFF(CFS) = 1.85

EFFECTIVE AREA(ACRES) = 5.26 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.3 PEAK FLOW RATE(CFS) = 2.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 FLOW VELOCITY(FEET/SEC.) = 5.57

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50503.00 = 1085.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50503.00 TO NODE 50504.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	779.00	DOWNSTREAM(FEET) =	765.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	382.00	CHANNEL SLOPE =	0.0366
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.031		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.56	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.48

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.09

AVERAGE FLOW DEPTH(FEET) = 0.61 TRAVEL TIME(MIN.) = 2.06

Tc(MIN.) = 13.22

SUBAREA AREA(ACRES) = 4.56 SUBAREA RUNOFF(CFS) = 1.77

EFFECTIVE AREA(ACRES) = 9.82 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 3.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.63 FLOW VELOCITY(FEET/SEC.) = 3.19

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50504.00 = 1467.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50504.00 TO NODE 50505.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) =	765.00	DOWNSTREAM(FEET) =	750.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	355.00	CHANNEL SLOPE =	0.0423
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.935		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.79	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.38

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.50

AVERAGE FLOW DEPTH(FEET) = 0.65 TRAVEL TIME(MIN.) = 1.69

Tc(MIN.) = 14.91

SUBAREA AREA(ACRES) = 3.79 SUBAREA RUNOFF(CFS) = 1.14

EFFECTIVE AREA(ACRES) = 13.61 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 13.6 PEAK FLOW RATE(CFS) = 4.10

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.63 FLOW VELOCITY(FEET/SEC.) = 3.44

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50505.00 = 1822.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50505.00 TO NODE 50506.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	750.00	DOWNSTREAM(FEET) =	712.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	261.00	CHANNEL SLOPE =	0.1456
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.908		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.43	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.99

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.73

AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 0.76

Tc(MIN.) = 15.67

SUBAREA AREA(ACRES) = 6.43 SUBAREA RUNOFF(CFS) = 1.78

EFFECTIVE AREA(ACRES) = 20.03 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.0 PEAK FLOW RATE (CFS) = 5.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.56 FLOW VELOCITY (FEET/SEC.) = 5.87  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50506.00 = 2083.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50506.00 TO NODE 50507.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 464.00 CHANNEL SLOPE = 0.2414  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.872

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.57	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.87  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.19  
AVERAGE FLOW DEPTH (FEET) = 0.52 TRAVEL TIME (MIN.) = 1.08  
Tc (MIN.) = 16.75  
SUBAREA AREA (ACRES) = 2.57 SUBAREA RUNOFF (CFS) = 0.63  
EFFECTIVE AREA (ACRES) = 22.60 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.6 PEAK FLOW RATE (CFS) = 5.55  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.51 FLOW VELOCITY (FEET/SEC.) = 7.16  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50507.00 = 2547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50507.00 TO NODE 50508.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 535.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 310.00 CHANNEL SLOPE = 0.2097  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.848

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.09	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.23  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.96  
AVERAGE FLOW DEPTH (FEET) = 0.55 TRAVEL TIME (MIN.) = 0.74

Tc (MIN.) = 17.49  
SUBAREA AREA (ACRES) = 6.09 SUBAREA RUNOFF (CFS) = 1.36  
EFFECTIVE AREA (ACRES) = 28.69 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 28.7 PEAK FLOW RATE (CFS) = 6.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.55 FLOW VELOCITY (FEET/SEC.) = 6.95  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50508.00 = 2857.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50508.00 TO NODE 50509.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 405.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.2658  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.814

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.02	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.37  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.84  
AVERAGE FLOW DEPTH (FEET) = 0.56 TRAVEL TIME (MIN.) = 1.04  
Tc (MIN.) = 18.53  
SUBAREA AREA (ACRES) = 10.02 SUBAREA RUNOFF (CFS) = 1.93  
EFFECTIVE AREA (ACRES) = 38.72 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.7 PEAK FLOW RATE (CFS) = 7.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.56 FLOW VELOCITY (FEET/SEC.) = 7.92  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50509.00 = 3346.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50509.00 TO NODE 50510.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 285.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 706.00 CHANNEL SLOPE = 0.1700  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.760

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.60	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.92

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.81  
AVERAGE FLOW DEPTH (FEET) = 0.62 TRAVEL TIME (MIN.) = 1.73  
Tc (MIN.) = 20.26  
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 0.95  
EFFECTIVE AREA (ACRES) = 45.32 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 7.45  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.61 FLOW VELOCITY (FEET/SEC.) = 6.73  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50510.00 = 4052.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50510.00 TO NODE 50511.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	285.00	DOWNSTREAM (FEET) =	238.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	1169.00	CHANNEL SLOPE =	0.0402
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH (FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.679		

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	22.45	0.60	0.991	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.32  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.00  
AVERAGE FLOW DEPTH (FEET) = 0.74 TRAVEL TIME (MIN.) = 3.90  
Tc (MIN.) = 24.16  
SUBAREA AREA (ACRES) = 22.45 SUBAREA RUNOFF (CFS) = 1.71  
EFFECTIVE AREA (ACRES) = 67.77 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 67.8 PEAK FLOW RATE (CFS) = 7.45  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.71 FLOW VELOCITY (FEET/SEC.) = 4.87  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50511.00 = 5221.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50511.00 TO NODE 50512.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	238.00	DOWNSTREAM (FEET) =	233.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	489.00	CHANNEL SLOPE =	0.0102
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH (FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.633		

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	22.45	0.60	0.991	-

USER-DEFINED - 39.83 0.60 0.990 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.18  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.97  
AVERAGE FLOW DEPTH (FEET) = 0.96 TRAVEL TIME (MIN.) = 2.75  
Tc (MIN.) = 26.90  
SUBAREA AREA (ACRES) = 39.83 SUBAREA RUNOFF (CFS) = 1.40  
EFFECTIVE AREA (ACRES) = 107.59 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 107.6 PEAK FLOW RATE (CFS) = 7.45  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.93 FLOW VELOCITY (FEET/SEC.) = 2.90  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50512.00 = 5710.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50512.00 TO NODE 50513.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	233.00	DOWNSTREAM (FEET) =	209.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	537.00	CHANNEL SLOPE =	0.0447
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH (FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.606		

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	7.40	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.47  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.01  
AVERAGE FLOW DEPTH (FEET) = 0.70 TRAVEL TIME (MIN.) = 1.78  
Tc (MIN.) = 28.69  
SUBAREA AREA (ACRES) = 7.40 SUBAREA RUNOFF (CFS) = 0.04  
EFFECTIVE AREA (ACRES) = 114.99 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 115.0 PEAK FLOW RATE (CFS) = 7.45  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.70 FLOW VELOCITY (FEET/SEC.) = 5.00  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50513.00 = 6247.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50513.00 TO NODE 50513.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 28.69  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.606  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	7.40	0.60	1.000	-

USER-DEFINED - 38.19 0.60 0.961 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$  (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.961  
SUBAREA AREA (ACRES) = 38.19 SUBAREA RUNOFF (CFS) = 1.02  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.59  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.60 AREA-AVERAGED  $A_p$  = 0.99  
TOTAL AREA (ACRES) = 153.2 PEAK FLOW RATE (CFS) = 7.45  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 153.2 TC (MIN.) = 28.69  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.59  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.60 AREA-AVERAGED  $A_p$  = 0.986  
PEAK FLOW RATE (CFS) = 7.45

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 2 Yr \*  
\* From Node: 50600 To Node: 50610 \*  
\*\*\*\*\*

FILE NAME: 0610506T.DAT  
TIME/DATE OF STUDY: 08:40 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.820
- 2) 10.00; 1.213
- 3) 15.00; 0.930
- 4) 20.00; 0.765
- 5) 25.00; 0.661
- 6) 30.00; 0.587
- 7) 40.00; 0.505
- 8) 50.00; 0.448
- 9) 60.00; 0.406
- 10) 90.00; 0.341
- 11) 120.00; 0.297
- 12) 180.00; 0.248
- 13) 360.00; 0.181
- 14) 1440.00; 0.079

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 50600.00 TO NODE 50601.00 IS CODE = 21

-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00  
ELEVATION DATA: UPSTREAM(FEET) = 780.00 DOWNSTREAM(FEET) = 730.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.166  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.204  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	1.44	0.60	1.000	0	10.17

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.78  
TOTAL AREA(ACRES) = 1.44 PEAK FLOW RATE(CFS) = 0.78

\*\*\*\*\*

FLOW PROCESS FROM NODE 50601.00 TO NODE 50602.00 IS CODE = 51

-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.1541  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.119  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.27	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.08  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.98  
AVERAGE FLOW DEPTH(FEET) = 0.30 TRAVEL TIME(MIN.) = 1.49  
 $T_c$ (MIN.) = 11.66  
SUBAREA AREA(ACRES) = 1.27 SUBAREA RUNOFF(CFS) = 0.59  
EFFECTIVE AREA(ACRES) = 2.71 AREA-AVERAGED  $F_m$ (INCH/HR) = 0.60  
AREA-AVERAGED  $F_p$ (INCH/HR) = 0.60 AREA-AVERAGED  $A_p$  = 1.00  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 1.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 4.18  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50602.00 = 671.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50602.00 TO NODE 50603.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 258.00 CHANNEL SLOPE = 0.2907  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.074

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.31	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.55

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.43

AVERAGE FLOW DEPTH(FEET) = 0.31 TRAVEL TIME(MIN.) = 0.79

Tc(MIN.) = 12.45

SUBAREA AREA(ACRES) = 1.31 SUBAREA RUNOFF(CFS) = 0.56

EFFECTIVE AREA(ACRES) = 4.02 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 1.72

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 5.67

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50603.00 = 929.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50603.00 TO NODE 50604.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 585.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.1293  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.049

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.58	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.04

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.38

AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 0.44

Tc(MIN.) = 12.89

SUBAREA AREA(ACRES) = 1.58 SUBAREA RUNOFF(CFS) = 0.64

EFFECTIVE AREA(ACRES) = 5.60 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.6 PEAK FLOW RATE(CFS) = 2.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 FLOW VELOCITY(FEET/SEC.) = 4.51

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50604.00 = 1045.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50604.00 TO NODE 50605.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 584.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 16.00 CHANNEL SLOPE = 0.0625  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.045

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.98	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.26

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.75

AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 0.07

Tc(MIN.) = 12.97

SUBAREA AREA(ACRES) = 4.98 SUBAREA RUNOFF(CFS) = 2.00

EFFECTIVE AREA(ACRES) = 10.58 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 10.6 PEAK FLOW RATE(CFS) = 4.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 FLOW VELOCITY(FEET/SEC.) = 4.03

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50605.00 = 1061.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50605.00 TO NODE 50606.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 584.00 DOWNSTREAM(FEET) = 579.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 122.00 CHANNEL SLOPE = 0.0410  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.013

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.18	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.21

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.57

AVERAGE FLOW DEPTH(FEET) = 0.70 TRAVEL TIME(MIN.) = 0.57

Tc(MIN.) = 13.53

SUBAREA AREA(ACRES) = 5.18 SUBAREA RUNOFF(CFS) = 1.93

EFFECTIVE AREA(ACRES) = 15.76 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 15.8 PEAK FLOW RATE (CFS) = 5.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.73 FLOW VELOCITY (FEET/SEC.) = 3.69  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50606.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50606.00 TO NODE 50607.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	579.00	DOWNSTREAM (FEET) =	528.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	637.00	CHANNEL SLOPE =	0.0801
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.907		

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.34	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.88  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.93  
AVERAGE FLOW DEPTH (FEET) = 0.68 TRAVEL TIME (MIN.) = 2.15  
Tc (MIN.) = 15.69

SUBAREA AREA (ACRES) =	7.34	SUBAREA RUNOFF (CFS) =	2.03
EFFECTIVE AREA (ACRES) =	23.11	AREA-AVERAGED Fm (INCH/HR) =	0.60
AREA-AVERAGED Fp (INCH/HR) =	0.60	AREA-AVERAGED Ap =	1.00
TOTAL AREA (ACRES) =	23.1	PEAK FLOW RATE (CFS) =	6.40

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.66 FLOW VELOCITY (FEET/SEC.) = 4.88  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50607.00 = 1820.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50607.00 TO NODE 50608.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	528.00	DOWNSTREAM (FEET) =	422.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	529.00	CHANNEL SLOPE =	0.2004
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.866		

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.99	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.75  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.95  
AVERAGE FLOW DEPTH (FEET) = 0.57 TRAVEL TIME (MIN.) = 1.27  
Tc (MIN.) = 16.96

SUBAREA AREA (ACRES) = 2.99 SUBAREA RUNOFF (CFS) = 0.72  
EFFECTIVE AREA (ACRES) = 26.10 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.1 PEAK FLOW RATE (CFS) = 6.40  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.56 FLOW VELOCITY (FEET/SEC.) = 6.80  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50608.00 = 2349.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50608.00 TO NODE 50609.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	422.00	DOWNSTREAM (FEET) =	297.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	708.00	CHANNEL SLOPE =	0.1766
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.808		

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.94	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.52  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.79  
AVERAGE FLOW DEPTH (FEET) = 0.61 TRAVEL TIME (MIN.) = 1.74  
Tc (MIN.) = 18.69

SUBAREA AREA (ACRES) =	11.94	SUBAREA RUNOFF (CFS) =	2.24
EFFECTIVE AREA (ACRES) =	38.04	AREA-AVERAGED Fm (INCH/HR) =	0.60
AREA-AVERAGED Fp (INCH/HR) =	0.60	AREA-AVERAGED Ap =	1.00
TOTAL AREA (ACRES) =	38.0	PEAK FLOW RATE (CFS) =	7.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.60 FLOW VELOCITY (FEET/SEC.) = 6.65  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50609.00 = 3057.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50609.00 TO NODE 50610.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	297.00	DOWNSTREAM (FEET) =	207.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	1321.00	CHANNEL SLOPE =	0.0681
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH (FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.715		

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.38	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.68



TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.90  
AVERAGE FLOW DEPTH (FEET) = 0.66 TRAVEL TIME (MIN.) = 3.73  
Tc (MIN.) = 22.42  
SUBAREA AREA (ACRES) = 10.38 SUBAREA RUNOFF (CFS) = 1.07  
EFFECTIVE AREA (ACRES) = 48.42 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 7.14  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.64 FLOW VELOCITY (FEET/SEC.) = 5.85  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50610.00 = 4378.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 22.42  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.715  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.17	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.17 SUBAREA RUNOFF (CFS) = 0.12  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 49.6 PEAK FLOW RATE (CFS) = 7.14  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 49.6 TC (MIN.) = 22.42  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.000  
PEAK FLOW RATE (CFS) = 7.14

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 2 Yr \*  
\* From Node: 50700 To Node: 50716 \*  
\*\*\*\*\*

FILE NAME: 0610507T.DAT  
TIME/DATE OF STUDY: 08:40 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.820
- 2) 10.00; 1.213
- 3) 15.00; 0.930
- 4) 20.00; 0.765
- 5) 25.00; 0.661
- 6) 30.00; 0.587
- 7) 40.00; 0.505
- 8) 50.00; 0.448
- 9) 60.00; 0.406
- 10) 90.00; 0.341
- 11) 120.00; 0.297
- 12) 180.00; 0.248
- 13) 360.00; 0.181
- 14) 1440.00; 0.079

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50700.00 TO NODE 50701.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00  
ELEVATION DATA: UPSTREAM(FEET) = 1121.00 DOWNSTREAM(FEET) = 870.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.572  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.508  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.18	0.60	1.000	0	7.57

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.15  
TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 0.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50701.00 TO NODE 50702.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 827.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.3386  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.442  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.42	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.31  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.89  
AVERAGE FLOW DEPTH(FEET) = 0.16 TRAVEL TIME(MIN.) = 0.54  
Tc(MIN.) = 8.12  
SUBAREA AREA(ACRES) = 0.42 SUBAREA RUNOFF(CFS) = 0.32  
EFFECTIVE AREA(ACRES) = 0.61 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 0.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.19 FLOW VELOCITY(FEET/SEC.) = 4.34  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50702.00 = 456.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50702.00 TO NODE 50703.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 827.00 DOWNSTREAM(FEET) = 815.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 94.00 CHANNEL SLOPE = 0.1277  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.382

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.34	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.58

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.16

AVERAGE FLOW DEPTH(FEET) = 0.25 TRAVEL TIME(MIN.) = 0.50

Tc(MIN.) = 8.61

SUBAREA AREA(ACRES) = 0.34 SUBAREA RUNOFF(CFS) = 0.24

EFFECTIVE AREA(ACRES) = 0.94 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 0.67

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.26 FLOW VELOCITY(FEET/SEC.) = 3.22

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50703.00 = 550.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50703.00 TO NODE 50704.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 815.00 DOWNSTREAM(FEET) = 800.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 169.00 CHANNEL SLOPE = 0.0888  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.279

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.72	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.19

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.32

AVERAGE FLOW DEPTH(FEET) = 0.35 TRAVEL TIME(MIN.) = 0.85

Tc(MIN.) = 9.46

SUBAREA AREA(ACRES) = 1.72 SUBAREA RUNOFF(CFS) = 1.05

EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 1.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 FLOW VELOCITY(FEET/SEC.) = 3.64

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50704.00 = 719.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50704.00 TO NODE 50705.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 800.00 DOWNSTREAM(FEET) = 785.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 128.00 CHANNEL SLOPE = 0.1172  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.219

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.12	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.22

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.30

AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 0.50

Tc(MIN.) = 9.96

SUBAREA AREA(ACRES) = 2.12 SUBAREA RUNOFF(CFS) = 1.18

EFFECTIVE AREA(ACRES) = 4.79 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 2.67

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 4.48

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50705.00 = 847.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50705.00 TO NODE 50706.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 775.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.173

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.64	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.61

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.73

AVERAGE FLOW DEPTH(FEET) = 0.57 TRAVEL TIME(MIN.) = 0.76

Tc(MIN.) = 10.72

SUBAREA AREA(ACRES) = 3.64 SUBAREA RUNOFF(CFS) = 1.88

EFFECTIVE AREA(ACRES) = 8.42 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.4 PEAK FLOW RATE (CFS) = 4.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.61 FLOW VELOCITY (FEET/SEC.) = 3.92  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50706.00 = 1017.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50706.00 TO NODE 50707.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 775.00 DOWNSTREAM (FEET) = 772.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 162.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.116

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.65	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.42  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.69  
AVERAGE FLOW DEPTH (FEET) = 0.82 TRAVEL TIME (MIN.) = 1.00  
Tc (MIN.) = 11.72

SUBAREA AREA (ACRES) = 4.65 SUBAREA RUNOFF (CFS) = 2.16  
EFFECTIVE AREA (ACRES) = 13.07 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 13.1 PEAK FLOW RATE (CFS) = 6.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.86 FLOW VELOCITY (FEET/SEC.) = 2.75  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50707.00 = 1179.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50707.00 TO NODE 50708.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 772.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 357.00 CHANNEL SLOPE = 0.0756  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.046

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.55	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.79  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.84  
AVERAGE FLOW DEPTH (FEET) = 0.68 TRAVEL TIME (MIN.) = 1.23  
Tc (MIN.) = 12.95

SUBAREA AREA (ACRES) = 3.55 SUBAREA RUNOFF (CFS) = 1.43  
EFFECTIVE AREA (ACRES) = 16.62 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 16.6 PEAK FLOW RATE (CFS) = 6.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.68 FLOW VELOCITY (FEET/SEC.) = 4.79  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50708.00 = 1536.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50708.00 TO NODE 50709.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 733.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 444.00 CHANNEL SLOPE = 0.0270  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.926

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.58	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.50  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.39  
AVERAGE FLOW DEPTH (FEET) = 0.86 TRAVEL TIME (MIN.) = 2.19  
Tc (MIN.) = 15.13

SUBAREA AREA (ACRES) = 5.58 SUBAREA RUNOFF (CFS) = 1.64  
EFFECTIVE AREA (ACRES) = 22.20 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.2 PEAK FLOW RATE (CFS) = 6.68

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.83 FLOW VELOCITY (FEET/SEC.) = 3.26  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50709.00 = 1980.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50709.00 TO NODE 50710.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 733.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 467.00 CHANNEL SLOPE = 0.1242  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.882

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.17	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.21

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.90  
AVERAGE FLOW DEPTH (FEET) = 0.64 TRAVEL TIME (MIN.) = 1.32  
Tc (MIN.) = 16.45  
SUBAREA AREA (ACRES) = 4.17 SUBAREA RUNOFF (CFS) = 1.06  
EFFECTIVE AREA (ACRES) = 26.38 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.4 PEAK FLOW RATE (CFS) = 6.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.62 FLOW VELOCITY (FEET/SEC.) = 5.80  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50710.00 = 2447.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50710.00 TO NODE 50711.00 IS CODE = 51

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 619.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 516.00 CHANNEL SLOPE = 0.1085  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.834  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	21.41	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.97  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.89  
AVERAGE FLOW DEPTH (FEET) = 0.71 TRAVEL TIME (MIN.) = 1.46  
Tc (MIN.) = 17.91  
SUBAREA AREA (ACRES) = 21.41 SUBAREA RUNOFF (CFS) = 4.51  
EFFECTIVE AREA (ACRES) = 47.78 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 10.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.74 FLOW VELOCITY (FEET/SEC.) = 6.08  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50711.00 = 2963.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50711.00 TO NODE 50712.00 IS CODE = 51

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 619.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 650.00 CHANNEL SLOPE = 0.0292  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.761  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.43	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.61  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.71  
AVERAGE FLOW DEPTH (FEET) = 0.87 TRAVEL TIME (MIN.) = 2.30  
Tc (MIN.) = 20.21  
SUBAREA AREA (ACRES) = 7.43 SUBAREA RUNOFF (CFS) = 1.08  
EFFECTIVE AREA (ACRES) = 55.21 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.2 PEAK FLOW RATE (CFS) = 10.07  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.85 FLOW VELOCITY (FEET/SEC.) = 4.63  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50712.00 = 3613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50713.00 IS CODE = 51

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 794.00 CHANNEL SLOPE = 0.0907  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.724  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	36.47	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.12  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.44  
AVERAGE FLOW DEPTH (FEET) = 0.74 TRAVEL TIME (MIN.) = 1.78  
Tc (MIN.) = 21.99  
SUBAREA AREA (ACRES) = 36.47 SUBAREA RUNOFF (CFS) = 4.07  
EFFECTIVE AREA (ACRES) = 91.68 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 10.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.69 FLOW VELOCITY (FEET/SEC.) = 7.13  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50713.00 = 4407.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50713.00 TO NODE 50714.00 IS CODE = 51

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 423.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1215.00 CHANNEL SLOPE = 0.0864  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.664  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.43	0.60	1.000	-

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.52 0.60 0.998 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.998  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.78  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.08  
AVERAGE FLOW DEPTH(FEET) = 0.71 TRAVEL TIME(MIN.) = 2.86  
Tc(MIN.) = 24.85  
SUBAREA AREA(ACRES) = 18.52 SUBAREA RUNOFF(CFS) = 1.10  
EFFECTIVE AREA(ACRES) = 110.21 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 110.2 PEAK FLOW RATE(CFS) = 10.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.70 FLOW VELOCITY(FEET/SEC.) = 6.98  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50714.00 = 5622.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50714.00 TO NODE 50715.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 319.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 768.00 CHANNEL SLOPE = 0.1354  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.640  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 5.31 0.60 0.993 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.34  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.27  
AVERAGE FLOW DEPTH(FEET) = 0.65 TRAVEL TIME(MIN.) = 1.55  
Tc(MIN.) = 26.40  
SUBAREA AREA(ACRES) = 5.31 SUBAREA RUNOFF(CFS) = 0.21  
EFFECTIVE AREA(ACRES) = 115.52 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 115.5 PEAK FLOW RATE(CFS) = 10.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.64 FLOW VELOCITY(FEET/SEC.) = 8.23  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50715.00 = 6390.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50715.00 TO NODE 50716.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 319.00 DOWNSTREAM(FEET) = 182.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1513.00 CHANNEL SLOPE = 0.0905  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.588  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 79.09 0.60 0.979 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.67  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.16  
AVERAGE FLOW DEPTH(FEET) = 0.70 TRAVEL TIME(MIN.) = 3.52  
Tc(MIN.) = 29.92  
SUBAREA AREA(ACRES) = 79.09 SUBAREA RUNOFF(CFS) = 0.88  
EFFECTIVE AREA(ACRES) = 194.61 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 194.6 PEAK FLOW RATE(CFS) = 10.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.69 FLOW VELOCITY(FEET/SEC.) = 7.13  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50716.00 = 7903.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50716.00 TO NODE 50716.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 29.92  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.588  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 42.18 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 42.18 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 236.8 PEAK FLOW RATE(CFS) = 10.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 236.8 TC(MIN.) = 29.92  
EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.993  
PEAK FLOW RATE(CFS) = 10.23

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 2 Yr \*  
\* From Node: 50800 To Node: 50811 \*  
\*\*\*\*\*

FILE NAME: 0610508T.DAT  
TIME/DATE OF STUDY: 08:40 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.820
- 2) 10.00; 1.213
- 3) 15.00; 0.930
- 4) 20.00; 0.765
- 5) 25.00; 0.661
- 6) 30.00; 0.587
- 7) 40.00; 0.505
- 8) 50.00; 0.448
- 9) 60.00; 0.406
- 10) 90.00; 0.341
- 11) 120.00; 0.297
- 12) 180.00; 0.248
- 13) 360.00; 0.181
- 14) 1440.00; 0.079

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50800.00 TO NODE 50801.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00  
ELEVATION DATA: UPSTREAM(FEET) = 795.00 DOWNSTREAM(FEET) = 745.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.302  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.196  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.60	0.60	1.000	0	10.30

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.32  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50801.00 TO NODE 50802.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 725.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 245.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.124  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.35	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.11  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.20  
AVERAGE FLOW DEPTH(FEET) = 0.34 TRAVEL TIME(MIN.) = 1.28  
Tc(MIN.) = 11.58  
SUBAREA AREA(ACRES) = 3.35 SUBAREA RUNOFF(CFS) = 1.58  
EFFECTIVE AREA(ACRES) = 3.94 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 3.9 PEAK FLOW RATE(CFS) = 1.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:



DEPTH(FEET) = 0.41 FLOW VELOCITY(FEET/SEC.) = 3.60  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50802.00 = 566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50802.00 TO NODE 50803.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	725.00	DOWNSTREAM(FEET) =	700.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	325.00	CHANNEL SLOPE =	0.0769
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	1.039		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.52	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.16

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.64

AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 1.49

Tc(MIN.) = 13.07

SUBAREA AREA(ACRES) = 1.52 SUBAREA RUNOFF(CFS) = 0.60

EFFECTIVE AREA(ACRES) = 5.47 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 2.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 3.64

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50803.00 = 891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50803.00 TO NODE 50804.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	700.00	DOWNSTREAM(FEET) =	652.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	594.00	CHANNEL SLOPE =	0.0808
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.913		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.12	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.03

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.03

AVERAGE FLOW DEPTH(FEET) = 0.50 TRAVEL TIME(MIN.) = 2.46

Tc(MIN.) = 15.53

SUBAREA AREA(ACRES) = 6.12 SUBAREA RUNOFF(CFS) = 1.72

EFFECTIVE AREA(ACRES) = 11.59 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 11.6 PEAK FLOW RATE(CFS) = 3.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.51 FLOW VELOCITY(FEET/SEC.) = 4.12

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50804.00 = 1485.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50804.00 TO NODE 50805.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	652.00	DOWNSTREAM(FEET) =	542.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	499.00	CHANNEL SLOPE =	0.2204
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.869		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.17	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.89

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.27

AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 1.33

Tc(MIN.) = 16.85

SUBAREA AREA(ACRES) = 5.17 SUBAREA RUNOFF(CFS) = 1.25

EFFECTIVE AREA(ACRES) = 16.76 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 4.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.46 FLOW VELOCITY(FEET/SEC.) = 6.33

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50805.00 = 1984.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50805.00 TO NODE 50806.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	542.00	DOWNSTREAM(FEET) =	450.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	650.00	CHANNEL SLOPE =	0.1415
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.804		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.22	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.54

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.52

AVERAGE FLOW DEPTH(FEET) = 0.52 TRAVEL TIME(MIN.) = 1.96

Tc(MIN.) = 18.81

SUBAREA AREA(ACRES) = 5.22 SUBAREA RUNOFF(CFS) = 0.96

EFFECTIVE AREA(ACRES) = 21.99 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 4.06  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.50 FLOW VELOCITY (FEET/SEC.) = 5.40  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50806.00 = 2634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50806.00 TO NODE 50807.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 450.00 DOWNSTREAM (FEET) = 400.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 639.00 CHANNEL SLOPE = 0.0782  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.742  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.83	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.07  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.58  
AVERAGE FLOW DEPTH (FEET) = 0.61 TRAVEL TIME (MIN.) = 2.32  
Tc (MIN.) = 21.14  
SUBAREA AREA (ACRES) = 15.83 SUBAREA RUNOFF (CFS) = 2.02  
EFFECTIVE AREA (ACRES) = 37.82 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 37.8 PEAK FLOW RATE (CFS) = 4.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.60 FLOW VELOCITY (FEET/SEC.) = 4.50  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50807.00 = 3273.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50807.00 TO NODE 50808.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 400.00 DOWNSTREAM (FEET) = 350.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 448.00 CHANNEL SLOPE = 0.1116  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.712  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.46	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.20  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.24  
AVERAGE FLOW DEPTH (FEET) = 0.58 TRAVEL TIME (MIN.) = 1.42

Tc (MIN.) = 22.56  
SUBAREA AREA (ACRES) = 7.46 SUBAREA RUNOFF (CFS) = 0.75  
EFFECTIVE AREA (ACRES) = 45.28 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 4.82  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.56 FLOW VELOCITY (FEET/SEC.) = 5.13  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50808.00 = 3721.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50808.00 TO NODE 50809.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 350.00 DOWNSTREAM (FEET) = 283.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 438.00 CHANNEL SLOPE = 0.1530  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.686  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.20	0.60	0.972	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.16  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.92  
AVERAGE FLOW DEPTH (FEET) = 0.54 TRAVEL TIME (MIN.) = 1.23  
Tc (MIN.) = 23.80

SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 0.67  
EFFECTIVE AREA (ACRES) = 52.48 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 52.5 PEAK FLOW RATE (CFS) = 4.82  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.53 FLOW VELOCITY (FEET/SEC.) = 5.74  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50809.00 = 4159.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50809.00 TO NODE 50810.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 283.00 DOWNSTREAM (FEET) = 243.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 665.00 CHANNEL SLOPE = 0.0602  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.649  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	63.52	0.60	0.983	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.983  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.56  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.40  
 AVERAGE FLOW DEPTH(FEET) = 0.64 TRAVEL TIME(MIN.) = 2.05  
 Tc(MIN.) = 25.85  
 SUBAREA AREA(ACRES) = 63.52 SUBAREA RUNOFF(CFS) = 3.38  
 EFFECTIVE AREA(ACRES) = 116.00 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 116.0 PEAK FLOW RATE(CFS) = 5.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.61 FLOW VELOCITY(FEET/SEC.) = 5.26  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50810.00 = 4824.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50810.00 TO NODE 50811.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM(FEET) = 243.00 DOWNSTREAM(FEET) = 173.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1122.00 CHANNEL SLOPE = 0.0624  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.585

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	11.57	0.60	0.980	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.85  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.29  
 AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 4.36  
 Tc(MIN.) = 30.21  
 SUBAREA AREA(ACRES) = 11.57 SUBAREA RUNOFF(CFS) = 0.12  
 EFFECTIVE AREA(ACRES) = 127.57 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 127.6 PEAK FLOW RATE(CFS) = 5.79  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.67 FLOW VELOCITY(FEET/SEC.) = 4.32  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50811.00 = 5946.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
 MAINLINE Tc(MIN.) = 30.21  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.585  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	3.70	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 131.27 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 131.3 PEAK FLOW RATE(CFS) = 5.79  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 131.3 TC(MIN.) = 30.21  
 EFFECTIVE AREA(ACRES) = 131.27 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.988  
 PEAK FLOW RATE(CFS) = 5.79  
 =====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 2 \*  
\* HYDROLOGIC ANALYSIS - 2-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E502XX02.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	1.580
2)	6.000;	1.430
3)	7.000;	1.310
4)	8.000;	1.210
5)	9.000;	1.130
6)	10.000;	1.060
7)	11.000;	1.010
8)	12.000;	0.960
9)	13.000;	0.920
10)	14.000;	0.880
11)	15.000;	0.840
12)	20.000;	0.720
13)	25.000;	0.630
14)	30.000;	0.570
15)	40.000;	0.480
16)	50.000;	0.420
17)	60.000;	0.380
18)	90.000;	0.300
19)	120.000;	0.260
20)	180.000;	0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	(FT)	(FT)	SIDE / SIDE/ WAY	(FT)	(FT)	(FT)	(FT)	(n)
			HALF- CROWN TO STREET-CROSSFALL:					
			CURB GUTTER-GEOMETRIES:					
			WIDTH CROSSFALL IN- / OUT-/PARK-					
			HEIGHT WIDTH LIP HIKE FACTOR					

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50200.00 TO NODE 50201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 497.00 DOWNSTREAM(FEET) = 365.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.563

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.165

SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.60	1.000	95	8.56
NATURAL FAIR COVER "OPEN BRUSH"	-	0.60	0.60	1.000	95	8.56
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.20	0.60	1.000	95	8.56

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000

SUBAREA RUNOFF(CFS) = 0.71

TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 0.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50201.00 TO NODE 50202.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 365.00 DOWNSTREAM(FEET) = 335.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 259.00 CHANNEL SLOPE = 0.1158  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.71  
FLOW VELOCITY(FEET/SEC.) = 3.21 FLOW DEPTH(FEET) = 0.27  
TRAVEL TIME(MIN.) = 1.34  $T_c$ (MIN.) = 9.91  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50202.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50202.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.91  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.067  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.60 1.000 -  
USER-DEFINED - 0.70 0.60 1.000 -  
USER-DEFINED - 0.20 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 1.13  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 1.72

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50203.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 335.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.1020  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.72  
FLOW VELOCITY(FEET/SEC.) = 3.85 FLOW DEPTH(FEET) = 0.39  
TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 10.76  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50203.00 = 781.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50203.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.76  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.022  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.60 1.000 -  
USER-DEFINED - 0.20 0.60 1.000 -  
USER-DEFINED - 2.80 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 1.60  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 3.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50204.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 304.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0696  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.16  
FLOW VELOCITY(FEET/SEC.) = 3.86 FLOW DEPTH(FEET) = 0.52  
TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 11.44  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50204.00 = 939.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50204.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 11.44  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.988  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.60 0.100 -  
USER-DEFINED - 0.80 0.60 1.000 -  
USER-DEFINED - 2.80 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 1.84  
EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.57  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 4.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50205.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 304.00 DOWNSTREAM(FEET) = 234.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 487.00 CHANNEL SLOPE = 0.1437  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.74  
FLOW VELOCITY(FEET/SEC.) = 6.98 FLOW DEPTH(FEET) = 0.48  
TRAVEL TIME(MIN.) = 1.16 Tc(MIN.) = 12.60  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50205.00 = 1426.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 12.60  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.936  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.60 0.100 -

USER-DEFINED - 0.40 0.60 1.000 -  
 USER-DEFINED - 0.60 0.60 1.000 -  
 USER-DEFINED - 0.10 0.60 0.850 -  
 USER-DEFINED - 1.90 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 1.31  
 EFFECTIVE AREA(ACRES) = 16.10 AREA-AVERAGED Fm(INCH/HR) = 0.56  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 5.46

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN) = 12.60  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.936  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.60	0.100	-
USER-DEFINED	-	1.10	0.60	1.000	-
USER-DEFINED	-	4.90	0.60	1.000	-
USER-DEFINED	-	1.50	0.60	0.850	-
USER-DEFINED	-	3.70	0.60	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.882  
 SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 4.61  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.55  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.91  
 TOTAL AREA(ACRES) = 28.7 PEAK FLOW RATE(CFS) = 10.08

=====  
 END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 28.7 TC(MIN.) = 12.60  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.55  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.910  
 PEAK FLOW RATE(CFS) = 10.08  
 =====

=====  
 END OF RATIONAL METHOD ANALYSIS  
 =====

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 3 \*  
\* HYDROLOGIC ANALYSIS - 2-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E503XX02.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	1.580
2)	6.000;	1.430
3)	7.000;	1.310
4)	8.000;	1.210
5)	9.000;	1.130
6)	10.000;	1.060
7)	11.000;	1.010
8)	12.000;	0.960
9)	13.000;	0.920
10)	14.000;	0.880
11)	15.000;	0.840
12)	20.000;	0.720
13)	25.000;	0.630
14)	30.000;	0.570
15)	40.000;	0.480
16)	50.000;	0.420
17)	60.000;	0.380
18)	90.000;	0.300
19)	120.000;	0.260
20)	180.000;	0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	(FT)	(FT)	SIDE /	HEIGHT	WIDTH	LIP	HIKE	FACTOR
			SIDE /	(FT)	(FT)	(FT)	(FT)	(n)
			WAY					

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50300.00 TO NODE 50301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00  
ELEVATION DATA: UPSTREAM(FEET) = 1110.00 DOWNSTREAM(FEET) = 1035.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.517  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.094  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.60	0.60	1.000	95	9.52
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.60	1.000	95	9.52

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.40  
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 0.40

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50301.00 TO NODE 50302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 960.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 225.00 CHANNEL SLOPE = 0.3333  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.40  
FLOW VELOCITY(FEET/SEC.) = 4.11 FLOW DEPTH(FEET) = 0.18  
TRAVEL TIME(MIN.) = 0.91  $T_c$ (MIN.) = 10.43  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50302.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50302.00 TO NODE 50302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<



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=====
MAINLINE Tc(MIN) = 10.43
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.038
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.60    1.000   -
USER-DEFINED        -         1.00    0.60    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.10    SUBAREA RUNOFF(CFS) = 0.43
EFFECTIVE AREA(ACRES) = 2.00    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.0        PEAK FLOW RATE(CFS) = 0.79

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*****
FLOW PROCESS FROM NODE 50302.00 TO NODE 50303.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 84.00 CHANNEL SLOPE = 0.1190
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.79
FLOW VELOCITY(FEET/SEC.) = 3.37 FLOW DEPTH(FEET) = 0.28
TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 10.85
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50303.00 = 631.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50303.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 10.85
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.018
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.60    1.000   -
USER-DEFINED        -         0.30    0.60    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.70    SUBAREA RUNOFF(CFS) = 0.26
EFFECTIVE AREA(ACRES) = 2.70    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.7        PEAK FLOW RATE(CFS) = 1.02

```

```

*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50304.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 940.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 72.00 CHANNEL SLOPE = 0.1389
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

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```

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.02
FLOW VELOCITY(FEET/SEC.) = 3.75 FLOW DEPTH(FEET) = 0.30
TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 11.17
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50304.00 = 703.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50304.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

```

=====
MAINLINE Tc(MIN) = 11.17
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.002
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.30    0.60    1.000   -
USER-DEFINED        -         0.90    0.60    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.20    SUBAREA RUNOFF(CFS) = 0.80
EFFECTIVE AREA(ACRES) = 4.90    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.9        PEAK FLOW RATE(CFS) = 1.77

```

```

*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50305.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 940.00 DOWNSTREAM(FEET) = 890.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.2941
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.77
FLOW VELOCITY(FEET/SEC.) = 5.65 FLOW DEPTH(FEET) = 0.32
TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 11.67
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50305.00 = 873.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 11.67
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.977
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00    0.60    1.000   -
USER-DEFINED        -         0.80    0.60    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.80    SUBAREA RUNOFF(CFS) = 0.95
EFFECTIVE AREA(ACRES) = 7.70    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 7.7        PEAK FLOW RATE(CFS) = 2.61

```

```

*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50306.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 890.00 DOWNSTREAM(FEET) = 785.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 439.00 CHANNEL SLOPE = 0.2392
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.61
FLOW VELOCITY(FEET/SEC.) = 5.83 FLOW DEPTH(FEET) = 0.39
TRAVEL TIME(MIN.) = 1.25 Tc(MIN.) = 12.92
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50306.00 = 1312.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.92
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.923
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.80   0.60  1.000  -
USER-DEFINED        -         3.30   0.60  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 2.07
EFFECTIVE AREA(ACRES) = 14.80 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.8 PEAK FLOW RATE(CFS) = 4.31

```

```

*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50307.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 737.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 213.00 CHANNEL SLOPE = 0.2254
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.31
FLOW VELOCITY(FEET/SEC.) = 6.49 FLOW DEPTH(FEET) = 0.47
TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 13.47
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50307.00 = 1525.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 13.47
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.901
SUBAREA LOSS RATE DATA(AMC II):

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```

DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00   0.60  1.000  -
USER-DEFINED        -         0.90   0.60  1.000  -
USER-DEFINED        -         0.20   0.60  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 0.84
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 4.86

```

```

*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50308.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 737.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 527.00 CHANNEL SLOPE = 0.2600
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.86
FLOW VELOCITY(FEET/SEC.) = 7.09 FLOW DEPTH(FEET) = 0.48
TRAVEL TIME(MIN.) = 1.24 Tc(MIN.) = 14.71
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50308.00 = 2052.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

```

MAINLINE Tc(MIN) = 14.71
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.852
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         5.70   0.60  1.000  -
USER-DEFINED        -         1.00   0.60  1.000  -
USER-DEFINED        -         3.30   0.60  1.000  -
USER-DEFINED        -         0.40   0.60  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 2.36
EFFECTIVE AREA(ACRES) = 28.30 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 28.3 PEAK FLOW RATE(CFS) = 6.42

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```

*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50309.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 555.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 561.00 CHANNEL SLOPE = 0.0802
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00

```

CHANNEL FLOW THRU SUBAREA(CFS) = 6.42  
FLOW VELOCITY(FEET/SEC.) = 4.90 FLOW DEPTH(FEET) = 0.66  
TRAVEL TIME(MIN.) = 1.91 Tc(MIN.) = 16.62  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 2613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 16.62  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.801  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.60	1.000	-
USER-DEFINED	-	0.80	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 0.56  
EFFECTIVE AREA(ACRES) = 31.40 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.4 PEAK FLOW RATE(CFS) = 6.42  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50310.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 555.00 DOWNSTREAM(FEET) = 509.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 401.00 CHANNEL SLOPE = 0.1147  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 6.42  
FLOW VELOCITY(FEET/SEC.) = 5.55 FLOW DEPTH(FEET) = 0.62  
TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 17.82  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50310.00 = 3014.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 17.82  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.772  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	1.60	0.60	1.000	-
USER-DEFINED	-	7.60	0.60	1.000	-
USER-DEFINED	-	6.60	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	1.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 2.68  
EFFECTIVE AREA(ACRES) = 48.70 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 48.7 PEAK FLOW RATE(CFS) = 7.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50311.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 509.00 DOWNSTREAM(FEET) = 395.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 685.00 CHANNEL SLOPE = 0.1664  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.56  
FLOW VELOCITY(FEET/SEC.) = 6.66 FLOW DEPTH(FEET) = 0.62  
TRAVEL TIME(MIN.) = 1.71 Tc(MIN.) = 19.54  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50311.00 = 3699.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50311.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.54  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.731  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.50	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	2.90	0.60	1.000	-
USER-DEFINED	-	1.50	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 1.11  
EFFECTIVE AREA(ACRES) = 58.10 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 58.1 PEAK FLOW RATE(CFS) = 7.56  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50312.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 383.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 216.00 CHANNEL SLOPE = 0.0556  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.56  
FLOW VELOCITY(FEET/SEC.) = 4.45 FLOW DEPTH(FEET) = 0.75  
TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 20.35  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50312.00 = 3915.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 20.35  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.714  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.60	1.000	-
USER-DEFINED	-	1.50	0.60	1.000	-
USER-DEFINED	-	18.40	0.60	1.000	-
USER-DEFINED	-	11.60	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	1.80	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 37.70 SUBAREA RUNOFF(CFS) = 3.87  
EFFECTIVE AREA(ACRES) = 95.80 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 95.8 PEAK FLOW RATE(CFS) = 9.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 20.35  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.714  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.30	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 0.35  
EFFECTIVE AREA(ACRES) = 99.20 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 99.2 PEAK FLOW RATE(CFS) = 10.17

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50312.00 TO NODE 50313.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 383.00 DOWNSTREAM(FEET) = 350.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 762.00 CHANNEL SLOPE = 0.0433  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.17  
FLOW VELOCITY(FEET/SEC.) = 4.36 FLOW DEPTH(FEET) = 0.88  
TRAVEL TIME(MIN.) = 2.92 Tc(MIN.) = 23.26  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50313.00 = 4677.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 23.26  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.661  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	3.30	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 0.35  
EFFECTIVE AREA(ACRES) = 105.50 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 105.5 PEAK FLOW RATE(CFS) = 10.17  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 23.26  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.661  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.30	0.60	1.000	-
USER-DEFINED	-	1.60	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 10.90 SUBAREA RUNOFF(CFS) = 0.60  
EFFECTIVE AREA(ACRES) = 116.40 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 116.4 PEAK FLOW RATE(CFS) = 10.17  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50313.00 TO NODE 50314.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 318.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 957.00 CHANNEL SLOPE = 0.0334  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.17  
FLOW VELOCITY(FEET/SEC.) = 3.94 FLOW DEPTH(FEET) = 0.93  
TRAVEL TIME(MIN.) = 4.05 Tc(MIN.) = 27.31  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50314.00 = 5634.00 FEET.

```

*****
FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 27.31
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.602
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.30   0.60   1.000  -
USER-DEFINED        -         0.20   0.60   1.000  -
USER-DEFINED        -         3.70   0.60   1.000  -
USER-DEFINED        -         3.40   0.60   1.000  -
USER-DEFINED        -         2.00   0.60   1.000  -
USER-DEFINED        -        10.20   0.60   1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 21.80   SUBAREA RUNOFF(CFS) = 0.05
EFFECTIVE AREA(ACRES) = 138.20   AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 138.2   PEAK FLOW RATE(CFS) = 10.17
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 27.31
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.602
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        10.80   0.60   1.000  -
USER-DEFINED        -        15.20   0.60   1.000  -
USER-DEFINED        -         5.90   0.60   1.000  -
USER-DEFINED        -         1.30   0.60   1.000  -
USER-DEFINED        -         0.20   0.60   1.000  -
USER-DEFINED        -         1.30   0.60   1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 34.70   SUBAREA RUNOFF(CFS) = 0.08
EFFECTIVE AREA(ACRES) = 172.90   AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 172.9   PEAK FLOW RATE(CFS) = 10.17
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 27.31
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.602
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS

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```

LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.80   0.60   1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.80   SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 173.70   AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 173.7   PEAK FLOW RATE(CFS) = 10.17
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

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*****
FLOW PROCESS FROM NODE 50314.00 TO NODE 50315.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 318.00   DOWNSTREAM(FEET) = 313.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00   CHANNEL SLOPE = 0.0179
CHANNEL BASE(FEET) = 0.00   "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) = 5.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.17
FLOW VELOCITY(FEET/SEC.) = 3.12   FLOW DEPTH(FEET) = 1.04
TRAVEL TIME(MIN.) = 1.50   Tc(MIN.) = 28.81
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50315.00 = 5914.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 50315.00 TO NODE 50315.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 28.81
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.584
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70   0.60   1.000  -
USER-DEFINED        -         0.60   0.60   1.000  -
USER-DEFINED        -         0.50   0.60   1.000  -
USER-DEFINED        -         2.40   0.60   1.000  -
USER-DEFINED        -         2.00   0.60   1.000  -
USER-DEFINED        -         0.50   0.60   1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 6.70   SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 180.40   AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 1.00
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 180.4   PEAK FLOW RATE(CFS) = 10.17
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

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*****
FLOW PROCESS FROM NODE 50315.00 TO NODE 50316.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 313.00 DOWNSTREAM(FEET) = 285.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 642.00 CHANNEL SLOPE = 0.0436
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.17
FLOW VELOCITY(FEET/SEC.) = 4.36 FLOW DEPTH(FEET) = 0.88
TRAVEL TIME(MIN.) = 2.46 Tc(MIN.) = 31.26
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50316.00 = 6556.00 FEET.

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*****
FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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```

MAINLINE Tc(MIN) = 31.26

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* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.559

```

```

SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	3.50	0.60	1.000	-
USER-DEFINED	-	1.00	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	2.20	0.60	1.000	-

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

```

```

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

```

```

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

```

```

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

```

```

SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 0.00

```

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EFFECTIVE AREA(ACRES) = 187.70 AREA-AVERAGED Fm(INCH/HR) = 0.60

```

```

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

```

```

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

```

```

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

```

```

TOTAL AREA(ACRES) = 187.7 PEAK FLOW RATE(CFS) = 10.17

```

```

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

```

MAINLINE Tc(MIN) = 31.26

```

```

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.559

```

```

SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.60	1.000	-
USER-DEFINED	-	1.10	0.60	1.000	-

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

```

```

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

```

```

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

```

```

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

```

```

SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 0.00

```

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EFFECTIVE AREA(ACRES) = 189.90 AREA-AVERAGED Fm(INCH/HR) = 0.60

```

```

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

```

```

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

```

```

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

```

```

TOTAL AREA(ACRES) = 189.9 PEAK FLOW RATE(CFS) = 10.17

```

```

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 50316.00 TO NODE 50317.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

```

```

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

```

```

ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 282.00

```

```

CHANNEL LENGTH THRU SUBAREA(FEET) = 448.00 CHANNEL SLOPE = 0.0067

```

```

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

```

```

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00

```

```

CHANNEL FLOW THRU SUBAREA(CFS) = 10.17

```

```

FLOW VELOCITY(FEET/SEC.) = 2.15 FLOW DEPTH(FEET) = 1.26

```

```

TRAVEL TIME(MIN.) = 3.47 Tc(MIN.) = 34.74

```

```

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50317.00 = 7004.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

```

MAINLINE Tc(MIN) = 34.74

```

```

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.527

```

```

SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.60	1.000	-
USER-DEFINED	-	2.90	0.60	1.000	-
USER-DEFINED	-	2.60	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	10.20	0.60	1.000	-
USER-DEFINED	-	42.80	0.60	1.000	-

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

```

```

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997

```

```

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

```

```

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

```

```

SUBAREA AREA(ACRES) = 59.70 SUBAREA RUNOFF(CFS) = 0.09

```

```

EFFECTIVE AREA(ACRES) = 249.60 AREA-AVERAGED Fm(INCH/HR) = 0.60

```

```

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

```

```

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

```

```

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

```

```

TOTAL AREA(ACRES) = 249.6 PEAK FLOW RATE(CFS) = 10.17

```

```

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

```

MAINLINE Tc(MIN) = 34.74

```

```

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.527

```

```

SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.60	1.000	-

```

USER-DEFINED      -      17.50    0.60    1.000    -
USER-DEFINED      -      22.00    0.60    1.000    -
USER-DEFINED      -       0.90    0.60    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 65.80    SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 315.40    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 1.00
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 315.4    PEAK FLOW RATE(CFS) = 10.17
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 50317.00 TO NODE 50318.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 233.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 600.00 CHANNEL SLOPE = 0.0817
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.17
FLOW VELOCITY(FEET/SEC.) = 5.53 FLOW DEPTH(FEET) = 0.78
TRAVEL TIME(MIN.) = 1.81 Tc(MIN.) = 36.54
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50318.00 = 7604.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 36.54
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.511
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.60    0.100    -
USER-DEFINED        -         0.20    0.60    1.000    -
USER-DEFINED        -         1.10    0.60    0.100    -
USER-DEFINED        -         1.50    0.60    1.000    -
USER-DEFINED        -         1.60    0.60    1.000    -
USER-DEFINED        -         2.20    0.60    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.839
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 6.70    SUBAREA RUNOFF(CFS) = 0.50
EFFECTIVE AREA(ACRES) = 322.10    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 1.00
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 322.1    PEAK FLOW RATE(CFS) = 10.17
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

```

MAINLINE Tc(MIN) = 36.54
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.511
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.60    0.100    -
USER-DEFINED        -         0.90    0.60    0.850    -
USER-DEFINED        -         0.40    0.60    1.000    -
USER-DEFINED        -         5.00    0.60    1.000    -
USER-DEFINED        -         0.90    0.60    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.935
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 7.60    SUBAREA RUNOFF(CFS) = 0.23
EFFECTIVE AREA(ACRES) = 329.70    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 0.99
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 329.7    PEAK FLOW RATE(CFS) = 10.17
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 50318.00 TO NODE 50319.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 233.00 DOWNSTREAM(FEET) = 228.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 201.00 CHANNEL SLOPE = 0.0249
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.17
FLOW VELOCITY(FEET/SEC.) = 4.38 FLOW DEPTH(FEET) = 0.88
TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 37.31
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50319.00 = 7805.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

```

MAINLINE Tc(MIN) = 37.31
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.504
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.30    0.60    0.100    -
USER-DEFINED        -         0.30    0.60    1.000    -
USER-DEFINED        -         0.40    0.60    1.000    -
USER-DEFINED        -         0.90    0.60    1.000    -
USER-DEFINED        -         2.30    0.60    1.000    -
USER-DEFINED        -         1.10    0.60    1.000    -

```

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 0.53  
 EFFECTIVE AREA(ACRES) = 336.00 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 336.0 PEAK FLOW RATE(CFS) = 10.17  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 37.31  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.504  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.60	1.000	-
USER-DEFINED	-	1.60	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	1.40	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.994  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 0.02  
 EFFECTIVE AREA(ACRES) = 343.80 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 343.8 PEAK FLOW RATE(CFS) = 10.17  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50319.00 TO NODE 50320.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 228.00 DOWNSTREAM(FEET) = 214.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 809.00 CHANNEL SLOPE = 0.0173  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 10.17  
 FLOW VELOCITY(FEET/SEC.) = 3.81 FLOW DEPTH(FEET) = 0.94  
 TRAVEL TIME(MIN.) = 3.54 Tc(MIN.) = 40.85  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50320.00 = 8614.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 40.85  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.475  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.50	0.60	1.000	-
USER-DEFINED	-	4.80	0.60	0.850	-
USER-DEFINED	-	5.80	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.929  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 0.35  
 EFFECTIVE AREA(ACRES) = 355.20 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 355.2 PEAK FLOW RATE(CFS) = 10.17  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 40.85  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.475  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.90	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.854  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 0.70  
 EFFECTIVE AREA(ACRES) = 366.40 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 366.4 PEAK FLOW RATE(CFS) = 10.17  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 366.4 TC(MIN.) = 40.85  
 EFFECTIVE AREA(ACRES) = 366.40 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.985  
 PEAK FLOW RATE(CFS) = 10.17

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 4 \*  
\* HYDROLOGIC ANALYSIS - 2-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E504XX02.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.000; 1.580
- 2) 6.000; 1.430
- 3) 7.000; 1.310
- 4) 8.000; 1.210
- 5) 9.000; 1.130
- 6) 10.000; 1.060
- 7) 11.000; 1.010
- 8) 12.000; 0.960
- 9) 13.000; 0.920
- 10) 14.000; 0.880
- 11) 15.000; 0.840
- 12) 20.000; 0.720
- 13) 25.000; 0.630
- 14) 30.000; 0.570
- 15) 40.000; 0.480
- 16) 50.000; 0.420
- 17) 60.000; 0.380
- 18) 90.000; 0.300
- 19) 120.000; 0.260
- 20) 180.000; 0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.482  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.50	0.60	1.000	95	10.48

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.20  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.20  
FLOW VELOCITY(FEET/SEC.) = 2.99 FLOW DEPTH(FEET) = 0.15  
TRAVEL TIME(MIN.) = 1.46  $T_c$ (MIN.) = 11.94  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.94

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.963  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.13  
 EFFECTIVE AREA (ACRES) = 0.90 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 0.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 239.00 CHANNEL SLOPE = 0.4184  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 0.29  
 FLOW VELOCITY (FEET/SEC.) = 4.06 FLOW DEPTH (FEET) = 0.16  
 TRAVEL TIME (MIN.) = 0.98 Tc (MIN.) = 12.92  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50403.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.92  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.923  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.60 1.000 -  
 USER-DEFINED - 0.20 0.60 1.000 -  
 USER-DEFINED - 0.10 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.12  
 EFFECTIVE AREA (ACRES) = 1.30 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.3 PEAK FLOW RATE (CFS) = 0.38

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00 CHANNEL SLOPE = 0.7042  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 0.38

FLOW VELOCITY (FEET/SEC.) = 5.22 FLOW DEPTH (FEET) = 0.16  
 TRAVEL TIME (MIN.) = 0.23 Tc (MIN.) = 13.15  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50404.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 13.15  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.914  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.60 1.000 -  
 USER-DEFINED - 0.80 0.60 1.000 -  
 USER-DEFINED - 0.30 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 0.34  
 EFFECTIVE AREA (ACRES) = 2.50 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.5 PEAK FLOW RATE (CFS) = 0.71

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 145.00 CHANNEL SLOPE = 0.3448  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 0.71  
 FLOW VELOCITY (FEET/SEC.) = 4.94 FLOW DEPTH (FEET) = 0.22  
 TRAVEL TIME (MIN.) = 0.49 Tc (MIN.) = 13.64  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50405.00 TO NODE 50405.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 13.64  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.894  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.60 1.000 -  
 USER-DEFINED - 0.80 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 0.29  
 EFFECTIVE AREA (ACRES) = 3.60 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.6 PEAK FLOW RATE (CFS) = 0.95

```

*****
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.95
FLOW VELOCITY(FEET/SEC.) = 5.14 FLOW DEPTH(FEET) = 0.25
TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 14.15
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50406.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.15
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.874
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.60  1.000  -
USER-DEFINED        -         0.20   0.60  1.000  -
USER-DEFINED        -         0.80   0.60  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 0.30
EFFECTIVE AREA(ACRES) = 4.80 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 1.18

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.2193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.18
FLOW VELOCITY(FEET/SEC.) = 4.60 FLOW DEPTH(FEET) = 0.29
TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 14.98
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50407.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.98
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.841
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.50   0.60  1.000  -
USER-DEFINED        -         1.20   0.60  1.000  -
USER-DEFINED        -         1.70   0.60  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 1.39
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 2.43

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 325.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 490.00 CHANNEL SLOPE = 0.1531
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.43
FLOW VELOCITY(FEET/SEC.) = 4.88 FLOW DEPTH(FEET) = 0.41
TRAVEL TIME(MIN.) = 1.67 Tc(MIN.) = 16.65
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 16.65
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.800
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.60  1.000  -
USER-DEFINED        -         0.10   0.60  1.000  -
USER-DEFINED        -         0.60   0.60  1.000  -
USER-DEFINED        -         1.30   0.60  1.000  -
USER-DEFINED        -         0.50   0.60  1.000  -
USER-DEFINED        -         1.20   0.60  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 0.69
EFFECTIVE AREA(ACRES) = 15.00 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.0 PEAK FLOW RATE(CFS) = 2.71

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 16.65
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.800
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 0.16  
EFFECTIVE AREA(ACRES) = 15.90 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.9 PEAK FLOW RATE(CFS) = 2.87

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.87  
FLOW VELOCITY(FEET/SEC.) = 3.73 FLOW DEPTH(FEET) = 0.51  
TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 16.97  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 16.97  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.793  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	1.60	0.60	1.000	-
USER-DEFINED	-	6.40	0.60	1.000	-
USER-DEFINED	-	6.30	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 14.80 SUBAREA RUNOFF(CFS) = 2.57  
EFFECTIVE AREA(ACRES) = 30.70 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.7 PEAK FLOW RATE(CFS) = 5.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 16.97  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.793  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.10  
EFFECTIVE AREA(ACRES) = 31.30 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.3 PEAK FLOW RATE(CFS) = 5.43

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 5.43  
FLOW VELOCITY(FEET/SEC.) = 4.67 FLOW DEPTH(FEET) = 0.62  
TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 17.34  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 17.34  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.784  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	2.50	0.60	1.000	-
USER-DEFINED	-	1.20	0.60	1.000	-
USER-DEFINED	-	1.80	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 1.06  
EFFECTIVE AREA(ACRES) = 37.70 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 37.7 PEAK FLOW RATE(CFS) = 6.24

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 17.34  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.784  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.10  
 EFFECTIVE AREA(ACRES) = 38.30 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 38.3 PEAK FLOW RATE(CFS) = 6.34

\*\*\*\*\*

FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 312.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 566.00 CHANNEL SLOPE = 0.0530  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 6.34  
 FLOW VELOCITY(FEET/SEC.) = 4.14 FLOW DEPTH(FEET) = 0.71  
 TRAVEL TIME(MIN.) = 2.28 Tc(MIN.) = 19.62  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 19.62  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.729  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.60 0.100 -  
 USER-DEFINED - 0.20 0.60 1.000 -  
 USER-DEFINED - 1.60 0.60 1.000 -  
 USER-DEFINED - 0.90 0.60 1.000 -  
 USER-DEFINED - 1.50 0.60 0.100 -  
 USER-DEFINED - 0.40 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658  
 SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 1.51  
 EFFECTIVE AREA(ACRES) = 43.30 AREA-AVERAGED Fm(INCH/HR) = 0.58  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 43.3 PEAK FLOW RATE(CFS) = 6.34  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 19.62  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.729  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 0.80 0.60 1.000 -  
 USER-DEFINED - 5.80 0.60 1.000 -  
 USER-DEFINED - 0.50 0.60 1.000 -  
 USER-DEFINED - 3.40 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 1.22  
 EFFECTIVE AREA(ACRES) = 53.80 AREA-AVERAGED Fm(INCH/HR) = 0.58  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 53.8 PEAK FLOW RATE(CFS) = 7.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 216.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 954.00 CHANNEL SLOPE = 0.0692  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 7.19  
 FLOW VELOCITY(FEET/SEC.) = 5.89 FLOW DEPTH(FEET) = 0.64  
 TRAVEL TIME(MIN.) = 2.70 Tc(MIN.) = 22.32  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 22.32  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.678  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.60 0.100 -  
 USER-DEFINED - 0.60 0.60 1.000 -  
 USER-DEFINED - 1.00 0.60 1.000 -  
 USER-DEFINED - 1.10 0.60 1.000 -  
 USER-DEFINED - 0.40 0.60 1.000 -  
 USER-DEFINED - 0.20 0.60 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875  
 SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 0.50  
 EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.58  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 7.19  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 22.32  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.678  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	1.30	0.60	1.000	-
USER-DEFINED	-	9.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 SUBAREA AREA (ACRES) = 10.60      SUBAREA RUNOFF (CFS) = 0.76  
 EFFECTIVE AREA (ACRES) = 68.00      AREA-AVERAGED Fm (INCH/HR) = 0.58  
 AREA-AVERAGED Fp (INCH/HR) = 0.60      AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 68.0      PEAK FLOW RATE (CFS) = 7.19  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 22.32  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.678  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	1.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.934  
 SUBAREA AREA (ACRES) = 2.50      SUBAREA RUNOFF (CFS) = 0.27  
 EFFECTIVE AREA (ACRES) = 70.50      AREA-AVERAGED Fm (INCH/HR) = 0.58  
 AREA-AVERAGED Fp (INCH/HR) = 0.60      AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 70.5      PEAK FLOW RATE (CFS) = 7.19  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:  
 TOTAL AREA (ACRES) = 70.5      TC (MIN.) = 22.32  
 EFFECTIVE AREA (ACRES) = 70.50      AREA-AVERAGED Fm (INCH/HR) = 0.58  
 AREA-AVERAGED Fp (INCH/HR) = 0.60      AREA-AVERAGED Ap = 0.967  
 PEAK FLOW RATE (CFS) = 7.19

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2006 Advanced Engineering Software (aes)  
Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 2 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 2-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P201XX02.DAT  
TIME/DATE OF STUDY: 10:20 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	1.580
2)	6.000;	1.430
3)	7.000;	1.310
4)	8.000;	1.210
5)	9.000;	1.130
6)	10.000;	1.060
7)	11.000;	1.010
8)	12.000;	0.960
9)	13.000;	0.920
10)	14.000;	0.880
11)	15.000;	0.840
12)	20.000;	0.720
13)	25.000;	0.630
14)	30.000;	0.570
15)	40.000;	0.480
16)	50.000;	0.420
17)	60.000;	0.380
18)	90.000;	0.300
19)	120.000;	0.260
20)	180.000;	0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20100.00 TO NODE 20101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 830.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.230  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.114  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.60	1.000	95	9.23
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.60	1.000	95	9.23

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.28  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20101.00 TO NODE 20102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 276.00 CHANNEL SLOPE = 0.2899  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.28  
FLOW VELOCITY(FEET/SEC.) = 3.48 FLOW DEPTH(FEET) = 0.16  
TRAVEL TIME(MIN.) = 1.32  $T_c$ (MIN.) = 10.55  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20102.00 = 595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20102.00 TO NODE 20102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<



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=====
MAINLINE Tc(MIN) = 10.55
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.032
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.80     0.60     1.000    -
USER-DEFINED        -         0.20     0.60     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.00    SUBAREA RUNOFF(CFS) = 0.39
EFFECTIVE AREA(ACRES) = 1.60  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6      PEAK FLOW RATE(CFS) = 0.62

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*****
FLOW PROCESS FROM NODE 20102.00 TO NODE 20103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.1863
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.62
FLOW VELOCITY(FEET/SEC.) = 3.80 FLOW DEPTH(FEET) = 0.23
TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 11.26
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20103.00 = 756.00 FEET.

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.26
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.997
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50     0.60     1.000    -
USER-DEFINED        -         0.10     0.60     1.000    -
USER-DEFINED        -         0.30     0.60     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90    SUBAREA RUNOFF(CFS) = 0.32
EFFECTIVE AREA(ACRES) = 2.50  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.5      PEAK FLOW RATE(CFS) = 0.89

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 690.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 64.00 CHANNEL SLOPE = 0.4688

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CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.89
FLOW VELOCITY(FEET/SEC.) = 5.83 FLOW DEPTH(FEET) = 0.23
TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 11.44
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20104.00 = 820.00 FEET.

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.44
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.988
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40     0.60     1.000    -
USER-DEFINED        -         3.30     0.60     1.000    -
USER-DEFINED        -         0.10     0.60     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 1.33
EFFECTIVE AREA(ACRES) = 6.30  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.3      PEAK FLOW RATE(CFS) = 2.20

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 690.00 DOWNSTREAM(FEET) = 670.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 159.00 CHANNEL SLOPE = 0.1258
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.20
FLOW VELOCITY(FEET/SEC.) = 4.42 FLOW DEPTH(FEET) = 0.41
TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 12.04
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20105.00 = 979.00 FEET.

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*****
FLOW PROCESS FROM NODE 20105.00 TO NODE 20105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 12.04
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.958
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.60     1.000    -
USER-DEFINED        -         1.50     0.60     1.000    -
USER-DEFINED        -         2.20     0.60     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90    SUBAREA RUNOFF(CFS) = 1.26

```

EFFECTIVE AREA (ACRES) = 10.20 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 10.2 PEAK FLOW RATE (CFS) = 3.29

\*\*\*\*\*

FLOW PROCESS FROM NODE 20105.00 TO NODE 20106.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 670.00 DOWNSTREAM (FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 192.00 CHANNEL SLOPE = 0.1042  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 3.29  
FLOW VELOCITY (FEET/SEC.) = 4.55 FLOW DEPTH (FEET) = 0.49  
TRAVEL TIME (MIN.) = 0.70 Tc (MIN.) = 12.74  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20106.00 = 1171.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 12.74  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.930  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.60 1.000 -  
USER-DEFINED - 2.10 0.60 1.000 -  
USER-DEFINED - 0.90 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 3.80 SUBAREA RUNOFF (CFS) = 1.13  
EFFECTIVE AREA (ACRES) = 14.00 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 14.0 PEAK FLOW RATE (CFS) = 4.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 650.00 DOWNSTREAM (FEET) = 640.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 156.00 CHANNEL SLOPE = 0.0641  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.16  
FLOW VELOCITY (FEET/SEC.) = 3.98 FLOW DEPTH (FEET) = 0.59  
TRAVEL TIME (MIN.) = 0.65 Tc (MIN.) = 13.40  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20107.00 = 1327.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 13.40  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.904  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.60 1.000 -  
USER-DEFINED - 1.20 0.60 1.000 -  
USER-DEFINED - 2.30 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 1.10  
EFFECTIVE AREA (ACRES) = 18.00 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 18.0 PEAK FLOW RATE (CFS) = 4.93

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 640.00 DOWNSTREAM (FEET) = 609.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 512.00 CHANNEL SLOPE = 0.0605  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.93  
FLOW VELOCITY (FEET/SEC.) = 4.14 FLOW DEPTH (FEET) = 0.63  
TRAVEL TIME (MIN.) = 2.06 Tc (MIN.) = 15.46  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20108.00 = 1839.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20108.00 TO NODE 20108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 15.46  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.829  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.200 -  
USER-DEFINED - 1.50 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 1.000 -  
USER-DEFINED - 0.80 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970  
SUBAREA AREA (ACRES) = 2.70 SUBAREA RUNOFF (CFS) = 0.60  
EFFECTIVE AREA (ACRES) = 20.70 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.7 PEAK FLOW RATE (CFS) = 4.93  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

```
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 600.00
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.86
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.93
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 15.79
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20109.00 = 2033.00 FEET.
```

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*****
FLOW PROCESS FROM NODE 20109.00 TO NODE 20109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 15.79
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.821
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.70 0.60 0.200 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.44
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.58
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 4.93
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
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*****
FLOW PROCESS FROM NODE 20109.00 TO NODE 20110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 594.00
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.79
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.93
PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 16.67
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20110.00 = 2393.00 FEET.
```

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*****
FLOW PROCESS FROM NODE 20110.00 TO NODE 20110.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 16.67
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.800
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.60 0.100 -
```

```
USER-DEFINED - 3.50 0.60 0.200 -
USER-DEFINED - 2.70 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
USER-DEFINED - 1.20 0.60 1.000 -
USER-DEFINED - 0.30 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.626
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 3.13
EFFECTIVE AREA(ACRES) = 29.60 AREA-AVERAGED Fm(INCH/HR) = 0.52
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 29.6 PEAK FLOW RATE(CFS) = 7.33
```

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*****
FLOW PROCESS FROM NODE 20110.00 TO NODE 20111.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 594.00 DOWNSTREAM(FEET) = 590.00
FLOW LENGTH(FEET) = 246.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.45
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.33
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 17.22
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20111.00 = 2639.00 FEET.
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*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 17.22
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.787
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.70 0.60 0.100 -
USER-DEFINED - 2.10 0.60 0.200 -
USER-DEFINED - 2.10 0.60 1.000 -
USER-DEFINED - 0.60 0.60 1.000 -
USER-DEFINED - 4.70 0.60 1.000 -
USER-DEFINED - 0.90 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.792
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 3.11
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 10.09
```

```
*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20112.00 IS CODE = 31
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```

```
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 580.00
```

FLOW LENGTH(FEET) = 628.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.91  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 10.09  
PIPE TRAVEL TIME(MIN.) = 1.32 Tc(MIN.) = 18.54  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20112.00 = 3267.00 FEET.

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FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 18.54  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.755  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.60	0.100	-
USER-DEFINED	-	0.90	0.60	0.200	-
USER-DEFINED	-	4.40	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	7.50	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.797  
SUBAREA AREA(ACRES) = 15.20 SUBAREA RUNOFF(CFS) = 3.79  
EFFECTIVE AREA(ACRES) = 55.90 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 55.9 PEAK FLOW RATE(CFS) = 12.72

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 18.54  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.755  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	0.80	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 0.40  
EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 13.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20112.00 TO NODE 20113.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 580.00 DOWNSTREAM(FEET) = 570.00  
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.90  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 13.12  
PIPE TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 19.52  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20113.00 = 3786.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.52  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.732  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.60	0.100	-
USER-DEFINED	-	4.30	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	1.80	0.60	1.000	-
USER-DEFINED	-	4.60	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.877  
SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 2.33  
EFFECTIVE AREA(ACRES) = 70.90 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 14.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.52  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.732  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	0.100	-
USER-DEFINED	-	0.90	0.60	0.850	-
USER-DEFINED	-	1.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.787  
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 0.84  
EFFECTIVE AREA(ACRES) = 74.50 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 74.5 PEAK FLOW RATE(CFS) = 15.07

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20113.00 TO NODE 20114.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00  
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.84  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 15.07  
PIPE TRAVEL TIME(MIN.) = 1.48 Tc(MIN.) = 20.99  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20114.00 = 4393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 20.99  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.702  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.60 0.100 -  
USER-DEFINED - 4.00 0.60 0.850 -  
USER-DEFINED - 0.20 0.60 1.000 -  
USER-DEFINED - 1.40 0.60 1.000 -  
USER-DEFINED - 0.50 0.60 0.100 -  
USER-DEFINED - 0.90 0.60 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.747  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 1.80  
EFFECTIVE AREA(ACRES) = 82.40 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 82.4 PEAK FLOW RATE(CFS) = 15.07  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 20.99  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.702  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.60 1.000 -  
USER-DEFINED - 8.20 0.60 1.000 -  
USER-DEFINED - 3.20 0.60 1.000 -  
USER-DEFINED - 0.70 0.60 0.100 -  
USER-DEFINED - 3.70 0.60 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.932  
SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 2.25  
EFFECTIVE AREA(ACRES) = 99.90 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 99.9 PEAK FLOW RATE(CFS) = 17.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20115.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 560.00  
FLOW LENGTH(FEET) = 461.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.84  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 17.14  
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 21.97  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20115.00 = 4854.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 21.97  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.684  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.60 0.60 0.850 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 1.40 0.60 0.100 -  
USER-DEFINED - 6.20 0.60 0.850 -  
USER-DEFINED - 2.20 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798  
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 2.37  
EFFECTIVE AREA(ACRES) = 112.70 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 112.7 PEAK FLOW RATE(CFS) = 17.92

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 21.97  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.684  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.05  
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 17.98

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20116.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 560.00 DOWNSTREAM(FEET) = 528.00
FLOW LENGTH(FEET) = 219.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.25
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 17.98
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 22.15
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20116.00 = 5073.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 20116.00 TO NODE 20117.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 489.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 174.00 CHANNEL SLOPE = 0.2241
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 17.98
FLOW VELOCITY(FEET/SEC.) = 11.50 FLOW DEPTH(FEET) = 0.72
TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 22.40
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20117.00 = 5247.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.40
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.677
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.60 0.850 -
USER-DEFINED - 0.40 0.60 1.000 -
USER-DEFINED - 0.10 0.60 0.850 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 0.40 0.60 1.000 -
USER-DEFINED - 0.10 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.910
SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 0.29
EFFECTIVE AREA(ACRES) = 115.90 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 115.9 PEAK FLOW RATE(CFS) = 17.98
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.40
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.677

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.70 0.60 0.200 -
USER-DEFINED - 3.30 0.60 0.850 -
USER-DEFINED - 0.90 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
USER-DEFINED - 6.50 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.855
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 1.89
EFFECTIVE AREA(ACRES) = 128.70 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 128.7 PEAK FLOW RATE(CFS) = 19.38

\*\*\*\*\*
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.40
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.677
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.10 0.60 1.000 -
USER-DEFINED - 0.70 0.60 0.850 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 2.80 0.60 1.000 -
USER-DEFINED - 0.40 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 0.41
EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 133.8 PEAK FLOW RATE(CFS) = 19.79

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 133.8 TC(MIN.) = 22.40
EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.854
PEAK FLOW RATE(CFS) = 19.79

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

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Santa Ana, CA 92707

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S31 \*  
\* Rational Method Hydrology Analysis - 2-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S31.DAT  
TIME/DATE OF STUDY: 09:24 04/03/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.596
- 2) 10.00; 1.064
- 3) 15.00; 0.843
- 4) 20.00; 0.715
- 5) 25.00; 0.629
- 6) 30.00; 0.560
- 7) 40.00; 0.480
- 8) 50.00; 0.423
- 9) 60.00; 0.371
- 10) 90.00; 0.302
- 11) 120.00; 0.256
- 12) 180.00; 0.208
- 13) 360.00; 0.142
- 14) 1440.00; 0.060

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13100.00 TO NODE 13101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.58  
ELEVATION DATA: UPSTREAM(FEET) = 1069.66 DOWNSTREAM(FEET) = 969.92

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.312  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.244  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.94	0.60	1.000	0	8.31

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.54  
TOTAL AREA(ACRES) = 0.94 PEAK FLOW RATE(CFS) = 0.54

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13101.00 TO NODE 13102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 969.92 DOWNSTREAM(FEET) = 807.20  
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.89 CHANNEL SLOPE = 0.2444  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.019  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.67	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.03  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.07  
AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 2.73  
Tc(MIN.) = 11.04  
SUBAREA AREA(ACRES) = 7.67 SUBAREA RUNOFF(CFS) = 2.89  
EFFECTIVE AREA(ACRES) = 8.61 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 3.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.49 FLOW VELOCITY(FEET/SEC.) = 4.59  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13102.00 = 948.47 FEET.

\*\*\*\*\*



FLOW PROCESS FROM NODE 13102.00 TO NODE 13103.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 807.20 DOWNSTREAM(FEET) = 769.94
CHANNEL LENGTH THRU SUBAREA(FEET) = 691.01 CHANNEL SLOPE = 0.0539
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.850

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.65 0.60 0.999 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.65

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.01

AVERAGE FLOW DEPTH(FEET) = 0.79 TRAVEL TIME(MIN.) = 3.82

Tc(MIN.) = 14.86

SUBAREA AREA(ACRES) = 20.65 SUBAREA RUNOFF(CFS) = 4.66

EFFECTIVE AREA(ACRES) = 29.26 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 29.3 PEAK FLOW RATE(CFS) = 6.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.84 FLOW VELOCITY(FEET/SEC.) = 3.10

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13103.00 = 1639.48 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 769.94 DOWNSTREAM(FEET) = 693.88
FLOW LENGTH(FEET) = 1563.10 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 5.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.12

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 6.59

PIPE TRAVEL TIME(MIN.) = 2.57 Tc(MIN.) = 17.43

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13104.00 = 3202.58 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.43

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.781

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 28.00 0.60 0.750 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750

SUBAREA AREA(ACRES) = 28.00 SUBAREA RUNOFF(CFS) = 8.34
EFFECTIVE AREA(ACRES) = 57.26 AREA-AVERAGED Fm(INCH/HR) = 0.53
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 57.3 PEAK FLOW RATE(CFS) = 13.13

\*\*\*\*\*
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 693.88 DOWNSTREAM(FEET) = 645.69
FLOW LENGTH(FEET) = 1068.98 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 7.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 12.07

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 13.13

PIPE TRAVEL TIME(MIN.) = 1.48 Tc(MIN.) = 18.91

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13105.00 = 4271.56 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.91

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.743

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 35.28 0.60 0.867 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867

SUBAREA AREA(ACRES) = 35.28 SUBAREA RUNOFF(CFS) = 7.08

EFFECTIVE AREA(ACRES) = 92.54 AREA-AVERAGED Fm(INCH/HR) = 0.52

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.87

TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 18.25

\*\*\*\*\*
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 645.69 DOWNSTREAM(FEET) = 608.48
FLOW LENGTH(FEET) = 1127.55 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 9.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.89

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 18.25

PIPE TRAVEL TIME(MIN.) = 1.58 Tc(MIN.) = 20.49

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 20.49
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.707
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -       37.68   0.60    0.889   -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.889
SUBAREA AREA(ACRES) = 37.68      SUBAREA RUNOFF(CFS) = 5.88
EFFECTIVE AREA(ACRES) = 130.22   AREA-AVERAGED Fm(INCH/HR) = 0.53
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 130.2      PEAK FLOW RATE(CFS) = 21.10

```

```

*****
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 10
-----

```

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<

```

*****
FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 15.1
-----

```

>>>>DEFINE MEMORY BANK # 2<<<<

```

=====
PEAK FLOWRATE TABLE FILE NAME: S30.DNA
MEMORY BANK # 2 DEFINED AS FOLLOWS:
STREAM   Q      Tc      Fp(Fm)   Ap      Ae      HEADWATER
NUMBER   (CFS)   (MIN.) (INCH/HR) (ACRES)  NODE
1       141.43  53.48  0.60( 0.48) 0.81  1996.2  13000.00
2       137.37  56.64  0.60( 0.48) 0.81  2016.1  13010.00
TOTAL AREA(ACRES) = 2016.1

```

```

*****
FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 14.0
-----

```

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<

```

=====
MAIN-STREAM MEMORY DEFINED AS FOLLOWS:
STREAM   Q      Tc      Fp(Fm)   Ap      Ae      HEADWATER
NUMBER   (CFS)   (MIN.) (INCH/HR) (ACRES)  NODE
1       141.43  53.48  0.60( 0.48) 0.81  1996.2  13000.00
2       137.37  56.64  0.60( 0.48) 0.81  2016.1  13010.00
TOTAL AREA(ACRES) = 2016.1

```

```

*****
FLOW PROCESS FROM NODE 13026.00 TO NODE 13106.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 662.66 DOWNSTREAM(FEET) = 608.48
CHANNEL LENGTH THRU SUBAREA(FEET) = 3098.88 CHANNEL SLOPE = 0.0175
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.370

```

SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -       75.28   0.60    0.755   -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.755
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 144.50
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.43
AVERAGE FLOW DEPTH(FEET) = 2.55 TRAVEL TIME(MIN.) = 6.95
Tc(MIN.) = 60.43
SUBAREA AREA(ACRES) = 75.28      SUBAREA RUNOFF(CFS) = 6.14
EFFECTIVE AREA(ACRES) = 2071.44 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 2091.4      PEAK FLOW RATE(CFS) = 141.43
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.53 FLOW VELOCITY(FEET/SEC.) = 7.38
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

```

```

*****
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 11
-----

```

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

```

=====
** MAIN STREAM CONFLUENCE DATA **
STREAM   Q      Tc      Intensity  Fp(Fm)   Ap      Ae      HEADWATER
NUMBER   (CFS)   (MIN.) (INCH/HR) (INCH/HR) (ACRES)  NODE
1       141.43  60.43  0.370  0.60( 0.48) 0.80  2071.4  13000.00
2       137.37  63.65  0.363  0.60( 0.48) 0.80  2091.4  13010.00
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

```

```

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM   Q      Tc      Intensity  Fp(Fm)   Ap      Ae      HEADWATER
NUMBER   (CFS)   (MIN.) (INCH/HR) (INCH/HR) (ACRES)  NODE
1       21.10  20.49  0.707  0.60( 0.53) 0.88  130.2  13100.00
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

```

```

** PEAK FLOW RATE TABLE **
STREAM   Q      Tc      Intensity  Fp(Fm)   Ap      Ae      HEADWATER
NUMBER   (CFS)   (MIN.) (INCH/HR) (INCH/HR) (ACRES)  NODE
1       162.53  20.49  0.707  0.60( 0.49) 0.82  832.5  13100.00
2       146.72  60.43  0.370  0.60( 0.48) 0.81  2201.7  13000.00
3       142.56  63.65  0.363  0.60( 0.48) 0.81  2221.6  13010.00
TOTAL AREA(ACRES) = 2221.6

```

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 162.53 Tc(MIN.) = 20.488
EFFECTIVE AREA(ACRES) = 832.54 AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 2221.6
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

```

```

*****
FLOW PROCESS FROM NODE 13106.00 TO NODE 13107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 608.48 DOWNSTREAM(FEET) = 584.29
CHANNEL LENGTH THRU SUBAREA(FEET) = 1650.20 CHANNEL SLOPE = 0.0147
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.642
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 190.45 0.60 0.755 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 178.77
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.33
AVERAGE FLOW DEPTH(FEET) = 2.85 TRAVEL TIME(MIN.) = 3.75
Tc(MIN.) = 24.24
SUBAREA AREA(ACRES) = 190.45 SUBAREA RUNOFF(CFS) = 32.44
EFFECTIVE AREA(ACRES) = 1022.99 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 2412.1 PEAK FLOW RATE(CFS) = 162.53
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.75 FLOW VELOCITY(FEET/SEC.) = 7.16
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13107.00 = 20924.84 FEET.

```

```

*****
FLOW PROCESS FROM NODE 13107.00 TO NODE 13108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 584.29 DOWNSTREAM(FEET) = 563.78
CHANNEL LENGTH THRU SUBAREA(FEET) = 1061.67 CHANNEL SLOPE = 0.0193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.609
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 314.12 0.60 0.939 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.939
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 169.11
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.03
AVERAGE FLOW DEPTH(FEET) = 2.65 TRAVEL TIME(MIN.) = 2.20
Tc(MIN.) = 26.44
SUBAREA AREA(ACRES) = 314.12 SUBAREA RUNOFF(CFS) = 12.97
EFFECTIVE AREA(ACRES) = 1337.11 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 2726.2 PEAK FLOW RATE(CFS) = 162.53
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.61 FLOW VELOCITY(FEET/SEC.) = 7.94
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13108.00 = 21986.51 FEET.

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*****
FLOW PROCESS FROM NODE 13108.00 TO NODE 13109.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 563.78 DOWNSTREAM(FEET) = 541.61
CHANNEL LENGTH THRU SUBAREA(FEET) = 1657.28 CHANNEL SLOPE = 0.0134
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.557
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 203.63 0.60 0.785 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 173.50
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.04
AVERAGE FLOW DEPTH(FEET) = 2.87 TRAVEL TIME(MIN.) = 3.92
Tc(MIN.) = 30.37
SUBAREA AREA(ACRES) = 203.63 SUBAREA RUNOFF(CFS) = 21.95
EFFECTIVE AREA(ACRES) = 1540.74 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.83
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 2929.8 PEAK FLOW RATE(CFS) = 162.53
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.80 FLOW VELOCITY(FEET/SEC.) = 6.92
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13109.00 = 23643.79 FEET.

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** PEAK FLOW RATE TABLE **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	162.53	30.37	0.557	0.60( 0.50)	0.83	1540.7	13100.00
2	166.03	70.56	0.347	0.60( 0.49)	0.82	2909.9	13000.00
3	163.84	73.82	0.339	0.60( 0.49)	0.82	2929.8	13010.00

```

NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 166.03 Tc(MIN.) = 70.56
AREA-AVERAGED Fm(INCH/HR) = 0.49 AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA(ACRES) = 2909.86

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*****
FLOW PROCESS FROM NODE 13109.00 TO NODE 13110.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 541.61 DOWNSTREAM(FEET) = 509.94
CHANNEL LENGTH THRU SUBAREA(FEET) = 2016.96 CHANNEL SLOPE = 0.0157

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CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.336  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 283.06 0.60 0.791 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.791  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 174.98  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.50  
AVERAGE FLOW DEPTH (FEET) = 2.79 TRAVEL TIME (MIN.) = 4.48  
Tc (MIN.) = 75.04  
SUBAREA AREA (ACRES) = 283.06 SUBAREA RUNOFF (CFS) = 17.90  
EFFECTIVE AREA (ACRES) = 3192.92 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 3212.9 PEAK FLOW RATE (CFS) = 178.96  
END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.81 FLOW VELOCITY (FEET/SEC.) = 7.54  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13110.00 = 25660.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	162.53	34.86	0.521	0.60 (0.49)	0.82	1823.8	13100.00
2	178.96	75.04	0.336	0.60 (0.49)	0.81	3192.9	13000.00
3	176.28	78.34	0.329	0.60 (0.49)	0.81	3212.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 178.96 Tc (MIN.) = 75.04  
AREA-AVERAGED Fm (INCH/HR) = 0.49 AREA-AVERAGED Fp (INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA (ACRES) = 3192.92

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13110.00 TO NODE 13111.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 509.94 DOWNSTREAM (FEET) = 461.07  
CHANNEL LENGTH THRU SUBAREA (FEET) = 3058.95 CHANNEL SLOPE = 0.0160  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.321

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	248.05	0.60	0.783	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 186.73

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.66

AVERAGE FLOW DEPTH (FEET) = 2.85 TRAVEL TIME (MIN.) = 6.66  
Tc (MIN.) = 81.70  
SUBAREA AREA (ACRES) = 248.05 SUBAREA RUNOFF (CFS) = 15.54  
EFFECTIVE AREA (ACRES) = 3440.97 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 3460.9 PEAK FLOW RATE (CFS) = 186.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.85 FLOW VELOCITY (FEET/SEC.) = 7.65  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13111.00 = 28719.70 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	162.53	41.62	0.471	0.60 (0.49)	0.82	2071.8	13100.00
2	186.30	81.70	0.321	0.60 (0.49)	0.81	3441.0	13000.00
3	183.15	85.02	0.313	0.60 (0.49)	0.81	3460.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 186.30 Tc (MIN.) = 81.70  
AREA-AVERAGED Fm (INCH/HR) = 0.49 AREA-AVERAGED Fp (INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA (ACRES) = 3440.97

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13111.00 TO NODE 13112.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 461.07 DOWNSTREAM (FEET) = 452.77  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1781.78 CHANNEL SLOPE = 0.0047  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.307

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	179.91	0.60	0.694	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.694

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 193.89

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.87

AVERAGE FLOW DEPTH (FEET) = 3.64 TRAVEL TIME (MIN.) = 6.10

Tc (MIN.) = 87.80

SUBAREA AREA (ACRES) = 179.91 SUBAREA RUNOFF (CFS) = 15.19

EFFECTIVE AREA (ACRES) = 3620.88 AREA-AVERAGED Fm (INCH/HR) = 0.48

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 3640.9 PEAK FLOW RATE (CFS) = 193.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 3.64 FLOW VELOCITY (FEET/SEC.) = 4.87

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13112.00 = 30501.48 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	168.83	47.89	0.435	0.60 ( 0.48)	0.81	2251.8	13100.00
2	193.29	87.80	0.307	0.60 ( 0.48)	0.81	3620.9	13000.00
3	190.24	91.15	0.300	0.60 ( 0.48)	0.81	3640.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 193.29 Tc(MIN.) = 87.80  
 AREA-AVERAGED Fm(INCH/HR) = 0.48 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3620.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13112.00 TO NODE 13222.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 452.77 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1625.01 CHANNEL SLOPE = 0.0155  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.300

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	155.96	0.60	0.836	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.836

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 196.74

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.67

AVERAGE FLOW DEPTH(FEET) = 2.92 TRAVEL TIME(MIN.) = 3.53

Tc(MIN.) = 91.33

SUBAREA AREA(ACRES) = 155.96 SUBAREA RUNOFF(CFS) = 6.90

EFFECTIVE AREA(ACRES) = 3776.84 AREA-AVERAGED Fm(INCH/HR) = 0.48

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 3796.8 PEAK FLOW RATE(CFS) = 195.69

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.92 FLOW VELOCITY(FEET/SEC.) = 7.66

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13222.00 = 32126.49 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	170.57	51.53	0.415	0.60 ( 0.49)	0.81	2407.7	13100.00
2	195.69	91.33	0.300	0.60 ( 0.48)	0.81	3776.8	13000.00
3	193.58	94.68	0.294	0.60 ( 0.48)	0.81	3796.8	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 195.69 Tc(MIN.) = 91.33  
 AREA-AVERAGED Fm(INCH/HR) = 0.48 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3776.84

=====  
 END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 3796.8 TC(MIN.) = 91.33

EFFECTIVE AREA(ACRES) = 3776.84 AREA-AVERAGED Fm(INCH/HR)= 0.48  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.808  
 PEAK FLOW RATE(CFS) = 195.69

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	170.57	51.53	0.415	0.60 ( 0.49)	0.81	2407.7	13100.00
2	195.69	91.33	0.300	0.60 ( 0.48)	0.81	3776.8	13000.00
3	193.58	94.68	0.294	0.60 ( 0.48)	0.81	3796.8	13010.00

=====  
 END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S32 \*  
\* Rational Method Hydrology Analysis - 2-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S32.DAT  
TIME/DATE OF STUDY: 16:24 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.596
- 2) 10.00; 1.064
- 3) 15.00; 0.843
- 4) 20.00; 0.715
- 5) 25.00; 0.629
- 6) 30.00; 0.560
- 7) 40.00; 0.480
- 8) 50.00; 0.423
- 9) 60.00; 0.371
- 10) 90.00; 0.302
- 11) 120.00; 0.256
- 12) 180.00; 0.208
- 13) 360.00; 0.142
- 14) 1440.00; 0.060

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13200.00 TO NODE 13201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 298.57  
ELEVATION DATA: UPSTREAM(FEET) = 1069.04 DOWNSTREAM(FEET) = 1005.76

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.127  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.67	0.60	1.000	0	9.41

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.32  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 0.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13201.00 TO NODE 13202.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.76 DOWNSTREAM(FEET) = 896.98  
CHANNEL LENGTH THRU SUBAREA(FEET) = 747.55 CHANNEL SLOPE = 0.1455  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.911  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.42	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.41  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.06  
AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 4.07  
Tc(MIN.) = 13.48  
SUBAREA AREA(ACRES) = 7.42 SUBAREA RUNOFF(CFS) = 2.08  
EFFECTIVE AREA(ACRES) = 8.09 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.1 PEAK FLOW RATE(CFS) = 2.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.47 FLOW VELOCITY(FEET/SEC.) = 3.44  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13202.00 = 1046.12 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 896.98 DOWNSTREAM(FEET) = 840.27
FLOW LENGTH(FEET) = 1789.59 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 3.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.32
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.26
PIPE TRAVEL TIME(MIN.) = 4.72 Tc(MIN.) = 18.20
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13203.00 = 2835.71 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 18.20
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.761
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 38.89 0.60 0.731 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.731
SUBAREA AREA(ACRES) = 38.89 SUBAREA RUNOFF(CFS) = 11.30
EFFECTIVE AREA(ACRES) = 46.98 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.78
TOTAL AREA(ACRES) = 47.0 PEAK FLOW RATE(CFS) = 12.48

\*\*\*\*\*
FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 840.27 DOWNSTREAM(FEET) = 782.97
FLOW LENGTH(FEET) = 992.54 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 7.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.98
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 12.48
PIPE TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 19.47
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13204.00 = 3828.25 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 19.47
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.729
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 163.73 0.60 0.858 -

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 83.09 0.60 0.645 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645
SUBAREA AREA(ACRES) = 83.09 SUBAREA RUNOFF(CFS) = 25.55
EFFECTIVE AREA(ACRES) = 130.07 AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 130.1 PEAK FLOW RATE(CFS) = 36.65

\*\*\*\*\*
FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 782.97 DOWNSTREAM(FEET) = 692.52
FLOW LENGTH(FEET) = 2046.57 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 12.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.07
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 36.65
PIPE TRAVEL TIME(MIN.) = 2.12 Tc(MIN.) = 21.59
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13205.00 = 5874.82 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 21.59
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.688
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 88.51 0.60 0.679 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.679
SUBAREA AREA(ACRES) = 88.51 SUBAREA RUNOFF(CFS) = 22.33
EFFECTIVE AREA(ACRES) = 218.58 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 218.6 PEAK FLOW RATE(CFS) = 54.18

\*\*\*\*\*
FLOW PROCESS FROM NODE 13205.00 TO NODE 13206.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 692.52 DOWNSTREAM(FEET) = 605.24
CHANNEL LENGTH THRU SUBAREA(FEET) = 2704.69 CHANNEL SLOPE = 0.0323
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.573
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 163.73 0.60 0.858 -



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.858  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 60.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.06  
AVERAGE FLOW DEPTH(FEET) = 1.82 TRAVEL TIME(MIN.) = 7.44  
Tc(MIN.) = 29.03  
SUBAREA AREA(ACRES) = 163.73 SUBAREA RUNOFF(CFS) = 12.00  
EFFECTIVE AREA(ACRES) = 382.31 AREA-AVERAGED Fm(INCH/HR) = 0.46  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.76  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 382.3 PEAK FLOW RATE(CFS) = 54.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.75 FLOW VELOCITY(FEET/SEC.) = 5.90  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13206.00 = 8579.51 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13206.00 TO NODE 13207.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 605.24 DOWNSTREAM(FEET) = 555.41  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2479.15 CHANNEL SLOPE = 0.0201  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.502  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.60	0.888	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.888  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 57.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.03  
AVERAGE FLOW DEPTH(FEET) = 1.96 TRAVEL TIME(MIN.) = 8.22  
Tc(MIN.) = 37.25  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 7.26  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 54.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.91 FLOW VELOCITY(FEET/SEC.) = 4.94  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13207.00 = 11058.66 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 555.41 DOWNSTREAM(FEET) = 505.65  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1734.55 CHANNEL SLOPE = 0.0287  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.467  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.60	0.858	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.858  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 57.87  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.74  
AVERAGE FLOW DEPTH(FEET) = 1.83 TRAVEL TIME(MIN.) = 5.04  
Tc(MIN.) = 42.29  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 7.38  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 54.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.79 FLOW VELOCITY(FEET/SEC.) = 5.64  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 42.29  
RAINFALL INTENSITY(INCH/HR) = 0.47  
AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.81  
EFFECTIVE STREAM AREA(ACRES) = 649.28  
TOTAL STREAM AREA(ACRES) = 649.28  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 54.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13210.00 TO NODE 13211.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.51  
ELEVATION DATA: UPSTREAM(FEET) = 949.80 DOWNSTREAM(FEET) = 828.64

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.525  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.221  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 NATURAL FAIR COVER  
 "OPEN BRUSH" - 1.96 0.60 1.000 0 8.53  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 1.10  
 TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 1.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13211.00 TO NODE 13212.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 828.64 DOWNSTREAM(FEET) = 767.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 652.49 CHANNEL SLOPE = 0.0930  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.980  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 11.95 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.20  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.20  
 AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 3.39  
 Tc(MIN.) = 11.92  
 SUBAREA AREA(ACRES) = 11.95 SUBAREA RUNOFF(CFS) = 4.08  
 EFFECTIVE AREA(ACRES) = 13.91 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 4.75

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.67 FLOW VELOCITY(FEET/SEC.) = 3.55  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13212.00 = 967.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13212.00 TO NODE 13213.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 767.94 DOWNSTREAM(FEET) = 706.43  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 967.91 CHANNEL SLOPE = 0.0635  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.801  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 27.07 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.29  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.41  
 AVERAGE FLOW DEPTH(FEET) = 0.84 TRAVEL TIME(MIN.) = 4.73  
 Tc(MIN.) = 16.65  
 SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 4.90  
 EFFECTIVE AREA(ACRES) = 40.98 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 41.0 PEAK FLOW RATE(CFS) = 7.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.85 FLOW VELOCITY(FEET/SEC.) = 3.41  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13213.00 = 1934.91 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13213.00 TO NODE 13214.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 706.43 DOWNSTREAM(FEET) = 659.31  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 948.11 CHANNEL SLOPE = 0.0497  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.687  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 18.09 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.16  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.17  
 AVERAGE FLOW DEPTH(FEET) = 0.93 TRAVEL TIME(MIN.) = 4.98  
 Tc(MIN.) = 21.63  
 SUBAREA AREA(ACRES) = 18.09 SUBAREA RUNOFF(CFS) = 1.42  
 EFFECTIVE AREA(ACRES) = 59.07 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 7.42  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.89 FLOW VELOCITY(FEET/SEC.) = 3.13  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13214.00 = 2883.02 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13214.00 TO NODE 13215.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 659.31 DOWNSTREAM(FEET) = 628.91  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 970.24 CHANNEL SLOPE = 0.0313  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.590  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        71.42    0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.42
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.62
AVERAGE FLOW DEPTH(FEET) = 0.97 TRAVEL TIME(MIN.) = 6.17
Tc(MIN.) = 27.80
SUBAREA AREA(ACRES) = 71.42 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 130.49 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 130.5 PEAK FLOW RATE(CFS) = 7.42
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.97 FLOW VELOCITY(FEET/SEC.) = 2.62
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13215.00 = 3853.26 FEET.

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FLOW PROCESS FROM NODE 13215.00 TO NODE 13216.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 628.91 DOWNSTREAM(FEET) = 598.39
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.63 CHANNEL SLOPE = 0.0331
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.532
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 36.33 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.42
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.66
AVERAGE FLOW DEPTH(FEET) = 0.96 TRAVEL TIME(MIN.) = 5.78
Tc(MIN.) = 33.58
SUBAREA AREA(ACRES) = 36.33 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 166.82 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 166.8 PEAK FLOW RATE(CFS) = 7.42
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.96 FLOW VELOCITY(FEET/SEC.) = 2.66
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13216.00 = 4775.89 FEET.

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FLOW PROCESS FROM NODE 13216.00 TO NODE 13217.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 598.39 DOWNSTREAM(FEET) = 568.48
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.40 CHANNEL SLOPE = 0.0470
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.504
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 42.51 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.42
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.03
AVERAGE FLOW DEPTH(FEET) = 0.90 TRAVEL TIME(MIN.) = 3.50
Tc(MIN.) = 37.07
SUBAREA AREA(ACRES) = 42.51 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 209.33 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 209.3 PEAK FLOW RATE(CFS) = 7.42
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.90 FLOW VELOCITY(FEET/SEC.) = 3.03
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13217.00 = 5412.29 FEET.

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FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 568.48 DOWNSTREAM(FEET) = 505.65
CHANNEL LENGTH THRU SUBAREA(FEET) = 1896.50 CHANNEL SLOPE = 0.0331
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.431
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 73.24 0.60 0.951 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.951
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.12
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.74
AVERAGE FLOW DEPTH(FEET) = 0.99 TRAVEL TIME(MIN.) = 11.55
Tc(MIN.) = 48.63
SUBAREA AREA(ACRES) = 73.24 SUBAREA RUNOFF(CFS) = 1.39

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EFFECTIVE AREA(ACRES) = 282.57 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 282.6 PEAK FLOW RATE(CFS) = 7.42  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.96 FLOW VELOCITY(FEET/SEC.) = 2.66  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13220.00 = 7308.79 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 48.63  
 RAINFALL INTENSITY(INCH/HR) = 0.43  
 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.99  
 EFFECTIVE STREAM AREA(ACRES) = 282.57  
 TOTAL STREAM AREA(ACRES) = 282.57  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.42

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	54.18	42.29	0.467	0.60( 0.48)	0.81	649.3	13200.00
2	7.42	48.63	0.431	0.60( 0.59)	0.99	282.6	13210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	61.19	42.29	0.467	0.60( 0.51)	0.86	895.0	13200.00
2	57.36	48.63	0.431	0.60( 0.52)	0.86	931.8	13210.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 61.19 Tc(MIN.) = 42.29  
 EFFECTIVE AREA(ACRES) = 895.05 AREA-AVERAGED Fm(INCH/HR) = 0.51  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA(ACRES) = 931.8  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13220.00 TO NODE 13221.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 505.65 DOWNSTREAM(FEET) = 478.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1949.14 CHANNEL SLOPE = 0.0137

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.434

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	108.50	0.60	0.637	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.637

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 68.87  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.63  
 AVERAGE FLOW DEPTH(FEET) = 2.02 TRAVEL TIME(MIN.) = 5.77  
 Tc(MIN.) = 48.06

SUBAREA AREA(ACRES) = 108.50 SUBAREA RUNOFF(CFS) = 15.38  
 EFFECTIVE AREA(ACRES) = 1003.55 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.83  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 1040.3 PEAK FLOW RATE(CFS) = 65.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.98 FLOW VELOCITY(FEET/SEC.) = 5.56  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13221.00 = 14742.35 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	65.48	48.06	0.434	0.60( 0.50)	0.83	1003.5	13200.00
2	60.46	54.50	0.399	0.60( 0.50)	0.84	1040.3	13210.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 65.48 Tc(MIN.) = 48.06  
 AREA-AVERAGED Fm(INCH/HR) = 0.50 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.83 EFFECTIVE AREA(ACRES) = 1003.55

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13221.00 TO NODE 13222.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 478.94 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2078.70 CHANNEL SLOPE = 0.0247  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.407

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	87.26	0.60	0.699	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.699

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 70.30  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.07  
 AVERAGE FLOW DEPTH(FEET) = 1.82 TRAVEL TIME(MIN.) = 4.90

Tc(MIN.) = 52.96  
 SUBAREA AREA(ACRES) = 87.26 SUBAREA RUNOFF(CFS) = 9.63  
 EFFECTIVE AREA(ACRES) = 1090.81 AREA-AVERAGED Fm(INCH/HR) = 0.49  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.82  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 1127.6 PEAK FLOW RATE(CFS) = 71.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.83 FLOW VELOCITY(FEET/SEC.) = 7.09  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13222.00 = 16821.05 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	71.12	52.96	0.407	0.60 ( 0.49)	0.82	1090.8	13200.00
2	65.38	59.51	0.374	0.60 ( 0.50)	0.83	1127.6	13210.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 71.12 Tc(MIN.) = 52.96  
 AREA-AVERAGED Fm(INCH/HR) = 0.49 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA(ACRES) = 1090.81

=====  
 END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1127.6 TC(MIN.) = 52.96  
 EFFECTIVE AREA(ACRES) = 1090.81 AREA-AVERAGED Fm(INCH/HR)= 0.49  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.822  
 PEAK FLOW RATE(CFS) = 71.12

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	71.12	52.96	0.407	0.60 ( 0.49)	0.82	1090.8	13200.00
2	65.38	59.51	0.374	0.60 ( 0.50)	0.83	1127.6	13210.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S35 \*  
\* Rational Method Hydrology Analysis - 2-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S35.DAT  
TIME/DATE OF STUDY: 16:24 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.596
- 2) 10.00; 1.064
- 3) 15.00; 0.843
- 4) 20.00; 0.715
- 5) 25.00; 0.629
- 6) 30.00; 0.560
- 7) 40.00; 0.480
- 8) 50.00; 0.423
- 9) 60.00; 0.371
- 10) 90.00; 0.302
- 11) 120.00; 0.256
- 12) 180.00; 0.208
- 13) 360.00; 0.142
- 14) 1440.00; 0.060

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.00 TO NODE 13500.50 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 548.43  
ELEVATION DATA: UPSTREAM(FEET) = 1183.47 DOWNSTREAM(FEET) = 1065.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.978  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	5.11	0.60	1.000	0	11.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.74  
TOTAL AREA(ACRES) = 5.11 PEAK FLOW RATE(CFS) = 1.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.50 TO NODE 13501.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1033.15  
CHANNEL LENGTH THRU SUBAREA(FEET) = 431.71 CHANNEL SLOPE = 0.0738  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.866  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.87	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.84  
AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 2.53  
Tc(MIN.) = 14.49  
SUBAREA AREA(ACRES) = 8.87 SUBAREA RUNOFF(CFS) = 2.12  
EFFECTIVE AREA(ACRES) = 13.98 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 3.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 2.95  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13501.00 = 980.14 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13501.00 TO NODE 13502.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1033.15 DOWNSTREAM(FEET) = 990.26
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.63 CHANNEL SLOPE = 0.0452
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.705

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 16.82 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.19

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.59

AVERAGE FLOW DEPTH(FEET) = 0.74 TRAVEL TIME(MIN.) = 6.12

Tc(MIN.) = 20.61

SUBAREA AREA(ACRES) = 16.82 SUBAREA RUNOFF(CFS) = 1.59

EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 3.35

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.67 FLOW VELOCITY(FEET/SEC.) = 2.45

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13502.00 = 1928.77 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13502.00 TO NODE 13503.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.26 DOWNSTREAM(FEET) = 956.06
CHANNEL LENGTH THRU SUBAREA(FEET) = 940.98 CHANNEL SLOPE = 0.0363
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.595

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 46.02 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.49

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.29

AVERAGE FLOW DEPTH(FEET) = 0.71 TRAVEL TIME(MIN.) = 6.84

Tc(MIN.) = 27.45

SUBAREA AREA(ACRES) = 46.02 SUBAREA RUNOFF(CFS) = 0.00

EFFECTIVE AREA(ACRES) = 76.82 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 76.8 PEAK FLOW RATE(CFS) = 3.35

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.70 FLOW VELOCITY(FEET/SEC.) = 2.28

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13503.00 = 2869.75 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13503.00 TO NODE 13504.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 956.06 DOWNSTREAM(FEET) = 889.48
CHANNEL LENGTH THRU SUBAREA(FEET) = 2131.31 CHANNEL SLOPE = 0.0312
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.457

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 58.46 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.35

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.14

AVERAGE FLOW DEPTH(FEET) = 0.72 TRAVEL TIME(MIN.) = 16.59

Tc(MIN.) = 44.04

SUBAREA AREA(ACRES) = 58.46 SUBAREA RUNOFF(CFS) = 0.00

EFFECTIVE AREA(ACRES) = 135.28 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 135.3 PEAK FLOW RATE(CFS) = 3.35

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.72 FLOW VELOCITY(FEET/SEC.) = 2.14

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13504.00 = 5001.06 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13504.00 TO NODE 13505.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 889.48 DOWNSTREAM(FEET) = 848.10
CHANNEL LENGTH THRU SUBAREA(FEET) = 1661.97 CHANNEL SLOPE = 0.0249
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.381

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 49.30 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.35  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.97  
 AVERAGE FLOW DEPTH(FEET) = 0.75 TRAVEL TIME(MIN.) = 14.05  
 Tc(MIN.) = 58.09  
 SUBAREA AREA(ACRES) = 49.30 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 184.58 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 184.6 PEAK FLOW RATE(CFS) = 3.35  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.75 FLOW VELOCITY(FEET/SEC.) = 1.97  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.00 = 6663.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13505.00 TO NODE 13505.50 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 848.10 DOWNSTREAM(FEET) = 811.10  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1234.61 CHANNEL SLOPE = 0.0300  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.355  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.35	0.60	0.811	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.811  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.53  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.28  
 AVERAGE FLOW DEPTH(FEET) = 0.81 TRAVEL TIME(MIN.) = 9.02  
 Tc(MIN.) = 67.11  
 SUBAREA AREA(ACRES) = 39.35 SUBAREA RUNOFF(CFS) = 2.37  
 EFFECTIVE AREA(ACRES) = 223.93 AREA-AVERAGED Fm(INCH/HR) = 0.58  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.97  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 223.9 PEAK FLOW RATE(CFS) = 3.35  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.73 FLOW VELOCITY(FEET/SEC.) = 2.11  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.50 = 7897.64 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13505.50 TO NODE 13506.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 811.10 DOWNSTREAM(FEET) = 781.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1415.98 CHANNEL SLOPE = 0.0213  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.329  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	54.33	0.60	0.738	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.738  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.44  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.10  
 AVERAGE FLOW DEPTH(FEET) = 0.93 TRAVEL TIME(MIN.) = 11.22  
 Tc(MIN.) = 78.33

SUBAREA AREA(ACRES) = 54.33 SUBAREA RUNOFF(CFS) = 4.21  
 EFFECTIVE AREA(ACRES) = 278.26 AREA-AVERAGED Fm(INCH/HR) = 0.55  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.92  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 278.3 PEAK FLOW RATE(CFS) = 6.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.99 FLOW VELOCITY(FEET/SEC.) = 2.18  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.00 = 9313.62 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13506.50 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 781.00 DOWNSTREAM(FEET) = 743.17  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1542.62 CHANNEL SLOPE = 0.0245  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.304  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	61.33	0.60	0.783	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.23  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.45  
 AVERAGE FLOW DEPTH(FEET) = 1.06 TRAVEL TIME(MIN.) = 10.49  
 Tc(MIN.) = 88.81

SUBAREA AREA(ACRES) = 61.33 SUBAREA RUNOFF(CFS) = 3.65  
 EFFECTIVE AREA(ACRES) = 339.59 AREA-AVERAGED Fm(INCH/HR) = 0.54  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.90  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.



TOTAL AREA (ACRES) = 339.6 PEAK FLOW RATE (CFS) = 9.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.12 FLOW VELOCITY (FEET/SEC.) = 2.55  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.50 = 10856.24 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13506.50 TO NODE 13520.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 743.17 DOWNSTREAM (FEET) = 717.04  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1370.93 CHANNEL SLOPE = 0.0191  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.289

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.86	0.60	0.848	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.848

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.37

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.36

AVERAGE FLOW DEPTH (FEET) = 1.21 TRAVEL TIME (MIN.) = 9.68

Tc (MIN.) = 98.50

SUBAREA AREA (ACRES) = 39.86 SUBAREA RUNOFF (CFS) = 1.57

EFFECTIVE AREA (ACRES) = 379.45 AREA-AVERAGED Fm (INCH/HR) = 0.53

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.89

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 379.5 PEAK FLOW RATE (CFS) = 10.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.22 FLOW VELOCITY (FEET/SEC.) = 2.37  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13506.00 TO NODE 13520.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 98.50

RAINFALL INTENSITY (INCH/HR) = 0.29

AREA-AVERAGED Fm (INCH/HR) = 0.53

AREA-AVERAGED Fp (INCH/HR) = 0.60

AREA-AVERAGED Ap = 0.89

EFFECTIVE STREAM AREA (ACRES) = 379.45

TOTAL STREAM AREA (ACRES) = 379.45

PEAK FLOW RATE (CFS) AT CONFLUENCE = 10.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13510.00 TO NODE 13511.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 903.68

ELEVATION DATA: UPSTREAM (FEET) = 1216.90 DOWNSTREAM (FEET) = 1022.78

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.615

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.860

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	6.66	0.60	1.000	0	14.62

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 1.56

TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 1.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13511.00 TO NODE 13512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1022.78 DOWNSTREAM (FEET) = 954.27

CHANNEL LENGTH THRU SUBAREA (FEET) = 1027.63 CHANNEL SLOPE = 0.0667

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.699

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.83

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.71

AVERAGE FLOW DEPTH (FEET) = 0.59 TRAVEL TIME (MIN.) = 6.32

Tc (MIN.) = 20.94

SUBAREA AREA (ACRES) = 25.40 SUBAREA RUNOFF (CFS) = 2.26

EFFECTIVE AREA (ACRES) = 32.06 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 2.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.59 FLOW VELOCITY (FEET/SEC.) = 2.73

LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13512.00 = 1931.31 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13512.00 TO NODE 13513.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 954.27 DOWNSTREAM (FEET) = 872.45

CHANNEL LENGTH THRU SUBAREA (FEET) = 1926.42 CHANNEL SLOPE = 0.0425

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.521  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	90.23	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.30  
AVERAGE FLOW DEPTH (FEET) = 0.64 TRAVEL TIME (MIN.) = 13.96  
Tc (MIN.) = 34.90  
SUBAREA AREA (ACRES) = 90.23 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 122.29 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 122.3 PEAK FLOW RATE (CFS) = 2.86  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.64 FLOW VELOCITY (FEET/SEC.) = 2.30  
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13513.00 = 3857.73 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13513.00 TO NODE 13514.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 872.45 DOWNSTREAM (FEET) = 813.12  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1895.66 CHANNEL SLOPE = 0.0313  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.421  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	135.65	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.05  
AVERAGE FLOW DEPTH (FEET) = 0.68 TRAVEL TIME (MIN.) = 15.42  
Tc (MIN.) = 50.32  
SUBAREA AREA (ACRES) = 135.65 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 257.94 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 257.9 PEAK FLOW RATE (CFS) = 2.86  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.68 FLOW VELOCITY (FEET/SEC.) = 2.05  
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13514.00 = 5753.39 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13514.00 TO NODE 13515.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 813.12 DOWNSTREAM (FEET) = 773.74  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1926.15 CHANNEL SLOPE = 0.0204  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.351  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	109.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 1.75  
AVERAGE FLOW DEPTH (FEET) = 0.74 TRAVEL TIME (MIN.) = 18.31  
Tc (MIN.) = 68.63  
SUBAREA AREA (ACRES) = 109.30 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 367.24 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 367.2 PEAK FLOW RATE (CFS) = 2.86  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.74 FLOW VELOCITY (FEET/SEC.) = 1.75  
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13515.00 = 7679.54 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 773.74 DOWNSTREAM (FEET) = 717.04  
CHANNEL LENGTH THRU SUBAREA (FEET) = 2279.49 CHANNEL SLOPE = 0.0249  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.304  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	231.44	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.86  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.88  
 AVERAGE FLOW DEPTH(FEET) = 0.71 TRAVEL TIME(MIN.) = 20.24  
 Tc(MIN.) = 88.87  
 SUBAREA AREA(ACRES) = 231.44 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 598.68 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 598.7 PEAK FLOW RATE(CFS) = 2.86  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.71 FLOW VELOCITY(FEET/SEC.) = 1.88  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13520.00 = 9959.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

-----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 88.87  
 RAINFALL INTENSITY(INCH/HR) = 0.30  
 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 598.68  
 TOTAL STREAM AREA(ACRES) = 598.68  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.86

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	10.66	98.50	0.289	0.60( 0.53)	0.89	379.5	13500.00
2	2.86	88.87	0.304	0.60( 0.60)	1.00	598.7	13510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	13.00	88.87	0.304	0.60( 0.58)	0.96	941.0	13510.00
2	13.37	98.50	0.289	0.60( 0.57)	0.96	978.1	13500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 13.37 Tc(MIN.) = 98.50  
 EFFECTIVE AREA(ACRES) = 978.13 AREA-AVERAGED Fm(INCH/HR) = 0.57  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 978.1  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.00 TO NODE 13520.50 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM(FEET) = 717.04 DOWNSTREAM(FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2019.22 CHANNEL SLOPE = 0.0084  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.268

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 193.31 0.60 0.965 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.19  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.55  
 AVERAGE FLOW DEPTH(FEET) = 1.36 TRAVEL TIME(MIN.) = 13.18  
 Tc(MIN.) = 111.68

SUBAREA AREA(ACRES) = 193.31 SUBAREA RUNOFF(CFS) = 1.63  
 EFFECTIVE AREA(ACRES) = 1171.44 AREA-AVERAGED Fm(INCH/HR) = 0.58  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 1171.4 PEAK FLOW RATE(CFS) = 13.37  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.33 FLOW VELOCITY(FEET/SEC.) = 2.51  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.50 = 14246.39 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	13.00	102.10	0.283	0.60( 0.58)	0.96	1134.3	13510.00
2	13.37	111.68	0.268	0.60( 0.58)	0.96	1171.4	13500.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 13.37 Tc(MIN.) = 111.68  
 AREA-AVERAGED Fm(INCH/HR) = 0.58 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 1171.44

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.50 TO NODE 13521.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 661.95  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1622.36 CHANNEL SLOPE = 0.0235  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.257

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 129.79 0.60 0.897 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.92  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.78  
 AVERAGE FLOW DEPTH(FEET) = 1.15 TRAVEL TIME(MIN.) = 7.16  
 Tc(MIN.) = 118.83  
 SUBAREA AREA(ACRES) = 129.79 SUBAREA RUNOFF(CFS) = 3.10  
 EFFECTIVE AREA(ACRES) = 1301.23 AREA-AVERAGED Fm(INCH/HR) = 0.57  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 1301.2 PEAK FLOW RATE(CFS) = 14.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.12 FLOW VELOCITY(FEET/SEC.) = 3.74  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13521.00 = 15868.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	13.99	109.30	0.272	0.60( 0.57)	0.95	1264.1	13510.00
2	14.17	118.83	0.257	0.60( 0.57)	0.95	1301.2	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 14.17 Tc(MIN.) = 118.83  
 AREA-AVERAGED Fm(INCH/HR) = 0.57 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.95 EFFECTIVE AREA(ACRES) = 1301.23

\*\*\*\*\*

FLOW PROCESS FROM NODE 13521.00 TO NODE 13522.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 661.95 DOWNSTREAM(FEET) = 632.19  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2746.01 CHANNEL SLOPE = 0.0108  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.244  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	278.60	0.60	0.905	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.08  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.93  
 AVERAGE FLOW DEPTH(FEET) = 1.39 TRAVEL TIME(MIN.) = 15.61  
 Tc(MIN.) = 134.44  
 SUBAREA AREA(ACRES) = 278.60 SUBAREA RUNOFF(CFS) = 5.81  
 EFFECTIVE AREA(ACRES) = 1579.83 AREA-AVERAGED Fm(INCH/HR) = 0.57  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.94  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 1579.8 PEAK FLOW RATE(CFS) = 19.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.45 FLOW VELOCITY(FEET/SEC.) = 3.03  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13522.00 = 18614.76 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	18.94	124.94	0.252	0.60( 0.57)	0.95	1542.7	13510.00
2	19.25	134.44	0.244	0.60( 0.57)	0.94	1579.8	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 19.25 Tc(MIN.) = 134.44  
 AREA-AVERAGED Fm(INCH/HR) = 0.57 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.94 EFFECTIVE AREA(ACRES) = 1579.83

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1579.8 TC(MIN.) = 134.44  
 EFFECTIVE AREA(ACRES) = 1579.83 AREA-AVERAGED Fm(INCH/HR) = 0.57  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.945  
 PEAK FLOW RATE(CFS) = 19.25

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	18.94	124.94	0.252	0.60( 0.57)	0.95	1542.7	13510.00
2	19.25	134.44	0.244	0.60( 0.57)	0.94	1579.8	13500.00

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 5-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P05EVAA.DAT  
TIME/DATE OF STUDY: 14:42 11/14/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.604
- 2) 10.00; 1.741
- 3) 15.00; 1.296
- 4) 20.00; 1.108
- 5) 25.00; 0.968
- 6) 30.00; 0.871
- 7) 40.00; 0.743
- 8) 50.00; 0.660
- 9) 60.00; 0.598
- 10) 90.00; 0.495
- 11) 120.00; 0.435
- 12) 180.00; 0.364
- 13) 360.00; 0.267
- 14) 1200.00; 0.116

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE/ WAY		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 571.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.305  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.206  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	-	0.80	0.50	0.200	0	7.31

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 1.52  
TOTAL AREA (ACRES) = 0.80 PEAK FLOW RATE (CFS) = 1.52

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.206  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.50	0.200	-
USER-DEFINED	-	1.00	0.50	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.170  
SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 6.30  
EFFECTIVE AREA (ACRES) = 4.10 AREA-AVERAGED Fm (INCH/HR) = 0.09  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.18  
TOTAL AREA (ACRES) = 4.1 PEAK FLOW RATE (CFS) = 7.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.206  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.50	0.200	-
USER-DEFINED	-	1.00	0.50	0.100	-

USER-DEFINED - 2.60 0.50 0.200 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA (ACRES) = 2.60 SUBAREA RUNOFF (CFS) = 4.93  
 EFFECTIVE AREA (ACRES) = 6.70 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.19  
 TOTAL AREA (ACRES) = 6.7 PEAK FLOW RATE (CFS) = 12.74

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 571.00 DOWNSTREAM ELEVATION (FEET) = 530.50  
 STREET LENGTH (FEET) = 1215.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.28  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.39  
 HALFSTREET FLOOD WIDTH (FEET) = 12.93  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.53  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.78  
 STREET FLOW TRAVEL TIME (MIN.) = 4.47 Tc (MIN.) = 11.78

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.583

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.50	0.200	-
USER-DEFINED	-	0.10	0.50	0.200	-
USER-DEFINED	-	2.40	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.135  
 SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 5.05  
 EFFECTIVE AREA (ACRES) = 10.40 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA (ACRES) = 10.4 PEAK FLOW RATE (CFS) = 14.03

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.39 HALFSTREET FLOOD WIDTH (FEET) = 12.46  
 FLOW VELOCITY (FEET/SEC.) = 4.44 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.71  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1542.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 11.78  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.583  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.40	0.50	0.200	-
USER-DEFINED	-	18.20	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.119  
 SUBAREA AREA (ACRES) = 22.60 SUBAREA RUNOFF (CFS) = 30.98  
 EFFECTIVE AREA (ACRES) = 33.00 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.13  
 TOTAL AREA (ACRES) = 33.0 PEAK FLOW RATE (CFS) = 45.01

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 11.78  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.583  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.20	0.50	0.200	-
USER-DEFINED	-	0.10	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198  
 SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 8.41  
 EFFECTIVE AREA (ACRES) = 39.30 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA (ACRES) = 39.3 PEAK FLOW RATE (CFS) = 53.43

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 530.50 DOWNSTREAM (FEET) = 522.00  
 FLOW LENGTH (FEET) = 837.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.2 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.10  
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 53.43  
 PIPE TRAVEL TIME (MIN.) = 1.38 Tc (MIN.) = 13.16  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2379.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 13.16  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.460  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED - 15.30 0.50 0.100 -  
 USER-DEFINED - 0.70 0.50 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.133  
 SUBAREA AREA (ACRES) = 16.00 SUBAREA RUNOFF (CFS) = 20.07  
 EFFECTIVE AREA (ACRES) = 55.30 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA (ACRES) = 55.3 PEAK FLOW RATE (CFS) = 69.15

\*\*\*\*\*

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 522.00 DOWNSTREAM (FEET) = 473.00  
 FLOW LENGTH (FEET) = 568.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 24.12  
 ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 69.15  
 PIPE TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 13.55  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2947.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.55  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.425

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.50	0.850	-
USER-DEFINED	-	0.30	0.50	0.500	-
USER-DEFINED	-	0.50	0.50	0.100	-
USER-DEFINED	-	13.00	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.820  
 SUBAREA AREA (ACRES) = 15.90 SUBAREA RUNOFF (CFS) = 14.53  
 EFFECTIVE AREA (ACRES) = 71.20 AREA-AVERAGED Fm (INCH/HR) = 0.15  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA (ACRES) = 71.2 PEAK FLOW RATE (CFS) = 81.94

\*\*\*\*\*

FLOW PROCESS FROM NODE 104.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 473.00 DOWNSTREAM (FEET) = 435.00  
 FLOW LENGTH (FEET) = 588.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.8 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 22.52  
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 81.94  
 PIPE TRAVEL TIME (MIN.) = 0.44 Tc (MIN.) = 13.98

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 100.00 TO NODE 121.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 577.00 DOWNSTREAM (FEET) = 574.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.438  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.011  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	-	0.60	0.50	0.200	0	8.44

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF (CFS) = 1.03  
 TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 1.03

\*\*\*\*\*

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 574.00 DOWNSTREAM ELEVATION (FEET) = 557.00  
 STREET LENGTH (FEET) = 221.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.47

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.34  
 HALFSTREET FLOOD WIDTH (FEET) = 9.72  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.01  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.02  
 STREET FLOW TRAVEL TIME (MIN.) = 0.61 Tc (MIN.) = 9.05  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.905  
 SUBAREA LOSS RATE DATA (AMC II):



DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.200	-
USER-DEFINED	-	7.90	0.50	0.200	-
USER-DEFINED	-	4.10	0.50	0.400	-
USER-DEFINED	-	2.20	0.50	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.257  
SUBAREA AREA (ACRES) = 14.30 SUBAREA RUNOFF (CFS) = 22.86  
EFFECTIVE AREA (ACRES) = 14.90 AREA-AVERAGED Fm (INCH/HR) = 0.13  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.26  
TOTAL AREA (ACRES) = 14.9 PEAK FLOW RATE (CFS) = 23.83

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.40 HALFSTREET FLOOD WIDTH (FEET) = 13.09  
FLOW VELOCITY (FEET/SEC.) = 6.92 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.74  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 551.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 557.00 DOWNSTREAM ELEVATION (FEET) = 527.00  
STREET LENGTH (FEET) = 317.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 30.59

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.41  
HALFSTREET FLOOD WIDTH (FEET) = 13.87  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 8.00  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.28

STREET FLOW TRAVEL TIME (MIN.) = 0.66 Tc (MIN.) = 9.71

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.791

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.320	-
USER-DEFINED	-	4.50	0.50	0.400	-
USER-DEFINED	-	0.70	0.50	0.200	-
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	3.50	0.50	0.350	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.352

SUBAREA AREA (ACRES) = 9.30 SUBAREA RUNOFF (CFS) = 13.52

EFFECTIVE AREA (ACRES) = 24.20 AREA-AVERAGED Fm (INCH/HR) = 0.15

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.29

TOTAL AREA (ACRES) = 24.2 PEAK FLOW RATE (CFS) = 35.82

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.43 HALFSTREET FLOOD WIDTH (FEET) = 14.88

FLOW VELOCITY (FEET/SEC.) = 8.25 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.53

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 123.00 = 868.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 527.00 DOWNSTREAM ELEVATION (FEET) = 496.00  
STREET LENGTH (FEET) = 315.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 43.62

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.45  
HALFSTREET FLOOD WIDTH (FEET) = 15.98  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 8.82  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.95

STREET FLOW TRAVEL TIME (MIN.) = 0.60 Tc (MIN.) = 10.31

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.714

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.50	0.400	-
USER-DEFINED	-	1.40	0.50	0.350	-
USER-DEFINED	-	4.00	0.50	0.400	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	2.70	0.50	0.350	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387

SUBAREA AREA (ACRES) = 11.40 SUBAREA RUNOFF (CFS) = 15.60

EFFECTIVE AREA (ACRES) = 35.60 AREA-AVERAGED Fm (INCH/HR) = 0.16

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.32

TOTAL AREA (ACRES) = 35.6 PEAK FLOW RATE (CFS) = 49.74

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.46 HALFSTREET FLOOD WIDTH (FEET) = 16.91

FLOW VELOCITY (FEET/SEC.) = 9.05 DEPTH\*VELOCITY (FT\*FT/SEC.) = 4.20

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 124.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 10.31
RAINFALL INTENSITY(INCH/HR) = 1.71
AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA(ACRES) = 35.60
TOTAL STREAM AREA(ACRES) = 35.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 49.74

\*\*\*\*\*
FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 317.00
ELEVATION DATA: UPSTREAM(FEET) = 699.00 DOWNSTREAM(FEET) = 610.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.111
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.894

SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"OPEN BRUSH" - 1.50 0.50 1.000 0 9.11
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.88
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 1.88

\*\*\*\*\*
FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 575.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 206.00 CHANNEL SLOPE = 0.1699
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.787
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.80 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.50
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.50
AVERAGE FLOW DEPTH(FEET) = 0.46 TRAVEL TIME(MIN.) = 0.62
Tc(MIN.) = 9.73
SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 3.24
EFFECTIVE AREA(ACRES) = 4.30 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.3 PEAK FLOW RATE(CFS) = 4.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.52 FLOW VELOCITY(FEET/SEC.) = 6.05
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 523.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 548.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.1350
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.715
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.30 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.78
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.01
AVERAGE FLOW DEPTH(FEET) = 0.61 TRAVEL TIME(MIN.) = 0.55
Tc(MIN.) = 10.29
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 3.61
EFFECTIVE AREA(ACRES) = 7.60 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 7.6 PEAK FLOW RATE(CFS) = 8.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.66 FLOW VELOCITY(FEET/SEC.) = 6.34
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 723.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 548.00 DOWNSTREAM(FEET) = 524.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 318.00 CHANNEL SLOPE = 0.0755
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.626
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.30 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.48
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.25
AVERAGE FLOW DEPTH(FEET) = 0.78 TRAVEL TIME(MIN.) = 1.01
Tc(MIN.) = 11.30

SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 2.33  
EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 10.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.79 FLOW VELOCITY (FEET/SEC.) = 5.35  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 1041.00 FEET.

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FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 524.00 DOWNSTREAM (FEET) = 515.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 94.00 CHANNEL SLOPE = 0.0957  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.603

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.86

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.09

AVERAGE FLOW DEPTH (FEET) = 0.81 TRAVEL TIME (MIN.) = 0.26

Tc (MIN.) = 11.55

SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 3.67

EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 13.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.85 FLOW VELOCITY (FEET/SEC.) = 6.23  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 1135.00 FEET.

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FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 507.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 207.00 CHANNEL SLOPE = 0.0386  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.538

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.30	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.37

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.76

AVERAGE FLOW DEPTH (FEET) = 1.10 TRAVEL TIME (MIN.) = 0.73  
Tc (MIN.) = 12.28  
SUBAREA AREA (ACRES) = 8.30 SUBAREA RUNOFF (CFS) = 7.75  
EFFECTIVE AREA (ACRES) = 21.90 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 21.9 PEAK FLOW RATE (CFS) = 20.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.17 FLOW VELOCITY (FEET/SEC.) = 4.96  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 1342.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 507.00 DOWNSTREAM (FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 338.00 CHANNEL SLOPE = 0.0207  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.417

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	0.400	-
USER-DEFINED	-	13.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 26.32

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.16

AVERAGE FLOW DEPTH (FEET) = 1.45 TRAVEL TIME (MIN.) = 1.35

Tc (MIN.) = 13.63

SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 11.72

EFFECTIVE AREA (ACRES) = 36.00 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 36.0 PEAK FLOW RATE (CFS) = 29.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.52 FLOW VELOCITY (FEET/SEC.) = 4.29  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 1680.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 137.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 500.00 DOWNSTREAM (FEET) = 496.00  
FLOW LENGTH (FEET) = 726.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.3 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 6.97  
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 29.80

PIPE TRAVEL TIME (MIN.) = 1.74 Tc (MIN.) = 15.37

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

```

*****
FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 15.37
RAINFALL INTENSITY(INCH/HR) = 1.28
AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 36.00
TOTAL STREAM AREA(ACRES) = 36.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 29.80

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 49.74 10.31 1.714 0.50( 0.16) 0.32 35.6 100.00
2 29.80 15.37 1.282 0.50( 0.50) 1.00 36.0 130.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 79.54 10.31 1.714 0.50( 0.30) 0.59 59.7 100.00
2 65.71 15.37 1.282 0.50( 0.33) 0.66 71.6 130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 79.54 Tc(MIN.) = 10.31
EFFECTIVE AREA(ACRES) = 59.74 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59
TOTAL AREA(ACRES) = 71.6
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

*****
FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 444.00
FLOW LENGTH(FEET) = 888.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.51
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 79.54
PIPE TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 10.99
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 125.00 = 3294.00 FEET.

*****
FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

*****
MAINLINE Tc(MIN.) = 10.99
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.653
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.50 0.400 -
USER-DEFINED - 7.50 0.50 0.400 -
USER-DEFINED - 0.10 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.407
SUBAREA AREA(ACRES) = 8.60 SUBAREA RUNOFF(CFS) = 11.22
EFFECTIVE AREA(ACRES) = 68.34 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.57
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 84.08

*****
FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 444.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.74
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 84.08
PIPE TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 12.02
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 12.02
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.561
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.30 0.50 0.200 -
USER-DEFINED - 0.70 0.50 0.400 -
USER-DEFINED - 0.90 0.50 0.100 -
USER-DEFINED - 0.60 0.50 0.350 -
USER-DEFINED - 0.40 0.50 0.200 -
USER-DEFINED - 0.20 0.50 0.400 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.225
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 9.26
EFFECTIVE AREA(ACRES) = 75.44 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 87.3 PEAK FLOW RATE(CFS) = 87.73

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN.) = 12.02
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.561
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.50     0.100    -
USER-DEFINED        -         0.10     0.50     0.350    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225
SUBAREA AREA(ACRES) = 0.20   SUBAREA RUNOFF(CFS) = 0.26
EFFECTIVE AREA(ACRES) = 75.64   AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 87.5     PEAK FLOW RATE(CFS) = 87.99

```

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*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1
-----

```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

```

=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.02
RAINFALL INTENSITY(INCH/HR) = 1.56
AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.54
EFFECTIVE STREAM AREA(ACRES) = 75.64
TOTAL STREAM AREA(ACRES) = 87.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 87.99

```

```

*****
FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21
-----

```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

```

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 557.00   DOWNSTREAM(FEET) = 546.00

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```

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.105
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.413
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS   Tc
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          -         0.50     0.50     0.100    0   6.11
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 1.06
TOTAL AREA(ACRES) = 0.50   PEAK FLOW RATE(CFS) = 1.06

```

```

*****
FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62
-----

```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

```

UPSTREAM ELEVATION(FEET) = 546.00   DOWNSTREAM ELEVATION(FEET) = 488.00
STREET LENGTH(FEET) = 671.00   CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

```

```

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

```

```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

```

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.65

```

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.27
HALFSTREET FLOOD WIDTH(FEET) = 5.97
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.52
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.48
STREET FLOW TRAVEL TIME(MIN.) = 2.03   Tc(MIN.) = 8.13

```

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* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.063
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50     0.50     0.200    -
USER-DEFINED        -         0.90     0.50     0.100    -
USER-DEFINED        -         3.90     0.50     0.350    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
SUBAREA AREA(ACRES) = 5.30   SUBAREA RUNOFF(CFS) = 9.14
EFFECTIVE AREA(ACRES) = 5.80   AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 5.8     PEAK FLOW RATE(CFS) = 10.05

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) = 8.47
FLOW VELOCITY(FEET/SEC.) = 6.02   DEPTH*VELOCITY(FT*FT/SEC.) = 1.89
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1001.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 8.13
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.063
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap        SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         14.60    0.50     0.200    -
USER-DEFINED        -         1.10     0.50     0.100    -
USER-DEFINED        -         4.30     0.50     0.350    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.227
SUBAREA AREA(ACRES) = 20.00   SUBAREA RUNOFF(CFS) = 35.10
EFFECTIVE AREA(ACRES) = 25.80   AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 25.8     PEAK FLOW RATE(CFS) = 45.15

```

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*****
FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 488.00 DOWNSTREAM ELEVATION(FEET) = 460.00
STREET LENGTH(FEET) = 371.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 56.45
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.50
HALFSTREET FLOOD WIDTH(FEET) = 18.79
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.43
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 4.20
STREET FLOW TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 8.87
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.937
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.50 0.200 -
USER-DEFINED - 10.00 0.50 0.200 -
USER-DEFINED - 1.70 0.50 0.200 -
USER-DEFINED - 0.50 0.50 0.100 -
USER-DEFINED - 1.00 0.50 0.350 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.207
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 22.60
EFFECTIVE AREA(ACRES) = 39.50 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 39.5 PEAK FLOW RATE(CFS) = 64.81

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 19.80
FLOW VELOCITY(FEET/SEC.) = 8.77 DEPTH*VELOCITY(FT*FT/SEC.) = 4.53
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1372.00 FEET.

*****
FLOW PROCESS FROM NODE 113.00 TO NODE 126.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.45

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ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 64.81
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 9.32
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 1872.00 FEET.

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 9.32
RAINFALL INTENSITY(INCH/HR) = 1.86
AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.23
EFFECTIVE STREAM AREA(ACRES) = 39.50
TOTAL STREAM AREA(ACRES) = 39.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 64.81

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 87.99 12.02 1.561 0.50( 0.27) 0.54 75.6 100.00
1 71.99 17.18 1.214 0.50( 0.30) 0.60 87.5 130.00
2 64.81 9.32 1.859 0.50( 0.11) 0.23 39.5 110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 148.72 9.32 1.859 0.50( 0.21) 0.41 98.1 110.00
2 141.75 12.02 1.561 0.50( 0.22) 0.43 115.1 100.00
3 112.86 17.18 1.214 0.50( 0.24) 0.48 127.0 130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 148.72 Tc(MIN.) = 9.32
EFFECTIVE AREA(ACRES) = 98.14 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41
TOTAL AREA(ACRES) = 127.0
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 435.00
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.90
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 148.72

```

PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 9.70  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.70  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.793  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 0.200 -  
USER-DEFINED - 5.10 0.50 0.400 -  
USER-DEFINED - 0.30 0.50 0.100 -  
USER-DEFINED - 0.10 0.50 0.850 -  
USER-DEFINED - 0.80 0.50 0.200 -  
USER-DEFINED - 0.80 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.366  
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 11.30  
EFFECTIVE AREA(ACRES) = 105.94 AREA-AVERAGED Fm(INCH/HR) = 0.20  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 134.8 PEAK FLOW RATE(CFS) = 151.42

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.70  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.793  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.10 0.50 0.400 -  
USER-DEFINED - 0.30 0.50 0.100 -  
USER-DEFINED - 1.50 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 6.76  
EFFECTIVE AREA(ACRES) = 110.84 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 139.7 PEAK FLOW RATE(CFS) = 158.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\*\*\*\* MAIN STREAM CONFLUENCE DATA \*\*\*\*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 158.18 9.70 1.793 0.50( 0.21) 0.41 110.8 110.00  
2 150.93 12.40 1.527 0.50( 0.22) 0.43 127.8 100.00  
3 120.60 17.59 1.198 0.50( 0.24) 0.48 139.7 130.00

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 81.94 13.98 1.386 0.50( 0.15) 0.29 71.2 100.00  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 233.64 9.70 1.793 0.50( 0.19) 0.38 160.2 110.00  
2 231.85 12.40 1.527 0.50( 0.19) 0.38 191.0 100.00  
3 223.62 13.98 1.386 0.50( 0.20) 0.39 202.6 100.00  
4 190.12 17.59 1.198 0.50( 0.21) 0.42 210.9 130.00  
TOTAL AREA(ACRES) = 210.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 233.64 Tc(MIN.) = 9.700  
EFFECTIVE AREA(ACRES) = 160.22 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.38  
TOTAL AREA(ACRES) = 210.9  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 370.00  
FLOW LENGTH(FEET) = 500.20 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 38.04  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 233.64  
PIPE TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 9.92  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.10 = 4750.20 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.10 TO NODE 127.20 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 353.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 595.30 CHANNEL SLOPE = 0.0218  
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.601  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.50 0.100 -  
USER-DEFINED - 0.10 0.50 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 236.16

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.98  
 AVERAGE FLOW DEPTH (FEET) = 0.77 TRAVEL TIME (MIN.) = 1.66  
 Tc (MIN.) = 11.58  
 SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 5.02  
 EFFECTIVE AREA (ACRES) = 163.82 AREA-AVERAGED Fm (INCH/HR) = 0.19  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA (ACRES) = 214.5 PEAK FLOW RATE (CFS) = 233.64  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.76 FLOW VELOCITY (FEET/SEC.) = 5.97  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.20 = 5345.50 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.20 TO NODE 127.30 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 353.00 DOWNSTREAM (FEET) = 340.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 476.00 CHANNEL SLOPE = 0.0273  
 CHANNEL BASE (FEET) = 50.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.50  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.491

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.10	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 235.72  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.42  
 AVERAGE FLOW DEPTH (FEET) = 0.71 TRAVEL TIME (MIN.) = 1.24  
 Tc (MIN.) = 12.81

SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 4.15  
 EFFECTIVE AREA (ACRES) = 167.02 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA (ACRES) = 217.7 PEAK FLOW RATE (CFS) = 233.64  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.71 FLOW VELOCITY (FEET/SEC.) = 6.38  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.30 = 5821.50 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.30 TO NODE 13569.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 340.00 DOWNSTREAM (FEET) = 338.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 506.00 CHANNEL SLOPE = 0.0040  
 CHANNEL BASE (FEET) = 150.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.50  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.244

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.10	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.100	-

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.80 0.50 0.100 -  
 USER-DEFINED - 0.60 0.50 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 235.47  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.35  
 AVERAGE FLOW DEPTH (FEET) = 0.66 TRAVEL TIME (MIN.) = 3.58  
 Tc (MIN.) = 16.39

SUBAREA AREA (ACRES) = 3.40 SUBAREA RUNOFF (CFS) = 3.65  
 EFFECTIVE AREA (ACRES) = 170.42 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36  
 TOTAL AREA (ACRES) = 221.1 PEAK FLOW RATE (CFS) = 233.64  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.66 FLOW VELOCITY (FEET/SEC.) = 2.34  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 13569.00 = 6327.50 FEET.

END OF STUDY SUMMARY:  
 TOTAL AREA (ACRES) = 221.1 TC (MIN.) = 16.39  
 EFFECTIVE AREA (ACRES) = 170.42 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.360  
 PEAK FLOW RATE (CFS) = 233.64

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	233.64	16.39	1.244	0.50 (0.18)	0.36	170.4	110.00
2	231.85	19.13	1.141	0.50 (0.19)	0.37	201.2	100.00
3	223.62	20.82	1.085	0.50 (0.19)	0.38	212.8	100.00
4	190.12	24.85	0.972	0.50 (0.20)	0.40	221.1	130.00

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 5-YR ULTIMATE EV DECEMBER 2013 MCHANDOO/TMULI \*  
\*\*\*\*\*

FILE NAME: 2P05EVBB.DAT  
TIME/DATE OF STUDY: 16:37 12/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.630
- 2) 10.00; 1.755
- 3) 15.00; 1.301
- 4) 20.00; 1.113
- 5) 25.00; 0.972
- 6) 30.00; 0.874
- 7) 40.00; 0.746
- 8) 50.00; 0.664
- 9) 60.00; 0.602
- 10) 90.00; 0.498
- 11) 120.00; 0.439
- 12) 180.00; 0.368
- 13) 360.00; 0.270
- 14) 1200.00; 0.118

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00  
ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 543.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.596  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.176  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.80	0.50	0.100	56	7.60

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 1.53  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 1.53

\*\*\*\*\*  
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 543.00 DOWNSTREAM ELEVATION(FEET) = 523.00  
STREET LENGTH(FEET) = 502.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.87  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.25  
HALFSTREET FLOOD WIDTH(FEET) = 4.43  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.72  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.92  
STREET FLOW TRAVEL TIME(MIN.) = 2.25 Tc(MIN.) = 9.85  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.782

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.200	-
USER-DEFINED	-	1.30	0.50	0.100	-

USER-DEFINED - 0.30 0.50 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.261  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 2.68  
 EFFECTIVE AREA(ACRES) = 2.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 3.92  
  
 END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 5.66  
 FLOW VELOCITY(FEET/SEC.) = 3.84 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.04  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 810.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.85  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.782  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	1.40	0.50	0.100	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.18  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 6.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 523.00 DOWNSTREAM ELEVATION(FEET) = 468.00  
 STREET LENGTH(FEET) = 987.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 32.00  
  
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.49  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.32  
 HALFSTREET FLOOD WIDTH(FEET) = 8.06  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.06  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.62  
 STREET FLOW TRAVEL TIME(MIN.) = 3.25 Tc(MIN.) = 13.10  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.474  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	0.500	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	0.500	-
USER-DEFINED	-	1.90	0.50	0.100	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 3.19  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.14  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 11.36

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.50 0.50 0.500 -  
 USER-DEFINED - 2.40 0.50 0.100 -  
 USER-DEFINED - 1.30 0.50 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.426  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 4.76  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.15  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 9.76

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.65  
 FLOW VELOCITY(FEET/SEC.) = 5.20 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.72  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 1797.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 468.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.35  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.34  
 HALFSTREET FLOOD WIDTH(FEET) = 9.84  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.36  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.81  
 STREET FLOW TRAVEL TIME(MIN.) = 3.04 Tc(MIN.) = 16.14

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.258  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	0.500	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	0.500	-
USER-DEFINED	-	1.90	0.50	0.100	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 3.19  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.14  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 11.36

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 9.91
FLOW VELOCITY(FEET/SEC.) = 5.31 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.80
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2774.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.14
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.258
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.30 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 0.89
EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 12.24

\*\*\*\*\*
FLOW PROCESS FROM NODE 204.00 TO NODE 218.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 343.00
STREET LENGTH(FEET) = 1228.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.85
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.36
HALFSTREET FLOOD WIDTH(FEET) = 11.05
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.39
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.94
STREET FLOW TRAVEL TIME(MIN.) = 3.80 Tc(MIN.) = 19.94
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.115

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.50 0.500 -
USER-DEFINED - 0.50 0.50 0.100 -
USER-DEFINED - 0.40 0.50 1.000 -
USER-DEFINED - 0.70 0.50 0.500 -

USER-DEFINED - 1.50 0.50 0.100 -
USER-DEFINED - 0.80 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 3.20
EFFECTIVE AREA(ACRES) = 16.60 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 16.6 PEAK FLOW RATE(CFS) = 13.83

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.05
FLOW VELOCITY(FEET/SEC.) = 5.38 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.94
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.94
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.115
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.20 0.50 0.500 -
USER-DEFINED - 0.10 0.50 0.100 -
USER-DEFINED - 0.20 0.50 0.500 -
USER-DEFINED - 0.10 0.50 0.100 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450
SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 1.28
EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 15.11

\*\*\*\*\*
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 19.94
RAINFALL INTENSITY(INCH/HR) = 1.12
AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.39
EFFECTIVE STREAM AREA(ACRES) = 18.20
TOTAL STREAM AREA(ACRES) = 18.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 15.11

\*\*\*\*\*
FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
INITIAL SUBAREA FLOW-LENGTH(FEET) = 268.00

ELEVATION DATA: UPSTREAM(FEET) = 514.00 DOWNSTREAM(FEET) = 511.50

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.724  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.153

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	-	2.30	0.50	0.500	56	9.27
APARTMENTS	-	0.40	0.50	0.200	56	7.72

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.456  
SUBAREA RUNOFF(CFS) = 4.68  
TOTAL AREA(ACRES) = 2.70 PEAK FLOW RATE(CFS) = 4.68

\*\*\*\*\*  
FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 511.50 DOWNSTREAM ELEVATION(FEET) = 503.00  
STREET LENGTH(FEET) = 503.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.50  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 12.15  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.14  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.19  
STREET FLOW TRAVEL TIME(MIN.) = 2.67 Tc(MIN.) = 10.39  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.719

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	0.500	-
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	0.60	0.50	0.200	-
USER-DEFINED	-	6.20	0.50	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.475  
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 9.60  
EFFECTIVE AREA(ACRES) = 9.90 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.47  
TOTAL AREA(ACRES) = 9.9 PEAK FLOW RATE(CFS) = 13.23

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 14.02  
FLOW VELOCITY(FEET/SEC.) = 3.39 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.40  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 771.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.39  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.719

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.50	0.200	-
USER-DEFINED	-	0.30	0.50	0.500	-
USER-DEFINED	-	0.10	0.50	0.350	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.281  
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 1.85  
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 15.07

\*\*\*\*\*

FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 503.00 DOWNSTREAM ELEVATION(FEET) = 476.00  
STREET LENGTH(FEET) = 423.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.82

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 11.37  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.87  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.15  
STREET FLOW TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 11.59  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.610

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.50	0.500	-
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.350	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.454  
SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 1.49  
EFFECTIVE AREA (ACRES) = 12.40 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.45  
TOTAL AREA (ACRES) = 12.4 PEAK FLOW RATE (CFS) = 15.47

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.36 HALFSTREET FLOOD WIDTH (FEET) = 11.21  
FLOW VELOCITY (FEET/SEC.) = 5.88 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.13  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 11.59  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.610  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.50 0.200 -  
USER-DEFINED - 0.20 0.50 0.500 -  
USER-DEFINED - 0.30 0.50 0.100 -  
USER-DEFINED - 3.30 0.50 0.350 -  
USER-DEFINED - 0.20 0.50 0.200 -  
USER-DEFINED - 0.40 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.332  
SUBAREA AREA (ACRES) = 4.90 SUBAREA RUNOFF (CFS) = 6.37  
EFFECTIVE AREA (ACRES) = 17.30 AREA-AVERAGED Fm (INCH/HR) = 0.21  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.42  
TOTAL AREA (ACRES) = 17.3 PEAK FLOW RATE (CFS) = 21.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 11.59  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.610  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.40 0.50 0.100 -  
USER-DEFINED - 8.10 0.50 0.350 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.276  
SUBAREA AREA (ACRES) = 11.50 SUBAREA RUNOFF (CFS) = 15.24  
EFFECTIVE AREA (ACRES) = 28.80 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36  
TOTAL AREA (ACRES) = 28.8 PEAK FLOW RATE (CFS) = 37.08

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 476.00 DOWNSTREAM ELEVATION (FEET) = 460.00  
STREET LENGTH (FEET) = 789.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 37.08

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.53  
HALFSTREET FLOOD WIDTH (FEET) = 20.66  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.63  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.46  
STREET FLOW TRAVEL TIME (MIN.) = 2.84 Tc (MIN.) = 14.43  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.352  
SUBAREA AREA (ACRES) = 0.00 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 28.80 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36  
TOTAL AREA (ACRES) = 28.8 PEAK FLOW RATE (CFS) = 37.08  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.53 HALFSTREET FLOOD WIDTH (FEET) = 20.66  
FLOW VELOCITY (FEET/SEC.) = 4.63 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.46  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1983.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.43  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.352  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.00 0.50 0.500 -  
USER-DEFINED - 6.40 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 14.40 SUBAREA RUNOFF (CFS) = 14.29  
EFFECTIVE AREA (ACRES) = 43.20 AREA-AVERAGED Fm (INCH/HR) = 0.20  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41  
TOTAL AREA (ACRES) = 43.2 PEAK FLOW RATE (CFS) = 44.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 460.00 DOWNSTREAM ELEVATION (FEET) = 419.00  
STREET LENGTH (FEET) = 529.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 46.53  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.47  
HALFSTREET FLOOD WIDTH (FEET) = 17.23  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 8.18  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.85  
STREET FLOW TRAVEL TIME (MIN.) = 1.08 Tc (MIN.) = 15.51

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.282  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.20 0.50 0.500 -  
USER-DEFINED - 2.80 0.50 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 3.71  
EFFECTIVE AREA (ACRES) = 47.20 AREA-AVERAGED Fm (INCH/HR) = 0.21  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41  
TOTAL AREA (ACRES) = 47.2 PEAK FLOW RATE (CFS) = 45.64

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.47 HALFSTREET FLOOD WIDTH (FEET) = 17.15  
FLOW VELOCITY (FEET/SEC.) = 8.09 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.79  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 2512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 15.51  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.282  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.50 0.500 -  
USER-DEFINED - 4.10 0.50 0.500 -  
USER-DEFINED - 0.70 0.50 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 5.20  
EFFECTIVE AREA (ACRES) = 52.80 AREA-AVERAGED Fm (INCH/HR) = 0.21  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.42  
TOTAL AREA (ACRES) = 52.8 PEAK FLOW RATE (CFS) = 50.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 15.51  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.282  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.50 0.500 -  
USER-DEFINED - 4.10 0.50 0.500 -  
USER-DEFINED - 2.50 0.50 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 6.96  
EFFECTIVE AREA (ACRES) = 60.30 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43  
TOTAL AREA (ACRES) = 60.3 PEAK FLOW RATE (CFS) = 57.81

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 419.00 DOWNSTREAM ELEVATION (FEET) = 405.00  
STREET LENGTH (FEET) = 174.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 57.81  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.50  
HALFSTREET FLOOD WIDTH (FEET) = 18.71  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 8.71  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 4.32  
STREET FLOW TRAVEL TIME (MIN.) = 0.33 Tc (MIN.) = 15.85

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.269  
SUBAREA AREA (ACRES) = 0.00 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 60.30 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43  
TOTAL AREA (ACRES) = 60.3 PEAK FLOW RATE (CFS) = 57.81  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.50 HALFSTREET FLOOD WIDTH (FEET) = 18.71  
FLOW VELOCITY (FEET/SEC.) = 8.71 DEPTH\*VELOCITY (FT\*FT/SEC.) = 4.32  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 2686.00 FEET.

```

*****
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 372.00
FLOW LENGTH(FEET) = 395.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.43
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 57.81
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 16.14
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 3081.00 FEET.
*****
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.14
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.258
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.50 0.500 -
USER-DEFINED - 1.00 0.50 0.500 -
USER-DEFINED - 1.00 0.50 0.500 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 2.00
EFFECTIVE AREA(ACRES) = 62.50 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 62.5 PEAK FLOW RATE(CFS) = 58.52
*****
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.14
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.258
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.50 0.500 -
USER-DEFINED - 6.90 0.50 0.500 -
USER-DEFINED - 0.20 0.50 0.500 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 9.62
EFFECTIVE AREA(ACRES) = 73.10 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 73.1 PEAK FLOW RATE(CFS) = 68.14
*****
FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31
-----

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```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 343.00
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.25
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 68.14
PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 16.66
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 3688.00 FEET.
*****
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.66
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.238
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.50 0.500 -
USER-DEFINED - 0.40 0.50 0.400 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.443
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.64
EFFECTIVE AREA(ACRES) = 73.80 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 73.8 PEAK FLOW RATE(CFS) = 68.14
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 16.66
RAINFALL INTENSITY(INCH/HR) = 1.24
AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.44
EFFECTIVE STREAM AREA(ACRES) = 73.80
TOTAL STREAM AREA(ACRES) = 73.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 68.14

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 15.11 19.94 1.115 0.50( 0.19) 0.39 18.2 200.00
2 68.14 16.66 1.238 0.50( 0.22) 0.44 73.8 210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

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\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	82.45	16.66	1.238	0.50( 0.22)	0.43	89.0	210.00
2	75.00	19.94	1.115	0.50( 0.22)	0.43	92.0	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 82.45 Tc(MIN.) = 16.66  
EFFECTIVE AREA(ACRES) = 89.01 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 92.0  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 343.00 DOWNSTREAM(FEET) = 326.50  
FLOW LENGTH(FEET) = 734.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.12  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 82.45  
PIPE TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 17.47  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 219.00 = 4736.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.47  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.208  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	0.30	0.50	0.400	-
USER-DEFINED	-	0.60	0.50	0.100	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 2.44  
EFFECTIVE AREA(ACRES) = 91.91 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 94.9 PEAK FLOW RATE(CFS) = 82.45  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.47

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.208

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.54  
EFFECTIVE AREA(ACRES) = 92.51 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 95.5 PEAK FLOW RATE(CFS) = 82.45  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 326.50 DOWNSTREAM(FEET) = 325.00  
FLOW LENGTH(FEET) = 161.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.83  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 82.45  
PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 17.72  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 220.00 = 4897.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.72  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.199  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.90	0.50	0.500	-
USER-DEFINED	-	3.60	0.50	0.400	-
USER-DEFINED	-	18.40	0.50	0.500	-
USER-DEFINED	-	4.30	0.50	0.400	-
USER-DEFINED	-	0.50	0.50	0.500	-
USER-DEFINED	-	6.90	0.50	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462  
SUBAREA AREA(ACRES) = 38.60 SUBAREA RUNOFF(CFS) = 33.62  
EFFECTIVE AREA(ACRES) = 131.11 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 134.1 PEAK FLOW RATE(CFS) = 115.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 220.00 TO NODE 245.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 315.00  
FLOW LENGTH(FEET) = 1019.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.07  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 115.18  
PIPE TRAVEL TIME(MIN.) = 1.41 Tc(MIN.) = 19.13  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 19.13  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.146  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.400	-
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	0.400	-
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	1.00	0.50	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379  
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 2.50  
EFFECTIVE AREA(ACRES) = 134.01 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 137.0 PEAK FLOW RATE(CFS) = 115.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 19.13  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.146  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.264  
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 1.00  
EFFECTIVE AREA(ACRES) = 135.11 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 138.1 PEAK FLOW RATE(CFS) = 115.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.13  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.146  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.50	0.500	-
USER-DEFINED	-	0.30	0.50	0.400	-
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	0.500	-
USER-DEFINED	-	1.40	0.50	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.434  
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 2.67  
EFFECTIVE AREA(ACRES) = 138.31 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 141.3 PEAK FLOW RATE(CFS) = 115.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 10  
-----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 220.50 TO NODE 221.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 251.00  
ELEVATION DATA: UPSTREAM(FEET) = 551.00 DOWNSTREAM(FEET) = 547.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.785  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.793  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "1 DWELLING/ACRE"	-	3.10	0.50	0.200	56	9.79
RESIDENTIAL "1 DWELLING/ACRE"	-	3.10	0.50	0.100	56	9.79

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.150  
SUBAREA RUNOFF(CFS) = 9.58  
TOTAL AREA(ACRES) = 6.20 PEAK FLOW RATE(CFS) = 9.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 542.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0130  
CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.646  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	0.200	-
USER-DEFINED	-	0.10	0.50	0.200	-
USER-DEFINED	-	3.70	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.163  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.90  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.53  
 AVERAGE FLOW DEPTH (FEET) = 0.27 TRAVEL TIME (MIN.) = 1.42  
 Tc (MIN.) = 11.20  
 SUBAREA AREA (ACRES) = 4.70 SUBAREA RUNOFF (CFS) = 6.62  
 EFFECTIVE AREA (ACRES) = 10.90 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.16  
 TOTAL AREA (ACRES) = 10.9 PEAK FLOW RATE (CFS) = 15.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.30 FLOW VELOCITY (FEET/SEC.) = 4.83  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 222.00 = 637.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 542.00 DOWNSTREAM ELEVATION (FEET) = 531.00  
 STREET LENGTH (FEET) = 1146.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.97  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.52  
 HALFSTREET FLOOD WIDTH (FEET) = 20.12  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.15  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.64  
 STREET FLOW TRAVEL TIME (MIN.) = 6.07 Tc (MIN.) = 17.27

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.216  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.50	0.50	0.200	-
USER-DEFINED	-	2.90	0.50	0.200	-
USER-DEFINED	-	0.70	0.50	0.100	-
USER-DEFINED	-	2.60	0.50	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.292  
 SUBAREA AREA (ACRES) = 17.70 SUBAREA RUNOFF (CFS) = 17.04  
 EFFECTIVE AREA (ACRES) = 28.60 AREA-AVERAGED Fm (INCH/HR) = 0.12  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 28.6 PEAK FLOW RATE (CFS) = 28.20

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.55 HALFSTREET FLOOD WIDTH (FEET) = 21.45  
 FLOW VELOCITY (FEET/SEC.) = 3.28 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.79  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 223.00 = 1783.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 62

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 531.00 DOWNSTREAM ELEVATION (FEET) = 520.00  
 STREET LENGTH (FEET) = 702.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 33.72  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.54  
 HALFSTREET FLOOD WIDTH (FEET) = 20.90  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.12  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.21  
 STREET FLOW TRAVEL TIME (MIN.) = 2.84 Tc (MIN.) = 20.11

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.110  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.50	0.200	-
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	6.40	0.50	0.200	-
USER-DEFINED	-	3.70	0.50	0.100	-
USER-DEFINED	-	0.70	0.50	0.350	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175  
 SUBAREA AREA (ACRES) = 12.00 SUBAREA RUNOFF (CFS) = 11.04  
 EFFECTIVE AREA (ACRES) = 40.60 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.22  
 TOTAL AREA (ACRES) = 40.6 PEAK FLOW RATE (CFS) = 36.52

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.55 HALFSTREET FLOOD WIDTH (FEET) = 21.60  
 FLOW VELOCITY (FEET/SEC.) = 4.19 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.30  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 224.00 = 2485.00 FEET.

```

*****
FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 463.00
FLOW LENGTH(FEET) = 1760.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.99
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 36.52
PIPE TRAVEL TIME(MIN.) = 2.10 Tc(MIN.) = 22.21
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 225.00 = 4245.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.21
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.051
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        2.20   0.50   0.200  -
USER-DEFINED         -        0.10   0.50   0.500  -
USER-DEFINED         -        0.30   0.50   0.350  -
USER-DEFINED         -        6.80   0.50   0.200  -
USER-DEFINED         -        0.10   0.50   0.500  -
USER-DEFINED         -        2.00   0.50   0.350  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.235
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 9.66
EFFECTIVE AREA(ACRES) = 52.10 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 52.1 PEAK FLOW RATE(CFS) = 44.01

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*****
FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.21
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.051
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        6.40   0.50   0.500  -
USER-DEFINED         -        0.90   0.50   0.350  -
USER-DEFINED         -        5.20   0.50   0.500  -
USER-DEFINED         -        0.80   0.50   0.350  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.481
SUBAREA AREA(ACRES) = 13.30 SUBAREA RUNOFF(CFS) = 9.70
EFFECTIVE AREA(ACRES) = 65.40 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 65.4 PEAK FLOW RATE(CFS) = 53.71

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```

*****
FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 425.00
FLOW LENGTH(FEET) = 639.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.77
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 53.71
PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 22.75
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 226.00 = 4884.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 226.00 TO NODE 226.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.75
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.035
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        2.90   0.50   0.200  -
USER-DEFINED         -        2.90   0.50   0.500  -
USER-DEFINED         -        6.30   0.50   0.200  -
USER-DEFINED         -        6.00   0.50   0.500  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 14.04
EFFECTIVE AREA(ACRES) = 83.50 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.29
TOTAL AREA(ACRES) = 83.5 PEAK FLOW RATE(CFS) = 66.85

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*****
FLOW PROCESS FROM NODE 226.00 TO NODE 243.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 653.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.14
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 66.85
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 23.32
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 243.00 = 5537.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 23.32

```

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.019  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.90 0.50 0.200 -  
 USER-DEFINED - 1.60 0.50 0.500 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
 SUBAREA AREA (ACRES) = 4.50 SUBAREA RUNOFF (CFS) = 3.51  
 EFFECTIVE AREA (ACRES) = 88.00 AREA-AVERAGED Fm (INCH/HR) = 0.15  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA (ACRES) = 88.0 PEAK FLOW RATE (CFS) = 69.15

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 23.32  
 RAINFALL INTENSITY (INCH/HR) = 1.02  
 AREA-AVERAGED Fm (INCH/HR) = 0.15  
 AREA-AVERAGED Fp (INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.29  
 EFFECTIVE STREAM AREA (ACRES) = 88.00  
 TOTAL STREAM AREA (ACRES) = 88.00  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 69.15

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 547.50

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.751  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.974  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 APARTMENTS - 0.60 0.50 0.200 56 8.75  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF (CFS) = 1.01  
 TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 1.01

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 547.50 DOWNSTREAM (FEET) = 541.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 802.00 CHANNEL SLOPE = 0.0081

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 3.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.593  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.20 0.50 0.200 -  
 USER-DEFINED - 5.90 0.50 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.27  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.40  
 AVERAGE FLOW DEPTH (FEET) = 0.77 TRAVEL TIME (MIN.) = 3.04  
 Tc (MIN.) = 11.79  
 SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 8.46  
 EFFECTIVE AREA (ACRES) = 6.70 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA (ACRES) = 6.7 PEAK FLOW RATE (CFS) = 9.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.96 FLOW VELOCITY (FEET/SEC.) = 5.06  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1132.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 541.00 DOWNSTREAM (FEET) = 533.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 849.00 CHANNEL SLOPE = 0.0094  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 5.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.390  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 14.90 0.50 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.28  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.34  
 AVERAGE FLOW DEPTH (FEET) = 1.20 TRAVEL TIME (MIN.) = 2.23  
 Tc (MIN.) = 14.02  
 SUBAREA AREA (ACRES) = 14.90 SUBAREA RUNOFF (CFS) = 17.97  
 EFFECTIVE AREA (ACRES) = 21.60 AREA-AVERAGED Fm (INCH/HR) = 0.05  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 21.6 PEAK FLOW RATE (CFS) = 26.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.37 FLOW VELOCITY (FEET/SEC.) = 6.93  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1981.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.02  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.390  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.50 0.400 -  
 USER-DEFINED - 0.20 0.50 0.200 -  
 USER-DEFINED - 1.80 0.50 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124  
 SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 2.51  
 EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 28.53

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.02  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.390  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.50 0.100 -  
 USER-DEFINED - 0.10 0.50 0.400 -  
 USER-DEFINED - 1.30 0.50 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.117  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 2.16  
 EFFECTIVE AREA(ACRES) = 25.50 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 25.5 PEAK FLOW RATE(CFS) = 30.68

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 537.00 DOWNSTREAM(FEET) = 510.00  
 FLOW LENGTH(FEET) = 513.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.20  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 30.68  
 PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 14.55  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2494.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.55  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.342  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 9.40 0.50 0.400 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 9.66  
 EFFECTIVE AREA(ACRES) = 34.90 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.19  
 TOTAL AREA(ACRES) = 34.9 PEAK FLOW RATE(CFS) = 39.25

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.55  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.342  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.70 0.50 0.200 -  
 USER-DEFINED - 2.50 0.50 0.400 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356  
 SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 3.35  
 EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.20  
 TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 42.60

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 478.00  
 FLOW LENGTH(FEET) = 474.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.55  
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 42.60  
 PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 14.95  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 2968.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.95  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.305  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.70 0.50 0.200 -  
 USER-DEFINED - 1.60 0.50 0.400 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297

SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 3.44  
EFFECTIVE AREA (ACRES) = 41.40 AREA-AVERAGED Fm (INCH/HR) = 0.10  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.21  
TOTAL AREA (ACRES) = 41.4 PEAK FLOW RATE (CFS) = 44.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	478.00	DOWNSTREAM (FEET) =	471.00
FLOW LENGTH (FEET) =	473.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	30.0 INCH PIPE IS	23.2 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	10.97		
ESTIMATED PIPE DIAMETER (INCH) =	30.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	44.78		
PIPE TRAVEL TIME (MIN.) =	0.72	Tc (MIN.) =	15.67
LONGEST FLOWPATH FROM NODE	230.00 TO NODE	236.00 =	3441.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 15.67  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.276  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.50	0.200	-
USER-DEFINED	-	7.10	0.50	0.400	-
USER-DEFINED	-	2.70	0.50	0.200	-
USER-DEFINED	-	1.10	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
SUBAREA AREA (ACRES) = 12.30 SUBAREA RUNOFF (CFS) = 12.43  
EFFECTIVE AREA (ACRES) = 53.70 AREA-AVERAGED Fm (INCH/HR) = 0.12  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.23  
TOTAL AREA (ACRES) = 53.7 PEAK FLOW RATE (CFS) = 56.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 15.67  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.276  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.50	0.200	-
USER-DEFINED	-	5.40	0.50	0.500	-
USER-DEFINED	-	1.00	0.50	0.400	-
USER-DEFINED	-	0.60	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.378  
SUBAREA AREA (ACRES) = 9.90 SUBAREA RUNOFF (CFS) = 9.68

EFFECTIVE AREA (ACRES) = 63.60 AREA-AVERAGED Fm (INCH/HR) = 0.13  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.25  
TOTAL AREA (ACRES) = 63.6 PEAK FLOW RATE (CFS) = 65.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	471.00	DOWNSTREAM (FEET) =	468.00
FLOW LENGTH (FEET) =	283.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	39.0 INCH PIPE IS	26.8 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	10.84		
ESTIMATED PIPE DIAMETER (INCH) =	39.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	65.78		
PIPE TRAVEL TIME (MIN.) =	0.44	Tc (MIN.) =	16.10
LONGEST FLOWPATH FROM NODE	230.00 TO NODE	237.00 =	3724.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.10  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.259  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.10	0.50	0.200	-
USER-DEFINED	-	0.60	0.50	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.218  
SUBAREA AREA (ACRES) = 6.70 SUBAREA RUNOFF (CFS) = 6.94  
EFFECTIVE AREA (ACRES) = 70.30 AREA-AVERAGED Fm (INCH/HR) = 0.12  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.25  
TOTAL AREA (ACRES) = 70.3 PEAK FLOW RATE (CFS) = 71.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	468.00	DOWNSTREAM (FEET) =	461.00
FLOW LENGTH (FEET) =	698.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	39.0 INCH PIPE IS	29.3 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	10.72		
ESTIMATED PIPE DIAMETER (INCH) =	39.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	71.78		
PIPE TRAVEL TIME (MIN.) =	1.08	Tc (MIN.) =	17.19
LONGEST FLOWPATH FROM NODE	230.00 TO NODE	238.00 =	4422.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.19  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.219  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 8.40 0.50 0.200 -  
 USER-DEFINED - 0.60 0.50 0.500 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.220  
 SUBAREA AREA(ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 8.98  
 EFFECTIVE AREA(ACRES) = 79.30 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 79.3 PEAK FLOW RATE(CFS) = 78.18

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.19  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.219  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.10 0.50 0.200 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 2.11  
 EFFECTIVE AREA(ACRES) = 81.40 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 81.4 PEAK FLOW RATE(CFS) = 80.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 461.00 DOWNSTREAM(FEET) = 440.00  
 FLOW LENGTH(FEET) = 582.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.99  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 80.29  
 PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 17.73  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 5004.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.73  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.198  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.00 0.50 0.200 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 4.94  
 EFFECTIVE AREA(ACRES) = 86.40 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 86.4 PEAK FLOW RATE(CFS) = 83.75

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 418.00  
 FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.60  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 83.75  
 PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 18.34  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 5654.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.34  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.175  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.30 0.50 0.200 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA(ACRES) = 5.30 SUBAREA RUNOFF(CFS) = 5.13  
 EFFECTIVE AREA(ACRES) = 91.70 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 91.7 PEAK FLOW RATE(CFS) = 87.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.34  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.175  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.20 0.50 0.200 -  
 USER-DEFINED - 0.20 0.50 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.36  
 EFFECTIVE AREA(ACRES) = 93.10 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 93.1 PEAK FLOW RATE(CFS) = 88.45



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*****
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.34
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.175
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.20 0.50 0.200 -
USER-DEFINED - 0.70 0.50 0.600 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 1.71
EFFECTIVE AREA(ACRES) = 95.00 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 95.0 PEAK FLOW RATE(CFS) = 90.16

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*****
FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 418.00 DOWNSTREAM(FEET) = 404.00
FLOW LENGTH(FEET) = 1279.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.75
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.16
PIPE TRAVEL TIME(MIN.) = 1.81 Tc(MIN.) = 20.16
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 241.00 = 6933.00 FEET.

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*****
FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.16
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.109
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.10 0.50 0.200 -
USER-DEFINED - 1.20 0.50 0.100 -
USER-DEFINED - 6.30 0.50 0.850 -
USER-DEFINED - 4.60 0.50 0.600 -
USER-DEFINED - 1.60 0.50 0.200 -
USER-DEFINED - 4.00 0.50 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 18.80 SUBAREA RUNOFF(CFS) = 14.63
EFFECTIVE AREA(ACRES) = 113.80 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 113.8 PEAK FLOW RATE(CFS) = 99.08

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*****
FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.16
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.109
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.90 0.50 0.850 -
USER-DEFINED - 10.80 0.50 0.600 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.666
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 10.26
EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 109.34

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*****
FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 403.00
FLOW LENGTH(FEET) = 66.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.87
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 109.34
PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 20.24
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 6999.00 FEET.

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*****
FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.24
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.106
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.50 0.200 -
USER-DEFINED - 16.40 0.50 0.200 -
USER-DEFINED - 1.30 0.50 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.193
SUBAREA AREA(ACRES) = 19.10 SUBAREA RUNOFF(CFS) = 17.36
EFFECTIVE AREA(ACRES) = 147.60 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 147.6 PEAK FLOW RATE(CFS) = 126.43

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*****
FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

```

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 1270.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 39.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.80
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 126.43
PIPE TRAVEL TIME(MIN.) = 1.96 Tc(MIN.) = 22.20
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.20
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.051
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.50 0.200 -
USER-DEFINED - 2.00 0.50 0.850 -
USER-DEFINED - 2.80 0.50 0.200 -
USER-DEFINED - 1.50 0.50 0.100 -
USER-DEFINED - 0.10 0.50 0.350 -
USER-DEFINED - 1.10 0.50 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.421
SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 6.43
EFFECTIVE AREA(ACRES) = 156.10 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 156.1 PEAK FLOW RATE(CFS) = 126.43
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 22.20
RAINFALL INTENSITY(INCH/HR) = 1.05
AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA(ACRES) = 156.10
TOTAL STREAM AREA(ACRES) = 156.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 126.43

\*\* CONFLUENCE DATA \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 69.15 23.32 1.019 0.50( 0.15) 0.29 88.0 220.50
2 126.43 22.20 1.051 0.50( 0.16) 0.32 156.1 230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 194.64 22.20 1.051 0.50( 0.15) 0.31 239.9 230.00
2 191.11 23.32 1.019 0.50( 0.15) 0.31 244.1 220.50

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 194.64 Tc(MIN.) = 22.20
EFFECTIVE AREA(ACRES) = 239.86 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 244.1
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 243.00 TO NODE 244.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 394.00 DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 849.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.15
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 194.64
PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 22.72
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 244.00 = 9118.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 244.00 TO NODE 244.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.72
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.50 0.200 -
USER-DEFINED - 1.70 0.50 0.500 -
USER-DEFINED - 0.30 0.50 0.850 -
USER-DEFINED - 0.80 0.50 0.500 -
USER-DEFINED - 0.10 0.50 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.537
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 2.07
EFFECTIVE AREA(ACRES) = 242.86 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 247.1 PEAK FLOW RATE(CFS) = 194.64
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 244.00 TO NODE 245.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 315.00
FLOW LENGTH(FEET) = 777.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.20
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 194.64
PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 23.33
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.33
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.019
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.50 0.500 -
USER-DEFINED - 0.20 0.50 0.850 -
USER-DEFINED - 0.20 0.50 0.500 -
USER-DEFINED - 0.10 0.50 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631
SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 0.51
EFFECTIVE AREA(ACRES) = 243.66 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 247.9 PEAK FLOW RATE(CFS) = 194.64
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 194.64 23.33 1.019 0.50( 0.16) 0.31 243.7 230.00
2 191.11 24.45 0.987 0.50( 0.16) 0.31 247.9 220.50
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 115.18 19.13 1.146 0.50( 0.22) 0.44 138.3 210.00
2 104.55 22.50 1.043 0.50( 0.22) 0.44 141.3 200.00
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 298.19 19.13 1.146 0.50( 0.18) 0.36 338.1 210.00
2 297.35 22.50 1.043 0.50( 0.18) 0.36 376.3 200.00

3 296.21 23.33 1.019 0.50( 0.18) 0.36 385.0 230.00
4 288.64 24.45 0.987 0.50( 0.18) 0.36 389.2 220.50
TOTAL AREA(ACRES) = 389.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 298.19 Tc(MIN.) = 19.129
EFFECTIVE AREA(ACRES) = 338.11 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 389.2
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 3 <<<<

\*\*\*\*\*
FLOW PROCESS FROM NODE 245.00 TO NODE 246.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 306.00
FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 45.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.68
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 298.19
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 19.71
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 246.00 = 10514.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.71
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.124
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.90 0.50 0.500 -
USER-DEFINED - 0.30 0.50 0.400 -
USER-DEFINED - 2.50 0.50 0.500 -
USER-DEFINED - 0.70 0.50 0.400 -
USER-DEFINED - 9.10 0.50 0.350 -
USER-DEFINED - 2.80 0.50 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.410
SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 13.48
EFFECTIVE AREA(ACRES) = 354.41 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 405.5 PEAK FLOW RATE(CFS) = 299.96

\*\*\*\*\*
FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 19.71  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.124  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.60	0.50	0.400	-
USER-DEFINED	-	7.40	0.50	0.350	-
USER-DEFINED	-	0.30	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.375  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 7.84  
 EFFECTIVE AREA(ACRES) = 363.71 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA(ACRES) = 414.8 PEAK FLOW RATE(CFS) = 307.80

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 246.00 TO NODE 247.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 306.00 DOWNSTREAM(FEET) = 300.00  
 FLOW LENGTH(FEET) = 185.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 23.96  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 307.80  
 PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 19.84  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 247.00 = 10699.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 19.84  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.119  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.400	-
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	1.30	0.50	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.413  
 SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 1.64  
 EFFECTIVE AREA(ACRES) = 365.71 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA(ACRES) = 416.8 PEAK FLOW RATE(CFS) = 307.86

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 19.84  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.119  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.50	0.100	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.80	0.50	0.400	-
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.365  
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 2.19  
 EFFECTIVE AREA(ACRES) = 368.31 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA(ACRES) = 419.4 PEAK FLOW RATE(CFS) = 310.05

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 248.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 271.00  
 FLOW LENGTH(FEET) = 859.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 24.41  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 310.05  
 PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 20.43  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 20.43  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.101  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	0.400	-
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	2.60	0.50	0.400	-
USER-DEFINED	-	1.00	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356  
 SUBAREA AREA(ACRES) = 4.80 SUBAREA RUNOFF(CFS) = 3.99  
 EFFECTIVE AREA(ACRES) = 373.11 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA(ACRES) = 424.2 PEAK FLOW RATE(CFS) = 310.05  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.43
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.101
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50    0.50    0.400  -
USER-DEFINED        -         0.30    0.50    0.100  -
USER-DEFINED        -         0.10    0.50    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.367
SUBAREA AREA(ACRES) = 0.90   SUBAREA RUNOFF(CFS) = 0.74
EFFECTIVE AREA(ACRES) = 374.01  AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 425.1   PEAK FLOW RATE(CFS) = 310.05
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.43
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.101
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.50    0.500  -
USER-DEFINED        -         0.70    0.50    0.400  -
USER-DEFINED        -         2.20    0.50    0.500  -
USER-DEFINED        -         1.80    0.50    0.400  -
USER-DEFINED        -         0.20    0.50    0.350  -
USER-DEFINED        -         3.20    0.50    0.500  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.466
SUBAREA AREA(ACRES) = 8.20   SUBAREA RUNOFF(CFS) = 6.41
EFFECTIVE AREA(ACRES) = 382.21  AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 433.3   PEAK FLOW RATE(CFS) = 315.20

*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.43
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.101
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         5.70    0.50    0.400  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 5.70   SUBAREA RUNOFF(CFS) = 4.62

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EFFECTIVE AREA(ACRES) = 387.91  AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 439.0   PEAK FLOW RATE(CFS) = 319.83

*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.43
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.101
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         6.40    0.50    1.000  -
USER-DEFINED        -         1.40    0.50    1.000  -
USER-DEFINED        -         0.60    0.50    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 8.40   SUBAREA RUNOFF(CFS) = 4.54
EFFECTIVE AREA(ACRES) = 396.31  AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 447.4   PEAK FLOW RATE(CFS) = 324.37

*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====
*****
FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 413.04  DOWNSTREAM(FEET) = 405.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.928
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.293
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS   Tc
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
CONDOMINIUMS        -         0.20    0.50    0.350  56   7.70
RESIDENTIAL
"11+ DWELLINGS/ACRE" -         0.10    0.50    0.200  56   6.93
CONDOMINIUMS        -         0.10    0.50    0.350  56   7.70
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.312
SUBAREA RUNOFF(CFS) = 0.77
TOTAL AREA(ACRES) = 0.40   PEAK FLOW RATE(CFS) = 0.77

*****
FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

```

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 405.00 DOWNSTREAM ELEVATION(FEET) = 385.00  
STREET LENGTH(FEET) = 587.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.81

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.25  
HALFSTREET FLOOD WIDTH(FEET) = 5.03  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.35  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.84  
STREET FLOW TRAVEL TIME(MIN.) = 2.92 Tc(MIN.) = 9.85

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.781

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	0.350	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	0.200	-
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	0.40	0.50	0.350	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.224  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 4.06  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 4.64

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 7.16  
FLOW VELOCITY(FEET/SEC.) = 3.56 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.03  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 917.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 385.00 DOWNSTREAM(FEET) = 378.50  
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.20  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 4.64  
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 10.14

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1079.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.14  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.742  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN  
USER-DEFINED - 1.10 0.50 0.100 -  
USER-DEFINED - 1.30 0.50 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 3.65  
EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.09  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 8.19

\*\*\*\*\*  
FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 378.50 DOWNSTREAM(FEET) = 348.50  
FLOW LENGTH(FEET) = 637.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.39  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 8.19  
PIPE TRAVEL TIME(MIN.) = 0.93 Tc(MIN.) = 11.08  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 1716.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.08  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.657  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN  
USER-DEFINED - 0.60 0.50 0.500 -  
USER-DEFINED - 1.70 0.50 0.100 -  
USER-DEFINED - 1.00 0.50 0.350 -  
USER-DEFINED - 0.10 0.50 0.500 -  
USER-DEFINED - 0.70 0.50 0.100 -  
USER-DEFINED - 0.40 0.50 0.350 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.240  
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 6.23  
EFFECTIVE AREA(ACRES) = 10.00 AREA-AVERAGED Fm(INCH/HR) = 0.10  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.20

TOTAL AREA (ACRES) = 10.0 PEAK FLOW RATE (CFS) = 13.99

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 348.50 DOWNSTREAM(FEET) = 306.00
FLOW LENGTH(FEET) = 944.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.79
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.99
PIPE TRAVEL TIME(MIN.) = 1.23 Tc(MIN.) = 12.31
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.31
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.546
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.30 0.50 0.500 -
USER-DEFINED - 0.40 0.50 0.400 -
USER-DEFINED - 0.20 0.50 0.100 -
USER-DEFINED - 1.50 0.50 0.500 -
USER-DEFINED - 1.90 0.50 0.400 -
USER-DEFINED - 2.00 0.50 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 9.01
EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.27
TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 22.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.31
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.546
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.40 0.50 0.200 -
USER-DEFINED - 0.10 0.50 0.100 -
USER-DEFINED - 6.70 0.50 0.200 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.199
SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 14.57
EFFECTIVE AREA(ACRES) = 28.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24

TOTAL AREA (ACRES) = 28.5 PEAK FLOW RATE (CFS) = 36.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.31
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.546
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.10 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 2.92
EFFECTIVE AREA(ACRES) = 31.60 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 39.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.31
RAINFALL INTENSITY(INCH/HR) = 1.55
AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 31.60
TOTAL STREAM AREA(ACRES) = 31.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 39.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 400.00 TO NODE 420.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
INITIAL SUBAREA FLOW-LENGTH(FEET) = 300.40
ELEVATION DATA: UPSTREAM(FEET) = 312.80 DOWNSTREAM(FEET) = 310.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.115
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.085
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL - 0.50 0.50 0.100 56 8.11
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 0.92
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.92

\*\*\*\*\*

FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 307.00
STREET LENGTH(FEET) = 266.50 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 67.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 62.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.37
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 6.97
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.26
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.64
STREET FLOW TRAVEL TIME(MIN.) = 1.97 Tc(MIN.) = 10.08

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.748

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.50 0.100 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.92

EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.05

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 1.68

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.88

FLOW VELOCITY(FEET/SEC.) = 2.33 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.69

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.00 = 566.90 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 421.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 307.00 DOWNSTREAM(FEET) = 305.50
FLOW LENGTH(FEET) = 105.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 4.76

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 1.68

PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 10.45

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.10 = 671.90 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 10.45

RAINFALL INTENSITY(INCH/HR) = 1.71

AREA-AVERAGED Fm(INCH/HR) = 0.05

AREA-AVERAGED Fp(INCH/HR) = 0.50

AREA-AVERAGED Ap = 0.10

EFFECTIVE STREAM AREA(ACRES) = 1.10

TOTAL STREAM AREA(ACRES) = 1.10

PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.68

\*\* CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 39.49 12.31 1.546 0.50( 0.16) 0.31 31.6 300.00
2 1.68 10.45 1.714 0.50( 0.05) 0.10 1.1 400.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 39.28 10.45 1.714 0.50( 0.15) 0.31 27.9 400.00
2 41.00 12.31 1.546 0.50( 0.15) 0.31 32.7 300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 41.00 Tc(MIN.) = 12.31

EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31

TOTAL AREA(ACRES) = 32.7

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 421.10 TO NODE 426.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 305.50 DOWNSTREAM(FEET) = 301.00

FLOW LENGTH(FEET) = 261.40 MANNING'S N = 0.013

DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.56

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 41.00

PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 12.68

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.10 = 2921.40 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 426.10 TO NODE 426.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<



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=====
MAINLINE Tc(MIN.) = 12.68
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.511
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE             GROUP  (ACRES)  (INCH/HR)  (DECIMAL) CN
USER-DEFINED         -        0.20     0.50     0.400    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.20     SUBAREA RUNOFF(CFS) = 0.24
EFFECTIVE AREA(ACRES) = 32.90   AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.9     PEAK FLOW RATE(CFS) = 41.00
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 426.10 TO NODE 426.20 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 289.00
FLOW LENGTH(FEET) = 448.56 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.57
ESTIMATED PIPE DIAMETER(INCH) = 27.00     NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 41.00
PIPE TRAVEL TIME(MIN.) = 0.55     Tc(MIN.) = 13.23
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.20 = 3369.96 FEET.

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*****
FLOW PROCESS FROM NODE 426.20 TO NODE 426.20 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 13.23
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.461
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE             GROUP  (ACRES)  (INCH/HR)  (DECIMAL) CN
USER-DEFINED         -        0.20     0.50     0.400    -
USER-DEFINED         -        0.30     0.50     0.400    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.50     SUBAREA RUNOFF(CFS) = 0.57
EFFECTIVE AREA(ACRES) = 33.40   AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 33.4     PEAK FLOW RATE(CFS) = 41.00
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 426.20 TO NODE 426.30 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 289.00 DOWNSTREAM(FEET) = 282.00
FLOW LENGTH(FEET) = 260.45 MANNING'S N = 0.013

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DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.60
ESTIMATED PIPE DIAMETER(INCH) = 27.00     NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 41.00
PIPE TRAVEL TIME(MIN.) = 0.32     Tc(MIN.) = 13.55
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.30 = 3630.41 FEET.

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*****
FLOW PROCESS FROM NODE 426.30 TO NODE 426.30 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 13.55
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.432
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE             GROUP  (ACRES)  (INCH/HR)  (DECIMAL) CN
USER-DEFINED         -        0.30     0.50     0.400    -
USER-DEFINED         -        0.80     0.50     0.400    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 1.10     SUBAREA RUNOFF(CFS) = 1.22
EFFECTIVE AREA(ACRES) = 34.50   AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 34.5     PEAK FLOW RATE(CFS) = 41.00
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 426.30 TO NODE 248.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 271.00
FLOW LENGTH(FEET) = 411.44 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.57
ESTIMATED PIPE DIAMETER(INCH) = 27.00     NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 41.00
PIPE TRAVEL TIME(MIN.) = 0.51     Tc(MIN.) = 14.06
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

```

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*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

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```

=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 14.06
RAINFALL INTENSITY(INCH/HR) = 1.39
AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 34.50
TOTAL STREAM AREA(ACRES) = 34.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 41.00

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*****
FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 233.60
ELEVATION DATA: UPSTREAM (FEET) = 306.50 DOWNSTREAM (FEET) = 301.80

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.882
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.476
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS   Tc
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          -         0.20     0.50     0.100   56   5.88
COMMERCIAL          -         0.20     0.50     0.100   56   5.88
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 0.87
TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 0.87

*****
FLOW PROCESS FROM NODE 426.00 TO NODE 427.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====
UPSTREAM ELEVATION (FEET) = 301.80 DOWNSTREAM ELEVATION (FEET) = 294.00
STREET LENGTH (FEET) = 478.70 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 51.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.46
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.28
HALFSTREET FLOOD WIDTH (FEET) = 6.94
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.41
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.68
STREET FLOW TRAVEL TIME (MIN.) = 3.31 Tc (MIN.) = 9.19
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.896
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.50     0.100   -
USER-DEFINED        -         0.50     0.50     0.100   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.16
EFFECTIVE AREA (ACRES) = 1.10 AREA-AVERAGED Fm (INCH/HR) = 0.05

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AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 1.83

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.30 HALFSTREET FLOOD WIDTH (FEET) = 7.94
FLOW VELOCITY (FEET/SEC.) = 2.50 DEPTH*VELOCITY (FT*FT/SEC.) = 0.75
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 427.00 = 712.30 FEET.

*****
FLOW PROCESS FROM NODE 427.00 TO NODE 428.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====
UPSTREAM ELEVATION (FEET) = 294.00 DOWNSTREAM ELEVATION (FEET) = 286.00
STREET LENGTH (FEET) = 300.80 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 55.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.20
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.29
HALFSTREET FLOOD WIDTH (FEET) = 7.63
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.18
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.93
STREET FLOW TRAVEL TIME (MIN.) = 1.58 Tc (MIN.) = 10.77
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.685
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.50     0.100   -
USER-DEFINED        -         0.40     0.50     0.100   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.50 SUBAREA RUNOFF (CFS) = 0.74
EFFECTIVE AREA (ACRES) = 1.60 AREA-AVERAGED Fm (INCH/HR) = 0.05
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 1.6 PEAK FLOW RATE (CFS) = 2.35

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.30 HALFSTREET FLOOD WIDTH (FEET) = 7.95
FLOW VELOCITY (FEET/SEC.) = 3.21 DEPTH*VELOCITY (FT*FT/SEC.) = 0.96
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 428.00 = 1013.10 FEET.

*****
FLOW PROCESS FROM NODE 428.00 TO NODE 429.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====

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UPSTREAM ELEVATION(FEET) = 286.00 DOWNSTREAM ELEVATION(FEET) = 276.00  
STREET LENGTH(FEET) = 242.40 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.63

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.29  
HALFSTREET FLOOD WIDTH(FEET) = 7.52  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.89  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.14  
STREET FLOW TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 11.81

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.591

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.55  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 2.77

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.74  
FLOW VELOCITY(FEET/SEC.) = 3.94 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.16  
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 429.00 = 1255.50 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 429.00 TO NODE 429.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.81

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.591

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.400	-
USER-DEFINED	-	1.50	0.50	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 2.50  
EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.25  
TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 5.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 429.00 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 273.00  
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.58  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 5.28  
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 12.00  
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 248.00 = 1355.50 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 12.00  
RAINFALL INTENSITY(INCH/HR) = 1.57  
AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.25  
EFFECTIVE STREAM AREA(ACRES) = 4.00  
TOTAL STREAM AREA(ACRES) = 4.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.28

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	39.28	12.21	1.554	0.50( 0.16)	0.31	29.7	400.00
1	41.00	14.06	1.386	0.50( 0.16)	0.31	34.5	300.00
2	5.28	12.00	1.573	0.50( 0.13)	0.25	4.0	425.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	44.41	12.00	1.573	0.50( 0.15)	0.30	33.2	425.00
2	44.49	12.21	1.554	0.50( 0.15)	0.30	33.7	400.00
3	45.60	14.06	1.386	0.50( 0.15)	0.31	38.5	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 45.60 Tc(MIN.) = 14.06  
EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31  
TOTAL AREA(ACRES) = 38.5  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	44.41	12.00	1.573	0.50( 0.15)	0.30	33.2	425.00
2	44.49	12.21	1.554	0.50( 0.15)	0.30	33.7	400.00
3	45.60	14.06	1.386	0.50( 0.15)	0.31	38.5	300.00

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	324.37	20.43	1.101	0.50( 0.19)	0.38	396.3	210.00
2	319.45	23.81	1.006	0.50( 0.19)	0.38	434.5	200.00
3	316.73	24.64	0.982	0.50( 0.19)	0.38	443.2	230.00
4	309.79	25.77	0.957	0.50( 0.19)	0.38	447.4	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	333.96	12.00	1.573	0.50( 0.19)	0.37	266.1	425.00
2	335.04	12.21	1.554	0.50( 0.19)	0.37	270.7	400.00
3	338.92	14.06	1.386	0.50( 0.19)	0.37	311.3	300.00
4	359.41	20.43	1.101	0.50( 0.19)	0.38	434.8	210.00
5	350.97	23.81	1.006	0.50( 0.19)	0.37	473.0	200.00
6	347.39	24.64	0.982	0.50( 0.19)	0.37	481.7	230.00
7	339.51	25.77	0.957	0.50( 0.18)	0.37	485.9	220.50

TOTAL AREA (ACRES) = 485.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 359.41 Tc(MIN.) = 20.428  
EFFECTIVE AREA(ACRES) = 434.81 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.38  
TOTAL AREA (ACRES) = 485.9  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\* FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 12 \*\*\*\*\*

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\* FLOW PROCESS FROM NODE 248.00 TO NODE 249.00 IS CODE = 31 \*\*\*\*\*

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 261.00  
FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.60  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 359.41  
PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 20.67

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\* FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 10 \*\*\*\*\*

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\* FLOW PROCESS FROM NODE 429.00 TO NODE 430.00 IS CODE = 21 \*\*\*\*\*

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 262.70

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.459  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.375

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL AREA GROUP (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	- 0.20	0.50	0.100	56	6.46
COMMERCIAL	- 0.40	0.50	0.100	56	6.46

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 1.26  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.26

\*\*\*\*\* FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 61 \*\*\*\*\*

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 262.70 DOWNSTREAM ELEVATION(FEET) = 258.98  
STREET LENGTH(FEET) = 345.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.75  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 8.64  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.12  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.66  
STREET FLOW TRAVEL TIME(MIN.) = 2.72 Tc(MIN.) = 9.18  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.898  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.50	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.00  
EFFECTIVE AREA(ACRES) = 1.20 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 2.00

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 9.23  
FLOW VELOCITY(FEET/SEC.) = 2.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.70  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.00 = 675.60 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.00 TO NODE 431.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 258.98 DOWNSTREAM(FEET) = 258.00  
FLOW LENGTH(FEET) = 91.03 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.52  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 2.00  
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 9.52  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.10 = 766.63 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
-----

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 9.52  
RAINFALL INTENSITY(INCH/HR) = 1.84  
AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 1.20  
TOTAL STREAM AREA(ACRES) = 1.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 410.00 TO NODE 440.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----

INITIAL SUBAREA FLOW-LENGTH(FEET) = 299.70  
ELEVATION DATA: UPSTREAM(FEET) = 312.69 DOWNSTREAM(FEET) = 310.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.40	0.50	0.100	56	8.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.196  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.071  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 0.73  
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 0.73

\*\*\*\*\*  
FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 306.50  
STREET LENGTH(FEET) = 299.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.03  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.26  
HALFSTREET FLOOD WIDTH(FEET) = 5.70  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.18  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.57  
STREET FLOW TRAVEL TIME(MIN.) = 2.29 Tc(MIN.) = 10.48  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.711  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.60  
EFFECTIVE AREA(ACRES) = 0.80 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 1.20

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 6.34  
FLOW VELOCITY(FEET/SEC.) = 2.23 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.61  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 441.00 = 598.70 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 61  
-----

```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 306.50  DOWNSTREAM ELEVATION(FEET) = 299.00
STREET LENGTH(FEET) = 341.60  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.59
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 6.64
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.79
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.77
STREET FLOW TRAVEL TIME(MIN.) = 2.04  Tc(MIN.) = 12.52
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.526
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	0.40	0.50	0.100	-

```

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.60  SUBAREA RUNOFF(CFS) = 0.80
EFFECTIVE AREA(ACRES) = 1.40  AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.4  PEAK FLOW RATE(CFS) = 1.86

```

```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29  HALFSTREET FLOOD WIDTH(FEET) = 7.34
FLOW VELOCITY(FEET/SEC.) = 2.85  DEPTH*VELOCITY(FT*FT/SEC.) = 0.82
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 442.00 = 940.30 FEET.

```

```

*****
FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 61
*****

```

```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 299.00  DOWNSTREAM ELEVATION(FEET) = 288.50
STREET LENGTH(FEET) = 390.10  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

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```

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.21
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.29
HALFSTREET FLOOD WIDTH(FEET) = 7.64
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.19
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.94
STREET FLOW TRAVEL TIME(MIN.) = 2.04  Tc(MIN.) = 14.56
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.341
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	0.100	-

```

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.60  SUBAREA RUNOFF(CFS) = 0.70
EFFECTIVE AREA(ACRES) = 2.00  AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 2.0  PEAK FLOW RATE(CFS) = 2.32

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30  HALFSTREET FLOOD WIDTH(FEET) = 7.84
FLOW VELOCITY(FEET/SEC.) = 3.24  DEPTH*VELOCITY(FT*FT/SEC.) = 0.96
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 443.00 = 1330.40 FEET.

```

```

*****
FLOW PROCESS FROM NODE 443.00 TO NODE 444.00 IS CODE = 61
*****

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```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 288.50  DOWNSTREAM ELEVATION(FEET) = 281.00
STREET LENGTH(FEET) = 272.60  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

```

```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.54
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.30
HALFSTREET FLOOD WIDTH(FEET) = 8.24
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.29
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.00
STREET FLOW TRAVEL TIME(MIN.) = 1.38  Tc(MIN.) = 15.94
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.266
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.44  
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 2.63

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 8.34  
FLOW VELOCITY(FEET/SEC.) = 3.34 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.02  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 444.00 = 1603.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 444.00 TO NODE 445.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 281.00 DOWNSTREAM ELEVATION(FEET) = 268.10  
STREET LENGTH(FEET) = 462.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.98  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 8.93  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.41  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.08  
STREET FLOW TRAVEL TIME(MIN.) = 2.26 Tc(MIN.) = 18.20  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.181

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.71  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 3.15

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 9.23  
FLOW VELOCITY(FEET/SEC.) = 3.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.10  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 445.00 = 2065.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 445.00 TO NODE 446.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 268.10 DOWNSTREAM ELEVATION(FEET) = 257.00  
STREET LENGTH(FEET) = 532.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.62  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 10.53  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.18  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.09  
STREET FLOW TRAVEL TIME(MIN.) = 2.79 Tc(MIN.) = 20.99  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.085

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 0.93  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 3.82

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.85  
FLOW VELOCITY(FEET/SEC.) = 3.19 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.11  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 446.00 = 2598.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 446.00 TO NODE 431.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 257.00 DOWNSTREAM(FEET) = 256.50  
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.07  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 3.82  
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 21.40  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

```

*****
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 21.40
RAINFALL INTENSITY(INCH/HR) = 1.07
AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 4.10
TOTAL STREAM AREA(ACRES) = 4.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.82

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 2.00 9.52 1.839 0.50( 0.05) 0.10 1.2 429.00
2 3.82 21.40 1.073 0.50( 0.05) 0.10 4.1 410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 4.97 9.52 1.839 0.50( 0.05) 0.10 3.0 429.00
2 4.96 21.40 1.073 0.50( 0.05) 0.10 5.3 410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 4.97 Tc(MIN.) = 9.52
EFFECTIVE AREA(ACRES) = 3.02 AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 5.3
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

```

```

*****
FLOW PROCESS FROM NODE 431.10 TO NODE 249.00 IS CODE = 31
-----

```

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 258.00 DOWNSTREAM(FEET) = 257.00
FLOW LENGTH(FEET) = 230.42 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.08
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.97
PIPE TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 10.46
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

```

```

*****
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 11
-----
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

```

```

*****
** MAIN STREAM CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 4.97 10.46 1.713 0.50( 0.05) 0.10 3.0 429.00
2 4.96 22.34 1.047 0.50( 0.05) 0.10 5.3 410.00
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 333.96 12.25 1.551 0.50( 0.19) 0.37 266.1 425.00
2 335.04 12.46 1.532 0.50( 0.19) 0.37 270.7 400.00
3 338.92 14.30 1.364 0.50( 0.19) 0.37 311.3 300.00
4 359.41 20.67 1.094 0.50( 0.19) 0.38 434.8 210.00
5 350.97 24.05 0.999 0.50( 0.19) 0.37 473.0 200.00
6 347.39 24.89 0.975 0.50( 0.19) 0.37 481.7 230.00
7 339.51 26.01 0.952 0.50( 0.18) 0.37 485.9 220.50
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 324.09 10.46 1.713 0.50( 0.18) 0.37 230.2 429.00
2 338.93 12.25 1.551 0.50( 0.18) 0.37 269.4 425.00
3 340.01 12.46 1.532 0.50( 0.18) 0.37 274.1 400.00
4 343.88 14.30 1.364 0.50( 0.19) 0.37 315.0 300.00
5 364.37 20.67 1.094 0.50( 0.19) 0.37 439.8 210.00
6 360.20 22.34 1.047 0.50( 0.19) 0.37 459.0 410.00
7 355.69 24.05 0.999 0.50( 0.18) 0.37 478.3 200.00
8 351.99 24.89 0.975 0.50( 0.18) 0.37 487.0 230.00
9 344.00 26.01 0.952 0.50( 0.18) 0.37 491.2 220.50
TOTAL AREA(ACRES) = 491.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 364.37 Tc(MIN.) = 20.671
EFFECTIVE AREA(ACRES) = 439.79 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 491.2
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 12
-----

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>>>>CLEAR MEMORY BANK # 1 <<<<
-----
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 491.2 TC(MIN.) = 20.67
EFFECTIVE AREA(ACRES) = 439.79 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.373
PEAK FLOW RATE(CFS) = 364.37

```

```

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 324.09 10.46 1.713 0.50( 0.18) 0.37 230.2 429.00

```



2	338.93	12.25	1.551	0.50	( 0.18)	0.37	269.4	425.00
3	340.01	12.46	1.532	0.50	( 0.18)	0.37	274.1	400.00
4	343.88	14.30	1.364	0.50	( 0.19)	0.37	315.0	300.00
5	364.37	20.67	1.094	0.50	( 0.19)	0.37	439.8	210.00
6	360.20	22.34	1.047	0.50	( 0.19)	0.37	459.0	410.00
7	355.69	24.05	0.999	0.50	( 0.18)	0.37	478.3	200.00
8	351.99	24.89	0.975	0.50	( 0.18)	0.37	487.0	230.00
9	344.00	26.01	0.952	0.50	( 0.18)	0.37	491.2	220.50

=====  
=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506101F.DAT  
TIME/DATE OF STUDY: 12:42 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 2.230
- 2) 6.00; 2.010
- 3) 7.00; 1.850
- 4) 8.00; 1.710
- 5) 9.00; 1.600
- 6) 10.00; 1.510
- 7) 11.00; 1.430
- 8) 12.00; 1.360
- 9) 13.00; 1.300
- 10) 14.00; 1.250
- 11) 15.00; 1.200
- 12) 20.00; 1.020
- 13) 25.00; 0.900
- 14) 30.00; 0.810
- 15) 40.00; 0.690
- 16) 50.00; 0.610
- 17) 60.00; 0.550
- 18) 90.00; 0.440
- 19) 120.00; 0.370
- 20) 180.00; 0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10100.00 TO NODE 10101.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 820.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.606  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.546  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.10	0.50	1.000	98	9.61
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.50	1.000	98	9.61

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
 SUBAREA RUNOFF(CFS) = 0.38  
 TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 0.38

\*\*\*\*\*

FLOW PROCESS FROM NODE 10101.00 TO NODE 10102.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 790.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 152.00 CHANNEL SLOPE = 0.1974  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 0.38  
 FLOW VELOCITY(FEET/SEC.) = 3.35 FLOW DEPTH(FEET) = 0.19  
 TRAVEL TIME(MIN.) = 0.76  $T_c$ (MIN.) = 10.36  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10102.00 = 479.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10102.00 TO NODE 10102.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 10.36  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.481  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.50      0.50       1.000      -
USER-DEFINED  -        0.30      0.50       1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.80  SUBAREA RUNOFF (CFS) = 0.71
EFFECTIVE AREA (ACRES) = 1.20  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.2  PEAK FLOW RATE (CFS) = 1.06

```

```

*****
FLOW PROCESS FROM NODE 10102.00 TO NODE 10103.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 790.00  DOWNSTREAM(FEET) = 762.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00  CHANNEL SLOPE = 0.1400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.06
FLOW VELOCITY(FEET/SEC.) = 3.86  FLOW DEPTH(FEET) = 0.30
TRAVEL TIME(MIN.) = 0.86  Tc(MIN.) = 11.23
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10103.00 = 679.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10103.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.23
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.414
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.40  0.50  1.000  -
USER-DEFINED      -        0.80  0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.20  SUBAREA RUNOFF (CFS) = 0.99
EFFECTIVE AREA (ACRES) = 2.40  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 2.4  PEAK FLOW RATE (CFS) = 1.97

```

```

*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10104.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 762.00  DOWNSTREAM(FEET) = 754.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 124.00  CHANNEL SLOPE = 0.0645
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.97
FLOW VELOCITY(FEET/SEC.) = 3.32  FLOW DEPTH(FEET) = 0.45
TRAVEL TIME(MIN.) = 0.62  Tc(MIN.) = 11.85
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10104.00 = 803.00 FEET.

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.85
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.371
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.70  0.50  1.000  -
USER-DEFINED      -        1.10  0.50  1.000  -
USER-DEFINED      -        0.10  0.50  1.000  -
USER-DEFINED      -        0.40  0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 1.80
EFFECTIVE AREA (ACRES) = 4.70  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.7  PEAK FLOW RATE (CFS) = 3.68

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 754.00  DOWNSTREAM(FEET) = 740.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00  CHANNEL SLOPE = 0.0255
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.68
FLOW VELOCITY(FEET/SEC.) = 2.75  FLOW DEPTH(FEET) = 0.67
TRAVEL TIME(MIN.) = 3.34  Tc(MIN.) = 15.19
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10105.00 = 1353.00 FEET.

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10105.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.19
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.193
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        3.40  0.50  1.000  -
USER-DEFINED      -        0.60  0.50  1.000  -
USER-DEFINED      -        6.00  0.50  1.000  -
USER-DEFINED      -        0.60  0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 10.60  SUBAREA RUNOFF (CFS) = 6.61
EFFECTIVE AREA (ACRES) = 15.30  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 15.3  PEAK FLOW RATE (CFS) = 9.54

```

```

*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10106.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 740.00 DOWNSTREAM(FEET) = 623.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 929.00 CHANNEL SLOPE = 0.1259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 9.54
FLOW VELOCITY(FEET/SEC.) = 6.37 FLOW DEPTH(FEET) = 0.71
TRAVEL TIME(MIN.) = 2.43 Tc(MIN.) = 17.62
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10106.00 = 2282.00 FEET.
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10106.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.62
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.106
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.50 1.000 -
USER-DEFINED - 0.10 0.50 1.000 -
USER-DEFINED - 10.40 0.50 1.000 -
USER-DEFINED - 0.40 0.50 1.000 -
USER-DEFINED - 4.50 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 8.45
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 16.79
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 592.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 417.00 CHANNEL SLOPE = 0.0743
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 16.79
FLOW VELOCITY(FEET/SEC.) = 6.02 FLOW DEPTH(FEET) = 0.96
TRAVEL TIME(MIN.) = 1.15 Tc(MIN.) = 18.77
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10107.00 = 2699.00 FEET.
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10107.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.77

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* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.064
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.50 1.000 -
USER-DEFINED - 0.60 0.50 1.000 -
USER-DEFINED - 5.10 0.50 1.000 -
USER-DEFINED - 1.10 0.50 1.000 -
USER-DEFINED - 0.20 0.50 1.000 -
USER-DEFINED - 2.30 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 4.82
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 20.46
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 592.00 DOWNSTREAM(FEET) = 590.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0333
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.000
CHANNEL FLOW THRU SUBAREA(CFS) = 20.46
FLOW VELOCITY(FEET/SEC.) = 4.67 FLOW DEPTH(FEET) = 1.21
TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 18.99
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10108.00 = 2759.00 FEET.
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.99
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.057
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.50 1.000 -
USER-DEFINED - 1.10 0.50 1.000 -
USER-DEFINED - 7.00 0.50 1.000 -
USER-DEFINED - 0.40 0.50 1.000 -
USER-DEFINED - 7.50 0.50 1.000 -
USER-DEFINED - 1.80 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 9.06
EFFECTIVE AREA(ACRES) = 58.40 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.4 PEAK FLOW RATE(CFS) = 29.24
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 18.99
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.057
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.20     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20    SUBAREA RUNOFF(CFS) = 0.10
EFFECTIVE AREA(ACRES) = 58.60  AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.6    PEAK FLOW RATE(CFS) = 29.34

```

```

*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10109.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 590.00  DOWNSTREAM(FEET) = 526.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 973.00  CHANNEL SLOPE = 0.0658
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 29.34
FLOW VELOCITY(FEET/SEC.) = 6.61  FLOW DEPTH(FEET) = 1.22
TRAVEL TIME(MIN.) = 2.45  Tc(MIN.) = 21.44
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10109.00 = 3732.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10109.00 TO NODE 10109.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 21.44
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.986
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -       16.40     0.50     1.000    -
USER-DEFINED        -        0.60     0.50     1.000    -
USER-DEFINED        -        3.00     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.00    SUBAREA RUNOFF(CFS) = 8.74
EFFECTIVE AREA(ACRES) = 78.60  AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.6    PEAK FLOW RATE(CFS) = 34.33

```

```

*****
FLOW PROCESS FROM NODE 10109.00 TO NODE 10110.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 526.00  DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1045.00  CHANNEL SLOPE = 0.0679

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```

CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 34.33
FLOW VELOCITY(FEET/SEC.) = 6.93  FLOW DEPTH(FEET) = 1.28
TRAVEL TIME(MIN.) = 2.51  Tc(MIN.) = 23.95
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10110.00 = 4777.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10110.00 TO NODE 10110.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 23.95
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.925
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        1.00     0.50     1.000    -
USER-DEFINED        -        0.50     0.50     1.000    -
USER-DEFINED        -       31.60     0.50     1.000    -
USER-DEFINED        -        1.60     0.50     1.000    -
USER-DEFINED        -        0.40     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.10    SUBAREA RUNOFF(CFS) = 13.43
EFFECTIVE AREA(ACRES) = 113.70  AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.7    PEAK FLOW RATE(CFS) = 43.49

```

```

*****
FLOW PROCESS FROM NODE 10110.00 TO NODE 10111.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 455.00  DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 675.00  CHANNEL SLOPE = 0.0667
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 43.49
FLOW VELOCITY(FEET/SEC.) = 7.33  FLOW DEPTH(FEET) = 1.41
TRAVEL TIME(MIN.) = 1.54  Tc(MIN.) = 25.48
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10111.00 = 5452.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10111.00 TO NODE 10111.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 25.48
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.891
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        7.40     0.50     1.000    -
USER-DEFINED        -        6.00     0.50     1.000    -
USER-DEFINED        -       24.80     0.50     1.000    -
USER-DEFINED        -        0.90     0.50     1.000    -

```

USER-DEFINED - 4.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 43.20 SUBAREA RUNOFF (CFS) = 15.21  
EFFECTIVE AREA (ACRES) = 156.90 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 156.9 PEAK FLOW RATE (CFS) = 55.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10111.00 TO NODE 10112.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	410.00	DOWNSTREAM (FEET) =	405.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	143.00	CHANNEL SLOPE =	0.0350
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	4.00
CHANNEL FLOW THRU SUBAREA (CFS) =	55.23		
FLOW VELOCITY (FEET/SEC.) =	6.10	FLOW DEPTH (FEET) =	1.74
TRAVEL TIME (MIN.) =	0.39	Tc (MIN.) =	25.87
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10112.00 =	5595.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 25.87

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.884

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	7.90	0.50	1.000	-
USER-DEFINED	-	25.90	0.50	1.000	-
USER-DEFINED	-	19.30	0.50	1.000	-
USER-DEFINED	-	2.10	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 56.20 SUBAREA RUNOFF (CFS) = 19.43

EFFECTIVE AREA (ACRES) = 213.10 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 213.1 PEAK FLOW RATE (CFS) = 73.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10113.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	405.00	DOWNSTREAM (FEET) =	363.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	1642.00	CHANNEL SLOPE =	0.0256
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	73.66		
FLOW VELOCITY (FEET/SEC.) =	5.85	FLOW DEPTH (FEET) =	2.05

TRAVEL TIME (MIN.) = 4.68 Tc (MIN.) = 30.56  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10113.00 = 7237.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 30.56

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.803

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.50	1.000	-
USER-DEFINED	-	33.10	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 35.40 SUBAREA RUNOFF (CFS) = 9.66

EFFECTIVE AREA (ACRES) = 248.50 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 248.5 PEAK FLOW RATE (CFS) = 73.66

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10114.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	363.00	DOWNSTREAM (FEET) =	340.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	918.00	CHANNEL SLOPE =	0.0251
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	73.66		
FLOW VELOCITY (FEET/SEC.) =	5.80	FLOW DEPTH (FEET) =	2.06
TRAVEL TIME (MIN.) =	2.64	Tc (MIN.) =	33.19
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10114.00 =	8155.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 33.19

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.772

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	10.10	0.50	1.000	-
USER-DEFINED	-	17.70	0.50	1.000	-
USER-DEFINED	-	52.90	0.50	1.000	-
USER-DEFINED	-	1.00	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 83.10 SUBAREA RUNOFF (CFS) = 20.30  
EFFECTIVE AREA (ACRES) = 331.60 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 331.6 PEAK FLOW RATE (CFS) = 81.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 33.19  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.772  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.50 SUBAREA RUNOFF (CFS) = 0.37  
EFFECTIVE AREA (ACRES) = 333.10 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 333.1 PEAK FLOW RATE (CFS) = 81.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10115.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 340.00 DOWNSTREAM (FEET) = 301.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1467.00 CHANNEL SLOPE = 0.0266  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 81.39  
FLOW VELOCITY (FEET/SEC.) = 6.06 FLOW DEPTH (FEET) = 2.12  
TRAVEL TIME (MIN.) = 4.04 Tc (MIN.) = 37.23  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10115.00 = 9622.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10115.00 TO NODE 10115.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 37.23  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.723  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.60 0.50 1.000 -  
USER-DEFINED - 24.30 0.50 1.000 -  
USER-DEFINED - 47.70 0.50 1.000 -  
USER-DEFINED - 9.80 0.50 1.000 -  
USER-DEFINED - 1.60 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 94.00 SUBAREA RUNOFF (CFS) = 18.87  
EFFECTIVE AREA (ACRES) = 427.10 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 427.1 PEAK FLOW RATE (CFS) = 85.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10115.00 TO NODE 10116.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 301.00 DOWNSTREAM (FEET) = 272.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1696.00 CHANNEL SLOPE = 0.0171  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 85.74  
FLOW VELOCITY (FEET/SEC.) = 5.22 FLOW DEPTH (FEET) = 2.34  
TRAVEL TIME (MIN.) = 5.41 Tc (MIN.) = 42.64  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10116.00 = 11318.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 42.64  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.669  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 1.000 -  
USER-DEFINED - 4.90 0.50 1.000 -  
USER-DEFINED - 4.10 0.50 1.000 -  
USER-DEFINED - 0.40 0.50 1.000 -  
USER-DEFINED - 32.00 0.50 1.000 -  
USER-DEFINED - 3.80 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 45.60 SUBAREA RUNOFF (CFS) = 6.92  
EFFECTIVE AREA (ACRES) = 472.70 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 472.7 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 42.64  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.669  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.50 1.000 -  
USER-DEFINED - 7.70 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 9.70 SUBAREA RUNOFF (CFS) = 1.47  
EFFECTIVE AREA (ACRES) = 482.40 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 482.4 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10116.00 TO NODE 10117.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 272.00 DOWNSTREAM (FEET) = 252.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 878.00 CHANNEL SLOPE = 0.0228  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 85.74  
FLOW VELOCITY (FEET/SEC.) = 5.81 FLOW DEPTH (FEET) = 2.22  
TRAVEL TIME (MIN.) = 2.52 Tc (MIN.) = 45.16  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10117.00 = 12196.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 45.16

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.649

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	0.850	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	8.20	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.993

SUBAREA AREA (ACRES) = 12.30 SUBAREA RUNOFF (CFS) = 1.68

EFFECTIVE AREA (ACRES) = 494.70 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 494.7 PEAK FLOW RATE (CFS) = 85.74

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 45.16

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.649

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	0.850	-
USER-DEFINED	-	14.60	0.50	1.000	-
USER-DEFINED	-	6.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	3.50	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.996

SUBAREA AREA (ACRES) = 25.00 SUBAREA RUNOFF (CFS) = 3.38

EFFECTIVE AREA (ACRES) = 519.70 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 519.7 PEAK FLOW RATE (CFS) = 85.74

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10117.00 TO NODE 10118.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 252.00 DOWNSTREAM (FEET) = 249.00  
FLOW LENGTH (FEET) = 280.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.56  
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 85.74  
PIPE TRAVEL TIME (MIN.) = 0.40 Tc (MIN.) = 45.56  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10118.00 = 12476.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10118.00 TO NODE 10119.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 249.00 DOWNSTREAM (FEET) = 240.00  
FLOW LENGTH (FEET) = 892.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.0 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.27  
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 85.74  
PIPE TRAVEL TIME (MIN.) = 1.32 Tc (MIN.) = 46.88  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10119.00 = 13368.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 46.88

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.635

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	0.100	-
USER-DEFINED	-	1.00	0.50	0.600	-
USER-DEFINED	-	0.80	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.706

SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 0.91

EFFECTIVE AREA (ACRES) = 523.30 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00



TOTAL AREA (ACRES) = 523.3 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 46.88					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.635					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.80	0.50	1.000	-
USER-DEFINED	-	1.20	0.50	0.100	-
USER-DEFINED	-	9.60	0.50	0.600	-
USER-DEFINED	-	1.00	0.50	0.850	-
USER-DEFINED	-	0.80	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.627  
SUBAREA AREA (ACRES) = 13.60 SUBAREA RUNOFF (CFS) = 3.93  
EFFECTIVE AREA (ACRES) = 536.90 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 536.9 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 46.88					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.635					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.01  
EFFECTIVE AREA (ACRES) = 537.00 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 537.0 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10119.00 TO NODE 10120.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 240.00 DOWNSTREAM (FEET) = 239.00  
FLOW LENGTH (FEET) = 120.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.32  
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 85.74

PIPE TRAVEL TIME (MIN.) = 0.19 Tc (MIN.) = 47.08  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10120.00 = 13488.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 47.08					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.633					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	1.20	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	2.80	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.657  
SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 1.54  
EFFECTIVE AREA (ACRES) = 542.60 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 542.6 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 47.08					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.633					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	1.50	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	0.600	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	2.90	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.717  
SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 1.26  
EFFECTIVE AREA (ACRES) = 547.70 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 547.7 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 47.08					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.633					
SUBAREA LOSS RATE DATA (AMC II):					

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	1.00	0.50	1.000	-
USER-DEFINED	-	2.70	0.50	1.000	-
USER-DEFINED	-	11.20	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 15.80 SUBAREA RUNOFF (CFS) = 1.89  
EFFECTIVE AREA (ACRES) = 563.50 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 563.5 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10121.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----  
ELEVATION DATA: UPSTREAM(FEET) = 239.00 DOWNSTREAM(FEET) = 213.00  
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 30.03  
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 85.74  
PIPE TRAVEL TIME (MIN.) = 0.11 Tc (MIN.) = 47.18  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10121.00 = 13682.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10121.00 TO NODE 10122.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
-----  
ELEVATION DATA: UPSTREAM(FEET) = 213.00 DOWNSTREAM(FEET) = 176.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 995.00 CHANNEL SLOPE = 0.0372  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 85.74  
FLOW VELOCITY (FEET/SEC.) = 6.97 FLOW DEPTH (FEET) = 2.02  
TRAVEL TIME (MIN.) = 2.38 Tc (MIN.) = 49.56  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10122.00 = 14677.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc (MIN.) = 49.56  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.614  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 1.40 0.50 1.000 -

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	4.80	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 7.30 SUBAREA RUNOFF (CFS) = 0.74  
EFFECTIVE AREA (ACRES) = 570.80 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 570.8 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc (MIN.) = 49.56  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.614  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.80 0.50 1.000 -  
USER-DEFINED - 3.30 0.50 1.000 -  
USER-DEFINED - 1.40 0.50 1.000 -  
USER-DEFINED - 3.00 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 10.50 SUBAREA RUNOFF (CFS) = 1.07  
EFFECTIVE AREA (ACRES) = 581.30 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 581.3 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc (MIN.) = 49.56  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.614  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 3.30 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 0.60 0.50 1.000 -  
USER-DEFINED - 3.50 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 7.90 SUBAREA RUNOFF (CFS) = 0.81  
EFFECTIVE AREA (ACRES) = 589.20 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 589.2 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 49.56

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.614

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 0.18

EFFECTIVE AREA(ACRES) = 591.00 AREA-AVERAGED Fm(INCH/HR) = 0.49

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98

TOTAL AREA(ACRES) = 591.0 PEAK FLOW RATE(CFS) = 85.74

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====  
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 591.0 TC(MIN.) = 49.56

EFFECTIVE AREA(ACRES) = 591.00 AREA-AVERAGED Fm(INCH/HR)= 0.49

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.984

PEAK FLOW RATE(CFS) = 85.74

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2007 Advanced Engineering Software (aes)  
Ver. 13.4 Release Date: 01/25/2007 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506102F.DAT  
TIME/DATE OF STUDY: 14:01 01/08/2009  
=====

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.184
- 2) 10.00; 1.510
- 3) 15.00; 1.203
- 4) 20.00; 1.023
- 5) 25.00; 0.902
- 6) 30.00; 0.826
- 7) 40.00; 0.693
- 8) 50.00; 0.611
- 9) 60.00; 0.546
- 10) 90.00; 0.439
- 11) 120.00; 0.374
- 12) 180.00; 0.306
- 13) 360.00; 0.211
- 14) 1440.00; 0.088

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10200.00 TO NODE 10201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 293.00  
ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 617.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.991  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.511

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	-	0.73	0.50	0.600	0	9.99

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA RUNOFF(CFS) = 0.80  
TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 0.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10201.00 TO NODE 10202.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 617.00 DOWNSTREAM ELEVATION(FEET) = 613.00  
STREET LENGTH(FEET) = 323.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.22  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.28  
HALFSTREET FLOOD WIDTH(FEET) = 6.07  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.18  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.61  
STREET FLOW TRAVEL TIME(MIN.) = 2.47 Tc(MIN.) = 12.46  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.359

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.88	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 0.84  
EFFECTIVE AREA(ACRES) = 1.62 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 1.54

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.00  
FLOW VELOCITY(FEET/SEC.) = 2.26 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.68  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10202.00 = 616.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10202.00 TO NODE 10203.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 613.00 DOWNSTREAM ELEVATION(FEET) = 594.00  
STREET LENGTH(FEET) = 613.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.27

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.29  
HALFSTREET FLOOD WIDTH(FEET) = 6.73  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.53  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.03  
STREET FLOW TRAVEL TIME(MIN.) = 2.90 Tc(MIN.) = 15.35

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.190

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.82	0.50	0.614	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.614

SUBAREA AREA(ACRES) = 1.82 SUBAREA RUNOFF(CFS) = 1.45  
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 2.74

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 7.50  
FLOW VELOCITY(FEET/SEC.) = 3.65 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.12  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10203.00 = 1229.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10203.00 TO NODE 10204.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 594.00 DOWNSTREAM ELEVATION(FEET) = 578.00  
STREET LENGTH(FEET) = 433.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.18

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.71  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.05  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.27  
STREET FLOW TRAVEL TIME(MIN.) = 1.78 Tc(MIN.) = 17.14  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.126

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.21	0.50	0.655	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.655

SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 0.87  
EFFECTIVE AREA(ACRES) = 4.64 AREA-AVERAGED Fm(INCH/HR) = 0.31  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 3.41

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 8.04

FLOW VELOCITY(FEET/SEC.) = 4.08 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.30

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10204.00 = 1662.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 578.00 DOWNSTREAM(FEET) = 575.00  
FLOW LENGTH(FEET) = 147.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.62  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 3.41

PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 17.51

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10205.00 = 1809.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.51
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.113
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.61     0.50     0.917   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917
SUBAREA AREA(ACRES) = 3.61      SUBAREA RUNOFF(CFS) = 2.12
EFFECTIVE AREA(ACRES) = 8.25   AREA-AVERAGED Fm(INCH/HR) = 0.37
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.75
TOTAL AREA(ACRES) = 8.3       PEAK FLOW RATE(CFS) = 5.48

*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 563.00
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.64
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.48
PIPE TRAVEL TIME(MIN.) = 1.23 Tc(MIN.) = 18.74
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10206.00 = 2374.00 FEET.

*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.74
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.068
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         4.75     0.50     0.669   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.669
SUBAREA AREA(ACRES) = 4.75      SUBAREA RUNOFF(CFS) = 3.13
EFFECTIVE AREA(ACRES) = 13.00  AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 13.0       PEAK FLOW RATE(CFS) = 8.28

*****
FLOW PROCESS FROM NODE 10206.00 TO NODE 10207.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 563.00 DOWNSTREAM(FEET) = 547.00
FLOW LENGTH(FEET) = 599.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.25
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.28
PIPE TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 19.82
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10207.00 = 2973.00 FEET.

*****
FLOW PROCESS FROM NODE 10206.10 TO NODE 10207.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.82
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.030
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         4.59     0.50     0.664   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.664
SUBAREA AREA(ACRES) = 4.59      SUBAREA RUNOFF(CFS) = 2.88
EFFECTIVE AREA(ACRES) = 17.58  AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 17.6       PEAK FLOW RATE(CFS) = 10.71

*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 516.00
FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.64
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.71
PIPE TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 20.61
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10208.00 = 3573.00 FEET.

*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.61
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.008
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.60     0.50     0.697   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.697
SUBAREA AREA(ACRES) = 3.60      SUBAREA RUNOFF(CFS) = 2.14

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EFFECTIVE AREA(ACRES) = 21.18 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 21.2 PEAK FLOW RATE(CFS) = 12.51

\*\*\*\*\*

FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 516.00 DOWNSTREAM(FEET) = 480.00

FLOW LENGTH(FEET) = 604.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 13.86

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 12.51

PIPE TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 21.34

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10209.00 = 4177.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 21.34

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.991

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.21	0.50	0.645	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645

SUBAREA AREA(ACRES) = 8.21 SUBAREA RUNOFF(CFS) = 4.94

EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.34

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.69

TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 17.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 438.00

FLOW LENGTH(FEET) = 678.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.14

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 17.11

PIPE TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 22.08

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10210.00 = 4855.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.08

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.973

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.49	0.50	0.986	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986

SUBAREA AREA(ACRES) = 10.49 SUBAREA RUNOFF(CFS) = 4.53

EFFECTIVE AREA(ACRES) = 39.89 AREA-AVERAGED Fm(INCH/HR) = 0.38

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.77

TOTAL AREA(ACRES) = 39.9 PEAK FLOW RATE(CFS) = 21.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 280.00

FLOW LENGTH(FEET) = 2662.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.48

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 21.16

PIPE TRAVEL TIME(MIN.) = 2.87 Tc(MIN.) = 24.95

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10211.00 = 7517.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.95

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.903

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.00	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 3.63

EFFECTIVE AREA(ACRES) = 49.89 AREA-AVERAGED Fm(INCH/HR) = 0.41

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81

TOTAL AREA(ACRES) = 49.9 PEAK FLOW RATE(CFS) = 22.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 280.00 DOWNSTREAM(FEET) = 176.00

FLOW LENGTH(FEET) = 935.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 20.16

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 22.30

PIPE TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 25.72  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10212.00 = 8452.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 25.72  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.891  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	18.37	0.50	0.926	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.926  
SUBAREA AREA(ACRES) = 18.37 SUBAREA RUNOFF(CFS) = 7.07  
EFFECTIVE AREA(ACRES) = 68.26 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 68.3 PEAK FLOW RATE(CFS) = 28.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10212.00 TO NODE 10242.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 176.00 DOWNSTREAM(FEET) = 169.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00 CHANNEL SLOPE = 0.0211  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.872  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.97	0.50	0.970	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.17  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.32  
AVERAGE FLOW DEPTH(FEET) = 1.50 TRAVEL TIME(MIN.) = 1.28  
Tc(MIN.) = 27.00  
SUBAREA AREA(ACRES) = 1.97 SUBAREA RUNOFF(CFS) = 0.68  
EFFECTIVE AREA(ACRES) = 70.23 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 28.82  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.50 FLOW VELOCITY(FEET/SEC.) = 4.28  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 10  
-----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10220.00 TO NODE 10221.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 308.00 DOWNSTREAM(FEET) = 300.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.111  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.199  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	1.03	0.50	1.000	0	15.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.65  
TOTAL AREA(ACRES) = 1.03 PEAK FLOW RATE(CFS) = 0.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10221.10 TO NODE 10222.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 300.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.13

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.51  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.29  
STREET FLOW TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 16.22  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.159

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.64	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 0.97  
EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.50



AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 2.7 PEAK FLOW RATE (CFS) = 1.58

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.20 HALFSTREET FLOOD WIDTH (FEET) = 2.00  
FLOW VELOCITY (FEET/SEC.) = 6.51 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.29  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10222.00 = 764.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10221.20 TO NODE 10222.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 16.22  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.159  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.12	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 3.12 SUBAREA RUNOFF (CFS) = 1.85  
EFFECTIVE AREA (ACRES) = 5.78 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 5.8 PEAK FLOW RATE (CFS) = 3.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.10 TO NODE 10223.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

=====

UPSTREAM ELEVATION (FEET) = 261.00 DOWNSTREAM ELEVATION (FEET) = 208.00  
STREET LENGTH (FEET) = 622.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.89  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.24  
HALFSTREET FLOOD WIDTH (FEET) = 4.11  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.44  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.31  
STREET FLOW TRAVEL TIME (MIN.) = 1.91 Tc (MIN.) = 18.13

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.090  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.75	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.75 SUBAREA RUNOFF (CFS) = 0.93  
EFFECTIVE AREA (ACRES) = 7.54 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 7.5 PEAK FLOW RATE (CFS) = 4.00

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.24 HALFSTREET FLOOD WIDTH (FEET) = 4.21  
FLOW VELOCITY (FEET/SEC.) = 5.46 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.32  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10223.00 = 1386.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.20 TO NODE 10223.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 18.13  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.090  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.91	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 7.91 SUBAREA RUNOFF (CFS) = 4.20  
EFFECTIVE AREA (ACRES) = 15.45 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 15.4 PEAK FLOW RATE (CFS) = 8.21

\*\*\*\*\*

FLOW PROCESS FROM NODE 10223.10 TO NODE 10224.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

=====

UPSTREAM ELEVATION (FEET) = 208.00 DOWNSTREAM ELEVATION (FEET) = 204.00  
STREET LENGTH (FEET) = 758.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.09  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.44  
HALFSTREET FLOOD WIDTH (FEET) = 14.26  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.04  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.91  
STREET FLOW TRAVEL TIME (MIN.) = 6.18 Tc (MIN.) = 24.31  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.919

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.70	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 1.77  
EFFECTIVE AREA(ACRES) = 20.15 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.1 PEAK FLOW RATE(CFS) = 8.21  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 13.65  
FLOW VELOCITY(FEET/SEC.) = 2.00 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.86  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10224.00 = 2144.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.20 TO NODE 10224.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc(MIN.) = 24.31  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.919  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.21	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 0.45  
EFFECTIVE AREA(ACRES) = 21.35 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 8.21  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 204.00 DOWNSTREAM(FEET) = 201.00  
FLOW LENGTH(FEET) = 422.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.42  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 8.21  
PIPE TRAVEL TIME(MIN.) = 1.30 Tc(MIN.) = 25.61  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10225.00 = 2566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc(MIN.) = 25.61  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.893

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.81	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.81 SUBAREA RUNOFF(CFS) = 1.70  
EFFECTIVE AREA(ACRES) = 26.17 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 26.2 PEAK FLOW RATE(CFS) = 9.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 201.00 DOWNSTREAM(FEET) = 197.00  
FLOW LENGTH(FEET) = 799.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.98  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 9.25  
PIPE TRAVEL TIME(MIN.) = 2.67 Tc(MIN.) = 28.28  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10238.00 = 3365.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc(MIN.) = 28.28  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.852  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.24	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.24 SUBAREA RUNOFF(CFS) = 1.34  
EFFECTIVE AREA(ACRES) = 30.41 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.4 PEAK FLOW RATE(CFS) = 9.63

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 28.28  
RAINFALL INTENSITY(INCH/HR) = 0.85  
AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 30.41  
TOTAL STREAM AREA(ACRES) = 30.41

PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 10230.00 TO NODE 10231.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 276.00

ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 390.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.944

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.057

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
AGRICULTURAL POOR COVER "FALLOW"	-	0.95	0.50	1.000	0	5.94

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.33  
TOTAL AREA(ACRES) = 0.95 PEAK FLOW RATE(CFS) = 1.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10231.10 TO NODE 10232.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 390.00 DOWNSTREAM(FEET) = 301.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 394.00 CHANNEL SLOPE = 0.2259

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.929

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.68	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.42  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.95  
AVERAGE FLOW DEPTH(FEET) = 0.34 TRAVEL TIME(MIN.) = 0.95  
Tc(MIN.) = 6.89  
SUBAREA AREA(ACRES) = 1.68 SUBAREA RUNOFF(CFS) = 2.17  
EFFECTIVE AREA(ACRES) = 2.63 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 3.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 FLOW VELOCITY(FEET/SEC.) = 7.57

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10232.00 = 670.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10231.20 TO NODE 10232.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

\*\*\*\*\*

MAINLINE Tc(MIN.) = 6.89

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.929

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.38	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.38 SUBAREA RUNOFF(CFS) = 8.20  
EFFECTIVE AREA(ACRES) = 9.01 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 9.0 PEAK FLOW RATE(CFS) = 11.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10232.00 TO NODE 10233.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 301.00 DOWNSTREAM ELEVATION(FEET) = 277.00

STREET LENGTH(FEET) = 341.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.61

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.65

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.35

HALFSTREET FLOOD WIDTH(FEET) = 9.64

AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.10

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.14

STREET FLOW TRAVEL TIME(MIN.) = 0.93 Tc(MIN.) = 7.82

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.804

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 4.11  
EFFECTIVE AREA(ACRES) = 12.52 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 12.5 PEAK FLOW RATE(CFS) = 14.68

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 10.00

FLOW VELOCITY(FEET/SEC.) = 6.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.21

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10233.00 = 1011.00 FEET.

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*****
FLOW PROCESS FROM NODE 10233.10 TO NODE 10234.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 277.00 DOWNSTREAM ELEVATION(FEET) = 226.00
STREET LENGTH(FEET) = 682.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.74
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 10.46
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.52
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.40
STREET FLOW TRAVEL TIME(MIN.) = 1.74 Tc(MIN.) = 9.56
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.569
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.27 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 4.27 SUBAREA RUNOFF(CFS) = 4.11
EFFECTIVE AREA(ACRES) = 16.78 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 16.14

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 10.30
FLOW VELOCITY(FEET/SEC.) = 6.45 DEPTH*VELOCITY(FT*FT/SEC.) = 2.35
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10234.00 = 1693.00 FEET.

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*****
FLOW PROCESS FROM NODE 10233.20 TO NODE 10234.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.56
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.569
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 15.60 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 15.00

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EFFECTIVE AREA(ACRES) = 32.38 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 31.14
*****
FLOW PROCESS FROM NODE 10234.10 TO NODE 10235.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 3 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 226.00 DOWNSTREAM ELEVATION(FEET) = 205.00
STREET LENGTH(FEET) = 759.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.04
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.50
HALFSTREET FLOOD WIDTH(FEET) = 17.29
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.19
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.62
STREET FLOW TRAVEL TIME(MIN.) = 2.44 Tc(MIN.) = 12.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.387
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.74 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 3.79
EFFECTIVE AREA(ACRES) = 37.13 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 31.14
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.50 HALFSTREET FLOOD WIDTH(FEET) = 16.87
FLOW VELOCITY(FEET/SEC.) = 5.13 DEPTH*VELOCITY(FT*FT/SEC.) = 2.54
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10235.00 = 2452.00 FEET.

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*****
FLOW PROCESS FROM NODE 10234.20 TO NODE 10235.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.387
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            8.02       0.50       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) =    8.02            SUBAREA RUNOFF(CFS) =    6.40  
 EFFECTIVE AREA(ACRES) =    45.15        AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) =    45.1            PEAK FLOW RATE(CFS) =    36.04

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10234.30 TO NODE 10235.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.387  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA        Fp            Ap        SCS  
                           LAND USE        GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            2.62       0.50       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) =    2.62            SUBAREA RUNOFF(CFS) =    2.09  
 EFFECTIVE AREA(ACRES) =    47.76        AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) =    47.8            PEAK FLOW RATE(CFS) =    38.13

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10235.00 TO NODE 10236.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 205.00    DOWNSTREAM(FEET) = 201.00  
 FLOW LENGTH(FEET) = 489.00    MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.56  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00    NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 38.13  
 PIPE TRAVEL TIME(MIN.) = 0.95    Tc(MIN.) = 12.95  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10236.00 = 2941.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10235.10 TO NODE 10236.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.95  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.329  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA        Fp            Ap        SCS  
                           LAND USE        GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            2.89       0.50       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) =    2.89            SUBAREA RUNOFF(CFS) =    2.16  
 EFFECTIVE AREA(ACRES) =    50.65        AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) =    50.7            PEAK FLOW RATE(CFS) =    38.13  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10235.20 TO NODE 10236.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.95  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.329  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA        Fp            Ap        SCS  
                           LAND USE        GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            4.84       0.50       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) =    4.84            SUBAREA RUNOFF(CFS) =    3.61  
 EFFECTIVE AREA(ACRES) =    55.49        AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) =    55.5            PEAK FLOW RATE(CFS) =    41.38

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 201.00    DOWNSTREAM(FEET) = 199.00  
 FLOW LENGTH(FEET) = 278.00    MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.16  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00    NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 41.38  
 PIPE TRAVEL TIME(MIN.) = 0.57    Tc(MIN.) = 13.52  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10237.00 = 3219.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.52  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.294  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA        Fp            Ap        SCS  
                           LAND USE        GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            1.62       0.50       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) =    1.62            SUBAREA RUNOFF(CFS) =    1.16  
 EFFECTIVE AREA(ACRES) =    57.11        AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) =    57.1            PEAK FLOW RATE(CFS) =    41.38  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 31  
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```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 197.00
FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.66
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 41.38
PIPE TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 14.27
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

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*****
FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.27
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.248
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         1.38   0.50  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.38 SUBAREA RUNOFF(CFS) = 0.93
EFFECTIVE AREA(ACRES) = 58.49 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 41.38
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1
-----

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 14.27
RAINFALL INTENSITY(INCH/HR) = 1.25
AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 58.49
TOTAL STREAM AREA(ACRES) = 58.49
PEAK FLOW RATE(CFS) AT CONFLUENCE = 41.38

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** CONFLUENCE DATA **

```

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.63	28.28	0.852	0.50( 0.50)	1.00	30.4	10220.00
2	41.38	14.27	1.248	0.50( 0.50)	1.00	58.5	10230.00

```

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

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** PEAK FLOW RATE TABLE **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	51.01	14.27	1.248	0.50( 0.50)	1.00	73.8	10230.00
2	29.11	28.28	0.852	0.50( 0.50)	1.00	88.9	10220.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 51.01 Tc(MIN.) = 14.27
EFFECTIVE AREA(ACRES) = 73.83 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 88.9
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

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*****
FLOW PROCESS FROM NODE 10238.00 TO NODE 10239.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 197.00 DOWNSTREAM(FEET) = 193.00
FLOW LENGTH(FEET) = 753.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.78
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 51.01
PIPE TRAVEL TIME(MIN.) = 1.61 Tc(MIN.) = 15.88
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10239.00 = 4317.00 FEET.

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*****
FLOW PROCESS FROM NODE 10238.10 TO NODE 10239.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.88
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.171
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         2.72   0.50  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.72 SUBAREA RUNOFF(CFS) = 1.64
EFFECTIVE AREA(ACRES) = 76.55 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 91.6 PEAK FLOW RATE(CFS) = 51.01
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10238.20 TO NODE 10239.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.88
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.171
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         34.37  0.50  0.991  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

```

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991  
SUBAREA AREA (ACRES) = 34.37 SUBAREA RUNOFF (CFS) = 20.90  
EFFECTIVE AREA (ACRES) = 110.92 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 126.0 PEAK FLOW RATE (CFS) = 67.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM (FEET) = 193.00 DOWNSTREAM (FEET) = 191.00  
FLOW LENGTH (FEET) = 301.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.1 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.10  
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 67.13  
PIPE TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 16.43  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10240.00 = 4618.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 16.43  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.151  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.22 0.50 0.916 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.916  
SUBAREA AREA (ACRES) = 2.22 SUBAREA RUNOFF (CFS) = 1.39  
EFFECTIVE AREA (ACRES) = 113.15 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 128.2 PEAK FLOW RATE (CFS) = 67.13  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10240.00 TO NODE 10241.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM (FEET) = 191.00 DOWNSTREAM (FEET) = 180.00  
FLOW LENGTH (FEET) = 150.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.0 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 22.44  
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 67.13  
PIPE TRAVEL TIME (MIN.) = 0.11 Tc (MIN.) = 16.54  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10241.00 = 4768.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10241.00 TO NODE 10242.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
-----

ELEVATION DATA: UPSTREAM (FEET) = 180.00 DOWNSTREAM (FEET) = 169.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 267.00 CHANNEL SLOPE = 0.0412  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.129

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.16 0.50 0.958 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 67.76  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.50  
AVERAGE FLOW DEPTH (FEET) = 1.63 TRAVEL TIME (MIN.) = 0.52  
Tc (MIN.) = 17.07  
SUBAREA AREA (ACRES) = 2.16 SUBAREA RUNOFF (CFS) = 1.26  
EFFECTIVE AREA (ACRES) = 115.31 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 130.4 PEAK FLOW RATE (CFS) = 67.13  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.63 FLOW VELOCITY (FEET/SEC.) = 8.44  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
-----

\*\* MAIN STREAM CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 67.13 17.07 1.129 0.50 ( 0.50) 0.99 115.3 10230.00  
2 36.90 31.50 0.806 0.50 ( 0.50) 1.00 130.4 10220.00  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 28.82 27.00 0.872 0.50 ( 0.42) 0.85 70.2 10200.00  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 95.80 17.07 1.129 0.50 ( 0.48) 0.95 159.7 10230.00  
2 75.15 27.00 0.872 0.50 ( 0.47) 0.94 195.9 10200.00  
3 61.51 31.50 0.806 0.50 ( 0.47) 0.94 200.6 10220.00  
TOTAL AREA (ACRES) = 200.6

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE (CFS) = 95.80 Tc (MIN.) = 17.068  
EFFECTIVE AREA (ACRES) = 159.70 AREA-AVERAGED Fm (INCH/HR) = 0.48

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95  
TOTAL AREA (ACRES) = 200.6  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 169.00 DOWNSTREAM(FEET) = 163.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 315.00 CHANNEL SLOPE = 0.0190  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.101

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.10	0.50	0.995	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.995

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 98.28

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.96

AVERAGE FLOW DEPTH (FEET) = 2.17 TRAVEL TIME (MIN.) = 0.75

Tc (MIN.) = 17.82

SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 4.95

EFFECTIVE AREA (ACRES) = 168.81 AREA-AVERAGED Fm (INCH/HR) = 0.48

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96

TOTAL AREA (ACRES) = 209.7 PEAK FLOW RATE (CFS) = 95.80

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.15 FLOW VELOCITY (FEET/SEC.) = 6.92

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10243.00 TO NODE 10256.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.82

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.101

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.01	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 7.01 SUBAREA RUNOFF (CFS) = 3.79

EFFECTIVE AREA (ACRES) = 175.81 AREA-AVERAGED Fm (INCH/HR) = 0.48

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96

TOTAL AREA (ACRES) = 216.7 PEAK FLOW RATE (CFS) = 98.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 17.82

RAINFALL INTENSITY (INCH/HR) = 1.10

AREA-AVERAGED Fm (INCH/HR) = 0.48

AREA-AVERAGED Fp (INCH/HR) = 0.50

AREA-AVERAGED Ap = 0.96

EFFECTIVE STREAM AREA (ACRES) = 175.81

TOTAL STREAM AREA (ACRES) = 216.71

PEAK FLOW RATE (CFS) AT CONFLUENCE = 98.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10250.00 TO NODE 10251.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 284.00

ELEVATION DATA: UPSTREAM (FEET) = 246.00 DOWNSTREAM (FEET) = 243.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 16.802

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.138

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "WOODLAND, GRASS"	-	1.04	0.50	1.000	0	16.80

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 0.60

TOTAL AREA (ACRES) = 1.04 PEAK FLOW RATE (CFS) = 0.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10251.00 TO NODE 10252.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 243.00 DOWNSTREAM ELEVATION (FEET) = 240.00

STREET LENGTH (FEET) = 301.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67



\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.96  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.17  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.43  
STREET FLOW TRAVEL TIME(MIN.) = 2.31 Tc(MIN.) = 19.12  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.055  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.47	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 0.73  
EFFECTIVE AREA(ACRES) = 2.51 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 1.25

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.24 HALFSTREET FLOOD WIDTH(FEET) = 3.84  
FLOW VELOCITY(FEET/SEC.) = 1.86 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.44  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10252.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10252.00 TO NODE 10253.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 240.00 DOWNSTREAM ELEVATION(FEET) = 234.00  
STREET LENGTH(FEET) = 544.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.16  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.28  
HALFSTREET FLOOD WIDTH(FEET) = 5.84  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.03  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.56  
STREET FLOW TRAVEL TIME(MIN.) = 4.46 Tc(MIN.) = 23.57  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.936  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.60 SUBAREA RUNOFF(CFS) = 1.81  
EFFECTIVE AREA(ACRES) = 7.12 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 2.79

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 6.84  
FLOW VELOCITY(FEET/SEC.) = 2.12 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.63  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10253.00 = 1129.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 234.00 DOWNSTREAM(FEET) = 219.00  
FLOW LENGTH(FEET) = 362.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.05  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 2.79  
PIPE TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 24.32  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10254.00 = 1491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
-----

MAINLINE Tc(MIN.) = 24.32  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.918  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.55	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 3.22  
EFFECTIVE AREA(ACRES) = 15.66 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.7 PEAK FLOW RATE(CFS) = 5.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10254.00 TO NODE 10255.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 219.00 DOWNSTREAM(FEET) = 182.00  
FLOW LENGTH(FEET) = 716.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.77  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 5.89

PIPE TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 25.43  
 LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10255.00 = 2207.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10255.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 182.00 DOWNSTREAM(FEET) = 163.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.0833  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.887

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	13.88	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.31

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.53

AVERAGE FLOW DEPTH(FEET) = 0.65 TRAVEL TIME(MIN.) = 0.58

Tc(MIN.) = 26.01

SUBAREA AREA(ACRES) = 13.88 SUBAREA RUNOFF(CFS) = 4.83

EFFECTIVE AREA(ACRES) = 29.54 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 29.5 PEAK FLOW RATE(CFS) = 10.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.70 FLOW VELOCITY(FEET/SEC.) = 6.89

LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10256.00 = 2435.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 26.01  
 RAINFALL INTENSITY(INCH/HR) = 0.89  
 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 29.54  
 TOTAL STREAM AREA(ACRES) = 29.54  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 10.27

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	98.47	17.82	1.101	0.50( 0.48)	0.96	175.8	10230.00
1	75.15	27.80	0.859	0.50( 0.47)	0.95	212.0	10200.00
1	62.59	32.34	0.795	0.50( 0.47)	0.95	216.7	10220.00
2	10.27	26.01	0.887	0.50( 0.50)	1.00	29.5	10250.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	108.74	17.82	1.101	0.50( 0.48)	0.96	196.1	10230.00
2	89.60	26.01	0.887	0.50( 0.48)	0.95	235.1	10250.00
3	84.70	27.80	0.859	0.50( 0.48)	0.95	241.6	10200.00
4	70.42	32.34	0.795	0.50( 0.48)	0.95	246.3	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 108.74 Tc(MIN.) = 17.82

EFFECTIVE AREA(ACRES) = 196.05 AREA-AVERAGED Fm(INCH/HR) = 0.48

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96

TOTAL AREA(ACRES) = 246.3

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 246.3 TC(MIN.) = 17.82

EFFECTIVE AREA(ACRES) = 196.05 AREA-AVERAGED Fm(INCH/HR) = 0.48

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.962

PEAK FLOW RATE(CFS) = 108.74

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	108.74	17.82	1.101	0.50( 0.48)	0.96	196.1	10230.00
2	89.60	26.01	0.887	0.50( 0.48)	0.95	235.1	10250.00
3	84.70	27.80	0.859	0.50( 0.48)	0.95	241.6	10200.00
4	70.42	32.34	0.795	0.50( 0.48)	0.95	246.3	10220.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506103F.DAT  
TIME/DATE OF STUDY: 12:44 04/15/2013  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 2.230
- 2) 6.00; 2.010
- 3) 7.00; 1.850
- 4) 8.00; 1.710
- 5) 9.00; 1.600
- 6) 10.00; 1.510
- 7) 11.00; 1.430
- 8) 12.00; 1.360
- 9) 13.00; 1.300
- 10) 14.00; 1.250
- 11) 15.00; 1.200
- 12) 20.00; 1.020
- 13) 25.00; 0.900
- 14) 30.00; 0.810
- 15) 40.00; 0.690
- 16) 50.00; 0.610
- 17) 60.00; 0.550
- 18) 90.00; 0.440
- 19) 120.00; 0.370
- 20) 180.00; 0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH	LIP	HIKE	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10300.00 TO NODE 10301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 627.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 5.147  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.198  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "5-7 DWELLINGS/ACRE"	-	1.20	0.50	0.500	95	5.15

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.500  
 SUBAREA RUNOFF(CFS) = 2.10  
 TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 2.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 10301.00 TO NODE 10302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 510.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.2609  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 2.10  
 FLOW VELOCITY(FEET/SEC.) = 5.79 FLOW DEPTH(FEET) = 0.35  
 TRAVEL TIME(MIN.) = 0.33  $T_c$ (MIN.) = 5.48  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10302.00 = 443.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10302.00 TO NODE 10302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 5.48  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.125  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.50	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 2.53  
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 4.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10302.00 TO NODE 10303.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 467.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.2575  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.56  
FLOW VELOCITY(FEET/SEC.) = 6.93 FLOW DEPTH(FEET) = 0.47  
TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 5.88  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10303.00 = 610.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10303.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.88  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 3.54  
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 7.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10304.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 467.00 DOWNSTREAM(FEET) = 446.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.88  
FLOW VELOCITY(FEET/SEC.) = 6.98 FLOW DEPTH(FEET) = 0.61  
TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 6.15  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10304.00 = 725.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10304.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.15  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.985  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.50 0.500 -  
USER-DEFINED - 0.40 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 3.66  
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 11.31

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10305.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 446.00 DOWNSTREAM(FEET) = 366.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 423.00 CHANNEL SLOPE = 0.1891  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 11.31  
FLOW VELOCITY(FEET/SEC.) = 7.71 FLOW DEPTH(FEET) = 0.70  
TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 7.07  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10305.00 = 1148.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10305.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 7.07  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.840  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.50 0.500 -  
USER-DEFINED - 1.30 0.50 1.000 -  
USER-DEFINED - 1.50 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.912  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 4.24  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.32  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.65  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 14.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10306.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 300.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 574.00 CHANNEL SLOPE = 0.1150  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 14.59  
 FLOW VELOCITY (FEET/SEC.) = 6.83 FLOW DEPTH (FEET) = 0.84  
 TRAVEL TIME (MIN.) = 1.40 Tc (MIN.) = 8.47  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10306.00 = 1722.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10306.00 TO NODE 10306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 8.47  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.658  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	2.80	0.50	1.000	-
USER-DEFINED	-	0.50	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
 SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 3.77  
 EFFECTIVE AREA (ACRES) = 14.30 AREA-AVERAGED Fm (INCH/HR) = 0.37  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 14.3 PEAK FLOW RATE (CFS) = 16.62

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10306.00 TO NODE 10307.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 300.00 DOWNSTREAM (FEET) = 293.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0350  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 16.62  
 FLOW VELOCITY (FEET/SEC.) = 4.50 FLOW DEPTH (FEET) = 1.11  
 TRAVEL TIME (MIN.) = 0.74 Tc (MIN.) = 9.21  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10307.00 = 1922.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10307.00 TO NODE 10307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 9.21  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.581  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 0.68  
 EFFECTIVE AREA (ACRES) = 15.00 AREA-AVERAGED Fm (INCH/HR) = 0.37  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.75  
 TOTAL AREA (ACRES) = 15.0 PEAK FLOW RATE (CFS) = 16.62  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10307.00 TO NODE 10308.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 293.00 DOWNSTREAM (FEET) = 276.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0850  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 16.62  
 FLOW VELOCITY (FEET/SEC.) = 7.81 FLOW DEPTH (FEET) = 0.84  
 TRAVEL TIME (MIN.) = 0.43 Tc (MIN.) = 9.64  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10308.00 = 2122.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10308.00 TO NODE 10308.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 9.64  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.543  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.50	1.000	-
USER-DEFINED	-	8.50	0.50	0.500	-
USER-DEFINED	-	3.80	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.696  
 SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 15.05  
 EFFECTIVE AREA (ACRES) = 29.00 AREA-AVERAGED Fm (INCH/HR) = 0.36  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 29.0 PEAK FLOW RATE (CFS) = 30.83

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10308.00 TO NODE 10309.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 250.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 600.00 CHANNEL SLOPE = 0.0433  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 30.83  
 FLOW VELOCITY (FEET/SEC.) = 7.11 FLOW DEPTH (FEET) = 1.20  
 TRAVEL TIME (MIN.) = 1.41 Tc (MIN.) = 11.04  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10309.00 = 2722.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.04

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.427

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.00	0.50	0.600	-
USER-DEFINED	-	1.80	0.50	0.850	-
USER-DEFINED	-	1.40	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	3.40	0.50	0.500	-
USER-DEFINED	-	2.10	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.662

SUBAREA AREA(ACRES) = 15.40 SUBAREA RUNOFF(CFS) = 15.19

EFFECTIVE AREA(ACRES) = 44.40 AREA-AVERAGED Fm(INCH/HR) = 0.35

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.70

TOTAL AREA(ACRES) = 44.4 PEAK FLOW RATE(CFS) = 43.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.04

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.427

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.50	0.850	-
USER-DEFINED	-	8.80	0.50	1.000	-
USER-DEFINED	-	3.50	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.967

SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 13.41

EFFECTIVE AREA(ACRES) = 60.20 AREA-AVERAGED Fm(INCH/HR) = 0.39

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.77

TOTAL AREA(ACRES) = 60.2 PEAK FLOW RATE(CFS) = 56.42

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 250.00 DOWNSTREAM(FEET) = 208.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 1021.00 CHANNEL SLOPE = 0.0411

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00

CHANNEL FLOW THRU SUBAREA(CFS) = 56.42

FLOW VELOCITY(FEET/SEC.) = 8.11 FLOW DEPTH(FEET) = 1.52

TRAVEL TIME(MIN.) = 2.10 Tc(MIN.) = 13.14

LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10310.00 = 3743.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.14

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.293

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	4.00	0.50	0.600	-
USER-DEFINED	-	1.80	0.50	0.850	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.668

SUBAREA AREA(ACRES) = 6.60 SUBAREA RUNOFF(CFS) = 5.69

EFFECTIVE AREA(ACRES) = 66.80 AREA-AVERAGED Fm(INCH/HR) = 0.38

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76

TOTAL AREA(ACRES) = 66.8 PEAK FLOW RATE(CFS) = 56.42

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.14

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.293

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.500	-
USER-DEFINED	-	8.00	0.50	0.600	-
USER-DEFINED	-	7.10	0.50	0.850	-
USER-DEFINED	-	8.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA(ACRES) = 23.50 SUBAREA RUNOFF(CFS) = 18.73

EFFECTIVE AREA(ACRES) = 90.30 AREA-AVERAGED Fm(INCH/HR) = 0.39

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.77

TOTAL AREA(ACRES) = 90.3 PEAK FLOW RATE(CFS) = 73.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 10310.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 208.00 DOWNSTREAM(FEET) = 189.00

FLOW LENGTH(FEET) = 1595.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.9 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.59

ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 73.58

PIPE TRAVEL TIME(MIN.) = 2.29 Tc(MIN.) = 15.44

LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10335.00 = 5338.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 15.44
RAINFALL INTENSITY(INCH/HR) = 1.18
AREA-AVERAGED Fm(INCH/HR) = 0.39
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.77
EFFECTIVE STREAM AREA(ACRES) = 90.30
TOTAL STREAM AREA(ACRES) = 90.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 73.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 10320.00 TO NODE 10321.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 671.00 DOWNSTREAM(FEET) = 622.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.795
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.055
SUBAREA Tc AND LOSS RATE DATA(AMC II):

Table with 7 columns: DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.). Includes data for Residential (5-7 dwellings/acre).

\*\*\*\*\*

FLOW PROCESS FROM NODE 10321.00 TO NODE 10322.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 622.00 DOWNSTREAM(FEET) = 599.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 227.00 CHANNEL SLOPE = 0.1013
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.62
FLOW VELOCITY(FEET/SEC.) = 4.67 FLOW DEPTH(FEET) = 0.34
TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 6.60
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10322.00 = 557.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10322.00 TO NODE 10322.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.60
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.913
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.10
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 3.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 10322.00 TO NODE 10323.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 599.00 DOWNSTREAM(FEET) = 539.00
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.80
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.59
PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 6.75
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10323.00 = 719.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10323.00 TO NODE 10323.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.75
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.890
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 0.74
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 4.28

\*\*\*\*\*

FLOW PROCESS FROM NODE 10323.00 TO NODE 10324.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 539.00 DOWNSTREAM(FEET) = 530.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 97.00 CHANNEL SLOPE = 0.0928
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000



MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.28  
FLOW VELOCITY (FEET/SEC.) = 4.65 FLOW DEPTH (FEET) = 0.55  
TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 7.10  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10324.00 = 816.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10324.00 TO NODE 10324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 7.10  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.837  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.80 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 2.57  
EFFECTIVE AREA (ACRES) = 4.70 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 4.7 PEAK FLOW RATE (CFS) = 6.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10324.00 TO NODE 10325.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 530.00 DOWNSTREAM (FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 210.00 CHANNEL SLOPE = 0.1429  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 6.71  
FLOW VELOCITY (FEET/SEC.) = 6.10 FLOW DEPTH (FEET) = 0.61  
TRAVEL TIME (MIN.) = 0.57 Tc (MIN.) = 7.67  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10325.00 = 1026.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10325.00 TO NODE 10325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 7.67  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.756  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 1.70 SUBAREA RUNOFF (CFS) = 2.30  
EFFECTIVE AREA (ACRES) = 6.40 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 6.4 PEAK FLOW RATE (CFS) = 8.68

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10326.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 500.00 DOWNSTREAM (FEET) = 460.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 345.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 8.68  
FLOW VELOCITY (FEET/SEC.) = 6.05 FLOW DEPTH (FEET) = 0.69  
TRAVEL TIME (MIN.) = 0.95 Tc (MIN.) = 8.62  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10326.00 = 1371.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10326.00 TO NODE 10326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.62  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.642  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.90 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 1.90 SUBAREA RUNOFF (CFS) = 2.38  
EFFECTIVE AREA (ACRES) = 8.30 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 8.3 PEAK FLOW RATE (CFS) = 10.40

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10326.00 TO NODE 10327.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 460.00 DOWNSTREAM (FEET) = 430.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 263.00 CHANNEL SLOPE = 0.1141  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 10.40  
FLOW VELOCITY (FEET/SEC.) = 6.28 FLOW DEPTH (FEET) = 0.74  
TRAVEL TIME (MIN.) = 0.70 Tc (MIN.) = 9.32  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10327.00 = 1634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.32  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.571  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.50 0.500 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 4.88  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 14.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10328.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 375.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 437.00 CHANNEL SLOPE = 0.1259  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 14.75  
FLOW VELOCITY(FEET/SEC.) = 8.86 FLOW DEPTH(FEET) = 0.74  
TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 10.14  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10328.00 = 2071.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10328.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 10.14  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.499  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.50 0.500 -  
USER-DEFINED - 1.20 0.50 0.850 -  
USER-DEFINED - 0.90 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.772  
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 3.20  
EFFECTIVE AREA(ACRES) = 15.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 15.6 PEAK FLOW RATE(CFS) = 17.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10329.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 375.00 DOWNSTREAM(FEET) = 372.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 224.00 CHANNEL SLOPE = 0.0134  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 17.14  
FLOW VELOCITY(FEET/SEC.) = 3.95 FLOW DEPTH(FEET) = 1.20  
TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 11.09  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10329.00 = 2295.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10329.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 11.09  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.424  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.20 0.50 0.500 -  
USER-DEFINED - 1.40 0.50 0.850 -  
USER-DEFINED - 0.60 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.571  
SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 11.48  
EFFECTIVE AREA(ACRES) = 26.80 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 26.8 PEAK FLOW RATE(CFS) = 27.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10329.00 TO NODE 10330.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 300.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 452.00 CHANNEL SLOPE = 0.1593  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 27.57  
FLOW VELOCITY(FEET/SEC.) = 11.22 FLOW DEPTH(FEET) = 0.91  
TRAVEL TIME(MIN.) = 0.67 Tc(MIN.) = 11.76  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10330.00 = 2747.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10330.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 11.76  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.377  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.50 0.850 -  
USER-DEFINED - 4.20 0.50 0.500 -  
USER-DEFINED - 2.50 0.50 0.850 -  
USER-DEFINED - 0.60 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.673  
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 7.30  
EFFECTIVE AREA(ACRES) = 34.60 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 34.6 PEAK FLOW RATE(CFS) = 33.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10331.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 295.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 182.00 CHANNEL SLOPE = 0.0275
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 33.74
FLOW VELOCITY(FEET/SEC.) = 6.12 FLOW DEPTH(FEET) = 1.36
TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 12.25
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10331.00 = 2929.00 FEET.

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FLOW PROCESS FROM NODE 10331.00 TO NODE 10331.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.25
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.345
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.70   0.50  0.850 -
USER-DEFINED        -        11.30   0.50  0.500 -
USER-DEFINED        -         0.20   0.50  0.600 -
USER-DEFINED        -         4.20   0.50  0.850 -
USER-DEFINED        -         1.60   0.50  1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.652
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 17.42
EFFECTIVE AREA(ACRES) = 53.60 AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 53.6 PEAK FLOW RATE(CFS) = 50.16

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*****
FLOW PROCESS FROM NODE 10331.00 TO NODE 10332.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 295.00 DOWNSTREAM(FEET) = 245.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.00 CHANNEL SLOPE = 0.0542
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 50.16
FLOW VELOCITY(FEET/SEC.) = 8.71 FLOW DEPTH(FEET) = 1.39
TRAVEL TIME(MIN.) = 1.76 Tc(MIN.) = 14.02
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10332.00 = 3851.00 FEET.

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*****
FLOW PROCESS FROM NODE 10332.00 TO NODE 10332.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.02
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.249
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS

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LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.50  0.850 -
USER-DEFINED        -         1.40   0.50  0.500 -
USER-DEFINED        -        15.40   0.50  0.850 -
USER-DEFINED        -         8.60   0.50  1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.881
SUBAREA AREA(ACRES) = 25.60 SUBAREA RUNOFF(CFS) = 18.62
EFFECTIVE AREA(ACRES) = 79.20 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 79.2 PEAK FLOW RATE(CFS) = 64.16

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*****
FLOW PROCESS FROM NODE 10332.00 TO NODE 10333.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 199.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 564.00 CHANNEL SLOPE = 0.0816
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 64.16
FLOW VELOCITY(FEET/SEC.) = 10.81 FLOW DEPTH(FEET) = 1.41
TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 14.89
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10333.00 = 4415.00 FEET.

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*****
FLOW PROCESS FROM NODE 10333.00 TO NODE 10333.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.89
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.206
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.50   0.50  0.500 -
USER-DEFINED        -         0.50   0.50  0.850 -
USER-DEFINED        -         0.60   0.50  0.500 -
USER-DEFINED        -         5.70   0.50  0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.761
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 6.16
EFFECTIVE AREA(ACRES) = 87.50 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 87.5 PEAK FLOW RATE(CFS) = 67.23

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*****
FLOW PROCESS FROM NODE 10333.00 TO NODE 10334.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 195.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 454.00 CHANNEL SLOPE = 0.0088
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 4.00

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CHANNEL FLOW THRU SUBAREA(CFS) = 67.23  
FLOW VELOCITY(FEET/SEC.) = 4.75 FLOW DEPTH(FEET) = 2.17  
TRAVEL TIME(MIN.) = 1.59 Tc(MIN.) = 16.48  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10334.00 = 4869.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10334.00 TO NODE 10334.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 16.48  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.147  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.50 0.800 -  
USER-DEFINED - 2.60 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 2.43  
EFFECTIVE AREA(ACRES) = 91.20 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.71  
TOTAL AREA(ACRES) = 91.2 PEAK FLOW RATE(CFS) = 67.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10334.00 TO NODE 10335.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 195.00 DOWNSTREAM(FEET) = 189.00  
FLOW LENGTH(FEET) = 1291.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.96  
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 67.23  
PIPE TRAVEL TIME(MIN.) = 2.70 Tc(MIN.) = 19.18  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 19.18  
RAINFALL INTENSITY(INCH/HR) = 1.05  
AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.71  
EFFECTIVE STREAM AREA(ACRES) = 91.20  
TOTAL STREAM AREA(ACRES) = 91.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 67.23

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	73.58	15.44	1.184	0.50( 0.39)	0.77	90.3	10300.00
2	67.23	19.18	1.049	0.50( 0.35)	0.71	91.2	10320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	138.18	15.44	1.184	0.50( 0.37)	0.75	163.7	10300.00
2	128.35	19.18	1.049	0.50( 0.37)	0.74	181.5	10320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 138.18 Tc(MIN.) = 15.44  
EFFECTIVE AREA(ACRES) = 163.69 AREA-AVERAGED Fm(INCH/HR) = 0.37  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.75  
TOTAL AREA(ACRES) = 181.5  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10335.00 TO NODE 10336.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 189.00 DOWNSTREAM(FEET) = 188.00  
FLOW LENGTH(FEET) = 103.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 37.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.54  
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 138.18  
PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 15.57  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10336.00 = 6263.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10336.00 TO NODE 10337.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.78  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 138.18  
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 15.74  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10337.00 = 6475.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10337.00 TO NODE 10338.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 161.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 872.00 CHANNEL SLOPE = 0.0218  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 138.18  
FLOW VELOCITY (FEET/SEC.) = 7.99 FLOW DEPTH (FEET) = 2.40  
TRAVEL TIME (MIN.) = 1.82 Tc (MIN.) = 17.56  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10338.00 = 7347.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 17.56  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.108  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 0.850 -  
USER-DEFINED - 0.80 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 1.30 0.50 1.000 -  
USER-DEFINED - 0.90 0.50 0.850 -  
USER-DEFINED - 0.20 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.943  
SUBAREA AREA (ACRES) = 4.20 SUBAREA RUNOFF (CFS) = 2.40  
EFFECTIVE AREA (ACRES) = 167.89 AREA-AVERAGED Fm (INCH/HR) = 0.38  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 185.7 PEAK FLOW RATE (CFS) = 138.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 17.56  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.108  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 1.000 -  
USER-DEFINED - 4.60 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 2.73  
EFFECTIVE AREA (ACRES) = 172.89 AREA-AVERAGED Fm (INCH/HR) = 0.38  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 190.7 PEAK FLOW RATE (CFS) = 138.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10339.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
-----

ELEVATION DATA: UPSTREAM (FEET) = 161.00 DOWNSTREAM (FEET) = 159.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 328.00 CHANNEL SLOPE = 0.0061  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 138.18  
FLOW VELOCITY (FEET/SEC.) = 4.95 FLOW DEPTH (FEET) = 3.05  
TRAVEL TIME (MIN.) = 1.10 Tc (MIN.) = 18.66  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10339.00 = 7675.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 18.66  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.068  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.50 0.850 -  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 0.40 0.50 0.500 -  
USER-DEFINED - 2.30 0.50 0.850 -  
USER-DEFINED - 0.40 0.50 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.767  
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 4.25  
EFFECTIVE AREA (ACRES) = 179.79 AREA-AVERAGED Fm (INCH/HR) = 0.38  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 138.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 18.66  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.068  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 0.500 -  
USER-DEFINED - 6.30 0.50 0.850 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 2.20 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.876  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 5.22  
EFFECTIVE AREA (ACRES) = 188.99 AREA-AVERAGED Fm (INCH/HR) = 0.38  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 206.8 PEAK FLOW RATE (CFS) = 138.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10390.00 IS CODE = 51

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-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 159.00 DOWNSTREAM(FEET) = 155.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 782.00 CHANNEL SLOPE = 0.0051
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 138.18
FLOW VELOCITY(FEET/SEC.) = 4.63 FLOW DEPTH(FEET) = 3.15
TRAVEL TIME(MIN.) = 2.81 Tc(MIN.) = 21.48
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 21.48
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.985
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.30     0.50     0.800   -
USER-DEFINED        -         3.70     0.50     0.850   -
USER-DEFINED        -         0.10     0.50     1.000   -
USER-DEFINED        -         2.10     0.50     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.901
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 2.98
EFFECTIVE AREA(ACRES) = 195.19 AREA-AVERAGED Fm(INCH/HR) = 0.38
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 213.0 PEAK FLOW RATE(CFS) = 138.18
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
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*****
FLOW PROCESS FROM NODE 10340.00 TO NODE 10341.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 585.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.581
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.464
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS   Tc
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE"   -         0.10     0.50     0.800   95  10.58

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PUBLIC PARK - 0.50 0.50 0.850 95 10.90
AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW" - 0.40 0.50 1.000 95 21.09
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA RUNOFF(CFS) = 0.91
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 0.91

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*****
FLOW PROCESS FROM NODE 10341.00 TO NODE 10342.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====

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UPSTREAM ELEVATION(FEET) = 585.00 DOWNSTREAM ELEVATION(FEET) = 570.00
STREET LENGTH(FEET) = 250.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.80
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.32
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.05
STREET FLOW TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 11.36
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.405
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70     0.50     0.800   -
USER-DEFINED        -         1.40     0.50     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 1.77
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.46
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 2.63

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.22 HALFSTREET FLOOD WIDTH(FEET) = 2.99
FLOW VELOCITY(FEET/SEC.) = 4.71 DEPTH*VELOCITY(FT*FT/SEC.) = 1.03
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10342.00 = 558.00 FEET.

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*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

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=====
UPSTREAM ELEVATION(FEET) = 570.00  DOWNSTREAM ELEVATION(FEET) = 560.00
STREET LENGTH(FEET) = 415.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.55
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 6.29
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.04
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.86
STREET FLOW TRAVEL TIME(MIN.) = 2.28  Tc(MIN.) = 13.64
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.268
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -  1.20  0.50  0.800  -
USER-DEFINED  -  1.20  0.50  0.850  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.825
SUBAREA AREA(ACRES) = 2.40  SUBAREA RUNOFF(CFS) = 1.85
EFFECTIVE AREA(ACRES) = 5.50  AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 5.5  PEAK FLOW RATE(CFS) = 4.09

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30  HALFSTREET FLOOD WIDTH(FEET) = 6.85
FLOW VELOCITY(FEET/SEC.) = 3.11  DEPTH*VELOCITY(FT*FT/SEC.) = 0.92
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10343.00 = 973.00 FEET.

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*****
FLOW PROCESS FROM NODE 10343.00 TO NODE 10344.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

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```

=====
UPSTREAM ELEVATION(FEET) = 560.00  DOWNSTREAM ELEVATION(FEET) = 550.00
STREET LENGTH(FEET) = 616.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.02
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.33
HALFSTREET FLOOD WIDTH(FEET) = 8.47
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.77
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.91
STREET FLOW TRAVEL TIME(MIN.) = 3.71  Tc(MIN.) = 17.35
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.115
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -  2.10  0.50  0.800  -
USER-DEFINED  -  0.80  0.50  0.850  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814
SUBAREA AREA(ACRES) = 2.90  SUBAREA RUNOFF(CFS) = 1.85
EFFECTIVE AREA(ACRES) = 8.40  AREA-AVERAGED Fm(INCH/HR) = 0.43
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.86
TOTAL AREA(ACRES) = 8.4  PEAK FLOW RATE(CFS) = 5.19

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.33  HALFSTREET FLOOD WIDTH(FEET) = 8.63
FLOW VELOCITY(FEET/SEC.) = 2.78  DEPTH*VELOCITY(FT*FT/SEC.) = 0.92
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10344.00 = 1589.00 FEET.

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*****
FLOW PROCESS FROM NODE 10344.00 TO NODE 10345.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

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=====
UPSTREAM ELEVATION(FEET) = 550.00  DOWNSTREAM ELEVATION(FEET) = 510.00
STREET LENGTH(FEET) = 474.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.08
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 5.94
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.61
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.55
STREET FLOW TRAVEL TIME(MIN.) = 1.41  Tc(MIN.) = 18.76
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.065
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN

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USER-DEFINED          -      2.80      0.50      0.800      -
USER-DEFINED          -      0.20      0.50      0.850      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803
SUBAREA AREA(ACRES) = 3.00      SUBAREA RUNOFF(CFS) = 1.79
EFFECTIVE AREA(ACRES) = 11.40      AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50      AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 11.4      PEAK FLOW RATE(CFS) = 6.59

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.28      HALFSTREET FLOOD WIDTH(FEET) = 6.24
FLOW VELOCITY(FEET/SEC.) = 5.70      DEPTH*VELOCITY(FT*FT/SEC.) = 1.61
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10345.00 = 2063.00 FEET.

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*****
FLOW PROCESS FROM NODE 10345.00 TO NODE 10346.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 510.00      DOWNSTREAM ELEVATION(FEET) = 484.00
STREET LENGTH(FEET) = 231.00      CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.54

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.29
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 6.09
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.51
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.82
STREET FLOW TRAVEL TIME(MIN.) = 0.59      Tc(MIN.) = 19.35
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.043
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN
USER-DEFINED      -      2.40      0.50      0.800      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 2.40      SUBAREA RUNOFF(CFS) = 1.39
EFFECTIVE AREA(ACRES) = 13.80      AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50      AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 13.8      PEAK FLOW RATE(CFS) = 7.76

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.28      HALFSTREET FLOOD WIDTH(FEET) = 6.29
FLOW VELOCITY(FEET/SEC.) = 6.63      DEPTH*VELOCITY(FT*FT/SEC.) = 1.88
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10346.00 = 2294.00 FEET.

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*****
FLOW PROCESS FROM NODE 10346.00 TO NODE 10347.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 484.00      DOWNSTREAM ELEVATION(FEET) = 378.00
STREET LENGTH(FEET) = 995.00      CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.55

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.83
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.30
HALFSTREET FLOOD WIDTH(FEET) = 6.90
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.63
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.96
STREET FLOW TRAVEL TIME(MIN.) = 2.50      Tc(MIN.) = 21.86
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.975
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN
USER-DEFINED      -      4.10      0.50      0.800      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 4.10      SUBAREA RUNOFF(CFS) = 2.12
EFFECTIVE AREA(ACRES) = 17.90      AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50      AREA-AVERAGED Ap = 0.83
TOTAL AREA(ACRES) = 17.9      PEAK FLOW RATE(CFS) = 9.05

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30      HALFSTREET FLOOD WIDTH(FEET) = 7.00
FLOW VELOCITY(FEET/SEC.) = 6.65      DEPTH*VELOCITY(FT*FT/SEC.) = 1.98
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10347.00 = 3289.00 FEET.

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*****
FLOW PROCESS FROM NODE 10347.00 TO NODE 10348.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 378.00      DOWNSTREAM ELEVATION(FEET) = 303.00
STREET LENGTH(FEET) = 751.00      CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

```



SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.56

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.00  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 7.97  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.67  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.12  
STREET FLOW TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 23.73  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.930

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.20 0.50 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 3.91  
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 12.23

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.37  
FLOW VELOCITY(FEET/SEC.) = 6.87 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.24  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10348.00 = 4040.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10348.00 TO NODE 10349.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 303.00 DOWNSTREAM ELEVATION(FEET) = 252.00  
STREET LENGTH(FEET) = 607.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.50  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 9.54  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.59  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.30  
STREET FLOW TRAVEL TIME(MIN.) = 1.54 Tc(MIN.) = 25.27  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.895

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.30 0.50 0.800 -  
USER-DEFINED - 3.00 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.815  
SUBAREA AREA(ACRES) = 10.30 SUBAREA RUNOFF(CFS) = 4.52  
EFFECTIVE AREA(ACRES) = 36.40 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 36.4 PEAK FLOW RATE(CFS) = 15.93

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 9.95  
FLOW VELOCITY(FEET/SEC.) = 6.75 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.41  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10349.00 = 4647.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10349.00 TO NODE 10350.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 252.00 DOWNSTREAM ELEVATION(FEET) = 246.00  
STREET LENGTH(FEET) = 224.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.75  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.43  
HALFSTREET FLOOD WIDTH(FEET) = 13.76  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.50  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.95  
STREET FLOW TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 26.09  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.880

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 12.60 0.50 0.800 -  
USER-DEFINED - 0.50 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.802  
SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 5.65  
EFFECTIVE AREA(ACRES) = 49.50 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 49.5 PEAK FLOW RATE(CFS) = 21.09

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 HALFSTREET FLOOD WIDTH(FEET) = 14.47  
FLOW VELOCITY(FEET/SEC.) = 4.62 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.07  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10350.00 = 4871.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10350.00 TO NODE 10351.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 237.00  
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.86  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 21.09  
PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 26.97  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10351.00 = 5390.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10351.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 26.97  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.865  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 0.100 -  
USER-DEFINED - 5.60 0.50 0.800 -  
USER-DEFINED - 0.70 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.784  
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 2.76  
EFFECTIVE AREA(ACRES) = 56.00 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 56.0 PEAK FLOW RATE(CFS) = 23.15

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10352.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 237.00 DOWNSTREAM(FEET) = 230.00  
FLOW LENGTH(FEET) = 675.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.31  
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 23.15  
PIPE TRAVEL TIME(MIN.) = 1.35 Tc(MIN.) = 28.33  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10352.00 = 6065.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 28.33  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.840

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.00 0.50 0.100 -  
USER-DEFINED - 0.40 0.50 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.300  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 0.87  
EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.40  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 23.15  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 28.33  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.840  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.50 0.100 -  
USER-DEFINED - 9.40 0.50 0.800 -  
USER-DEFINED - 1.10 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.755  
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 4.70  
EFFECTIVE AREA(ACRES) = 68.70 AREA-AVERAGED Fm(INCH/HR) = 0.40  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.79  
TOTAL AREA(ACRES) = 68.7 PEAK FLOW RATE(CFS) = 27.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10353.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 230.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.69  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 27.49  
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 28.53  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10353.00 = 6366.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10353.00 TO NODE 10353.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 28.53  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.836

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	6.00	0.50	0.800	-
USER-DEFINED	-	1.30	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.799  
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 2.91  
EFFECTIVE AREA(ACRES) = 76.10 AREA-AVERAGED Fm(INCH/HR) = 0.40  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.79  
TOTAL AREA(ACRES) = 76.1 PEAK FLOW RATE(CFS) = 30.17

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10353.00 TO NODE 10354.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----  
ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 172.00  
FLOW LENGTH(FEET) = 458.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.79  
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 30.17  
PIPE TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 29.24  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10354.00 = 6824.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10354.00 TO NODE 10390.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
-----  
ELEVATION DATA: UPSTREAM(FEET) = 172.00 DOWNSTREAM(FEET) = 155.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00 CHANNEL SLOPE = 0.0411  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 30.17  
FLOW VELOCITY(FEET/SEC.) = 6.89 FLOW DEPTH(FEET) = 1.21  
TRAVEL TIME(MIN.) = 1.00 Tc(MIN.) = 30.24  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc(MIN.) = 30.24  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.807  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	0.90	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.520  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 0.98  
EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.39  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.78  
TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 30.17  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc(MIN.) = 30.24  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.807  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	2.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.964  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 1.11  
EFFECTIVE AREA(ACRES) = 81.90 AREA-AVERAGED Fm(INCH/HR) = 0.40  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.79  
TOTAL AREA(ACRES) = 81.9 PEAK FLOW RATE(CFS) = 30.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc(MIN.) = 30.24  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.807  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.50	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 0.69  
EFFECTIVE AREA(ACRES) = 84.40 AREA-AVERAGED Fm(INCH/HR) = 0.40  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 84.4 PEAK FLOW RATE(CFS) = 30.95

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
-----  
\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
------------------	------------	--------------	------------------------	---------------------	---------------	---------------	-------------------

1 30.95 30.24 0.807 0.50( 0.40) 0.80 84.4 10340.00  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	138.18	21.48	0.985	0.50( 0.38)	0.77	195.2	10300.00
2	128.35	25.33	0.894	0.50( 0.38)	0.76	213.0	10320.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	169.13	21.48	0.985	0.50( 0.39)	0.78	255.1	10300.00
2	159.30	25.33	0.894	0.50( 0.39)	0.77	283.7	10320.00
3	137.55	30.24	0.807	0.50( 0.39)	0.77	297.4	10340.00

TOTAL AREA (ACRES) = 297.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 169.13 Tc(MIN.) = 21.479  
EFFECTIVE AREA(ACRES) = 255.15 AREA-AVERAGED Fm(INCH/HR) = 0.39  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.77  
TOTAL AREA(ACRES) = 297.4  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10360.00 TO NODE 10361.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 337.00 DOWNSTREAM(FEET) = 292.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.697

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.454

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.50	1.000	95	10.70
NATURAL FAIR COVER "GRASS"	-	0.50	0.50	1.000	95	10.70
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.10	0.50	1.000	95	10.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.77  
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 0.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10361.00 TO NODE 10362.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 292.00 DOWNSTREAM(FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 199.00 CHANNEL SLOPE = 0.0101  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.77  
FLOW VELOCITY(FEET/SEC.) = 1.61 FLOW DEPTH(FEET) = 0.40  
TRAVEL TIME(MIN.) = 2.06 Tc(MIN.) = 12.75  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10362.00 = 529.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10362.00 TO NODE 10362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 12.75

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.315

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986

SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 0.81

EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 1.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10362.00 TO NODE 10363.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 290.00 DOWNSTREAM(FEET) = 288.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.47  
FLOW VELOCITY(FEET/SEC.) = 2.15 FLOW DEPTH(FEET) = 0.48  
TRAVEL TIME(MIN.) = 1.14 Tc(MIN.) = 13.89  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10363.00 = 676.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10363.00 TO NODE 10363.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 13.89
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.255
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
  LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         1.40     0.50     1.000     -
USER-DEFINED        -         0.20     0.50     0.850     -
USER-DEFINED        -         0.80     0.50     1.000     -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.988
SUBAREA AREA(ACRES) = 2.40      SUBAREA RUNOFF(CFS) = 1.64
EFFECTIVE AREA(ACRES) = 4.40    AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 4.4        PEAK FLOW RATE(CFS) = 3.01

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*****
FLOW PROCESS FROM NODE 10363.00 TO NODE 10364.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 288.00  DOWNSTREAM(FEET) = 286.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00  CHANNEL SLOPE = 0.0136
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.01
FLOW VELOCITY(FEET/SEC.) = 2.59  FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 0.95  Tc(MIN.) = 14.84
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10364.00 = 823.00 FEET.

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*****
FLOW PROCESS FROM NODE 10364.00 TO NODE 10364.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 14.84
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.208
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
  LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.10     0.50     0.850     -
USER-DEFINED        -         1.40     0.50     1.000     -
USER-DEFINED        -         0.20     0.50     1.000     -
USER-DEFINED        -         0.10     0.50     0.850     -
USER-DEFINED        -         0.10     0.50     1.000     -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.984
SUBAREA AREA(ACRES) = 1.90      SUBAREA RUNOFF(CFS) = 1.22
EFFECTIVE AREA(ACRES) = 6.30    AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 6.3        PEAK FLOW RATE(CFS) = 4.05

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*****
FLOW PROCESS FROM NODE 10364.00 TO NODE 10365.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 286.00  DOWNSTREAM(FEET) = 284.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00  CHANNEL SLOPE = 0.0081
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.05
FLOW VELOCITY(FEET/SEC.) = 2.29  FLOW DEPTH(FEET) = 0.77
TRAVEL TIME(MIN.) = 1.81  Tc(MIN.) = 16.64
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10365.00 = 1071.00 FEET.

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*****
FLOW PROCESS FROM NODE 10365.00 TO NODE 10365.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 16.64
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.141
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
  LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.90     0.50     1.000     -
USER-DEFINED        -         1.80     0.50     1.000     -
USER-DEFINED        -         0.30     0.50     0.850     -
USER-DEFINED        -         0.50     0.50     1.000     -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.987
SUBAREA AREA(ACRES) = 3.50      SUBAREA RUNOFF(CFS) = 2.04
EFFECTIVE AREA(ACRES) = 9.80    AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 9.8        PEAK FLOW RATE(CFS) = 5.70

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*****
FLOW PROCESS FROM NODE 10365.00 TO NODE 10366.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

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=====
ELEVATION DATA: UPSTREAM(FEET) = 284.00  DOWNSTREAM(FEET) = 282.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00  CHANNEL SLOPE = 0.0081
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.70
FLOW VELOCITY(FEET/SEC.) = 2.49  FLOW DEPTH(FEET) = 0.87
TRAVEL TIME(MIN.) = 1.66  Tc(MIN.) = 18.31
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10366.00 = 1319.00 FEET.

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*****
FLOW PROCESS FROM NODE 10366.00 TO NODE 10366.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 18.31
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.081
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
  LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.10     0.50     0.850     -

```

USER-DEFINED - 3.20 0.50 1.000 -  
USER-DEFINED - 2.30 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 0.850 -  
USER-DEFINED - 2.70 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995  
SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 4.46  
EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 9.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10366.00 TO NODE 10367.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 279.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 292.00 CHANNEL SLOPE = 0.0103  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.64  
FLOW VELOCITY(FEET/SEC.) = 3.09 FLOW DEPTH(FEET) = 1.02  
TRAVEL TIME(MIN.) = 1.57 Tc(MIN.) = 19.88  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10367.00 = 1611.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10367.00 TO NODE 10367.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 19.88  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.024  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 0.850 -  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 1.10 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 0.850 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972  
SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 0.77  
EFFECTIVE AREA (ACRES) = 19.90 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 19.9 PEAK FLOW RATE (CFS) = 9.64  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10367.00 TO NODE 10368.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 279.00 DOWNSTREAM(FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 378.00 CHANNEL SLOPE = 0.0079  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.64  
FLOW VELOCITY(FEET/SEC.) = 2.80 FLOW DEPTH(FEET) = 1.07  
TRAVEL TIME(MIN.) = 2.25 Tc(MIN.) = 22.13  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10368.00 = 1989.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10368.00 TO NODE 10368.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 22.13  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.969  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 0.850 -  
USER-DEFINED - 0.90 0.50 1.000 -  
USER-DEFINED - 0.90 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.973  
SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 0.95  
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 9.64  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10368.00 TO NODE 10369.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 247.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 229.00 CHANNEL SLOPE = 0.1266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.64  
FLOW VELOCITY(FEET/SEC.) = 7.94 FLOW DEPTH(FEET) = 0.64  
TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 22.61  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10369.00 = 2218.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10369.00 TO NODE 10369.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 22.61  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.957  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.50 0.850 -  
USER-DEFINED - 9.70 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 1.40 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996

SUBAREA AREA (ACRES) = 11.60 SUBAREA RUNOFF (CFS) = 4.79  
EFFECTIVE AREA (ACRES) = 33.70 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 33.7 PEAK FLOW RATE (CFS) = 14.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10369.00 TO NODE 10370.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 247.00 DOWNSTREAM (FEET) = 226.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 179.00 CHANNEL SLOPE = 0.1173  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 14.01  
FLOW VELOCITY (FEET/SEC.) = 8.46 FLOW DEPTH (FEET) = 0.74  
TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 22.96  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10370.00 = 2397.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10370.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 22.96  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.949  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 0.850 -  
USER-DEFINED - 3.60 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 5.60 0.50 1.000 -  
USER-DEFINED - 1.50 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
SUBAREA AREA (ACRES) = 11.10 SUBAREA RUNOFF (CFS) = 4.50  
EFFECTIVE AREA (ACRES) = 44.80 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 44.8 PEAK FLOW RATE (CFS) = 18.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10371.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 226.00 DOWNSTREAM (FEET) = 188.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 434.00 CHANNEL SLOPE = 0.0876  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 18.25  
FLOW VELOCITY (FEET/SEC.) = 8.09 FLOW DEPTH (FEET) = 0.87  
TRAVEL TIME (MIN.) = 0.89 Tc (MIN.) = 23.86  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10371.00 = 2831.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10371.00 TO NODE 10371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 23.86  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.927  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 0.100 -  
USER-DEFINED - 1.20 0.50 0.850 -  
USER-DEFINED - 1.60 0.50 1.000 -  
USER-DEFINED - 0.40 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 0.100 -  
USER-DEFINED - 7.20 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958  
SUBAREA AREA (ACRES) = 10.70 SUBAREA RUNOFF (CFS) = 4.32  
EFFECTIVE AREA (ACRES) = 55.50 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 21.70

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10371.00 TO NODE 10389.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 188.00 DOWNSTREAM (FEET) = 157.00  
FLOW LENGTH (FEET) = 1918.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.64  
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 21.70  
PIPE TRAVEL TIME (MIN.) = 3.32 Tc (MIN.) = 27.17  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 27.17  
RAINFALL INTENSITY (INCH/HR) = 0.86  
AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.99  
EFFECTIVE STREAM AREA (ACRES) = 55.50  
TOTAL STREAM AREA (ACRES) = 55.50  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 21.70

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10380.00 TO NODE 10381.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 241.00
ELEVATION DATA: UPSTREAM (FEET) = 275.00 DOWNSTREAM (FEET) = 273.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.110
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.835
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL - 0.20 0.50 0.100 95 7.11
PUBLIC PARK - 1.10 0.50 0.850 95 11.30
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.735
SUBAREA RUNOFF (CFS) = 1.72
TOTAL AREA (ACRES) = 1.30 PEAK FLOW RATE (CFS) = 1.72

\*\*\*\*\*
FLOW PROCESS FROM NODE 10381.00 TO NODE 10382.00 IS CODE = 63
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<

UPSTREAM ELEVATION (FEET) = 273.00 DOWNSTREAM ELEVATION (FEET) = 271.00
STREET LENGTH (FEET) = 238.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.65
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.30
HALFSTREET FLOOD WIDTH (FEET) = 7.22
AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.87
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.56
STREET FLOW TRAVEL TIME (MIN.) = 2.13 Tc (MIN.) = 9.24
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.579
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.50 0.100 -
USER-DEFINED - 1.40 0.50 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.718
SUBAREA AREA (ACRES) = 1.70 SUBAREA RUNOFF (CFS) = 1.87
EFFECTIVE AREA (ACRES) = 3.00 AREA-AVERAGED Fm (INCH/HR) = 0.36
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73
TOTAL AREA (ACRES) = 3.0 PEAK FLOW RATE (CFS) = 3.28

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.32 HALFSTREET FLOOD WIDTH (FEET) = 8.09
FLOW VELOCITY (FEET/SEC.) = 1.94 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.62
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10382.00 = 479.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10382.00 TO NODE 10383.00 IS CODE = 63
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<

UPSTREAM ELEVATION (FEET) = 271.00 DOWNSTREAM ELEVATION (FEET) = 268.00
STREET LENGTH (FEET) = 357.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.81
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.35
HALFSTREET FLOOD WIDTH (FEET) = 9.72
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.12
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.75
STREET FLOW TRAVEL TIME (MIN.) = 2.80 Tc (MIN.) = 12.04
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.358

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.50 0.50 0.100 -
USER-DEFINED - 0.20 0.50 0.500 -
USER-DEFINED - 1.30 0.50 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.452
SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 3.06
EFFECTIVE AREA (ACRES) = 6.00 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59
TOTAL AREA (ACRES) = 6.0 PEAK FLOW RATE (CFS) = 5.74

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 10.59
FLOW VELOCITY (FEET/SEC.) = 2.19 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.81
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10383.00 = 836.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10383.00 TO NODE 10384.00 IS CODE = 63
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<

UPSTREAM ELEVATION (FEET) = 268.00 DOWNSTREAM ELEVATION (FEET) = 264.00
STREET LENGTH (FEET) = 473.00 CURB HEIGHT (INCHES) = 8.0



STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.51  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.40  
HALFSTREET FLOOD WIDTH(FEET) = 11.91  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.33  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.93  
STREET FLOW TRAVEL TIME(MIN.) = 3.38 Tc(MIN.) = 15.42  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.185

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.50 0.500 -  
USER-DEFINED - 0.10 0.50 0.850 -  
USER-DEFINED - 0.10 0.50 0.100 -  
USER-DEFINED - 3.00 0.50 0.500 -  
USER-DEFINED - 0.60 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.548  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 3.53  
EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.57  
TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 8.33

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 12.46  
FLOW VELOCITY(FEET/SEC.) = 2.39 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.97  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10384.00 = 1309.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10384.00 TO NODE 10385.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 264.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
STREET LENGTH(FEET) = 463.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.46  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.45  
HALFSTREET FLOOD WIDTH(FEET) = 14.49  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.28  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.02  
STREET FLOW TRAVEL TIME(MIN.) = 3.38 Tc(MIN.) = 18.80  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.063

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 0.600 -  
USER-DEFINED - 0.30 0.50 0.600 -  
USER-DEFINED - 0.60 0.50 0.850 -  
USER-DEFINED - 0.30 0.50 0.500 -  
USER-DEFINED - 4.00 0.50 0.600 -  
USER-DEFINED - 0.80 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.650  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 4.25  
EFFECTIVE AREA(ACRES) = 16.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 16.7 PEAK FLOW RATE(CFS) = 11.46

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 15.04  
FLOW VELOCITY(FEET/SEC.) = 2.34 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.07  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10385.00 = 1772.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10385.00 TO NODE 10385.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc(MIN.) = 18.80  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.063  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.15  
EFFECTIVE AREA(ACRES) = 16.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 16.9 PEAK FLOW RATE(CFS) = 11.61

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10385.00 TO NODE 10386.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 261.00 DOWNSTREAM(FEET) = 200.00  
FLOW LENGTH(FEET) = 712.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.56  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 11.61  
PIPE TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 19.56  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10386.00 = 2484.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 19.56  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.50 0.100 -  
USER-DEFINED - 0.20 0.50 0.850 -  
USER-DEFINED - 0.30 0.50 0.100 -  
USER-DEFINED - 0.30 0.50 0.850 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.561  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 0.95  
EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 12.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 19.56  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.50 0.100 -  
USER-DEFINED - 0.10 0.50 0.600 -  
USER-DEFINED - 1.70 0.50 0.850 -  
USER-DEFINED - 0.20 0.50 0.100 -  
USER-DEFINED - 0.30 0.50 0.850 -  
USER-DEFINED - 0.30 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.544  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 2.82  
EFFECTIVE AREA(ACRES) = 22.40 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 22.4 PEAK FLOW RATE(CFS) = 14.96

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.56  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.50 0.100 -  
USER-DEFINED - 0.20 0.50 0.500 -  
USER-DEFINED - 0.10 0.50 0.600 -  
USER-DEFINED - 0.30 0.50 0.850 -  
USER-DEFINED - 0.70 0.50 0.100 -  
USER-DEFINED - 0.10 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 2.91  
EFFECTIVE AREA(ACRES) = 25.90 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.54  
TOTAL AREA(ACRES) = 25.9 PEAK FLOW RATE(CFS) = 17.87

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 19.56  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 1.70 0.50 0.100 -  
USER-DEFINED - 0.10 0.50 0.850 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.228  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 1.66  
EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.52  
TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 19.53

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 19.56  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 0.100 -  
USER-DEFINED - 0.50 0.50 0.850 -  
USER-DEFINED - 2.10 0.50 0.100 -  
USER-DEFINED - 0.20 0.50 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.225  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 2.49  
EFFECTIVE AREA(ACRES) = 30.90 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.49

TOTAL AREA (ACRES) = 30.9 PEAK FLOW RATE (CFS) = 22.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====
MAINLINE Tc (MIN.) = 19.56
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.036
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.00 0.50 0.100 -
USER-DEFINED - 1.50 0.50 0.600 -
USER-DEFINED - 1.70 0.50 0.100 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.204
SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 6.05
EFFECTIVE AREA (ACRES) = 38.10 AREA-AVERAGED Fm (INCH/HR) = 0.22
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43
TOTAL AREA (ACRES) = 38.1 PEAK FLOW RATE (CFS) = 28.07

\*\*\*\*\*
FLOW PROCESS FROM NODE 10386.00 TO NODE 10387.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM (FEET) = 200.00 DOWNSTREAM (FEET) = 163.00
FLOW LENGTH (FEET) = 1145.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.39
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 28.07
PIPE TRAVEL TIME (MIN.) = 1.42 Tc (MIN.) = 20.98
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10387.00 = 3629.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====
MAINLINE Tc (MIN.) = 20.98
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.996
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.50 0.100 -
USER-DEFINED - 23.80 0.50 0.850 -
USER-DEFINED - 0.30 0.50 1.000 -
USER-DEFINED - 0.80 0.50 1.000 -
USER-DEFINED - 0.60 0.50 0.100 -
USER-DEFINED - 6.90 0.50 0.850 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.830
SUBAREA AREA (ACRES) = 32.90 SUBAREA RUNOFF (CFS) = 17.21
EFFECTIVE AREA (ACRES) = 71.00 AREA-AVERAGED Fm (INCH/HR) = 0.31
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.62

TOTAL AREA (ACRES) = 71.0 PEAK FLOW RATE (CFS) = 43.93

\*\*\*\*\*
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====
MAINLINE Tc (MIN.) = 20.98
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.996
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.50 1.000 -
USER-DEFINED - 0.20 0.50 0.850 -
USER-DEFINED - 1.20 0.50 0.100 -
USER-DEFINED - 1.70 0.50 0.850 -
USER-DEFINED - 0.30 0.50 1.000 -
USER-DEFINED - 0.10 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.641
SUBAREA AREA (ACRES) = 3.80 SUBAREA RUNOFF (CFS) = 2.31
EFFECTIVE AREA (ACRES) = 74.80 AREA-AVERAGED Fm (INCH/HR) = 0.31
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.62
TOTAL AREA (ACRES) = 74.8 PEAK FLOW RATE (CFS) = 46.24

\*\*\*\*\*
FLOW PROCESS FROM NODE 10387.00 TO NODE 10388.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM (FEET) = 163.00 DOWNSTREAM (FEET) = 158.00
FLOW LENGTH (FEET) = 150.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 15.18
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 46.24
PIPE TRAVEL TIME (MIN.) = 0.16 Tc (MIN.) = 21.15
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10388.00 = 3779.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====
MAINLINE Tc (MIN.) = 21.15
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.992
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.80 0.50 0.100 -
USER-DEFINED - 0.40 0.50 0.400 -
USER-DEFINED - 0.60 0.50 0.850 -
USER-DEFINED - 0.10 0.50 1.000 -
USER-DEFINED - 0.10 0.50 1.000 -
USER-DEFINED - 0.10 0.50 0.100 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223

SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 4.84  
EFFECTIVE AREA (ACRES) = 80.90 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 80.9 PEAK FLOW RATE (CFS) = 50.81

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 21.15  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.992  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 0.100 -  
USER-DEFINED - 10.70 0.50 0.400 -  
USER-DEFINED - 2.30 0.50 0.850 -  
USER-DEFINED - 0.50 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 0.70 0.50 0.400 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.502  
SUBAREA AREA (ACRES) = 14.60 SUBAREA RUNOFF (CFS) = 9.74  
EFFECTIVE AREA (ACRES) = 95.50 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.58  
TOTAL AREA (ACRES) = 95.5 PEAK FLOW RATE (CFS) = 60.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 21.15  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.992  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 0.36  
EFFECTIVE AREA (ACRES) = 96.20 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.58  
TOTAL AREA (ACRES) = 96.2 PEAK FLOW RATE (CFS) = 60.91

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10389.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 158.00 DOWNSTREAM (FEET) = 157.00  
FLOW LENGTH (FEET) = 51.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.7 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.32  
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 60.91

PIPE TRAVEL TIME (MIN.) = 0.06 Tc (MIN.) = 21.21  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10389.00 = 3830.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION (MIN.) = 21.21  
RAINFALL INTENSITY (INCH/HR) = 0.99  
AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.58  
EFFECTIVE STREAM AREA (ACRES) = 96.20  
TOTAL STREAM AREA (ACRES) = 96.20  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 60.91

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	21.70	27.17	0.861	0.50 (0.49)	0.99	55.5	10360.00
2	60.91	21.21	0.991	0.50 (0.29)	0.58	96.2	10380.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	82.61	21.21	0.991	0.50 (0.35)	0.70	139.5	10380.00
2	71.33	27.17	0.861	0.50 (0.36)	0.73	151.7	10360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 82.61 Tc (MIN.) = 21.21  
EFFECTIVE AREA (ACRES) = 139.52 AREA-AVERAGED Fm (INCH/HR) = 0.35  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.70  
TOTAL AREA (ACRES) = 151.7  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10390.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 157.00 DOWNSTREAM (FEET) = 155.00  
FLOW LENGTH (FEET) = 312.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.41  
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 82.61  
PIPE TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 21.77  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.77

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.978

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	3.10	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	5.70	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.997

SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 4.10

EFFECTIVE AREA(ACRES) = 149.02 AREA-AVERAGED Fm(INCH/HR) = 0.36

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.72

TOTAL AREA(ACRES) = 161.2 PEAK FLOW RATE(CFS) = 82.62

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.77

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.978

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 0.95  
EFFECTIVE AREA(ACRES) = 151.22 AREA-AVERAGED Fm(INCH/HR) = 0.36  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 163.4 PEAK FLOW RATE(CFS) = 83.57

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	83.57	21.77	0.978	0.50( 0.36)	0.73	151.2	10380.00
2	71.33	27.75	0.850	0.50( 0.37)	0.75	163.4	10360.00

LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	169.13	21.48	0.985	0.50( 0.39)	0.78	255.1	10300.00
2	159.30	25.33	0.894	0.50( 0.39)	0.77	283.7	10320.00

3 137.55 30.24 0.807 0.50( 0.39) 0.77 297.4 10340.00  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	252.52	21.48	0.985	0.50( 0.38)	0.76	404.4	10300.00
2	251.96	21.77	0.978	0.50( 0.38)	0.76	408.5	10380.00
3	235.57	25.33	0.894	0.50( 0.38)	0.76	442.2	10320.00
4	219.91	27.75	0.850	0.50( 0.38)	0.76	453.9	10360.00
5	202.40	30.24	0.807	0.50( 0.38)	0.76	460.8	10340.00
TOTAL AREA(ACRES) = 460.8							

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 252.52 Tc(MIN.) = 21.479

EFFECTIVE AREA(ACRES) = 404.38 AREA-AVERAGED Fm(INCH/HR) = 0.38

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76

TOTAL AREA(ACRES) = 460.8

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 460.8 TC(MIN.) = 21.48

EFFECTIVE AREA(ACRES) = 404.38 AREA-AVERAGED Fm(INCH/HR) = 0.38

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.757

PEAK FLOW RATE(CFS) = 252.52

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	252.52	21.48	0.985	0.50( 0.38)	0.76	404.4	10300.00
2	251.96	21.77	0.978	0.50( 0.38)	0.76	408.5	10380.00
3	235.57	25.33	0.894	0.50( 0.38)	0.76	442.2	10320.00
4	219.91	27.75	0.850	0.50( 0.38)	0.76	453.9	10360.00
5	202.40	30.24	0.807	0.50( 0.38)	0.76	460.8	10340.00

END OF RATIONAL METHOD ANALYSIS



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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

FILE NAME: 0506104F.DAT
TIME/DATE OF STUDY: 12:47 04/15/2013

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 2.230
2) 6.00; 2.010
3) 7.00; 1.850
4) 8.00; 1.710
5) 9.00; 1.600
6) 10.00; 1.510
7) 11.00; 1.430
8) 12.00; 1.360
9) 13.00; 1.300
10) 14.00; 1.250
11) 15.00; 1.200
12) 20.00; 1.020
13) 25.00; 0.900
14) 30.00; 0.810
15) 40.00; 0.690
16) 50.00; 0.610
17) 60.00; 0.550
18) 90.00; 0.440
19) 120.00; 0.370
20) 180.00; 0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

Table with columns: NO., HALF WIDTH (FT), CROWN CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-SIDE, PARK-/SIDE/WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), LIP HIKE (FT), GEOMETRIES (FT), MANNING FACTOR (n). Rows 1-4.

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10400.00 TO NODE 10401.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 540.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.434
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.941
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
PUBLIC PARK - 0.50 0.50 0.850 95 6.43
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA RUNOFF(CFS) = 0.68
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.68

\*\*\*\*\*

FLOW PROCESS FROM NODE 10401.00 TO NODE 10402.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 500.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.3419
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.68
FLOW VELOCITY(FEET/SEC.) = 4.77 FLOW DEPTH(FEET) = 0.22
TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 6.84
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10402.00 = 424.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10402.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 6.84
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.875
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.50 0.850 -
USER-DEFINED - 0.30 0.50 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.940  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 0.63  
EFFECTIVE AREA(ACRES) = 1.00 AREA-AVERAGED Fm(INCH/HR) = 0.45  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 1.28

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10403.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.2439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.28  
FLOW VELOCITY(FEET/SEC.) = 4.93 FLOW DEPTH(FEET) = 0.29  
TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 7.26  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10403.00 = 547.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10403.00 TO NODE 10403.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.26  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.814

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.850	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.10  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.45  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.91  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 2.33

\*\*\*\*\*

FLOW PROCESS FROM NODE 10403.00 TO NODE 10404.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 420.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 266.00 CHANNEL SLOPE = 0.1880  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.33  
FLOW VELOCITY(FEET/SEC.) = 5.20 FLOW DEPTH(FEET) = 0.39  
TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 8.11  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10404.00 = 813.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10404.00 TO NODE 10404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.11  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.698

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.50	0.850	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.863  
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 2.62  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.44  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 4.75

\*\*\*\*\*

FLOW PROCESS FROM NODE 10404.00 TO NODE 10405.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 370.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 289.00 CHANNEL SLOPE = 0.1730  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.75  
FLOW VELOCITY(FEET/SEC.) = 5.99 FLOW DEPTH(FEET) = 0.51  
TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 8.91  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10405.00 = 1102.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10405.00 TO NODE 10405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.91  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.609

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.50	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 4.26  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.43  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 8.68

\*\*\*\*\*

FLOW PROCESS FROM NODE 10405.00 TO NODE 10406.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 367.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 23.00 CHANNEL SLOPE = 0.1304



CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 8.68  
FLOW VELOCITY (FEET/SEC.) = 6.33 FLOW DEPTH (FEET) = 0.68  
TRAVEL TIME (MIN.) = 0.06 Tc (MIN.) = 8.98  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10406.00 = 1125.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.98  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.603  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 2.23  
EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.43  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 10.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 367.00 DOWNSTREAM (FEET) = 344.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 214.00 CHANNEL SLOPE = 0.1075  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 10.85  
FLOW VELOCITY (FEET/SEC.) = 6.17 FLOW DEPTH (FEET) = 0.77  
TRAVEL TIME (MIN.) = 0.58 Tc (MIN.) = 9.55  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10407.00 = 1339.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.55  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.550  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 2.03  
EFFECTIVE AREA (ACRES) = 12.30 AREA-AVERAGED Fm (INCH/HR) = 0.43  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 12.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 344.00 DOWNSTREAM (FEET) = 327.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 919.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 12.39  
FLOW VELOCITY (FEET/SEC.) = 4.11 FLOW DEPTH (FEET) = 1.00  
TRAVEL TIME (MIN.) = 3.72 Tc (MIN.) = 13.28  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10408.00 = 2258.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10408.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 13.28  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.286  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 0.800 -  
USER-DEFINED - 7.90 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.849  
SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 6.20  
EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.43  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 15.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 327.00 DOWNSTREAM (FEET) = 314.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 807.00 CHANNEL SLOPE = 0.0161  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 15.67  
FLOW VELOCITY (FEET/SEC.) = 4.13 FLOW DEPTH (FEET) = 1.12  
TRAVEL TIME (MIN.) = 3.26 Tc (MIN.) = 16.53  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10409.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10409.00 TO NODE 10409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 16.53  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.145  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        6.90     0.50      0.800      -
USER-DEFINED  -        5.70     0.50      0.850      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.823
SUBAREA AREA (ACRES) = 12.60  SUBAREA RUNOFF (CFS) = 8.32
EFFECTIVE AREA (ACRES) = 32.90  AREA-AVERAGED Fm (INCH/HR) = 0.42
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.84
TOTAL AREA (ACRES) = 32.9  PEAK FLOW RATE (CFS) = 21.40

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*****
FLOW PROCESS FROM NODE 10409.00 TO NODE 10410.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 314.00  DOWNSTREAM(FEET) = 266.00
FLOW LENGTH(FEET) = 213.00  MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 26.10
ESTIMATED PIPE DIAMETER (INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 21.40
PIPE TRAVEL TIME (MIN.) = 0.14  Tc (MIN.) = 16.67
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10410.00 = 3278.00 FEET.

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*****
FLOW PROCESS FROM NODE 10410.00 TO NODE 10411.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 266.00  DOWNSTREAM(FEET) = 170.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 1470.00  CHANNEL SLOPE = 0.0653
CHANNEL BASE (FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 21.40
FLOW VELOCITY (FEET/SEC.) = 7.55  FLOW DEPTH (FEET) = 0.97
TRAVEL TIME (MIN.) = 3.24  Tc (MIN.) = 19.91
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10411.00 = 4748.00 FEET.

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*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10411.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 19.91
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.023
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.60     0.50     0.100  -
USER-DEFINED  -        0.10     0.50     0.850  -
USER-DEFINED  -        0.40     0.50     0.100  -
USER-DEFINED  -        6.60     0.50     0.800  -
USER-DEFINED  -        0.80     0.50     0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.723

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SUBAREA AREA (ACRES) = 8.50  SUBAREA RUNOFF (CFS) = 5.06
EFFECTIVE AREA (ACRES) = 41.40  AREA-AVERAGED Fm (INCH/HR) = 0.41
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.82
TOTAL AREA (ACRES) = 41.4  PEAK FLOW RATE (CFS) = 22.86

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*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10412.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 170.00  DOWNSTREAM(FEET) = 161.00
FLOW LENGTH (FEET) = 1129.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 7.43
ESTIMATED PIPE DIAMETER (INCH) = 27.00  NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 22.86
PIPE TRAVEL TIME (MIN.) = 2.53  Tc (MIN.) = 22.44
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10412.00 = 5877.00 FEET.

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*****
FLOW PROCESS FROM NODE 10412.00 TO NODE 10413.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 161.00  DOWNSTREAM(FEET) = 141.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 360.00  CHANNEL SLOPE = 0.0556
CHANNEL BASE (FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 22.86
FLOW VELOCITY (FEET/SEC.) = 7.22  FLOW DEPTH (FEET) = 1.03
TRAVEL TIME (MIN.) = 0.83  Tc (MIN.) = 23.27
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10413.00 = 6237.00 FEET.

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*****
FLOW PROCESS FROM NODE 10413.00 TO NODE 10413.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 23.27
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.941
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        1.20     0.50     0.100  -
USER-DEFINED  -        0.40     0.50     0.850  -
USER-DEFINED  -        0.30     0.50     0.100  -
USER-DEFINED  -        0.10     0.50     0.850  -
USER-DEFINED  -        0.90     0.50     1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.509
SUBAREA AREA (ACRES) = 2.90  SUBAREA RUNOFF (CFS) = 1.79
EFFECTIVE AREA (ACRES) = 44.30  AREA-AVERAGED Fm (INCH/HR) = 0.40
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.80
TOTAL AREA (ACRES) = 44.3  PEAK FLOW RATE (CFS) = 22.86
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
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END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 44.3 TC (MIN.) = 23.27  
EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.40  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.50 AREA-AVERAGED  $A_p$  = 0.798  
PEAK FLOW RATE (CFS) = 22.86

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=====  
END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

FILE NAME: 0506105M.DAT
TIME/DATE OF STUDY: 12:50 04/15/2013

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 2.230
2) 6.00; 2.010
3) 7.00; 1.850
4) 8.00; 1.710
5) 9.00; 1.600
6) 10.00; 1.510
7) 11.00; 1.430
8) 12.00; 1.360
9) 13.00; 1.300
10) 14.00; 1.250
11) 15.00; 1.200
12) 20.00; 1.020
13) 25.00; 0.900
14) 30.00; 0.810
15) 40.00; 0.690
16) 50.00; 0.610
17) 60.00; 0.550
18) 90.00; 0.440
19) 120.00; 0.370
20) 180.00; 0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

Table with columns: NO., HALF WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-SIDE, PARK-/SIDE/WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), GUTTER LIP (FT), GUTTER HIKE (FT), GEOMETRIES, MANNING FACTOR (n)

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10500.00 TO NODE 10501.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00
ELEVATION DATA: UPSTREAM(FEET) = 1123.00 DOWNSTREAM(FEET) = 1085.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.984
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.431
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"GRASS" - 0.20 0.50 1.000 95 10.98
NATURAL FAIR COVER
"GRASS" - 0.30 0.50 1.000 95 10.98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.42
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.42

\*\*\*\*\*

FLOW PROCESS FROM NODE 10501.00 TO NODE 10502.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1085.00 DOWNSTREAM(FEET) = 1050.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 181.00 CHANNEL SLOPE = 0.1934
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.42
FLOW VELOCITY(FEET/SEC.) = 3.45 FLOW DEPTH(FEET) = 0.20
TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 11.86
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10502.00 = 507.00 FEET.

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FLOW PROCESS FROM NODE 10502.00 TO NODE 10502.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.86
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.370
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.10     0.50      1.000     -
USER-DEFINED  -        0.80     0.50      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 0.70
EFFECTIVE AREA (ACRES) = 1.40  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.4    PEAK FLOW RATE (CFS) = 1.10

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FLOW PROCESS FROM NODE 10502.00 TO NODE 10503.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1025.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 193.00  CHANNEL SLOPE = 0.1295
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.10
FLOW VELOCITY(FEET/SEC.) = 3.80  FLOW DEPTH(FEET) = 0.31
TRAVEL TIME(MIN.) = 0.85  Tc(MIN.) = 12.71
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10503.00 = 700.00 FEET.

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10503.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.71
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.318
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.50   0.50  1.000  -
USER-DEFINED      -        1.80   0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 1.69
EFFECTIVE AREA (ACRES) = 3.70  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 3.7    PEAK FLOW RATE (CFS) = 2.72

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10504.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1025.00  DOWNSTREAM(FEET) = 1020.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00  CHANNEL SLOPE = 0.0151
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.72
FLOW VELOCITY(FEET/SEC.) = 2.60  FLOW DEPTH(FEET) = 0.59
TRAVEL TIME(MIN.) = 2.13  Tc(MIN.) = 14.83
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10504.00 = 1032.00 FEET.

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10504.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.83
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.208
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.10   0.50  1.000  -
USER-DEFINED      -        0.80   0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 0.57
EFFECTIVE AREA (ACRES) = 4.60  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.6    PEAK FLOW RATE (CFS) = 2.93

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10505.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1020.00  DOWNSTREAM(FEET) = 975.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 397.00  CHANNEL SLOPE = 0.1134
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.93
FLOW VELOCITY(FEET/SEC.) = 5.63  FLOW DEPTH(FEET) = 0.42
TRAVEL TIME(MIN.) = 1.18  Tc(MIN.) = 16.01
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10505.00 = 1429.00 FEET.

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FLOW PROCESS FROM NODE 10505.00 TO NODE 10505.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 16.01
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.164
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.20   0.50  1.000  -
USER-DEFINED      -        1.20   0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.40  SUBAREA RUNOFF (CFS) = 0.84
EFFECTIVE AREA (ACRES) = 6.00  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.0    PEAK FLOW RATE (CFS) = 3.58

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10506.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 905.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 334.00 CHANNEL SLOPE = 0.2096
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.58
FLOW VELOCITY(FEET/SEC.) = 7.48 FLOW DEPTH(FEET) = 0.40
TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 16.75
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10506.00 = 1763.00 FEET.

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10506.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 16.75
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.137
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        6.10   0.50   1.000  -
USER-DEFINED        -        3.70   0.50   1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 5.62
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 9.06

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10507.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 790.00 CHANNEL SLOPE = 0.0380
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 9.06
FLOW VELOCITY(FEET/SEC.) = 4.02 FLOW DEPTH(FEET) = 0.87
TRAVEL TIME(MIN.) = 3.28 Tc(MIN.) = 20.03
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10507.00 = 2553.00 FEET.

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FLOW PROCESS FROM NODE 10507.00 TO NODE 10507.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 20.03
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.019
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        2.70   0.50   1.000  -
USER-DEFINED        -        6.30   0.50   1.000  -
USER-DEFINED        -        0.30   0.50   1.000  -

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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 4.35
EFFECTIVE AREA(ACRES) = 25.10 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 11.73

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10508.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 755.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 11.73
FLOW VELOCITY(FEET/SEC.) = 6.28 FLOW DEPTH(FEET) = 0.79
TRAVEL TIME(MIN.) = 2.97 Tc(MIN.) = 23.00
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10508.00 = 3673.00 FEET.

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FLOW PROCESS FROM NODE 10508.00 TO NODE 10508.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 23.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.948
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.80   0.50   1.000  -
USER-DEFINED        -       11.10   0.50   1.000  -
USER-DEFINED        -        3.10   0.50   1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 6.05
EFFECTIVE AREA(ACRES) = 40.10 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 16.16

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10509.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 755.00 DOWNSTREAM(FEET) = 533.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1578.00 CHANNEL SLOPE = 0.1407
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 16.16
FLOW VELOCITY(FEET/SEC.) = 7.56 FLOW DEPTH(FEET) = 0.84
TRAVEL TIME(MIN.) = 3.48 Tc(MIN.) = 26.48
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10509.00 = 5251.00 FEET.

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FLOW PROCESS FROM NODE 10509.00 TO NODE 10509.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 26.48

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.873

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.80	0.50	1.000	-
USER-DEFINED	-	11.40	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-
USER-DEFINED	-	8.30	0.50	1.000	-
USER-DEFINED	-	38.10	0.50	1.000	-
USER-DEFINED	-	8.70	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 77.40 SUBAREA RUNOFF (CFS) = 26.00

EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 39.47

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FLOW PROCESS FROM NODE 10509.00 TO NODE 10510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 415.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1236.00 CHANNEL SLOPE = 0.0955  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 39.47  
 FLOW VELOCITY (FEET/SEC.) = 8.17 FLOW DEPTH (FEET) = 1.27  
 TRAVEL TIME (MIN.) = 2.52 Tc (MIN.) = 29.00  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10510.00 = 6487.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 29.00

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.828

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	30.10	0.50	1.000	-
USER-DEFINED	-	15.30	0.50	1.000	-
USER-DEFINED	-	2.00	0.50	1.000	-
USER-DEFINED	-	11.30	0.50	1.000	-
USER-DEFINED	-	5.10	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 64.90 SUBAREA RUNOFF (CFS) = 19.15

EFFECTIVE AREA (ACRES) = 182.40 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 182.4 PEAK FLOW RATE (CFS) = 53.81

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FLOW PROCESS FROM NODE 10510.00 TO NODE 10511.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1161.00 CHANNEL SLOPE = 0.0973  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 53.81  
 FLOW VELOCITY (FEET/SEC.) = 8.87 FLOW DEPTH (FEET) = 1.42  
 TRAVEL TIME (MIN.) = 2.18 Tc (MIN.) = 31.18  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10511.00 = 7648.00 FEET.

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FLOW PROCESS FROM NODE 10511.00 TO NODE 10511.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 31.18

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.796

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.50	0.50	1.000	-
USER-DEFINED	-	10.80	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-
USER-DEFINED	-	22.10	0.50	1.000	-
USER-DEFINED	-	4.30	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 54.80 SUBAREA RUNOFF (CFS) = 14.58

EFFECTIVE AREA (ACRES) = 237.20 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 237.2 PEAK FLOW RATE (CFS) = 63.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 302.00 DOWNSTREAM (FEET) = 190.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1644.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 63.11  
 FLOW VELOCITY (FEET/SEC.) = 8.09 FLOW DEPTH (FEET) = 1.61  
 TRAVEL TIME (MIN.) = 3.39 Tc (MIN.) = 34.57  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10512.00 = 9292.00 FEET.

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FLOW PROCESS FROM NODE 10512.00 TO NODE 10512.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 34.57
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.755
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50   0.50   1.000  -
USER-DEFINED        -         0.20   0.50   1.000  -
USER-DEFINED        -         1.70   0.50   1.000  -
USER-DEFINED        -         0.10   0.50   1.000  -
USER-DEFINED        -        14.20   0.50   1.000  -
USER-DEFINED        -         2.80   0.50   1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 19.50   SUBAREA RUNOFF(CFS) = 4.48
EFFECTIVE AREA(ACRES) = 256.70   AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 256.7   PEAK FLOW RATE(CFS) = 63.11
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10512.00 TO NODE 10513.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 190.00 DOWNSTREAM(FEET) = 183.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 86.00 CHANNEL SLOPE = 0.0814
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00
CHANNEL FLOW THRU SUBAREA(CFS) = 63.11
FLOW VELOCITY(FEET/SEC.) = 8.65 FLOW DEPTH(FEET) = 1.56
TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 34.73
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10513.00 = 9378.00 FEET.

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*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 34.73
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.50   0.100  -
USER-DEFINED        -         1.30   0.50   1.000  -
USER-DEFINED        -        29.90   0.50   1.000  -
USER-DEFINED        -        11.90   0.50   1.000  -
USER-DEFINED        -         1.70   0.50   1.000  -
USER-DEFINED        -         0.60   0.50   0.100  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 45.50   SUBAREA RUNOFF(CFS) = 10.64
EFFECTIVE AREA(ACRES) = 302.20   AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 302.2   PEAK FLOW RATE(CFS) = 69.10

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*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 34.73
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         9.30   0.50   1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30   SUBAREA RUNOFF(CFS) = 2.12
EFFECTIVE AREA(ACRES) = 311.50   AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 311.5   PEAK FLOW RATE(CFS) = 71.21

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*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10514.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 171.00
FLOW LENGTH(FEET) = 1209.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.66
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 71.21
PIPE TRAVEL TIME(MIN.) = 1.89 Tc(MIN.) = 36.62
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10514.00 = 10587.00 FEET.

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*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10514.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 36.62
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.731
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.50   0.100  -
USER-DEFINED        -         0.40   0.50   1.000  -
USER-DEFINED        -         1.70   0.50   0.100  -
USER-DEFINED        -        31.30   0.50   1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 33.60   SUBAREA RUNOFF(CFS) = 7.73
EFFECTIVE AREA(ACRES) = 345.10   AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 345.1   PEAK FLOW RATE(CFS) = 72.59

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*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10515.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

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>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 171.00 DOWNSTREAM(FEET) = 165.00
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.01
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 72.59
PIPE TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 37.48
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10515.00 = 11152.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10515.00 TO NODE 10515.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 37.48
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.720
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.50 0.850 -
USER-DEFINED - 1.30 0.50 0.100 -
USER-DEFINED - 0.90 0.50 0.850 -
USER-DEFINED - 15.30 0.50 0.100 -
USER-DEFINED - 1.10 0.50 0.850 -
USER-DEFINED - 0.10 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.202
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 10.70
EFFECTIVE AREA(ACRES) = 364.30 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 364.3 PEAK FLOW RATE(CFS) = 80.10

\*\*\*\*\*
FLOW PROCESS FROM NODE 10515.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00
FLOW LENGTH(FEET) = 709.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.05
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 80.10
PIPE TRAVEL TIME(MIN.) = 1.07 Tc(MIN.) = 38.55
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 38.55
RAINFALL INTENSITY(INCH/HR) = 0.71

AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.95
EFFECTIVE STREAM AREA(ACRES) = 364.30
TOTAL STREAM AREA(ACRES) = 364.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 80.10

\*\*\*\*\*
FLOW PROCESS FROM NODE 10520.00 TO NODE 10521.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*
INITIAL SUBAREA FLOW-LENGTH(FEET) = 289.00
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 180.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.311
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.806
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL - 0.30 0.50 0.100 95 7.31
PUBLIC PARK - 1.20 0.50 0.850 95 11.62
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.700
SUBAREA RUNOFF(CFS) = 1.97
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 1.97

\*\*\*\*\*
FLOW PROCESS FROM NODE 10521.00 TO NODE 10522.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<

\*\*\*\*\*
UPSTREAM ELEVATION(FEET) = 180.00 DOWNSTREAM ELEVATION(FEET) = 176.00
STREET LENGTH(FEET) = 408.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.32
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.31
HALFSTREET FLOOD WIDTH(FEET) = 7.78
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.09
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.66
STREET FLOW TRAVEL TIME(MIN.) = 3.25 Tc(MIN.) = 10.56
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.465
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	0.850	-
USER-DEFINED	-	0.60	0.50	0.100	-
USER-DEFINED	-	0.80	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.520  
SUBAREA AREA (ACRES) = 2.50 SUBAREA RUNOFF (CFS) = 2.71  
EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 4.22

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.33 HALFSTREET FLOOD WIDTH (FEET) = 8.78  
FLOW VELOCITY (FEET/SEC.) = 2.19 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.73  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10522.00 = 697.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10522.00 TO NODE 10523.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION (FEET) = 176.00 DOWNSTREAM ELEVATION (FEET) = 173.00  
STREET LENGTH (FEET) = 333.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.25  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.39  
HALFSTREET FLOOD WIDTH (FEET) = 11.52  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.39  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.93  
STREET FLOW TRAVEL TIME (MIN.) = 2.32 Tc (MIN.) = 12.89  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.307

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.100	-
USER-DEFINED	-	4.70	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.600	-
USER-DEFINED	-	0.10	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.109  
SUBAREA AREA (ACRES) = 5.40 SUBAREA RUNOFF (CFS) = 6.09  
EFFECTIVE AREA (ACRES) = 9.40 AREA-AVERAGED Fm (INCH/HR) = 0.16  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31

TOTAL AREA (ACRES) = 9.4 PEAK FLOW RATE (CFS) = 9.73

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 13.16  
FLOW VELOCITY (FEET/SEC.) = 2.53 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.07  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10523.00 = 1030.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10523.00 TO NODE 10523.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 12.89  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.307  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	1.90	0.50	0.850	-
USER-DEFINED	-	0.80	0.50	0.100	-
USER-DEFINED	-	4.80	0.50	0.850	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	4.90	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785  
SUBAREA AREA (ACRES) = 12.70 SUBAREA RUNOFF (CFS) = 10.45  
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.58  
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 20.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10523.00 TO NODE 10524.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM (FEET) = 173.00 DOWNSTREAM (FEET) = 165.00  
FLOW LENGTH (FEET) = 736.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 8.06  
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 20.18  
PIPE TRAVEL TIME (MIN.) = 1.52 Tc (MIN.) = 14.41  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10524.00 = 1766.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10524.00 TO NODE 10524.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 14.41  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.230  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	0.100	-

USER-DEFINED - 0.40 0.50 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.308  
 SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 1.74  
 EFFECTIVE AREA (ACRES) = 23.90 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.56  
 TOTAL AREA (ACRES) = 23.9 PEAK FLOW RATE (CFS) = 20.39

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10524.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 165.00 DOWNSTREAM (FEET) = 158.00  
 FLOW LENGTH (FEET) = 623.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.19  
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 20.39  
 PIPE TRAVEL TIME (MIN.) = 1.27 Tc (MIN.) = 15.68  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10525.00 = 2389.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 15.68  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.176  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.90	0.50	0.850	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	6.80	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
 SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 6.13  
 EFFECTIVE AREA (ACRES) = 33.00 AREA-AVERAGED Fm (INCH/HR) = 0.32  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.64  
 TOTAL AREA (ACRES) = 33.0 PEAK FLOW RATE (CFS) = 25.36

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 15.68  
 RAINFALL INTENSITY (INCH/HR) = 1.18  
 AREA-AVERAGED Fm (INCH/HR) = 0.32  
 AREA-AVERAGED Fp (INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.64

EFFECTIVE STREAM AREA (ACRES) = 33.00  
 TOTAL STREAM AREA (ACRES) = 33.00  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 25.36

\*\* CONFLUENCE DATA \*\*

STREAM	Q	Tc	Intensity	Fp (Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	80.10	38.55	0.707	0.50 (0.48)	0.95	364.3	10500.00
2	25.36	15.68	1.176	0.50 (0.32)	0.64	33.0	10520.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM	Q	Tc	Intensity	Fp (Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	105.46	15.68	1.176	0.50 (0.45)	0.90	181.1	10520.00
2	91.55	38.55	0.707	0.50 (0.46)	0.93	397.3	10500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 105.46 Tc (MIN.) = 15.68  
 EFFECTIVE AREA (ACRES) = 181.15 AREA-AVERAGED Fm (INCH/HR) = 0.45  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.90  
 TOTAL AREA (ACRES) = 397.3  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10525.00 TO NODE 10526.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 158.00 DOWNSTREAM (FEET) = 148.00  
 FLOW LENGTH (FEET) = 30.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.0 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 44.28  
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 105.46  
 PIPE TRAVEL TIME (MIN.) = 0.01 Tc (MIN.) = 15.69  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10526.00 = 11891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10526.00 TO NODE 10527.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 148.00 DOWNSTREAM (FEET) = 135.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 296.00 CHANNEL SLOPE = 0.0439  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 105.46  
 FLOW VELOCITY (FEET/SEC.) = 9.69 FLOW DEPTH (FEET) = 1.90  
 TRAVEL TIME (MIN.) = 0.51 Tc (MIN.) = 16.20  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10527.00 = 12187.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 16.20  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.157  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 0.80 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 0.83  
EFFECTIVE AREA(ACRES) = 182.55 AREA-AVERAGED Fm(INCH/HR) = 0.45  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 398.7 PEAK FLOW RATE(CFS) = 116.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 16.20  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.157  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 0.100 -  
USER-DEFINED - 1.10 0.50 1.000 -  
USER-DEFINED - 0.40 0.50 1.000 -  
USER-DEFINED - 1.10 0.50 1.000 -  
USER-DEFINED - 2.20 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 2.94  
EFFECTIVE AREA(ACRES) = 187.45 AREA-AVERAGED Fm(INCH/HR) = 0.45  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 403.6 PEAK FLOW RATE(CFS) = 119.37

=====  
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 403.6 TC(MIN.) = 16.20  
EFFECTIVE AREA(ACRES) = 187.45 AREA-AVERAGED Fm(INCH/HR) = 0.45  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.898  
PEAK FLOW RATE(CFS) = 119.37

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	119.37	16.20	1.157	0.50(0.45)	0.90	187.4	10520.00
2	91.55	39.09	0.701	0.50(0.46)	0.93	403.6	10500.00

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

FILE NAME: 0506106F.DAT
TIME/DATE OF STUDY: 12:52 04/15/2013

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 2.230
2) 6.00; 2.010
3) 7.00; 1.850
4) 8.00; 1.710
5) 9.00; 1.600
6) 10.00; 1.510
7) 11.00; 1.430
8) 12.00; 1.360
9) 13.00; 1.300
10) 14.00; 1.250
11) 15.00; 1.200
12) 20.00; 1.020
13) 25.00; 0.900
14) 30.00; 0.810
15) 40.00; 0.690
16) 50.00; 0.610
17) 60.00; 0.550
18) 90.00; 0.440
19) 120.00; 0.370
20) 180.00; 0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

Table with columns: NO., HALF- WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL: IN- / OUT- / SIDE / SIDE / WAY, CURB HEIGHT (FT), GUTTER-GEOMETRIES: WIDTH (FT), LIP (FT), HIKE (FT), MANNING FACTOR (n)

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10600.00 TO NODE 10601.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 311.00
ELEVATION DATA: UPSTREAM(FEET) = 166.00 DOWNSTREAM(FEET) = 164.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.602
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.462
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 0.50 0.50 0.500 95 10.60
PUBLIC PARK - 0.60 0.50 0.850 95 13.16
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.691
SUBAREA RUNOFF(CFS) = 1.11
TOTAL AREA (ACRES) = 1.10 PEAK FLOW RATE (CFS) = 1.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 10601.00 TO NODE 10602.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 164.00 DOWNSTREAM ELEVATION(FEET) = 162.00
STREET LENGTH(FEET) = 220.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.11
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 6.16
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.86

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.52  
 STREET FLOW TRAVEL TIME (MIN.) = 1.97 Tc (MIN.) = 12.57  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.326  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.500	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	1.80	0.50	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.517  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 2.02  
 EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 2.99

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.31 HALFSTREET FLOOD WIDTH (FEET) = 7.53  
 FLOW VELOCITY (FEET/SEC.) = 1.97 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.61  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10602.00 = 531.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10602.00 TO NODE 10603.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 162.00 DOWNSTREAM ELEVATION (FEET) = 159.00  
 STREET LENGTH (FEET) = 328.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.63  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.35  
 HALFSTREET FLOOD WIDTH (FEET) = 9.34  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.18  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.75  
 STREET FLOW TRAVEL TIME (MIN.) = 2.51 Tc (MIN.) = 15.09  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.197

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.50	0.500	-
USER-DEFINED	-	0.30	0.50	0.850	-
USER-DEFINED	-	2.40	0.50	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527  
 SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 3.28

EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 5.89

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 10.51  
 FLOW VELOCITY (FEET/SEC.) = 2.28 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.84  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10603.00 = 859.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10603.00 TO NODE 10604.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 159.00 DOWNSTREAM ELEVATION (FEET) = 155.00  
 STREET LENGTH (FEET) = 465.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.68  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.41  
 HALFSTREET FLOOD WIDTH (FEET) = 12.62  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.44  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.00  
 STREET FLOW TRAVEL TIME (MIN.) = 3.18 Tc (MIN.) = 18.27  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.082

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.50	0.500	-
USER-DEFINED	-	0.40	0.50	0.850	-
USER-DEFINED	-	3.00	0.50	0.500	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	0.10	0.50	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.513  
 SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 5.58  
 EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 10.74

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.43 HALFSTREET FLOOD WIDTH (FEET) = 13.79  
 FLOW VELOCITY (FEET/SEC.) = 2.57 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.11  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10604.00 = 1324.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10604.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.27
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.082
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.50    0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.10    SUBAREA RUNOFF(CFS) = 0.06
EFFECTIVE AREA(ACRES) = 14.70  AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 14.7    PEAK FLOW RATE(CFS) = 10.80

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10605.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 155.00  DOWNSTREAM(FEET) = 140.00
FLOW LENGTH(FEET) = 214.00  MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.18
ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.80
PIPE TRAVEL TIME(MIN.) = 0.25    Tc(MIN.) = 18.52
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10605.00 = 1538.00 FEET.

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10605.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.52
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.073
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20    0.50    0.100  -
USER-DEFINED        -         1.70    0.50    0.100  -
USER-DEFINED        -        10.20    0.50    0.800  -
USER-DEFINED        -         2.90    0.50    0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.682
SUBAREA AREA(ACRES) = 16.00    SUBAREA RUNOFF(CFS) = 10.54
EFFECTIVE AREA(ACRES) = 30.70  AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 30.7    PEAK FLOW RATE(CFS) = 21.22

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10606.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 140.00  DOWNSTREAM(FEET) = 133.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00  CHANNEL SLOPE = 0.0400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 21.22
FLOW VELOCITY(FEET/SEC.) = 6.26  FLOW DEPTH(FEET) = 1.06
TRAVEL TIME(MIN.) = 0.47    Tc(MIN.) = 18.98
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10606.00 = 1713.00 FEET.

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.98
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.057
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.50    0.500  -
USER-DEFINED        -         0.30    0.50    0.850  -
USER-DEFINED        -         0.10    0.50    1.000  -
USER-DEFINED        -         1.10    0.50    1.000  -
USER-DEFINED        -         0.10    0.50    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 1.80    SUBAREA RUNOFF(CFS) = 0.97
EFFECTIVE AREA(ACRES) = 32.50  AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 32.5    PEAK FLOW RATE(CFS) = 21.72

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.98
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.057
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.50    0.850  -
USER-DEFINED        -         1.20    0.50    1.000  -
USER-DEFINED        -         0.10    0.50    1.000  -
USER-DEFINED        -         1.80    0.50    1.000  -
USER-DEFINED        -         0.10    0.50    0.850  -
USER-DEFINED        -         0.20    0.50    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 1.94
EFFECTIVE AREA(ACRES) = 36.30  AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.66
TOTAL AREA(ACRES) = 36.3    PEAK FLOW RATE(CFS) = 23.66

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FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.98

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.057

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.30

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.34

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.67

TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 23.96

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 36.9 TC(MIN.) = 18.98

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR)= 0.34

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.670

PEAK FLOW RATE(CFS) = 23.96

END OF RATIONAL METHOD ANALYSIS



Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 5 Yr \*  
\* From Node: 50100 To Node: 50167 \*  
\*\*\*\*\*

FILE NAME: 0610501U.DAT  
TIME/DATE OF STUDY: 10:12 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.720
- 2) 10.00; 1.805
- 3) 15.00; 1.321
- 4) 20.00; 1.131
- 5) 25.00; 0.986
- 6) 30.00; 0.883
- 7) 40.00; 0.757
- 8) 50.00; 0.674
- 9) 60.00; 0.613
- 10) 90.00; 0.510
- 11) 120.00; 0.452
- 12) 180.00; 0.380
- 13) 360.00; 0.282
- 14) 1440.00; 0.124

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50100.00 TO NODE 50101.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00  
ELEVATION DATA: UPSTREAM(FEET) = 1072.00 DOWNSTREAM(FEET) = 1063.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.598  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.360  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.50	1.000	0	14.60

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.47  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.47

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FLOW PROCESS FROM NODE 50101.00 TO NODE 50102.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 1063.00 DOWNSTREAM(FEET) = 975.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 273.00 CHANNEL SLOPE = 0.3223  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.297  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.29	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.38  
AVERAGE FLOW DEPTH(FEET) = 0.21 TRAVEL TIME(MIN.) = 1.04  
Tc(MIN.) = 15.64  
SUBAREA AREA(ACRES) = 0.29 SUBAREA RUNOFF(CFS) = 0.21  
EFFECTIVE AREA(ACRES) = 0.90 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 0.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.22 FLOW VELOCITY(FEET/SEC.) = 4.59  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50102.00 = 597.00 FEET.

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FLOW PROCESS FROM NODE 50102.00 TO NODE 50103.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 948.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 111.00 CHANNEL SLOPE = 0.2432  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.280

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.22	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.72

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.20

AVERAGE FLOW DEPTH(FEET) = 0.24 TRAVEL TIME(MIN.) = 0.44

Tc(MIN.) = 16.08

SUBAREA AREA(ACRES) = 0.22 SUBAREA RUNOFF(CFS) = 0.16

EFFECTIVE AREA(ACRES) = 1.12 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 0.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.25 FLOW VELOCITY(FEET/SEC.) = 4.30

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50103.00 = 708.00 FEET.

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FLOW PROCESS FROM NODE 50103.00 TO NODE 50104.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 948.00 DOWNSTREAM(FEET) = 914.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 136.00 CHANNEL SLOPE = 0.2500  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.262

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.99

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.73

AVERAGE FLOW DEPTH(FEET) = 0.26 TRAVEL TIME(MIN.) = 0.48

Tc(MIN.) = 16.56

SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 0.41

EFFECTIVE AREA(ACRES) = 1.71 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 1.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.29 FLOW VELOCITY(FEET/SEC.) = 4.81

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50104.00 = 844.00 FEET.

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FLOW PROCESS FROM NODE 50104.00 TO NODE 50105.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 914.00 DOWNSTREAM(FEET) = 895.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 52.00 CHANNEL SLOPE = 0.3654  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.257

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.73	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.76

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.19

AVERAGE FLOW DEPTH(FEET) = 0.31 TRAVEL TIME(MIN.) = 0.14

Tc(MIN.) = 16.70

SUBAREA AREA(ACRES) = 1.73 SUBAREA RUNOFF(CFS) = 1.18

EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 2.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.34 FLOW VELOCITY(FEET/SEC.) = 6.74

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50105.00 = 896.00 FEET.

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FLOW PROCESS FROM NODE 50105.00 TO NODE 50106.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 835.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00 CHANNEL SLOPE = 0.2143  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.227

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.59

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.03

AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.77

Tc(MIN.) = 17.47

SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 2.49

EFFECTIVE AREA(ACRES) = 7.24 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 7.2 PEAK FLOW RATE (CFS) = 4.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.49 FLOW VELOCITY (FEET/SEC.) = 6.50  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50106.00 = 1176.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50106.00 TO NODE 50107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 835.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 413.00 CHANNEL SLOPE = 0.2179  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.190

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.53	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.15  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.06  
AVERAGE FLOW DEPTH (FEET) = 0.54 TRAVEL TIME (MIN.) = 0.98  
Tc (MIN.) = 18.45

SUBAREA AREA (ACRES) = 4.53 SUBAREA RUNOFF (CFS) = 2.81  
EFFECTIVE AREA (ACRES) = 11.77 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.8 PEAK FLOW RATE (CFS) = 7.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.58 FLOW VELOCITY (FEET/SEC.) = 7.32  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50107.00 = 1589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50107.00 TO NODE 50108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 302.00 CHANNEL SLOPE = 0.2318  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.166

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.76	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.04  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.96  
AVERAGE FLOW DEPTH (FEET) = 0.62 TRAVEL TIME (MIN.) = 0.63  
Tc (MIN.) = 19.08

SUBAREA AREA (ACRES) = 5.76 SUBAREA RUNOFF (CFS) = 3.45  
EFFECTIVE AREA (ACRES) = 17.54 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.5 PEAK FLOW RATE (CFS) = 10.51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.65 FLOW VELOCITY (FEET/SEC.) = 8.21  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50108.00 = 1891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50108.00 TO NODE 50109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 655.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 81.00 CHANNEL SLOPE = 0.2469  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.161

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.77	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.20  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.18  
AVERAGE FLOW DEPTH (FEET) = 0.74 TRAVEL TIME (MIN.) = 0.15  
Tc (MIN.) = 19.22

SUBAREA AREA (ACRES) = 15.77 SUBAREA RUNOFF (CFS) = 9.37  
EFFECTIVE AREA (ACRES) = 33.31 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 33.3 PEAK FLOW RATE (CFS) = 19.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.82 FLOW VELOCITY (FEET/SEC.) = 9.83  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50109.00 = 1972.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 655.00 DOWNSTREAM (FEET) = 590.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 379.00 CHANNEL SLOPE = 0.1715  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.134

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.53	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.08  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.94

AVERAGE FLOW DEPTH(FEET) = 0.93 TRAVEL TIME(MIN.) = 0.71  
Tc(MIN.) = 19.93  
SUBAREA AREA(ACRES) = 11.53 SUBAREA RUNOFF(CFS) = 6.58  
EFFECTIVE AREA(ACRES) = 44.84 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 44.8 PEAK FLOW RATE(CFS) = 25.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.97 FLOW VELOCITY(FEET/SEC.) = 9.13  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50110.00 = 2351.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50110.00 TO NODE 50111.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 570.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 340.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.108  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 27.15 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 32.99  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.51  
AVERAGE FLOW DEPTH(FEET) = 1.30 TRAVEL TIME(MIN.) = 0.87  
Tc(MIN.) = 20.80  
SUBAREA AREA(ACRES) = 27.15 SUBAREA RUNOFF(CFS) = 14.85  
EFFECTIVE AREA(ACRES) = 71.99 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 72.0 PEAK FLOW RATE(CFS) = 39.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.39 FLOW VELOCITY(FEET/SEC.) = 6.83  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50111.00 = 2691.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50111.00 TO NODE 50112.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 567.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 403.00 CHANNEL SLOPE = 0.0074  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.051  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 66.68 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 55.89  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.43  
AVERAGE FLOW DEPTH(FEET) = 2.33 TRAVEL TIME(MIN.) = 1.96  
Tc(MIN.) = 22.76  
SUBAREA AREA(ACRES) = 66.68 SUBAREA RUNOFF(CFS) = 33.04  
EFFECTIVE AREA(ACRES) = 138.68 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 138.7 PEAK FLOW RATE(CFS) = 68.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.52 FLOW VELOCITY(FEET/SEC.) = 3.61  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50112.00 = 3094.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50112.00 TO NODE 50140.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 22.76  
RAINFALL INTENSITY(INCH/HR) = 1.05  
AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 138.68  
TOTAL STREAM AREA(ACRES) = 138.68  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 68.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50120.00 TO NODE 50121.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00  
ELEVATION DATA: UPSTREAM(FEET) = 1068.00 DOWNSTREAM(FEET) = 968.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.018  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.984  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	-	0.29	0.50	1.000	0	9.02

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.38  
TOTAL AREA(ACRES) = 0.29 PEAK FLOW RATE(CFS) = 0.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50121.00 TO NODE 50122.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 968.00 DOWNSTREAM(FEET) = 916.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 242.00 CHANNEL SLOPE = 0.2149  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.803  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.55	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 0.71  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.04  
 AVERAGE FLOW DEPTH (FEET) = 0.24 TRAVEL TIME (MIN.) = 1.00  
 Tc (MIN.) = 10.02  
 SUBAREA AREA (ACRES) = 0.55 SUBAREA RUNOFF (CFS) = 0.64  
 EFFECTIVE AREA (ACRES) = 0.83 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 0.8 PEAK FLOW RATE (CFS) = 0.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.27 FLOW VELOCITY (FEET/SEC.) = 4.42  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50122.00 = 566.00 FEET.

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FLOW PROCESS FROM NODE 50122.00 TO NODE 50123.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 916.00 DOWNSTREAM (FEET) = 906.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 111.00 CHANNEL SLOPE = 0.0901  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.751  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.68	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.36  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.43  
 AVERAGE FLOW DEPTH (FEET) = 0.36 TRAVEL TIME (MIN.) = 0.54  
 Tc (MIN.) = 10.56  
 SUBAREA AREA (ACRES) = 0.68 SUBAREA RUNOFF (CFS) = 0.76  
 EFFECTIVE AREA (ACRES) = 1.51 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.5 PEAK FLOW RATE (CFS) = 1.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.39 FLOW VELOCITY (FEET/SEC.) = 3.66  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50123.00 = 677.00 FEET.

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FLOW PROCESS FROM NODE 50123.00 TO NODE 50124.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 906.00 DOWNSTREAM (FEET) = 903.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 60.00 CHANNEL SLOPE = 0.0500  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.719  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.03  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.05  
 AVERAGE FLOW DEPTH (FEET) = 0.47 TRAVEL TIME (MIN.) = 0.33  
 Tc (MIN.) = 10.88  
 SUBAREA AREA (ACRES) = 0.59 SUBAREA RUNOFF (CFS) = 0.65  
 EFFECTIVE AREA (ACRES) = 2.10 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.1 PEAK FLOW RATE (CFS) = 2.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.49 FLOW VELOCITY (FEET/SEC.) = 3.16  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50124.00 = 737.00 FEET.

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FLOW PROCESS FROM NODE 50124.00 TO NODE 50125.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 903.00 DOWNSTREAM (FEET) = 901.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 29.00 CHANNEL SLOPE = 0.0690  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.707  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.44	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.09  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.87  
 AVERAGE FLOW DEPTH (FEET) = 0.52 TRAVEL TIME (MIN.) = 0.13  
 Tc (MIN.) = 11.01  
 SUBAREA AREA (ACRES) = 1.44 SUBAREA RUNOFF (CFS) = 1.56  
 EFFECTIVE AREA (ACRES) = 3.54 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.5 PEAK FLOW RATE (CFS) = 3.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.56 FLOW VELOCITY (FEET/SEC.) = 4.06  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50125.00 = 766.00 FEET.

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FLOW PROCESS FROM NODE 50125.00 TO NODE 50126.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 901.00 DOWNSTREAM(FEET) = 889.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 130.00 CHANNEL SLOPE = 0.0923
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.664
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.69 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.26
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.87
AVERAGE FLOW DEPTH(FEET) = 0.60 TRAVEL TIME(MIN.) = 0.44
Tc(MIN.) = 11.45
SUBAREA AREA(ACRES) = 2.69 SUBAREA RUNOFF(CFS) = 2.82
EFFECTIVE AREA(ACRES) = 6.23 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.2 PEAK FLOW RATE(CFS) = 6.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.65 FLOW VELOCITY(FEET/SEC.) = 5.13
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50126.00 = 896.00 FEET.

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FLOW PROCESS FROM NODE 50126.00 TO NODE 50127.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 889.00 DOWNSTREAM(FEET) = 855.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 231.00 CHANNEL SLOPE = 0.1472
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.606
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.18 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.62
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.39
AVERAGE FLOW DEPTH(FEET) = 0.63 TRAVEL TIME(MIN.) = 0.60
Tc(MIN.) = 12.06
SUBAREA AREA(ACRES) = 2.18 SUBAREA RUNOFF(CFS) = 2.17
EFFECTIVE AREA(ACRES) = 8.41 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 8.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.65 FLOW VELOCITY(FEET/SEC.) = 6.54
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50127.00 = 1127.00 FEET.

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FLOW PROCESS FROM NODE 50127.00 TO NODE 50128.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 855.00 DOWNSTREAM(FEET) = 793.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 211.00 CHANNEL SLOPE = 0.2938
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.569
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 5.70 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.11
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.10
AVERAGE FLOW DEPTH(FEET) = 0.64 TRAVEL TIME(MIN.) = 0.39
Tc(MIN.) = 12.44
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 5.48
EFFECTIVE AREA(ACRES) = 14.11 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.1 PEAK FLOW RATE(CFS) = 13.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.69 FLOW VELOCITY(FEET/SEC.) = 9.51
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50128.00 = 1338.00 FEET.

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FLOW PROCESS FROM NODE 50128.00 TO NODE 50129.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 793.00 DOWNSTREAM(FEET) = 708.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 353.00 CHANNEL SLOPE = 0.2408
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.509
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 9.99 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.11
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.52
AVERAGE FLOW DEPTH(FEET) = 0.80 TRAVEL TIME(MIN.) = 0.62
Tc(MIN.) = 13.06
SUBAREA AREA(ACRES) = 9.99 SUBAREA RUNOFF(CFS) = 9.07
EFFECTIVE AREA(ACRES) = 24.10 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 21.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.86 FLOW VELOCITY(FEET/SEC.) = 9.92
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50129.00 = 1691.00 FEET.

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FLOW PROCESS FROM NODE 50129.00 TO NODE 50130.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 708.00 DOWNSTREAM(FEET) = 571.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 735.00 CHANNEL SLOPE = 0.1864

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.386

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 13.71 0.50 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.34

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.61

AVERAGE FLOW DEPTH(FEET) = 0.97 TRAVEL TIME(MIN.) = 1.27

Tc(MIN.) = 14.33

SUBAREA AREA(ACRES) = 13.71 SUBAREA RUNOFF(CFS) = 10.93

EFFECTIVE AREA(ACRES) = 37.82 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 30.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.01 FLOW VELOCITY(FEET/SEC.) = 9.81

LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50130.00 = 2426.00 FEET.

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FLOW PROCESS FROM NODE 50130.00 TO NODE 50131.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 571.00 DOWNSTREAM(FEET) = 566.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 709.00 CHANNEL SLOPE = 0.0071

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.198

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 20.71 0.50 0.986 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.986

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 36.71

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.03

AVERAGE FLOW DEPTH(FEET) = 2.01 TRAVEL TIME(MIN.) = 3.91

Tc(MIN.) = 18.24

SUBAREA AREA(ACRES) = 20.71 SUBAREA RUNOFF(CFS) = 13.13

EFFECTIVE AREA(ACRES) = 58.52 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 36.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.02 FLOW VELOCITY(FEET/SEC.) = 3.02

LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50131.00 = 3135.00 FEET.

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FLOW PROCESS FROM NODE 50132.00 TO NODE 50131.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.24

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.198

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 154.02 0.50 0.949 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.949

SUBAREA AREA(ACRES) = 154.02 SUBAREA RUNOFF(CFS) = 100.26

EFFECTIVE AREA(ACRES) = 212.54 AREA-AVERAGED Fm(INCH/HR) = 0.48

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96

TOTAL AREA(ACRES) = 212.5 PEAK FLOW RATE(CFS) = 137.15

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FLOW PROCESS FROM NODE 50131.00 TO NODE 50140.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 18.24

RAINFALL INTENSITY(INCH/HR) = 1.20

AREA-AVERAGED Fm(INCH/HR) = 0.48

AREA-AVERAGED Fp(INCH/HR) = 0.50

AREA-AVERAGED Ap = 0.96

EFFECTIVE STREAM AREA(ACRES) = 212.54

TOTAL STREAM AREA(ACRES) = 212.54

PEAK FLOW RATE(CFS) AT CONFLUENCE = 137.15

\*\* CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER

NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE

1 68.71 22.76 1.051 0.50( 0.50) 1.00 138.7 50100.00

2 137.15 18.24 1.198 0.50( 0.48) 0.96 212.5 50120.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER

NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE

1 205.86 18.24 1.198 0.50( 0.49) 0.97 323.7 50120.00

2 177.69 22.76 1.051 0.50( 0.49) 0.98 351.2 50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 205.86 Tc(MIN.) = 18.24

EFFECTIVE AREA(ACRES) = 323.67 AREA-AVERAGED Fm(INCH/HR) = 0.49

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97

TOTAL AREA(ACRES) = 351.2

LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50140.00 = 3135.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 566.00 DOWNSTREAM(FEET) = 416.00
FLOW LENGTH(FEET) = 376.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 56.07
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 205.86
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 18.35
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50141.00 = 3511.00 FEET.

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FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.35
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.194
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 48.73 0.50 0.922 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.922
SUBAREA AREA(ACRES) = 48.73 SUBAREA RUNOFF(CFS) = 32.13
EFFECTIVE AREA(ACRES) = 372.40 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 400.0 PEAK FLOW RATE(CFS) = 237.83

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FLOW PROCESS FROM NODE 50141.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 416.00 DOWNSTREAM(FEET) = 404.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 972.00 CHANNEL SLOPE = 0.0123
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.100
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.56 0.50 0.610 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.610
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 240.53
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.97
AVERAGE FLOW DEPTH(FEET) = 3.66 TRAVEL TIME(MIN.) = 2.71
Tc(MIN.) = 21.07
SUBAREA AREA(ACRES) = 7.56 SUBAREA RUNOFF(CFS) = 5.41
EFFECTIVE AREA(ACRES) = 379.97 AREA-AVERAGED Fm(INCH/HR) = 0.48

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 407.5 PEAK FLOW RATE(CFS) = 237.83
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 3.65 FLOW VELOCITY(FEET/SEC.) = 5.95
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50162.00 = 4483.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 237.83 21.07 1.100 0.50( 0.48) 0.96 380.0 50120.00
2 202.31 25.71 0.971 0.50( 0.48) 0.96 407.5 50100.00

NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 237.83 Tc(MIN.) = 21.07
AREA-AVERAGED Fm(INCH/HR) = 0.48 AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 379.97

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FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 21.07
RAINFALL INTENSITY(INCH/HR) = 1.10
AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 379.97
TOTAL STREAM AREA(ACRES) = 407.52
PEAK FLOW RATE(CFS) AT CONFLUENCE = 237.83

\*\*\*\*\*

FLOW PROCESS FROM NODE 50150.00 TO NODE 50151.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00
ELEVATION DATA: UPSTREAM(FEET) = 1076.00 DOWNSTREAM(FEET) = 988.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.235
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.945
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" - 0.46 0.50 1.000 0 9.23
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.59
TOTAL AREA(ACRES) = 0.46 PEAK FLOW RATE(CFS) = 0.59

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FLOW PROCESS FROM NODE 50151.00 TO NODE 50152.00 IS CODE = 51



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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 988.00 DOWNSTREAM(FEET) = 938.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 220.00 CHANNEL SLOPE = 0.2273
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.799
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.59 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.94
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.47
AVERAGE FLOW DEPTH(FEET) = 0.26 TRAVEL TIME(MIN.) = 0.82
Tc(MIN.) = 10.05
SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 0.69
EFFECTIVE AREA(ACRES) = 1.04 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 1.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.29 FLOW VELOCITY(FEET/SEC.) = 4.75
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50152.00 = 543.00 FEET.

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FLOW PROCESS FROM NODE 50152.00 TO NODE 50153.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 938.00 DOWNSTREAM(FEET) = 904.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 218.00 CHANNEL SLOPE = 0.1560
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.722
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.13 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.84
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.51
AVERAGE FLOW DEPTH(FEET) = 0.37 TRAVEL TIME(MIN.) = 0.81
Tc(MIN.) = 10.86
SUBAREA AREA(ACRES) = 1.13 SUBAREA RUNOFF(CFS) = 1.25
EFFECTIVE AREA(ACRES) = 2.18 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.2 PEAK FLOW RATE(CFS) = 2.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.40 FLOW VELOCITY(FEET/SEC.) = 4.95
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50153.00 = 761.00 FEET.

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FLOW PROCESS FROM NODE 50153.00 TO NODE 50154.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 904.00 DOWNSTREAM(FEET) = 881.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 212.00 CHANNEL SLOPE = 0.1085
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.651
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.00 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.95
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.83
AVERAGE FLOW DEPTH(FEET) = 0.52 TRAVEL TIME(MIN.) = 0.73
Tc(MIN.) = 11.59
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 3.11
EFFECTIVE AREA(ACRES) = 5.18 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 5.2 PEAK FLOW RATE(CFS) = 5.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.58 FLOW VELOCITY(FEET/SEC.) = 5.23
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50154.00 = 973.00 FEET.

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FLOW PROCESS FROM NODE 50154.00 TO NODE 50155.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 881.00 DOWNSTREAM(FEET) = 877.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0253
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.573
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.81 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.20
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.25
AVERAGE FLOW DEPTH(FEET) = 0.86 TRAVEL TIME(MIN.) = 0.81
Tc(MIN.) = 12.40
SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 3.68
EFFECTIVE AREA(ACRES) = 8.99 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 9.0 PEAK FLOW RATE(CFS) = 8.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.92 FLOW VELOCITY(FEET/SEC.) = 3.41

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LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50155.00 = 1131.00 FEET.

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FLOW PROCESS FROM NODE 50155.00 TO NODE 50156.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 877.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 195.00 CHANNEL SLOPE = 0.0103
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.448

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.32 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.09
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.52
AVERAGE FLOW DEPTH(FEET) = 1.15 TRAVEL TIME(MIN.) = 1.29
Tc(MIN.) = 13.69
SUBAREA AREA(ACRES) = 3.32 SUBAREA RUNOFF(CFS) = 2.83
EFFECTIVE AREA(ACRES) = 12.31 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 10.50

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.17 FLOW VELOCITY(FEET/SEC.) = 2.55
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50156.00 = 1326.00 FEET.

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FLOW PROCESS FROM NODE 50156.00 TO NODE 50157.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 850.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 424.00 CHANNEL SLOPE = 0.0590
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.318

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.78 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.89
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.03
AVERAGE FLOW DEPTH(FEET) = 0.89 TRAVEL TIME(MIN.) = 1.41
Tc(MIN.) = 15.09
SUBAREA AREA(ACRES) = 3.78 SUBAREA RUNOFF(CFS) = 2.78
EFFECTIVE AREA(ACRES) = 16.09 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 11.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.88 FLOW VELOCITY(FEET/SEC.) = 5.07
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50157.00 = 1750.00 FEET.

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FLOW PROCESS FROM NODE 50157.00 TO NODE 50158.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 835.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0949
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.302

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 11.22 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.89
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.49
AVERAGE FLOW DEPTH(FEET) = 0.90 TRAVEL TIME(MIN.) = 0.41
Tc(MIN.) = 15.50
SUBAREA AREA(ACRES) = 11.22 SUBAREA RUNOFF(CFS) = 8.10
EFFECTIVE AREA(ACRES) = 27.31 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 27.3 PEAK FLOW RATE(CFS) = 19.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.98 FLOW VELOCITY(FEET/SEC.) = 6.85
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50158.00 = 1908.00 FEET.

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FLOW PROCESS FROM NODE 50158.00 TO NODE 50159.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 835.00 DOWNSTREAM(FEET) = 680.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 721.00 CHANNEL SLOPE = 0.2150
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.257

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.87 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.82
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.05
AVERAGE FLOW DEPTH(FEET) = 0.94 TRAVEL TIME(MIN.) = 1.20
Tc(MIN.) = 16.70
SUBAREA AREA(ACRES) = 20.87 SUBAREA RUNOFF(CFS) = 14.21
EFFECTIVE AREA(ACRES) = 48.18 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 48.2 PEAK FLOW RATE (CFS) = 32.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.02 FLOW VELOCITY (FEET/SEC.) = 10.56  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50159.00 = 2629.00 FEET.

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FLOW PROCESS FROM NODE 50159.00 TO NODE 50160.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 680.00 DOWNSTREAM (FEET) = 558.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 874.00 CHANNEL SLOPE = 0.1396

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.199

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	32.02	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 42.88

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.64

AVERAGE FLOW DEPTH (FEET) = 1.22 TRAVEL TIME (MIN.) = 1.51

Tc (MIN.) = 18.21

SUBAREA AREA (ACRES) = 32.02 SUBAREA RUNOFF (CFS) = 20.14

EFFECTIVE AREA (ACRES) = 80.20 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 80.2 PEAK FLOW RATE (CFS) = 50.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.29 FLOW VELOCITY (FEET/SEC.) = 10.04  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50160.00 = 3503.00 FEET.

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FLOW PROCESS FROM NODE 50160.00 TO NODE 50161.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 558.00 DOWNSTREAM (FEET) = 463.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 1013.00 CHANNEL SLOPE = 0.0938

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.128

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	13.52	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 54.27

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.83

AVERAGE FLOW DEPTH (FEET) = 1.43 TRAVEL TIME (MIN.) = 1.91

Tc (MIN.) = 20.12

SUBAREA AREA (ACRES) = 13.52 SUBAREA RUNOFF (CFS) = 7.64

EFFECTIVE AREA (ACRES) = 93.72 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 93.7 PEAK FLOW RATE (CFS) = 52.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.42 FLOW VELOCITY (FEET/SEC.) = 8.72

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50161.00 = 4516.00 FEET.

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FLOW PROCESS FROM NODE 50161.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 463.00 DOWNSTREAM (FEET) = 404.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 1126.00 CHANNEL SLOPE = 0.0524

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.052

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	19.35	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 57.72

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.18

AVERAGE FLOW DEPTH (FEET) = 1.64 TRAVEL TIME (MIN.) = 2.62

Tc (MIN.) = 22.74

SUBAREA AREA (ACRES) = 19.35 SUBAREA RUNOFF (CFS) = 9.60

EFFECTIVE AREA (ACRES) = 113.07 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 113.1 PEAK FLOW RATE (CFS) = 56.10

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.62 FLOW VELOCITY (FEET/SEC.) = 7.12

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

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FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

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TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION (MIN.) = 22.74

RAINFALL INTENSITY (INCH/HR) = 1.05

AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50

AREA-AVERAGED Ap = 1.00

EFFECTIVE STREAM AREA (ACRES) = 113.07

TOTAL STREAM AREA (ACRES) = 113.07

PEAK FLOW RATE (CFS) AT CONFLUENCE = 56.10

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
------------------	------------	--------------	------------------------	----------------------	----	---------------	-------------------

1	237.83	21.07	1.100	0.50( 0.48)	0.96	380.0	50120.00
1	202.31	25.71	0.971	0.50( 0.48)	0.96	407.5	50100.00
2	56.10	22.74	1.052	0.50( 0.50)	1.00	113.1	50150.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	293.93	21.07	1.100	0.50( 0.48)	0.97	484.7	50120.00
2	281.16	22.74	1.052	0.50( 0.49)	0.97	502.9	50150.00
3	250.23	25.71	0.971	0.50( 0.49)	0.97	520.6	50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 293.93 Tc(MIN.) = 21.07  
EFFECTIVE AREA(ACRES) = 484.73 AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 520.6  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50162.00 TO NODE 50163.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 378.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1158.00 CHANNEL SLOPE = 0.0225  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.031  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	151.93	0.50	0.990	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 330.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.09  
AVERAGE FLOW DEPTH(FEET) = 3.69 TRAVEL TIME(MIN.) = 2.38  
Tc(MIN.) = 23.45  
SUBAREA AREA(ACRES) = 151.93 SUBAREA RUNOFF(CFS) = 73.22  
EFFECTIVE AREA(ACRES) = 636.66 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 672.5 PEAK FLOW RATE(CFS) = 311.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.61 FLOW VELOCITY(FEET/SEC.) = 7.96  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50163.00 = 6800.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	311.37	23.45	1.031	0.50( 0.49)	0.97	636.7	50120.00
2	291.72	25.15	0.983	0.50( 0.49)	0.97	654.9	50150.00
3	261.60	28.20	0.920	0.50( 0.49)	0.98	672.5	50100.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 311.37 Tc(MIN.) = 23.45  
AREA-AVERAGED Fm(INCH/HR) = 0.49 AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.97 EFFECTIVE AREA(ACRES) = 636.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50163.00 TO NODE 50164.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 378.00 DOWNSTREAM(FEET) = 356.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 886.00 CHANNEL SLOPE = 0.0248  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.982  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	177.01	0.50	0.989	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.989  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 350.18  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.51  
AVERAGE FLOW DEPTH(FEET) = 3.70 TRAVEL TIME(MIN.) = 1.73  
Tc(MIN.) = 25.19  
SUBAREA AREA(ACRES) = 177.01 SUBAREA RUNOFF(CFS) = 77.61  
EFFECTIVE AREA(ACRES) = 813.67 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 849.5 PEAK FLOW RATE(CFS) = 360.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.74 FLOW VELOCITY(FEET/SEC.) = 8.59  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50164.00 = 7686.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	360.99	25.19	0.982	0.50( 0.49)	0.98	813.7	50120.00
2	342.45	26.91	0.947	0.50( 0.49)	0.98	831.9	50150.00
3	301.12	30.01	0.883	0.50( 0.49)	0.98	849.5	50100.00

NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 360.99 Tc(MIN.) = 25.19  
AREA-AVERAGED Fm(INCH/HR) = 0.49 AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 813.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50164.00 TO NODE 50165.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 356.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1762.00 CHANNEL SLOPE = 0.0233  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.912  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	177.01	0.50	0.989	-

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 155.27 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 389.76  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.54  
 AVERAGE FLOW DEPTH(FEET) = 3.90 TRAVEL TIME(MIN.) = 3.44  
 Tc(MIN.) = 28.63  
 SUBAREA AREA(ACRES) = 155.27 SUBAREA RUNOFF(CFS) = 57.48  
 EFFECTIVE AREA(ACRES) = 968.94 AREA-AVERAGED Fm(INCH/HR) = 0.49  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1004.8 PEAK FLOW RATE(CFS) = 366.96

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.81 FLOW VELOCITY(FEET/SEC.) = 8.42  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50165.00 = 9448.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	366.96	28.63	0.912	0.50( 0.49)	0.98	968.9	50120.00
2	344.28	30.40	0.878	0.50( 0.49)	0.98	987.1	50150.00
3	313.44	33.61	0.838	0.50( 0.49)	0.98	1004.8	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 366.96 Tc(MIN.) = 28.63  
 AREA-AVERAGED Fm(INCH/HR) = 0.49 AREA-AVERAGED Fp(INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 968.94

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50165.00 TO NODE 50166.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 893.00 CHANNEL SLOPE = 0.0347  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.882

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	50.24	0.50	0.997	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 375.61  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.84  
 AVERAGE FLOW DEPTH(FEET) = 3.57 TRAVEL TIME(MIN.) = 1.51  
 Tc(MIN.) = 30.14  
 SUBAREA AREA(ACRES) = 50.24 SUBAREA RUNOFF(CFS) = 17.31  
 EFFECTIVE AREA(ACRES) = 1019.17 AREA-AVERAGED Fm(INCH/HR) = 0.49  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1055.0 PEAK FLOW RATE(CFS) = 366.96  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.54 FLOW VELOCITY(FEET/SEC.) = 9.78  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50166.00 = 10341.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	366.96	30.14	0.882	0.50( 0.49)	0.98	1019.2	50120.00
2	344.28	31.93	0.859	0.50( 0.49)	0.98	1037.4	50150.00
3	313.44	35.19	0.818	0.50( 0.49)	0.98	1055.0	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 366.96 Tc(MIN.) = 30.14  
 AREA-AVERAGED Fm(INCH/HR) = 0.49 AREA-AVERAGED Fp(INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 1019.17

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50166.00 TO NODE 50167.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 240.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00 CHANNEL SLOPE = 0.0437  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.862

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.36	0.50	0.892	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.892  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 368.52  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.68  
 AVERAGE FLOW DEPTH(FEET) = 3.39 TRAVEL TIME(MIN.) = 1.57  
 Tc(MIN.) = 31.71  
 SUBAREA AREA(ACRES) = 8.36 SUBAREA RUNOFF(CFS) = 3.13  
 EFFECTIVE AREA(ACRES) = 1027.53 AREA-AVERAGED Fm(INCH/HR) = 0.49  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1063.4 PEAK FLOW RATE(CFS) = 366.96  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.39 FLOW VELOCITY(FEET/SEC.) = 10.64  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50167.00 = 11349.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	366.96	31.71	0.862	0.50( 0.49)	0.98	1027.5	50120.00
2	344.28	33.54	0.839	0.50( 0.49)	0.98	1045.7	50150.00
3	313.44	36.83	0.797	0.50( 0.49)	0.98	1063.4	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 366.96 Tc(MIN.) = 31.71  
 AREA-AVERAGED Fm(INCH/HR) = 0.49 AREA-AVERAGED Fp(INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 1027.53

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1063.4 TC(MIN.) = 31.71  
 EFFECTIVE AREA(ACRES) = 1027.53 AREA-AVERAGED Fm(INCH/HR) = 0.49  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.981

PEAK FLOW RATE (CFS) = 366.96

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	366.96	31.71	0.862	0.50 ( 0.49)	0.98	1027.5	50120.00
2	344.28	33.54	0.839	0.50 ( 0.49)	0.98	1045.7	50150.00
3	313.44	36.83	0.797	0.50 ( 0.49)	0.98	1063.4	50100.00

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END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*
\* Rancho Mission Viejo ROMP Study \*
\* Storm Event: 5 Yr \*
\* From Node: 50500 To Node: 50513 \*

FILE NAME: 0610505U.DAT
TIME/DATE OF STUDY: 10:13 01/21/2013

=====
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
\*USER-DEFINED TABLED RAINFALL USED\*
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.631
2) 10.00; 1.756
3) 15.00; 1.302
4) 20.00; 1.113
5) 25.00; 0.972
6) 30.00; 0.874
7) 40.00; 0.746
8) 50.00; 0.664
9) 60.00; 0.602
10) 90.00; 0.499
11) 120.00; 0.439
12) 180.00; 0.368
13) 360.00; 0.270
14) 1440.00; 0.118

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

Table with 10 columns: NO., HALF-WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-/PARK-SIDE / SIDE/ WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), GUTTER LIP (FT), GUTTER GEOMETRIES (FT), MANNING FACTOR (n). Rows 1-5.

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*
FLOW PROCESS FROM NODE 50500.00 TO NODE 50501.00 IS CODE = 21
=====

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 1122.00 DOWNSTREAM(FEET) = 980.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.501
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.019
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"GRASS" - 0.67 0.50 1.000 0 8.50
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.91
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 0.91

\*\*\*\*\*
FLOW PROCESS FROM NODE 50501.00 TO NODE 50502.00 IS CODE = 51
=====

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 832.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 500.00 CHANNEL SLOPE = 0.2960
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.752
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.83 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.38
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.38
AVERAGE FLOW DEPTH(FEET) = 0.29 TRAVEL TIME(MIN.) = 1.55
Tc(MIN.) = 10.05
SUBAREA AREA(ACRES) = 0.83 SUBAREA RUNOFF(CFS) = 0.94
EFFECTIVE AREA(ACRES) = 1.50 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.5 PEAK FLOW RATE(CFS) = 1.69

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 5.66  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50502.00 = 830.00 FEET.

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FLOW PROCESS FROM NODE 50502.00 TO NODE 50503.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 832.00 DOWNSTREAM(FEET) = 779.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 255.00 CHANNEL SLOPE = 0.2078  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.687

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.76	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.70

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.01

AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.71

Tc(MIN.) = 10.76

SUBAREA AREA(ACRES) = 3.76 SUBAREA RUNOFF(CFS) = 4.01

EFFECTIVE AREA(ACRES) = 5.26 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.3 PEAK FLOW RATE(CFS) = 5.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.53 FLOW VELOCITY(FEET/SEC.) = 6.69

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50503.00 = 1085.00 FEET.

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FLOW PROCESS FROM NODE 50503.00 TO NODE 50504.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 779.00 DOWNSTREAM(FEET) = 765.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 382.00 CHANNEL SLOPE = 0.0366  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.534

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.56	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.74

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.78

AVERAGE FLOW DEPTH(FEET) = 0.83 TRAVEL TIME(MIN.) = 1.69

Tc(MIN.) = 12.44

SUBAREA AREA(ACRES) = 4.56 SUBAREA RUNOFF(CFS) = 4.24

EFFECTIVE AREA(ACRES) = 9.82 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 9.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.87 FLOW VELOCITY(FEET/SEC.) = 3.98

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50504.00 = 1467.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50504.00 TO NODE 50505.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 355.00 CHANNEL SLOPE = 0.0423  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.410

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.79	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.69

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.35

AVERAGE FLOW DEPTH(FEET) = 0.91 TRAVEL TIME(MIN.) = 1.36

Tc(MIN.) = 13.80

SUBAREA AREA(ACRES) = 3.79 SUBAREA RUNOFF(CFS) = 3.10

EFFECTIVE AREA(ACRES) = 13.61 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 13.6 PEAK FLOW RATE(CFS) = 11.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.92 FLOW VELOCITY(FEET/SEC.) = 4.39

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50505.00 = 1822.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50505.00 TO NODE 50506.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 712.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 261.00 CHANNEL SLOPE = 0.1456  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.356

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.43	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.63

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.30

AVERAGE FLOW DEPTH(FEET) = 0.79 TRAVEL TIME(MIN.) = 0.60

Tc(MIN.) = 14.40

SUBAREA AREA(ACRES) = 6.43 SUBAREA RUNOFF(CFS) = 4.95

EFFECTIVE AREA(ACRES) = 20.03 AREA-AVERAGED Fm(INCH/HR) = 0.50



AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.0 PEAK FLOW RATE (CFS) = 15.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.83 FLOW VELOCITY (FEET/SEC.) = 7.53  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50506.00 = 2083.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50506.00 TO NODE 50507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 464.00 CHANNEL SLOPE = 0.2414  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.293

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.57	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 16.35  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.30  
AVERAGE FLOW DEPTH (FEET) = 0.77 TRAVEL TIME (MIN.) = 0.83  
Tc (MIN.) = 15.23

SUBAREA AREA (ACRES) = 2.57 SUBAREA RUNOFF (CFS) = 1.83  
EFFECTIVE AREA (ACRES) = 22.60 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.6 PEAK FLOW RATE (CFS) = 16.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.76 FLOW VELOCITY (FEET/SEC.) = 9.31  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50507.00 = 2547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50507.00 TO NODE 50508.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 535.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 310.00 CHANNEL SLOPE = 0.2097  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.271

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.09	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.06  
AVERAGE FLOW DEPTH (FEET) = 0.82 TRAVEL TIME (MIN.) = 0.57  
Tc (MIN.) = 15.80

SUBAREA AREA (ACRES) = 6.09 SUBAREA RUNOFF (CFS) = 4.23  
EFFECTIVE AREA (ACRES) = 28.69 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 28.7 PEAK FLOW RATE (CFS) = 19.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.84 FLOW VELOCITY (FEET/SEC.) = 9.32  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50508.00 = 2857.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50508.00 TO NODE 50509.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 405.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.2658  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.242

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.02	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.27  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.50  
AVERAGE FLOW DEPTH (FEET) = 0.86 TRAVEL TIME (MIN.) = 0.78  
Tc (MIN.) = 16.58

SUBAREA AREA (ACRES) = 10.02 SUBAREA RUNOFF (CFS) = 6.70  
EFFECTIVE AREA (ACRES) = 38.72 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.7 PEAK FLOW RATE (CFS) = 25.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.90 FLOW VELOCITY (FEET/SEC.) = 10.75  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50509.00 = 3346.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50509.00 TO NODE 50510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 285.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 706.00 CHANNEL SLOPE = 0.1700  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.194

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.60	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.92  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.26

AVERAGE FLOW DEPTH (FEET) = 1.00 TRAVEL TIME (MIN.) = 1.27  
Tc (MIN.) = 17.85  
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 4.12  
EFFECTIVE AREA (ACRES) = 45.32 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 28.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.00 FLOW VELOCITY (FEET/SEC.) = 9.36  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50510.00 = 4052.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50510.00 TO NODE 50511.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 285.00 DOWNSTREAM (FEET) = 238.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1169.00 CHANNEL SLOPE = 0.0402  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.096  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 22.45 0.50 0.991 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 34.39  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.09  
AVERAGE FLOW DEPTH (FEET) = 1.27 TRAVEL TIME (MIN.) = 2.75  
Tc (MIN.) = 20.59  
SUBAREA AREA (ACRES) = 22.45 SUBAREA RUNOFF (CFS) = 12.14  
EFFECTIVE AREA (ACRES) = 67.77 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 67.8 PEAK FLOW RATE (CFS) = 36.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.30 FLOW VELOCITY (FEET/SEC.) = 7.19  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50511.00 = 5221.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50511.00 TO NODE 50512.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 238.00 DOWNSTREAM (FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.0102  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.046  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 39.83 0.50 0.990 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 46.33  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.58  
AVERAGE FLOW DEPTH (FEET) = 1.84 TRAVEL TIME (MIN.) = 1.78  
Tc (MIN.) = 22.37  
SUBAREA AREA (ACRES) = 39.83 SUBAREA RUNOFF (CFS) = 19.75  
EFFECTIVE AREA (ACRES) = 107.59 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 107.6 PEAK FLOW RATE (CFS) = 53.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.94 FLOW VELOCITY (FEET/SEC.) = 4.73  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50512.00 = 5710.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50512.00 TO NODE 50513.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 233.00 DOWNSTREAM (FEET) = 209.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 537.00 CHANNEL SLOPE = 0.0447  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.016  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.40 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 54.85  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.29  
AVERAGE FLOW DEPTH (FEET) = 1.48 TRAVEL TIME (MIN.) = 1.08  
Tc (MIN.) = 23.45  
SUBAREA AREA (ACRES) = 7.40 SUBAREA RUNOFF (CFS) = 3.43  
EFFECTIVE AREA (ACRES) = 114.99 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 115.0 PEAK FLOW RATE (CFS) = 53.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.47 FLOW VELOCITY (FEET/SEC.) = 8.28  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50513.00 = 6247.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50513.00 TO NODE 50513.00 IS CODE = 81

-----  
>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 23.45  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.016  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.19 0.50 0.961 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.961  
SUBAREA AREA (ACRES) = 38.19 SUBAREA RUNOFF (CFS) = 18.39  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED Fm (INCH/HR) = 0.49

AREA-AVERAGED  $F_p$  (INCH/HR) = 0.50 AREA-AVERAGED  $A_p$  = 0.99  
TOTAL AREA (ACRES) = 153.2 PEAK FLOW RATE (CFS) = 72.00

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 153.2 TC (MIN.) = 23.45  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.49  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.50 AREA-AVERAGED  $A_p$  = 0.986  
PEAK FLOW RATE (CFS) = 72.00  
=====

=====  
END OF RATIONAL METHOD ANALYSIS

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 5 Yr \*  
\* From Node: 50600 To Node: 50610 \*  
\*\*\*\*\*

FILE NAME: 0610506U.DAT  
TIME/DATE OF STUDY: 10:13 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.631
- 2) 10.00; 1.756
- 3) 15.00; 1.302
- 4) 20.00; 1.113
- 5) 25.00; 0.972
- 6) 30.00; 0.874
- 7) 40.00; 0.746
- 8) 50.00; 0.664
- 9) 60.00; 0.602
- 10) 90.00; 0.499
- 11) 120.00; 0.439
- 12) 180.00; 0.368
- 13) 360.00; 0.270
- 14) 1440.00; 0.118

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50600.00 TO NODE 50601.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00  
ELEVATION DATA: UPSTREAM(FEET) = 780.00 DOWNSTREAM(FEET) = 730.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.166  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.741  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"GRASS" - 1.44 0.50 1.000 0 10.17  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.60  
TOTAL AREA(ACRES) = 1.44 PEAK FLOW RATE(CFS) = 1.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50601.00 TO NODE 50602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.1541  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.629  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.27 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.25  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.83  
AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 1.23  
Tc(MIN.) = 11.40  
SUBAREA AREA(ACRES) = 1.27 SUBAREA RUNOFF(CFS) = 1.29  
EFFECTIVE AREA(ACRES) = 2.71 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 2.75

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.42 FLOW VELOCITY(FEET/SEC.) = 5.09  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50602.00 = 671.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50602.00 TO NODE 50603.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 258.00 CHANNEL SLOPE = 0.2907  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.571

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.31	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.38

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.74

AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 0.64

Tc(MIN.) = 12.04

SUBAREA AREA(ACRES) = 1.31 SUBAREA RUNOFF(CFS) = 1.26

EFFECTIVE AREA(ACRES) = 4.02 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 3.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.43 FLOW VELOCITY(FEET/SEC.) = 6.98

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50603.00 = 929.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50603.00 TO NODE 50604.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 585.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.1293  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.538

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.58	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.61

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.33

AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 0.36

Tc(MIN.) = 12.40

SUBAREA AREA(ACRES) = 1.58 SUBAREA RUNOFF(CFS) = 1.48

EFFECTIVE AREA(ACRES) = 5.60 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.6 PEAK FLOW RATE(CFS) = 5.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.56 FLOW VELOCITY(FEET/SEC.) = 5.53

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50604.00 = 1045.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50604.00 TO NODE 50605.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 584.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 16.00 CHANNEL SLOPE = 0.0625  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.533

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.98	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.55

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.63

AVERAGE FLOW DEPTH(FEET) = 0.74 TRAVEL TIME(MIN.) = 0.06

Tc(MIN.) = 12.46

SUBAREA AREA(ACRES) = 4.98 SUBAREA RUNOFF(CFS) = 4.63

EFFECTIVE AREA(ACRES) = 10.58 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 10.6 PEAK FLOW RATE(CFS) = 9.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.81 FLOW VELOCITY(FEET/SEC.) = 4.95

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50605.00 = 1061.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50605.00 TO NODE 50606.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 584.00 DOWNSTREAM(FEET) = 579.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 122.00 CHANNEL SLOPE = 0.0410  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.491

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.18	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.15

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.42

AVERAGE FLOW DEPTH(FEET) = 0.96 TRAVEL TIME(MIN.) = 0.46

Tc(MIN.) = 12.91

SUBAREA AREA(ACRES) = 5.18 SUBAREA RUNOFF(CFS) = 4.62

EFFECTIVE AREA(ACRES) = 15.76 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 15.8 PEAK FLOW RATE (CFS) = 14.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.01 FLOW VELOCITY (FEET/SEC.) = 4.59  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50606.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50606.00 TO NODE 50607.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 579.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 637.00 CHANNEL SLOPE = 0.0801  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.336  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.34	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 16.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.20  
AVERAGE FLOW DEPTH (FEET) = 0.95 TRAVEL TIME (MIN.) = 1.71  
Tc (MIN.) = 14.63  
SUBAREA AREA (ACRES) = 7.34 SUBAREA RUNOFF (CFS) = 5.52  
EFFECTIVE AREA (ACRES) = 23.11 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 23.1 PEAK FLOW RATE (CFS) = 17.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.96 FLOW VELOCITY (FEET/SEC.) = 6.23  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50607.00 = 1820.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50607.00 TO NODE 50608.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 422.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 529.00 CHANNEL SLOPE = 0.2004  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.279  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.99	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.42  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.94  
AVERAGE FLOW DEPTH (FEET) = 0.83 TRAVEL TIME (MIN.) = 0.99  
Tc (MIN.) = 15.61

SUBAREA AREA (ACRES) = 2.99 SUBAREA RUNOFF (CFS) = 2.10  
EFFECTIVE AREA (ACRES) = 26.10 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.1 PEAK FLOW RATE (CFS) = 18.28

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.83 FLOW VELOCITY (FEET/SEC.) = 8.91  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50608.00 = 2349.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50608.00 TO NODE 50609.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 422.00 DOWNSTREAM (FEET) = 297.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 708.00 CHANNEL SLOPE = 0.1766  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.229  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.94	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 22.20  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.92  
AVERAGE FLOW DEPTH (FEET) = 0.91 TRAVEL TIME (MIN.) = 1.32  
Tc (MIN.) = 16.94  
SUBAREA AREA (ACRES) = 11.94 SUBAREA RUNOFF (CFS) = 7.83  
EFFECTIVE AREA (ACRES) = 38.04 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.0 PEAK FLOW RATE (CFS) = 24.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.95 FLOW VELOCITY (FEET/SEC.) = 9.20  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50609.00 = 3057.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50609.00 TO NODE 50610.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 297.00 DOWNSTREAM (FEET) = 207.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1321.00 CHANNEL SLOPE = 0.0681  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.127  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.38	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.87  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.19

AVERAGE FLOW DEPTH (FEET) = 1.07 TRAVEL TIME (MIN.) = 2.69  
Tc (MIN.) = 19.62  
SUBAREA AREA (ACRES) = 10.38 SUBAREA RUNOFF (CFS) = 5.86  
EFFECTIVE AREA (ACRES) = 48.42 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 27.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.06 FLOW VELOCITY (FEET/SEC.) = 8.14  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50610.00 = 4378.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 19.62  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.127  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.17 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.17 SUBAREA RUNOFF (CFS) = 0.66  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 49.6 PEAK FLOW RATE (CFS) = 27.99

=====

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 49.6 TC (MIN.) = 19.62  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.000  
PEAK FLOW RATE (CFS) = 27.99

=====

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END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 5 Yr \*  
\* From Node: 50700 To Node: 50716 \*  
\*\*\*\*\*

FILE NAME: 0610507U.DAT  
TIME/DATE OF STUDY: 10:14 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.631
- 2) 10.00; 1.756
- 3) 15.00; 1.302
- 4) 20.00; 1.113
- 5) 25.00; 0.972
- 6) 30.00; 0.874
- 7) 40.00; 0.746
- 8) 50.00; 0.664
- 9) 60.00; 0.602
- 10) 90.00; 0.499
- 11) 120.00; 0.439
- 12) 180.00; 0.368
- 13) 360.00; 0.270
- 14) 1440.00; 0.118

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL IN- / OUT- / SIDE / SIDE/ WAY	STREET-CROSSFALL: IN- / OUT- / PARK- / WAY (FT)	CURB HEIGHT (FT)	GUTTER-GEOMETRIES WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50700.00 TO NODE 50701.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00  
ELEVATION DATA: UPSTREAM(FEET) = 1121.00 DOWNSTREAM(FEET) = 870.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.572  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.181  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.18	0.50	1.000	0	7.57
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000						
SUBAREA RUNOFF(CFS) = 0.28						
TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 0.28						

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50701.00 TO NODE 50702.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 827.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.3386  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.102  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.42	0.50	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.58					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.70					
AVERAGE FLOW DEPTH(FEET) = 0.20 TRAVEL TIME(MIN.) = 0.45					
Tc(MIN.) = 8.02					
SUBAREA AREA(ACRES) = 0.42 SUBAREA RUNOFF(CFS) = 0.61					
EFFECTIVE AREA(ACRES) = 0.61 AREA-AVERAGED Fm(INCH/HR) = 0.50					
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 0.87					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:



DEPTH(FEET) = 0.24 FLOW VELOCITY(FEET/SEC.) = 5.08  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50702.00 = 456.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50703.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	827.00	DOWNSTREAM(FEET) =	815.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	94.00	CHANNEL SLOPE =	0.1277
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	2.028		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.34	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.11

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.70

AVERAGE FLOW DEPTH(FEET) = 0.32 TRAVEL TIME(MIN.) = 0.42

Tc(MIN.) = 8.44

SUBAREA AREA(ACRES) = 0.34 SUBAREA RUNOFF(CFS) = 0.47

EFFECTIVE AREA(ACRES) = 0.94 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 1.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.33 FLOW VELOCITY(FEET/SEC.) = 3.91

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50703.00 = 550.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50704.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	815.00	DOWNSTREAM(FEET) =	800.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	169.00	CHANNEL SLOPE =	0.0888
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	1.904		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.72	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.39

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.98

AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.71

Tc(MIN.) = 9.15

SUBAREA AREA(ACRES) = 1.72 SUBAREA RUNOFF(CFS) = 2.17

EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 3.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.51 FLOW VELOCITY(FEET/SEC.) = 4.35

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50704.00 = 719.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50705.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	800.00	DOWNSTREAM(FEET) =	785.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	128.00	CHANNEL SLOPE =	0.1172
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	1.832		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.12	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.64

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.18

AVERAGE FLOW DEPTH(FEET) = 0.55 TRAVEL TIME(MIN.) = 0.41

Tc(MIN.) = 9.56

SUBAREA AREA(ACRES) = 2.12 SUBAREA RUNOFF(CFS) = 2.54

EFFECTIVE AREA(ACRES) = 4.79 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 5.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 FLOW VELOCITY(FEET/SEC.) = 5.46

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50705.00 = 847.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50705.00 TO NODE 50706.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	785.00	DOWNSTREAM(FEET) =	775.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	170.00	CHANNEL SLOPE =	0.0588
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) =	1.739		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.64	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.77

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.57

AVERAGE FLOW DEPTH(FEET) = 0.75 TRAVEL TIME(MIN.) = 0.62

Tc(MIN.) = 10.18

SUBAREA AREA(ACRES) = 3.64 SUBAREA RUNOFF(CFS) = 4.05

EFFECTIVE AREA(ACRES) = 8.42 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.4 PEAK FLOW RATE (CFS) = 9.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.81 FLOW VELOCITY (FEET/SEC.) = 4.75  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50706.00 = 1017.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50706.00 TO NODE 50707.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 775.00 DOWNSTREAM (FEET) = 772.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 162.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.665

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.65	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.83  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.28  
AVERAGE FLOW DEPTH (FEET) = 1.10 TRAVEL TIME (MIN.) = 0.82  
Tc (MIN.) = 11.01

SUBAREA AREA (ACRES) = 4.65 SUBAREA RUNOFF (CFS) = 4.87  
EFFECTIVE AREA (ACRES) = 13.07 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 13.1 PEAK FLOW RATE (CFS) = 13.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.16 FLOW VELOCITY (FEET/SEC.) = 3.38  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50707.00 = 1179.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50707.00 TO NODE 50708.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 772.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 357.00 CHANNEL SLOPE = 0.0756  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.573

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.55	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.41  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.89  
AVERAGE FLOW DEPTH (FEET) = 0.93 TRAVEL TIME (MIN.) = 1.01  
Tc (MIN.) = 12.02

SUBAREA AREA (ACRES) = 3.55 SUBAREA RUNOFF (CFS) = 3.43  
EFFECTIVE AREA (ACRES) = 16.62 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 16.6 PEAK FLOW RATE (CFS) = 16.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.94 FLOW VELOCITY (FEET/SEC.) = 6.01  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50708.00 = 1536.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50708.00 TO NODE 50709.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 733.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 444.00 CHANNEL SLOPE = 0.0270  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.412

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.58	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.34  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.19  
AVERAGE FLOW DEPTH (FEET) = 1.21 TRAVEL TIME (MIN.) = 1.77  
Tc (MIN.) = 13.78

SUBAREA AREA (ACRES) = 5.58 SUBAREA RUNOFF (CFS) = 4.58  
EFFECTIVE AREA (ACRES) = 22.20 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.2 PEAK FLOW RATE (CFS) = 18.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.20 FLOW VELOCITY (FEET/SEC.) = 4.20  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50709.00 = 1980.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50709.00 TO NODE 50710.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 733.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 467.00 CHANNEL SLOPE = 0.1242  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.319

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.17	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 19.76  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.56

AVERAGE FLOW DEPTH (FEET) = 0.93 TRAVEL TIME (MIN.) = 1.03  
Tc (MIN.) = 14.81  
SUBAREA AREA (ACRES) = 4.17 SUBAREA RUNOFF (CFS) = 3.07  
EFFECTIVE AREA (ACRES) = 26.38 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.4 PEAK FLOW RATE (CFS) = 19.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.93 FLOW VELOCITY (FEET/SEC.) = 7.55  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50710.00 = 2447.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50710.00 TO NODE 50711.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 619.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 516.00 CHANNEL SLOPE = 0.1085  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.267

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 21.41 0.50 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 26.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.79  
AVERAGE FLOW DEPTH (FEET) = 1.07 TRAVEL TIME (MIN.) = 1.10  
Tc (MIN.) = 15.92  
SUBAREA AREA (ACRES) = 21.41 SUBAREA RUNOFF (CFS) = 14.78  
EFFECTIVE AREA (ACRES) = 47.78 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 32.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.16 FLOW VELOCITY (FEET/SEC.) = 8.22  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50711.00 = 2963.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50711.00 TO NODE 50712.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 619.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 650.00 CHANNEL SLOPE = 0.0292  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.203

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.43 0.50 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 35.33  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.34  
AVERAGE FLOW DEPTH (FEET) = 1.36 TRAVEL TIME (MIN.) = 1.71  
Tc (MIN.) = 17.62  
SUBAREA AREA (ACRES) = 7.43 SUBAREA RUNOFF (CFS) = 4.70  
EFFECTIVE AREA (ACRES) = 55.21 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.2 PEAK FLOW RATE (CFS) = 34.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.36 FLOW VELOCITY (FEET/SEC.) = 6.34  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50712.00 = 3613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50713.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 794.00 CHANNEL SLOPE = 0.0907  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.154

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 36.47 0.50 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 45.65  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.29  
AVERAGE FLOW DEPTH (FEET) = 1.22 TRAVEL TIME (MIN.) = 1.29  
Tc (MIN.) = 18.91  
SUBAREA AREA (ACRES) = 36.47 SUBAREA RUNOFF (CFS) = 21.47  
EFFECTIVE AREA (ACRES) = 91.68 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 53.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.29 FLOW VELOCITY (FEET/SEC.) = 10.77  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50713.00 = 4407.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50713.00 TO NODE 50714.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 423.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1215.00 CHANNEL SLOPE = 0.0864  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.091

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.52 0.50 0.998 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.998  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 58.90  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.81  
 AVERAGE FLOW DEPTH(FEET) = 1.35 TRAVEL TIME(MIN.) = 1.87  
 Tc(MIN.) = 20.78  
 SUBAREA AREA(ACRES) = 18.52 SUBAREA RUNOFF(CFS) = 9.87  
 EFFECTIVE AREA(ACRES) = 110.21 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 110.2 PEAK FLOW RATE(CFS) = 58.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.35 FLOW VELOCITY(FEET/SEC.) = 10.79  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50714.00 = 5622.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50714.00 TO NODE 50715.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 319.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 768.00 CHANNEL SLOPE = 0.1354  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.063  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.31	0.50	0.993	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 59.98  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.83  
 AVERAGE FLOW DEPTH(FEET) = 1.25 TRAVEL TIME(MIN.) = 1.00  
 Tc(MIN.) = 21.78  
 SUBAREA AREA(ACRES) = 5.31 SUBAREA RUNOFF(CFS) = 2.71  
 EFFECTIVE AREA(ACRES) = 115.52 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 115.5 PEAK FLOW RATE(CFS) = 58.62  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.24 FLOW VELOCITY(FEET/SEC.) = 12.73  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50715.00 = 6390.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50715.00 TO NODE 50716.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 319.00 DOWNSTREAM(FEET) = 182.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1513.00 CHANNEL SLOPE = 0.0905  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.002  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	79.09	0.50	0.979	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 76.87  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.74  
 AVERAGE FLOW DEPTH(FEET) = 1.48 TRAVEL TIME(MIN.) = 2.15  
 Tc(MIN.) = 23.93  
 SUBAREA AREA(ACRES) = 79.09 SUBAREA RUNOFF(CFS) = 36.48  
 EFFECTIVE AREA(ACRES) = 194.61 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 194.6 PEAK FLOW RATE(CFS) = 88.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.56 FLOW VELOCITY(FEET/SEC.) = 12.16  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50716.00 = 7903.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50716.00 TO NODE 50716.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 23.93  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.002  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	42.18	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 42.18 SUBAREA RUNOFF(CFS) = 19.06  
 EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 236.8 PEAK FLOW RATE(CFS) = 107.76

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 236.8 TC(MIN.) = 23.93  
 EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.993  
 PEAK FLOW RATE(CFS) = 107.76

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 5 Yr \*  
\* From Node: 50800 To Node: 50811 \*  
\*\*\*\*\*

FILE NAME: 0610508U.DAT  
TIME/DATE OF STUDY: 10:14 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.631
- 2) 10.00; 1.756
- 3) 15.00; 1.302
- 4) 20.00; 1.113
- 5) 25.00; 0.972
- 6) 30.00; 0.874
- 7) 40.00; 0.746
- 8) 50.00; 0.664
- 9) 60.00; 0.602
- 10) 90.00; 0.499
- 11) 120.00; 0.439
- 12) 180.00; 0.368
- 13) 360.00; 0.270
- 14) 1440.00; 0.118

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	60.0	30.0	0.020/0.020	0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020	0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020	0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020	0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020	0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
- \*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50800.00 TO NODE 50801.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00  
ELEVATION DATA: UPSTREAM(FEET) = 795.00 DOWNSTREAM(FEET) = 745.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.302  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.729  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.60	0.50	1.000	0	10.30

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.66  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50801.00 TO NODE 50802.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 725.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 245.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.631  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.35	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.37  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.81  
AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 1.07  
 $T_c$ (MIN.) = 11.37  
SUBAREA AREA(ACRES) = 3.35 SUBAREA RUNOFF(CFS) = 3.41  
EFFECTIVE AREA(ACRES) = 3.94 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 3.9 PEAK FLOW RATE(CFS) = 4.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.55 FLOW VELOCITY(FEET/SEC.) = 4.36  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50802.00 = 566.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50802.00 TO NODE 50803.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 725.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 325.00 CHANNEL SLOPE = 0.0769  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.519

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.52	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.72

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.40

AVERAGE FLOW DEPTH(FEET) = 0.60 TRAVEL TIME(MIN.) = 1.23

Tc(MIN.) = 12.60

SUBAREA AREA(ACRES) = 1.52 SUBAREA RUNOFF(CFS) = 1.40

EFFECTIVE AREA(ACRES) = 5.47 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 5.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.61 FLOW VELOCITY(FEET/SEC.) = 4.53

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50803.00 = 891.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50803.00 TO NODE 50804.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 652.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 594.00 CHANNEL SLOPE = 0.0808  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.341

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.12	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.34

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.04

AVERAGE FLOW DEPTH(FEET) = 0.70 TRAVEL TIME(MIN.) = 1.97

Tc(MIN.) = 14.57

SUBAREA AREA(ACRES) = 6.12 SUBAREA RUNOFF(CFS) = 4.63

EFFECTIVE AREA(ACRES) = 11.59 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 11.6 PEAK FLOW RATE(CFS) = 8.77

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.74 FLOW VELOCITY(FEET/SEC.) = 5.27

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50804.00 = 1485.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50804.00 TO NODE 50805.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 652.00 DOWNSTREAM(FEET) = 542.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 499.00 CHANNEL SLOPE = 0.2204  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.279

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.17	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.58

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.07

AVERAGE FLOW DEPTH(FEET) = 0.66 TRAVEL TIME(MIN.) = 1.03

Tc(MIN.) = 15.60

SUBAREA AREA(ACRES) = 5.17 SUBAREA RUNOFF(CFS) = 3.63

EFFECTIVE AREA(ACRES) = 16.76 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 11.75

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.69 FLOW VELOCITY(FEET/SEC.) = 8.24

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50805.00 = 1984.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50805.00 TO NODE 50806.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 542.00 DOWNSTREAM(FEET) = 450.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 650.00 CHANNEL SLOPE = 0.1415  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.222

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.22	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.45

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.21

AVERAGE FLOW DEPTH(FEET) = 0.79 TRAVEL TIME(MIN.) = 1.50

Tc(MIN.) = 17.10

SUBAREA AREA(ACRES) = 5.22 SUBAREA RUNOFF(CFS) = 3.39

EFFECTIVE AREA(ACRES) = 21.99 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 14.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.80 FLOW VELOCITY (FEET/SEC.) = 7.37  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50806.00 = 2634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50806.00 TO NODE 50807.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 450.00 DOWNSTREAM (FEET) = 400.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 639.00 CHANNEL SLOPE = 0.0782  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.159

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.83	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.99  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.30  
AVERAGE FLOW DEPTH (FEET) = 1.00 TRAVEL TIME (MIN.) = 1.69  
Tc (MIN.) = 18.79

SUBAREA AREA (ACRES) = 15.83 SUBAREA RUNOFF (CFS) = 9.38  
EFFECTIVE AREA (ACRES) = 37.82 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 37.8 PEAK FLOW RATE (CFS) = 22.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.07 FLOW VELOCITY (FEET/SEC.) = 6.58  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50807.00 = 3273.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50807.00 TO NODE 50808.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 400.00 DOWNSTREAM (FEET) = 350.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 448.00 CHANNEL SLOPE = 0.1116  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.122

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.46	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 24.50  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.74  
AVERAGE FLOW DEPTH (FEET) = 1.03 TRAVEL TIME (MIN.) = 0.96  
Tc (MIN.) = 19.76

SUBAREA AREA (ACRES) = 7.46 SUBAREA RUNOFF (CFS) = 4.17  
EFFECTIVE AREA (ACRES) = 45.28 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 25.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.04 FLOW VELOCITY (FEET/SEC.) = 7.78  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50808.00 = 3721.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50808.00 TO NODE 50809.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 350.00 DOWNSTREAM (FEET) = 283.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 438.00 CHANNEL SLOPE = 0.1530  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.097

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.20	0.50	0.972	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.972  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.33  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.90  
AVERAGE FLOW DEPTH (FEET) = 1.01 TRAVEL TIME (MIN.) = 0.82  
Tc (MIN.) = 20.58

SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 3.96  
EFFECTIVE AREA (ACRES) = 52.48 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 52.5 PEAK FLOW RATE (CFS) = 28.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.03 FLOW VELOCITY (FEET/SEC.) = 8.97  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50809.00 = 4159.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50809.00 TO NODE 50810.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 283.00 DOWNSTREAM (FEET) = 243.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 665.00 CHANNEL SLOPE = 0.0602  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.061

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	63.52	0.50	0.983	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.983  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 44.55  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.79



AVERAGE FLOW DEPTH (FEET) = 1.30 TRAVEL TIME (MIN.) = 1.26  
Tc (MIN.) = 21.84  
SUBAREA AREA (ACRES) = 63.52 SUBAREA RUNOFF (CFS) = 32.56  
EFFECTIVE AREA (ACRES) = 116.00 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 116.0 PEAK FLOW RATE (CFS) = 59.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.44 FLOW VELOCITY (FEET/SEC.) = 9.44  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50810.00 = 4824.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50810.00 TO NODE 50811.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 243.00 DOWNSTREAM (FEET) = 173.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1122.00 CHANNEL SLOPE = 0.0624  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.994

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.57	0.50	0.980	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 61.76

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.82

AVERAGE FLOW DEPTH (FEET) = 1.62 TRAVEL TIME (MIN.) = 2.39

Tc (MIN.) = 24.23

SUBAREA AREA (ACRES) = 11.57 SUBAREA RUNOFF (CFS) = 5.24

EFFECTIVE AREA (ACRES) = 127.57 AREA-AVERAGED Fm (INCH/HR) = 0.49

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 127.6 PEAK FLOW RATE (CFS) = 59.14

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.60 FLOW VELOCITY (FEET/SEC.) = 7.71

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50811.00 = 5946.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 24.23

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.994

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 1.64

EFFECTIVE AREA (ACRES) = 131.27 AREA-AVERAGED Fm (INCH/HR) = 0.49

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 131.3 PEAK FLOW RATE (CFS) = 59.14

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 131.3 TC (MIN.) = 24.23

EFFECTIVE AREA (ACRES) = 131.27 AREA-AVERAGED Fm (INCH/HR) = 0.49

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.988

PEAK FLOW RATE (CFS) = 59.14

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 2 \*  
\* HYDROLOGIC ANALYSIS - 5-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E502XX05.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.000; 2.230  
2) 6.000; 2.010  
3) 7.000; 1.850  
4) 8.000; 1.710  
5) 9.000; 1.600  
6) 10.000; 1.510  
7) 11.000; 1.430  
8) 12.000; 1.360  
9) 13.000; 1.300  
10) 14.000; 1.250  
11) 15.000; 1.200  
12) 20.000; 1.020  
13) 25.000; 0.900  
14) 30.000; 0.810  
15) 40.000; 0.690  
16) 50.000; 0.610  
17) 60.000; 0.550  
18) 90.000; 0.440  
19) 120.000; 0.370  
20) 180.000; 0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50200.00 TO NODE 50201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 497.00 DOWNSTREAM(FEET) = 365.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.563  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.648  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.50	1.000	95	8.56
NATURAL FAIR COVER "OPEN BRUSH"	-	0.60	0.50	1.000	95	8.56
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.20	0.50	1.000	95	8.56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.45  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 1.45

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50201.00 TO NODE 50202.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 365.00 DOWNSTREAM(FEET) = 335.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 259.00 CHANNEL SLOPE = 0.1158  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.45  
FLOW VELOCITY(FEET/SEC.) = 3.85 FLOW DEPTH(FEET) = 0.35  
TRAVEL TIME(MIN.) = 1.12  $T_c$ (MIN.) = 9.68  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50202.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50202.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.68  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.538  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.50 1.000 -  
USER-DEFINED - 0.70 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 2.52  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 3.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50203.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 335.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.1020  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.83  
FLOW VELOCITY(FEET/SEC.) = 4.69 FLOW DEPTH(FEET) = 0.52  
TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 10.38  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50203.00 = 781.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50203.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.38  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.480  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 2.80 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 3.70  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 7.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50204.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 304.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0696  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.32  
FLOW VELOCITY(FEET/SEC.) = 4.78 FLOW DEPTH(FEET) = 0.71  
TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 10.93  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50204.00 = 939.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50204.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.93  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.436  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 0.100 -  
USER-DEFINED - 0.80 0.50 1.000 -  
USER-DEFINED - 2.80 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 3.90  
EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 10.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50205.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 304.00 DOWNSTREAM(FEET) = 234.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 487.00 CHANNEL SLOPE = 0.1437  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.89  
FLOW VELOCITY(FEET/SEC.) = 8.56 FLOW DEPTH(FEET) = 0.65  
TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 11.88  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50205.00 = 1426.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 11.88  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.368  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.50 0.100 -

USER-DEFINED - 0.40 0.50 1.000 -  
 USER-DEFINED - 0.60 0.50 1.000 -  
 USER-DEFINED - 0.10 0.50 0.850 -  
 USER-DEFINED - 1.90 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 2.94  
 EFFECTIVE AREA(ACRES) = 16.10 AREA-AVERAGED Fm(INCH/HR) = 0.47  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 13.07

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 11.88  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.368  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.50	0.100	-
USER-DEFINED	-	1.10	0.50	1.000	-
USER-DEFINED	-	4.90	0.50	1.000	-
USER-DEFINED	-	1.50	0.50	0.850	-
USER-DEFINED	-	3.70	0.50	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.882  
 SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 10.51  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.46  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.91  
 TOTAL AREA(ACRES) = 28.7 PEAK FLOW RATE(CFS) = 23.59

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 28.7 TC(MIN.) = 11.88  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.46  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.910  
 PEAK FLOW RATE(CFS) = 23.59

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 3 \*  
\* HYDROLOGIC ANALYSIS - 5-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E503XX05.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	2.230
2)	6.000;	2.010
3)	7.000;	1.850
4)	8.000;	1.710
5)	9.000;	1.600
6)	10.000;	1.510
7)	11.000;	1.430
8)	12.000;	1.360
9)	13.000;	1.300
10)	14.000;	1.250
11)	15.000;	1.200
12)	20.000;	1.020
13)	25.000;	0.900
14)	30.000;	0.810
15)	40.000;	0.690
16)	50.000;	0.610
17)	60.000;	0.550
18)	90.000;	0.440
19)	120.000;	0.370
20)	180.000;	0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	(FT)	(FT)	SIDE / SIDE/ WAY	(FT)	(FT)	(FT)	(FT)	(n)
			HALF- CROWN TO STREET-CROSSFALL:				CURB GUTTER-GEOMETRIES:	MANNING
			WIDTH CROSSFALL IN- / OUT-/PARK-				HEIGHT WIDTH LIP HIKE	FACTOR

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50300.00 TO NODE 50301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00  
ELEVATION DATA: UPSTREAM(FEET) = 1110.00 DOWNSTREAM(FEET) = 1035.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.517  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.553  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.60	0.50	1.000	95	9.52
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.50	1.000	95	9.52

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.85  
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 0.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50301.00 TO NODE 50302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 960.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 225.00 CHANNEL SLOPE = 0.3333  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.85  
FLOW VELOCITY(FEET/SEC.) = 4.96 FLOW DEPTH(FEET) = 0.24  
TRAVEL TIME(MIN.) = 0.76  $T_c$ (MIN.) = 10.27  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50302.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50302.00 TO NODE 50302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN) = 10.27
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.488
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.50    1.000   -
USER-DEFINED        -         1.00    0.50    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.10    SUBAREA RUNOFF(CFS) = 0.98
EFFECTIVE AREA(ACRES) = 2.00    AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.0        PEAK FLOW RATE(CFS) = 1.78

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*****
FLOW PROCESS FROM NODE 50302.00 TO NODE 50303.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 84.00 CHANNEL SLOPE = 0.1190
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.78
FLOW VELOCITY(FEET/SEC.) = 4.14 FLOW DEPTH(FEET) = 0.38
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 10.61
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50303.00 = 631.00 FEET.

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*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50303.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.61
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.461
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.50    1.000   -
USER-DEFINED        -         0.30    0.50    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.70    SUBAREA RUNOFF(CFS) = 0.61
EFFECTIVE AREA(ACRES) = 2.70    AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.7        PEAK FLOW RATE(CFS) = 2.33

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*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50304.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 940.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 72.00 CHANNEL SLOPE = 0.1389
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

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MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.33
FLOW VELOCITY(FEET/SEC.) = 4.65 FLOW DEPTH(FEET) = 0.41
TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 10.87
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50304.00 = 703.00 FEET.

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*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50304.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.87
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.440
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.30    0.50    1.000   -
USER-DEFINED        -         0.90    0.50    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.20    SUBAREA RUNOFF(CFS) = 1.86
EFFECTIVE AREA(ACRES) = 4.90    AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.9        PEAK FLOW RATE(CFS) = 4.15

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*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50305.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 940.00 DOWNSTREAM(FEET) = 890.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.2941
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.15
FLOW VELOCITY(FEET/SEC.) = 7.15 FLOW DEPTH(FEET) = 0.44
TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 11.27
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50305.00 = 873.00 FEET.

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*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.27
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.411
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00    0.50    1.000   -
USER-DEFINED        -         0.80    0.50    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.80    SUBAREA RUNOFF(CFS) = 2.30
EFFECTIVE AREA(ACRES) = 7.70    AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 7.7        PEAK FLOW RATE(CFS) = 6.31

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*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50306.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 890.00 DOWNSTREAM(FEET) = 785.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 439.00 CHANNEL SLOPE = 0.2392
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 6.31
FLOW VELOCITY(FEET/SEC.) = 7.30 FLOW DEPTH(FEET) = 0.54
TRAVEL TIME(MIN.) = 1.00 Tc(MIN.) = 12.27
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50306.00 = 1312.00 FEET.

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*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.27
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.344
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         3.80   0.50  1.000  -
USER-DEFINED       -         3.30   0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 5.39
EFFECTIVE AREA(ACRES) = 14.80 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.8 PEAK FLOW RATE(CFS) = 11.24

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*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50307.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 737.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 213.00 CHANNEL SLOPE = 0.2254
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 11.24
FLOW VELOCITY(FEET/SEC.) = 8.24 FLOW DEPTH(FEET) = 0.67
TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 12.70
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50307.00 = 1525.00 FEET.

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*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.70
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.318
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         2.00   0.50  1.000  -
USER-DEFINED       -         0.90   0.50  1.000  -
USER-DEFINED       -         0.20   0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 2.28
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 13.18

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*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50308.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 737.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 527.00 CHANNEL SLOPE = 0.2600
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 13.18
FLOW VELOCITY(FEET/SEC.) = 9.04 FLOW DEPTH(FEET) = 0.70
TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 13.67
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50308.00 = 2052.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 13.67
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.266
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         5.70   0.50  1.000  -
USER-DEFINED       -         1.00   0.50  1.000  -
USER-DEFINED       -         3.30   0.50  1.000  -
USER-DEFINED       -         0.40   0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 7.17
EFFECTIVE AREA(ACRES) = 28.30 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 28.3 PEAK FLOW RATE(CFS) = 19.52

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*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50309.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 555.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 561.00 CHANNEL SLOPE = 0.0802
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00

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CHANNEL FLOW THRU SUBAREA(CFS) = 19.52  
FLOW VELOCITY(FEET/SEC.) = 6.45 FLOW DEPTH(FEET) = 1.00  
TRAVEL TIME(MIN.) = 1.45 Tc(MIN.) = 15.12  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 2613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 15.12  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.196  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.50	1.000	-
USER-DEFINED	-	0.80	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 1.94  
EFFECTIVE AREA(ACRES) = 31.40 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.4 PEAK FLOW RATE(CFS) = 19.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50310.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 555.00 DOWNSTREAM(FEET) = 509.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 401.00 CHANNEL SLOPE = 0.1147  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 19.65  
FLOW VELOCITY(FEET/SEC.) = 7.36 FLOW DEPTH(FEET) = 0.94  
TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 16.03  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50310.00 = 3014.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 16.03  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.163  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	1.60	0.50	1.000	-
USER-DEFINED	-	7.60	0.50	1.000	-
USER-DEFINED	-	6.60	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 10.32

EFFECTIVE AREA(ACRES) = 48.70 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 48.7 PEAK FLOW RATE(CFS) = 29.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50311.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 509.00 DOWNSTREAM(FEET) = 395.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 685.00 CHANNEL SLOPE = 0.1664  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 29.05  
FLOW VELOCITY(FEET/SEC.) = 9.32 FLOW DEPTH(FEET) = 1.02  
TRAVEL TIME(MIN.) = 1.23 Tc(MIN.) = 17.25  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50311.00 = 3699.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50311.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.25  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.119  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.50	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	2.90	0.50	1.000	-
USER-DEFINED	-	1.50	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 5.23  
EFFECTIVE AREA(ACRES) = 58.10 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 58.1 PEAK FLOW RATE(CFS) = 32.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50312.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 383.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 216.00 CHANNEL SLOPE = 0.0556  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 32.35  
FLOW VELOCITY(FEET/SEC.) = 6.36 FLOW DEPTH(FEET) = 1.30  
TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 17.82  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50312.00 = 3915.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.82

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.099

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.50	1.000	-
USER-DEFINED	-	1.50	0.50	1.000	-
USER-DEFINED	-	18.40	0.50	1.000	-
USER-DEFINED	-	11.60	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	1.80	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 37.70 SUBAREA RUNOFF (CFS) = 20.30

EFFECTIVE AREA (ACRES) = 95.80 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 95.8 PEAK FLOW RATE (CFS) = 51.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.82

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.099

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.30	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 3.40 SUBAREA RUNOFF (CFS) = 1.83

EFFECTIVE AREA (ACRES) = 99.20 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 99.2 PEAK FLOW RATE (CFS) = 53.42

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50313.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 383.00 DOWNSTREAM (FEET) = 350.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 762.00 CHANNEL SLOPE = 0.0433

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00

CHANNEL FLOW THRU SUBAREA (CFS) = 53.42

FLOW VELOCITY (FEET/SEC.) = 6.58 FLOW DEPTH (FEET) = 1.65

TRAVEL TIME (MIN.) = 1.93 Tc (MIN.) = 19.75

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50313.00 = 4677.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 19.75

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.029

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	3.30	0.50	1.000	-
USER-DEFINED	-	0.60	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 3.00

EFFECTIVE AREA (ACRES) = 105.50 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 105.5 PEAK FLOW RATE (CFS) = 53.42

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 19.75

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.029

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.30	0.50	1.000	-
USER-DEFINED	-	1.60	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 10.90 SUBAREA RUNOFF (CFS) = 5.19

EFFECTIVE AREA (ACRES) = 116.40 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 116.4 PEAK FLOW RATE (CFS) = 55.40

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50314.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 350.00 DOWNSTREAM (FEET) = 318.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 957.00 CHANNEL SLOPE = 0.0334

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00

CHANNEL FLOW THRU SUBAREA (CFS) = 55.40

FLOW VELOCITY (FEET/SEC.) = 6.02 FLOW DEPTH (FEET) = 1.75

TRAVEL TIME (MIN.) = 2.65 Tc (MIN.) = 22.40

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50314.00 = 5634.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.40  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.962  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.30 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 3.70 0.50 1.000 -  
USER-DEFINED - 3.40 0.50 1.000 -  
USER-DEFINED - 2.00 0.50 1.000 -  
USER-DEFINED - 10.20 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 21.80 SUBAREA RUNOFF(CFS) = 9.07  
EFFECTIVE AREA(ACRES) = 138.20 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 138.2 PEAK FLOW RATE(CFS) = 57.49

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.40  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.962  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.80 0.50 1.000 -  
USER-DEFINED - 15.20 0.50 1.000 -  
USER-DEFINED - 5.90 0.50 1.000 -  
USER-DEFINED - 1.30 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 1.30 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 34.70 SUBAREA RUNOFF(CFS) = 14.44  
EFFECTIVE AREA(ACRES) = 172.90 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 172.9 PEAK FLOW RATE(CFS) = 71.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.40  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.962  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 0.33

EFFECTIVE AREA(ACRES) = 173.70 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 173.7 PEAK FLOW RATE(CFS) = 72.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50314.00 TO NODE 50315.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 318.00 DOWNSTREAM(FEET) = 313.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00 CHANNEL SLOPE = 0.0179  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 72.26  
FLOW VELOCITY(FEET/SEC.) = 5.07 FLOW DEPTH(FEET) = 2.18  
TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 23.32  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50315.00 = 5914.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50315.00 TO NODE 50315.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.32  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.940  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 1.000 -  
USER-DEFINED - 0.60 0.50 1.000 -  
USER-DEFINED - 0.50 0.50 1.000 -  
USER-DEFINED - 2.40 0.50 1.000 -  
USER-DEFINED - 2.00 0.50 1.000 -  
USER-DEFINED - 0.50 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 2.65  
EFFECTIVE AREA(ACRES) = 180.40 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 180.4 PEAK FLOW RATE(CFS) = 72.26  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50315.00 TO NODE 50316.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 313.00 DOWNSTREAM(FEET) = 285.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 642.00 CHANNEL SLOPE = 0.0436  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 72.26  
FLOW VELOCITY(FEET/SEC.) = 7.09 FLOW DEPTH(FEET) = 1.84  
TRAVEL TIME(MIN.) = 1.51 Tc(MIN.) = 24.83  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50316.00 = 6556.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 24.83

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.904

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	3.50	0.50	1.000	-
USER-DEFINED	-	1.00	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	2.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 2.65

EFFECTIVE AREA(ACRES) = 187.70 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 187.7 PEAK FLOW RATE(CFS) = 72.26

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 24.83

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.904

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 0.80

EFFECTIVE AREA(ACRES) = 189.90 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 189.9 PEAK FLOW RATE(CFS) = 72.26

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50316.00 TO NODE 50317.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 448.00 CHANNEL SLOPE = 0.0067  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 72.26  
 FLOW VELOCITY(FEET/SEC.) = 3.51 FLOW DEPTH(FEET) = 2.62  
 TRAVEL TIME(MIN.) = 2.13 Tc(MIN.) = 26.96  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50317.00 = 7004.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 26.96

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.865

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.50	1.000	-
USER-DEFINED	-	2.90	0.50	1.000	-
USER-DEFINED	-	2.60	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	10.20	0.50	1.000	-
USER-DEFINED	-	42.80	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997

SUBAREA AREA(ACRES) = 59.70 SUBAREA RUNOFF(CFS) = 19.67

EFFECTIVE AREA(ACRES) = 249.60 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 249.6 PEAK FLOW RATE(CFS) = 81.98

\*\*\*\*\*

FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 26.96

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.865

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.50	1.000	-
USER-DEFINED	-	17.50	0.50	1.000	-
USER-DEFINED	-	22.00	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 65.80 SUBAREA RUNOFF(CFS) = 21.59

EFFECTIVE AREA(ACRES) = 315.40 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 315.4 PEAK FLOW RATE(CFS) = 103.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 50317.00 TO NODE 50318.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 233.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 600.00 CHANNEL SLOPE = 0.0817  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 103.57  
 FLOW VELOCITY(FEET/SEC.) = 9.83 FLOW DEPTH(FEET) = 1.87  
 TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 27.97

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50318.00 = 7604.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 27.97

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.846

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	0.100	-
USER-DEFINED	-	1.50	0.50	1.000	-
USER-DEFINED	-	1.60	0.50	1.000	-
USER-DEFINED	-	2.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.839

SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 2.57

EFFECTIVE AREA(ACRES) = 322.10 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 322.1 PEAK FLOW RATE(CFS) = 103.57

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 27.97

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.846

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	0.90	0.50	0.850	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	5.00	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.935

SUBAREA AREA(ACRES) = 7.60 SUBAREA RUNOFF(CFS) = 2.59

EFFECTIVE AREA(ACRES) = 329.70 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 329.7 PEAK FLOW RATE(CFS) = 103.57

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50318.00 TO NODE 50319.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 233.00 DOWNSTREAM(FEET) = 228.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 201.00 CHANNEL SLOPE = 0.0249

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00

CHANNEL FLOW THRU SUBAREA(CFS) = 103.57

FLOW VELOCITY(FEET/SEC.) = 7.81 FLOW DEPTH(FEET) = 2.10

TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 28.40

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50319.00 = 7805.00 FEET.

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FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 28.40

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.839

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	2.30	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 2.45

EFFECTIVE AREA(ACRES) = 336.00 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 336.0 PEAK FLOW RATE(CFS) = 103.69

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FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 28.40

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.839

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.50	1.000	-
USER-DEFINED	-	1.60	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	0.850	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	1.40	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.994

SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 2.40

EFFECTIVE AREA(ACRES) = 343.80 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 343.8 PEAK FLOW RATE(CFS) = 106.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50320.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 228.00 DOWNSTREAM(FEET) = 214.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 809.00 CHANNEL SLOPE = 0.0173  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 106.09  
 FLOW VELOCITY(FEET/SEC.) = 6.86 FLOW DEPTH(FEET) = 2.27  
 TRAVEL TIME(MIN.) = 1.97 Tc(MIN.) = 30.37  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50320.00 = 8614.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 30.37

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.806

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.50	0.50	1.000	-
USER-DEFINED	-	4.80	0.50	0.850	-
USER-DEFINED	-	5.80	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.929

SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 3.50

EFFECTIVE AREA(ACRES) = 355.20 AREA-AVERAGED Fm(INCH/HR) = 0.49

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 355.2 PEAK FLOW RATE(CFS) = 106.09

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 30.37

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.806

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.90	0.50	0.850	-
USER-DEFINED	-	0.30	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.854

SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 3.81

EFFECTIVE AREA(ACRES) = 366.40 AREA-AVERAGED Fm(INCH/HR) = 0.49

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 366.4 PEAK FLOW RATE(CFS) = 106.09

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 366.4 TC(MIN.) = 30.37

EFFECTIVE AREA(ACRES) = 366.40 AREA-AVERAGED Fm(INCH/HR) = 0.49

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.985

PEAK FLOW RATE(CFS) = 106.09

\*\*\*\*\*

=====  
 END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 4 \*  
\* HYDROLOGIC ANALYSIS - 5-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E504XX05.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	2.230
2)	6.000;	2.010
3)	7.000;	1.850
4)	8.000;	1.710
5)	9.000;	1.600
6)	10.000;	1.510
7)	11.000;	1.430
8)	12.000;	1.360
9)	13.000;	1.300
10)	14.000;	1.250
11)	15.000;	1.200
12)	20.000;	1.020
13)	25.000;	0.900
14)	30.000;	0.810
15)	40.000;	0.690
16)	50.000;	0.610
17)	60.000;	0.550
18)	90.000;	0.440
19)	120.000;	0.370
20)	180.000;	0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	(FT)	(FT)	SIDE / SIDE/ WAY	(FT)	(FT)	(FT)	(FT)	(n)
			HALF- CROWN TO STREET-CROSSFALL:	CURB	GUTTER-GEOMETRIES:	MANNING		
			WIDTH CROSSFALL IN- / OUT-/PARK-	HEIGHT	WIDTH LIP	HIKE	FACTOR	

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.482

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.471

SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.50	0.50	1.000	95	10.48

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000

SUBAREA RUNOFF(CFS) = 0.44

TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.44  
FLOW VELOCITY(FEET/SEC.) = 3.81 FLOW DEPTH(FEET) = 0.20  
TRAVEL TIME(MIN.) = 1.15  $T_c$ (MIN.) = 11.63  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.63



\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.386  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.32  
 EFFECTIVE AREA (ACRES) = 0.90 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 0.72

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 239.00 CHANNEL SLOPE = 0.4184  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 0.72  
 FLOW VELOCITY (FEET/SEC.) = 5.10 FLOW DEPTH (FEET) = 0.22  
 TRAVEL TIME (MIN.) = 0.78 Tc (MIN.) = 12.41  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50403.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.41  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.336  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.50 1.000 -  
 USER-DEFINED - 0.20 0.50 1.000 -  
 USER-DEFINED - 0.10 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.30  
 EFFECTIVE AREA (ACRES) = 1.30 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.3 PEAK FLOW RATE (CFS) = 0.98

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00 CHANNEL SLOPE = 0.7042  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 0.98

FLOW VELOCITY (FEET/SEC.) = 6.83 FLOW DEPTH (FEET) = 0.22  
 TRAVEL TIME (MIN.) = 0.17 Tc (MIN.) = 12.58  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50404.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.58  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.325  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.50 1.000 -  
 USER-DEFINED - 0.80 0.50 1.000 -  
 USER-DEFINED - 0.30 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 0.89  
 EFFECTIVE AREA (ACRES) = 2.50 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.5 PEAK FLOW RATE (CFS) = 1.86

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 145.00 CHANNEL SLOPE = 0.3448  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1.86  
 FLOW VELOCITY (FEET/SEC.) = 6.13 FLOW DEPTH (FEET) = 0.32  
 TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 12.98  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50405.00 TO NODE 50405.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.98  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.301  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.50 1.000 -  
 USER-DEFINED - 0.80 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 0.79  
 EFFECTIVE AREA (ACRES) = 3.60 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.6 PEAK FLOW RATE (CFS) = 2.60

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*****
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.60
FLOW VELOCITY(FEET/SEC.) = 6.55 FLOW DEPTH(FEET) = 0.36
TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 13.38
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50406.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 13.38
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.281
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.50    1.000  -
USER-DEFINED        -         0.20    0.50    1.000  -
USER-DEFINED        -         0.80    0.50    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 0.84
EFFECTIVE AREA(ACRES) = 4.80 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 3.37

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*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.2193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.37
FLOW VELOCITY(FEET/SEC.) = 6.03 FLOW DEPTH(FEET) = 0.43
TRAVEL TIME(MIN.) = 0.63 Tc(MIN.) = 14.01
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50407.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.01
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.250
SUBAREA LOSS RATE DATA(AMC II):

```

```

DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.50    0.50    1.000  -
USER-DEFINED        -         1.20    0.50    1.000  -
USER-DEFINED        -         1.70    0.50    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 4.32
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 7.55

```

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*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 325.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 490.00 CHANNEL SLOPE = 0.1531
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.55
FLOW VELOCITY(FEET/SEC.) = 6.49 FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 1.26 Tc(MIN.) = 15.27
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 15.27
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.190
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.50    1.000  -
USER-DEFINED        -         0.10    0.50    1.000  -
USER-DEFINED        -         0.60    0.50    1.000  -
USER-DEFINED        -         1.30    0.50    1.000  -
USER-DEFINED        -         0.50    0.50    1.000  -
USER-DEFINED        -         1.20    0.50    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 2.36
EFFECTIVE AREA(ACRES) = 15.00 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.0 PEAK FLOW RATE(CFS) = 9.32

```

```

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 15.27
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.190
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 0.56  
EFFECTIVE AREA(ACRES) = 15.90 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.9 PEAK FLOW RATE(CFS) = 9.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.88  
FLOW VELOCITY(FEET/SEC.) = 5.09 FLOW DEPTH(FEET) = 0.80  
TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 15.50  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 15.50  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.182  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	1.60	0.50	1.000	-
USER-DEFINED	-	6.40	0.50	1.000	-
USER-DEFINED	-	6.30	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 14.80 SUBAREA RUNOFF(CFS) = 9.08  
EFFECTIVE AREA(ACRES) = 30.70 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.7 PEAK FLOW RATE(CFS) = 18.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 15.50  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.182  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.37  
EFFECTIVE AREA(ACRES) = 31.30 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.3 PEAK FLOW RATE(CFS) = 19.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 19.20  
FLOW VELOCITY(FEET/SEC.) = 6.35 FLOW DEPTH(FEET) = 1.00  
TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 15.77  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 15.77  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.172  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	2.50	0.50	1.000	-
USER-DEFINED	-	1.20	0.50	1.000	-
USER-DEFINED	-	1.80	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 3.87  
EFFECTIVE AREA(ACRES) = 37.70 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 37.7 PEAK FLOW RATE(CFS) = 22.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 15.77  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.172  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.36  
 EFFECTIVE AREA(ACRES) = 38.30 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 38.3 PEAK FLOW RATE(CFS) = 23.16

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 312.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 566.00 CHANNEL SLOPE = 0.0530  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 23.16  
 FLOW VELOCITY(FEET/SEC.) = 5.77 FLOW DEPTH(FEET) = 1.16  
 TRAVEL TIME(MIN.) = 1.63 Tc(MIN.) = 17.41  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.41  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.113  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	1.60	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	1.50	0.50	0.100	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658  
 SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 3.53  
 EFFECTIVE AREA(ACRES) = 43.30 AREA-AVERAGED Fm(INCH/HR) = 0.48  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 43.3 PEAK FLOW RATE(CFS) = 24.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.41  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.113  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.50	1.000	-

USER-DEFINED - 5.80 0.50 1.000 -  
 USER-DEFINED - 0.50 0.50 1.000 -  
 USER-DEFINED - 3.40 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 5.79  
 EFFECTIVE AREA(ACRES) = 53.80 AREA-AVERAGED Fm(INCH/HR) = 0.48  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 53.8 PEAK FLOW RATE(CFS) = 30.46

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 216.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 954.00 CHANNEL SLOPE = 0.0692  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 30.46  
 FLOW VELOCITY(FEET/SEC.) = 8.46 FLOW DEPTH(FEET) = 1.10  
 TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 19.29  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 19.29  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.046  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	1.00	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875  
 SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 1.97  
 EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.48  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 30.46  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 19.29  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.046  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.50	1.000	-

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	1.30	0.50	1.000	-
USER-DEFINED	-	9.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.999  
 SUBAREA AREA(ACRES) = 10.60      SUBAREA RUNOFF(CFS) = 5.21  
 EFFECTIVE AREA(ACRES) = 68.00      AREA-AVERAGED  $F_m$ (INCH/HR) = 0.48  
 AREA-AVERAGED  $F_p$ (INCH/HR) = 0.50      AREA-AVERAGED  $A_p$  = 0.97  
 TOTAL AREA(ACRES) = 68.0      PEAK FLOW RATE(CFS) = 34.36

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE  $T_c$ (MIN) = 19.29  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.046  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.50	0.850	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	1.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.934  
 SUBAREA AREA(ACRES) = 2.50      SUBAREA RUNOFF(CFS) = 1.30  
 EFFECTIVE AREA(ACRES) = 70.50      AREA-AVERAGED  $F_m$ (INCH/HR) = 0.48  
 AREA-AVERAGED  $F_p$ (INCH/HR) = 0.50      AREA-AVERAGED  $A_p$  = 0.97  
 TOTAL AREA(ACRES) = 70.5      PEAK FLOW RATE(CFS) = 35.66

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 70.5       $T_c$ (MIN.) = 19.29  
 EFFECTIVE AREA(ACRES) = 70.50      AREA-AVERAGED  $F_m$ (INCH/HR) = 0.48  
 AREA-AVERAGED  $F_p$ (INCH/HR) = 0.50      AREA-AVERAGED  $A_p$  = 0.967  
 PEAK FLOW RATE(CFS) = 35.66

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 2 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 5-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P201XX05.DAT  
TIME/DATE OF STUDY: 10:20 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.000; 2.230  
2) 6.000; 2.010  
3) 7.000; 1.850  
4) 8.000; 1.710  
5) 9.000; 1.600  
6) 10.000; 1.510  
7) 11.000; 1.430  
8) 12.000; 1.360  
9) 13.000; 1.300  
10) 14.000; 1.250  
11) 15.000; 1.200  
12) 20.000; 1.020  
13) 25.000; 0.900  
14) 30.000; 0.810  
15) 40.000; 0.690  
16) 50.000; 0.610  
17) 60.000; 0.550  
18) 90.000; 0.440  
19) 120.000; 0.370  
20) 180.000; 0.300  
\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20100.00 TO NODE 20101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 830.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.230  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.579  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.50	1.000	95	9.23
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.50	1.000	95	9.23

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.58  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20101.00 TO NODE 20102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 276.00 CHANNEL SLOPE = 0.2899  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.58  
FLOW VELOCITY(FEET/SEC.) = 4.37 FLOW DEPTH(FEET) = 0.21  
TRAVEL TIME(MIN.) = 1.05  $T_c$ (MIN.) = 10.28  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20102.00 = 595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20102.00 TO NODE 20102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN) = 10.28
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.487
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -      0.80    0.50    1.000  -
USER-DEFINED          -      0.20    0.50    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.00    SUBAREA RUNOFF(CFS) = 0.89
EFFECTIVE AREA(ACRES) = 1.60    AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6      PEAK FLOW RATE(CFS) = 1.42

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*****
FLOW PROCESS FROM NODE 20102.00 TO NODE 20103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

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=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.1863
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.42
FLOW VELOCITY(FEET/SEC.) = 4.53 FLOW DEPTH(FEET) = 0.32
TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 10.87
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20103.00 = 756.00 FEET.

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20103.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.87
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.440
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -      0.50    0.50    1.000  -
USER-DEFINED          -      0.10    0.50    1.000  -
USER-DEFINED          -      0.30    0.50    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90    SUBAREA RUNOFF(CFS) = 0.76
EFFECTIVE AREA(ACRES) = 2.50    AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.5      PEAK FLOW RATE(CFS) = 2.11

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 690.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 64.00 CHANNEL SLOPE = 0.4688

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CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.11
FLOW VELOCITY(FEET/SEC.) = 7.07 FLOW DEPTH(FEET) = 0.32
TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 11.02
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20104.00 = 820.00 FEET.

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.02
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.428
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -      0.40    0.50    1.000  -
USER-DEFINED          -      3.30    0.50    1.000  -
USER-DEFINED          -      0.10    0.50    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 3.17
EFFECTIVE AREA(ACRES) = 6.30    AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.3      PEAK FLOW RATE(CFS) = 5.26

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 690.00 DOWNSTREAM(FEET) = 670.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 159.00 CHANNEL SLOPE = 0.1258
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.26
FLOW VELOCITY(FEET/SEC.) = 5.45 FLOW DEPTH(FEET) = 0.57
TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 11.51
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20105.00 = 979.00 FEET.

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*****
FLOW PROCESS FROM NODE 20105.00 TO NODE 20105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.51
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.394
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -      0.20    0.50    1.000  -
USER-DEFINED          -      1.50    0.50    1.000  -
USER-DEFINED          -      2.20    0.50    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90    SUBAREA RUNOFF(CFS) = 3.14

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EFFECTIVE AREA(ACRES) = 10.20 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 10.2 PEAK FLOW RATE(CFS) = 8.21

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FLOW PROCESS FROM NODE 20105.00 TO NODE 20106.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 670.00 DOWNSTREAM(FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 192.00 CHANNEL SLOPE = 0.1042  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 8.21  
FLOW VELOCITY(FEET/SEC.) = 5.72 FLOW DEPTH(FEET) = 0.69  
TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 12.07  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20106.00 = 1171.00 FEET.

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FLOW PROCESS FROM NODE 20106.00 TO NODE 20106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 12.07  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.356  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.50 1.000 -  
USER-DEFINED - 2.10 0.50 1.000 -  
USER-DEFINED - 0.90 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 2.93  
EFFECTIVE AREA(ACRES) = 14.00 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 10.78

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FLOW PROCESS FROM NODE 20106.00 TO NODE 20107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 650.00 DOWNSTREAM(FEET) = 640.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 156.00 CHANNEL SLOPE = 0.0641  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.78  
FLOW VELOCITY(FEET/SEC.) = 5.07 FLOW DEPTH(FEET) = 0.84  
TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 12.58  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20107.00 = 1327.00 FEET.

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FLOW PROCESS FROM NODE 20107.00 TO NODE 20107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN) = 12.58  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.325

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 1.20 0.50 1.000 -  
USER-DEFINED - 2.30 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 2.97  
EFFECTIVE AREA(ACRES) = 18.00 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 18.0 PEAK FLOW RATE(CFS) = 13.36

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FLOW PROCESS FROM NODE 20107.00 TO NODE 20108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 640.00 DOWNSTREAM(FEET) = 609.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 512.00 CHANNEL SLOPE = 0.0605  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 13.36  
FLOW VELOCITY(FEET/SEC.) = 5.26 FLOW DEPTH(FEET) = 0.92  
TRAVEL TIME(MIN.) = 1.62 Tc(MIN.) = 14.21  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20108.00 = 1839.00 FEET.

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 14.21  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.240  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 0.200 -  
USER-DEFINED - 1.50 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 0.80 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 1.83  
EFFECTIVE AREA(ACRES) = 20.70 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.7 PEAK FLOW RATE(CFS) = 13.81

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<



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=====
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 600.00
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.90
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.81
PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 14.46
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20109.00 = 2033.00 FEET.

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FLOW PROCESS FROM NODE 20109.00 TO NODE 20109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 14.46
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.227
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.70     0.50     0.200   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.71
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 14.29

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*****
FLOW PROCESS FROM NODE 20109.00 TO NODE 20110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 594.00
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.82
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 14.29
PIPE TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 15.14
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20110.00 = 2393.00 FEET.

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*****
FLOW PROCESS FROM NODE 20110.00 TO NODE 20110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 15.14
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.195
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.30     0.50     0.100   -
USER-DEFINED         -        3.50     0.50     0.200   -
USER-DEFINED         -        2.70     0.50     1.000   -
USER-DEFINED         -        0.20     0.50     1.000   -
USER-DEFINED         -        1.20     0.50     1.000   -

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```

USER-DEFINED         -        0.30     0.50     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 6.51
EFFECTIVE AREA(ACRES) = 29.60 AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 29.6 PEAK FLOW RATE(CFS) = 20.18

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*****
FLOW PROCESS FROM NODE 20110.00 TO NODE 20111.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 594.00 DOWNSTREAM(FEET) = 590.00
FLOW LENGTH(FEET) = 246.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.53
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.18
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 15.57
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20111.00 = 2639.00 FEET.

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*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 15.57
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.180
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN

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USER-DEFINED         -        0.70     0.50     0.100   -
USER-DEFINED         -        2.10     0.50     0.200   -
USER-DEFINED         -        2.10     0.50     1.000   -
USER-DEFINED         -        0.60     0.50     1.000   -
USER-DEFINED         -        4.70     0.50     1.000   -
USER-DEFINED         -        0.90     0.50     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.792
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 7.83
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.43
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 27.60

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*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20112.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 580.00
FLOW LENGTH(FEET) = 628.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.22
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 27.60

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PIPE TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 16.59  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20112.00 = 3267.00 FEET.

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FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.59

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.143

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.50	0.100	-
USER-DEFINED	-	0.90	0.50	0.200	-
USER-DEFINED	-	4.40	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	7.50	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.797

SUBAREA AREA(ACRES) = 15.20 SUBAREA RUNOFF(CFS) = 10.18

EFFECTIVE AREA(ACRES) = 55.90 AREA-AVERAGED Fm(INCH/HR) = 0.42

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 55.9 PEAK FLOW RATE(CFS) = 36.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.59

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.143

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	0.850	-
USER-DEFINED	-	0.80	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 1.44

EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.42

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 37.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20113.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 580.00 DOWNSTREAM(FEET) = 570.00

FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.65

ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 37.87  
PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 17.33  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20113.00 = 3786.00 FEET.

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FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.33

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.116

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.50	0.100	-
USER-DEFINED	-	4.30	0.50	0.850	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	1.80	0.50	1.000	-
USER-DEFINED	-	4.60	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.877

SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 7.68

EFFECTIVE AREA(ACRES) = 70.90 AREA-AVERAGED Fm(INCH/HR) = 0.42

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 44.14

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FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.33

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.116

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	0.100	-
USER-DEFINED	-	0.90	0.50	0.850	-
USER-DEFINED	-	1.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.787

SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 2.34

EFFECTIVE AREA(ACRES) = 74.50 AREA-AVERAGED Fm(INCH/HR) = 0.42

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 74.5 PEAK FLOW RATE(CFS) = 46.48

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20114.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00

FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 9.05

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 46.48  
PIPE TRAVEL TIME(MIN.) = 1.12 Tc(MIN.) = 18.45  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20114.00 = 4393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 18.45  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.076  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.50 0.100 -  
USER-DEFINED - 4.00 0.50 0.850 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 1.40 0.50 1.000 -  
USER-DEFINED - 0.50 0.50 0.100 -  
USER-DEFINED - 0.90 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.747  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 4.99  
EFFECTIVE AREA(ACRES) = 82.40 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 82.4 PEAK FLOW RATE(CFS) = 48.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 18.45  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.076  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.50 1.000 -  
USER-DEFINED - 8.20 0.50 1.000 -  
USER-DEFINED - 3.20 0.50 1.000 -  
USER-DEFINED - 0.70 0.50 0.100 -  
USER-DEFINED - 3.70 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.932  
SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 9.60  
EFFECTIVE AREA(ACRES) = 99.90 AREA-AVERAGED Fm(INCH/HR) = 0.43  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 99.9 PEAK FLOW RATE(CFS) = 58.37

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20115.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 560.00  
FLOW LENGTH(FEET) = 461.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.53  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 58.37  
PIPE TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 19.18  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20115.00 = 4854.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 19.18  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.049  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.60 0.50 0.850 -  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 1.40 0.50 0.100 -  
USER-DEFINED - 6.20 0.50 0.850 -  
USER-DEFINED - 2.20 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798  
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 7.49  
EFFECTIVE AREA(ACRES) = 112.70 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 112.7 PEAK FLOW RATE(CFS) = 63.50

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 19.18  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.049  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.35  
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 63.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20116.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 560.00 DOWNSTREAM(FEET) = 528.00  
FLOW LENGTH(FEET) = 219.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 28.86

ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 63.84  
 PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 19.31  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20116.00 = 5073.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20116.00 TO NODE 20117.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 489.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 174.00 CHANNEL SLOPE = 0.2241  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 63.84  
 FLOW VELOCITY(FEET/SEC.) = 15.75 FLOW DEPTH(FEET) = 1.16  
 TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 19.49  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20117.00 = 5247.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.49  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.038  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.50	0.850	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.910  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 1.31  
 EFFECTIVE AREA(ACRES) = 115.90 AREA-AVERAGED Fm(INCH/HR) = 0.42  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 115.9 PEAK FLOW RATE(CFS) = 64.01

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.49  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.038  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.50	0.200	-
USER-DEFINED	-	3.30	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	6.50	0.50	1.000	-

USER-DEFINED - 0.20 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.855  
 SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 7.03  
 EFFECTIVE AREA(ACRES) = 128.70 AREA-AVERAGED Fm(INCH/HR) = 0.42  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 128.7 PEAK FLOW RATE(CFS) = 71.05

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.49  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.038  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	2.80	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 2.52  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 133.8 PEAK FLOW RATE(CFS) = 73.57

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 133.8 TC(MIN.) = 19.49  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.854  
 PEAK FLOW RATE(CFS) = 73.57

=====

END OF RATIONAL METHOD ANALYSIS



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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S31 \*  
\* Rational Method Hydrology Analysis - 5-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S31.DAT  
TIME/DATE OF STUDY: 16:20 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.184
- 2) 10.00; 1.510
- 3) 15.00; 1.203
- 4) 20.00; 1.023
- 5) 25.00; 0.902
- 6) 30.00; 0.826
- 7) 40.00; 0.693
- 8) 50.00; 0.611
- 9) 60.00; 0.546
- 10) 90.00; 0.439
- 11) 120.00; 0.374
- 12) 180.00; 0.306
- 13) 360.00; 0.211
- 14) 1440.00; 0.088

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL IN- / OUT- / PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	MANNING LIP (FT)	HIKE FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13100.00 TO NODE 13101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.58  
ELEVATION DATA: UPSTREAM(FEET) = 1069.66 DOWNSTREAM(FEET) = 969.92

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.312  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.738  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.94	0.50	1.000	0	8.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.05  
TOTAL AREA(ACRES) = 0.94 PEAK FLOW RATE(CFS) = 1.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13101.00 TO NODE 13102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 969.92 DOWNSTREAM(FEET) = 807.20  
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.89 CHANNEL SLOPE = 0.2444  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.477  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.67	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.44  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.99  
AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 2.22  
Tc(MIN.) = 10.54  
SUBAREA AREA(ACRES) = 7.67 SUBAREA RUNOFF(CFS) = 6.74  
EFFECTIVE AREA(ACRES) = 8.61 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 7.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.67 FLOW VELOCITY(FEET/SEC.) = 5.68  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13102.00 = 948.47 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13102.00 TO NODE 13103.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 807.20 DOWNSTREAM(FEET) = 769.94
CHANNEL LENGTH THRU SUBAREA(FEET) = 691.01 CHANNEL SLOPE = 0.0539
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.292
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.65 0.50 0.999 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.98
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.83
AVERAGE FLOW DEPTH(FEET) = 1.14 TRAVEL TIME(MIN.) = 3.01
Tc(MIN.) = 13.54
SUBAREA AREA(ACRES) = 20.65 SUBAREA RUNOFF(CFS) = 14.73
EFFECTIVE AREA(ACRES) = 29.26 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 29.3 PEAK FLOW RATE(CFS) = 20.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.29 FLOW VELOCITY(FEET/SEC.) = 4.15
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13103.00 = 1639.48 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 769.94 DOWNSTREAM(FEET) = 693.88
FLOW LENGTH(FEET) = 1563.10 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 9.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.19
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.87
PIPE TRAVEL TIME(MIN.) = 1.84 Tc(MIN.) = 15.38
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13104.00 = 3202.58 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.38
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.189
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 28.00 0.50 0.750 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750

SUBAREA AREA(ACRES) = 28.00 SUBAREA RUNOFF(CFS) = 20.51
EFFECTIVE AREA(ACRES) = 57.26 AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 57.3 PEAK FLOW RATE(CFS) = 38.66

\*\*\*\*\*
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 693.88 DOWNSTREAM(FEET) = 645.69
FLOW LENGTH(FEET) = 1068.98 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 13.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.42
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 38.66
PIPE TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 16.46
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13105.00 = 4271.56 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.46
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.150
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 35.28 0.50 0.867 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867
SUBAREA AREA(ACRES) = 35.28 SUBAREA RUNOFF(CFS) = 22.75
EFFECTIVE AREA(ACRES) = 92.54 AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 59.39

\*\*\*\*\*
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 645.69 DOWNSTREAM(FEET) = 608.48
FLOW LENGTH(FEET) = 1127.55 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 18.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.39
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 59.39
PIPE TRAVEL TIME(MIN.) = 1.15 Tc(MIN.) = 17.61
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 17.61
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.109
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      37.68   0.50    0.889  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.889
SUBAREA AREA(ACRES) = 37.68   SUBAREA RUNOFF(CFS) = 22.52
EFFECTIVE AREA(ACRES) = 130.22  AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 130.2     PEAK FLOW RATE(CFS) = 78.49

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\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 15.1

>>>>DEFINE MEMORY BANK # 2 <<<<

PEAK FLOWRATE TABLE FILE NAME: S30.DNA

MEMORY BANK # 2 DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	497.31	41.52	0.50( 0.40)	0.81	1990.5	13000.00
2	455.52	44.80	0.50( 0.40)	0.81	2016.1	13010.00
TOTAL AREA(ACRES) = 2016.1						

\*\*\*\*\*

FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 14.0

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<

\*\*\*\*\*

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	497.31	41.52	0.50( 0.40)	0.81	1990.5	13000.00
2	455.52	44.80	0.50( 0.40)	0.81	2016.1	13010.00
TOTAL AREA(ACRES) = 2016.1						

\*\*\*\*\*

FLOW PROCESS FROM NODE 13026.00 TO NODE 13106.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

\*\*\*\*\*

ELEVATION DATA: UPSTREAM(FEET) = 662.66 DOWNSTREAM(FEET) = 608.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 3098.88 CHANNEL SLOPE = 0.0175  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.639

SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      75.28   0.50    0.755  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.755
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 506.16
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.15
AVERAGE FLOW DEPTH(FEET) = 4.08   TRAVEL TIME(MIN.) = 5.09
Tc(MIN.) = 46.61
SUBAREA AREA(ACRES) = 75.28   SUBAREA RUNOFF(CFS) = 17.71
EFFECTIVE AREA(ACRES) = 2065.80  AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 2091.4     PEAK FLOW RATE(CFS) = 497.31
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 4.05 FLOW VELOCITY(FEET/SEC.) = 10.11

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\*\*\*\*

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	497.31	46.61	0.639	0.50( 0.40)	0.80	2065.8	13000.00
2	455.52	50.00	0.611	0.50( 0.40)	0.80	2091.4	13010.00
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.							

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	78.49	17.61	1.109	0.50( 0.44)	0.88	130.2	13100.00
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.							

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	575.80	17.61	1.109	0.50( 0.41)	0.81	910.7	13100.00
2	520.73	46.61	0.639	0.50( 0.40)	0.81	2196.0	13000.00
3	475.69	50.00	0.611	0.50( 0.40)	0.81	2221.6	13010.00
TOTAL AREA(ACRES) = 2221.6							

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 575.80 Tc(MIN.) = 17.610

EFFECTIVE AREA(ACRES) = 910.69 AREA-AVERAGED Fm(INCH/HR) = 0.41

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81

TOTAL AREA(ACRES) = 2221.6

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13106.00 TO NODE 13107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<



>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 608.48 DOWNSTREAM(FEET) = 584.29
CHANNEL LENGTH THRU SUBAREA(FEET) = 1650.20 CHANNEL SLOPE = 0.0147
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.015
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 190.45 0.50 0.755 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 630.40
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.05
AVERAGE FLOW DEPTH(FEET) = 4.57 TRAVEL TIME(MIN.) = 2.74
Tc(MIN.) = 20.35
SUBAREA AREA(ACRES) = 190.45 SUBAREA RUNOFF(CFS) = 109.19
EFFECTIVE AREA(ACRES) = 1101.14 AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 2412.1 PEAK FLOW RATE(CFS) = 606.99
END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.51 FLOW VELOCITY(FEET/SEC.) = 9.96
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13107.00 = 20924.84 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13107.00 TO NODE 13108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 584.29 DOWNSTREAM(FEET) = 563.78
CHANNEL LENGTH THRU SUBAREA(FEET) = 1061.67 CHANNEL SLOPE = 0.0193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.977
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 314.12 0.50 0.939 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.939
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 678.75
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.34
AVERAGE FLOW DEPTH(FEET) = 4.47 TRAVEL TIME(MIN.) = 1.56
Tc(MIN.) = 21.91
SUBAREA AREA(ACRES) = 314.12 SUBAREA RUNOFF(CFS) = 143.44
EFFECTIVE AREA(ACRES) = 1415.26 AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.83
TOTAL AREA(ACRES) = 2726.2 PEAK FLOW RATE(CFS) = 713.15
END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.55 FLOW VELOCITY(FEET/SEC.) = 11.48
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13108.00 = 21986.51 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13108.00 TO NODE 13109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 563.78 DOWNSTREAM(FEET) = 541.61
CHANNEL LENGTH THRU SUBAREA(FEET) = 1657.28 CHANNEL SLOPE = 0.0134
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.912
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 203.63 0.50 0.785 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 760.72
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.17
AVERAGE FLOW DEPTH(FEET) = 4.99 TRAVEL TIME(MIN.) = 2.72
Tc(MIN.) = 24.62
SUBAREA AREA(ACRES) = 203.63 SUBAREA RUNOFF(CFS) = 95.10
EFFECTIVE AREA(ACRES) = 1618.89 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.83
TOTAL AREA(ACRES) = 2929.8 PEAK FLOW RATE(CFS) = 724.86
END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.90 FLOW VELOCITY(FEET/SEC.) = 10.05
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13109.00 = 23643.79 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13109.00 TO NODE 13110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 541.61 DOWNSTREAM(FEET) = 509.94
CHANNEL LENGTH THRU SUBAREA(FEET) = 2016.96 CHANNEL SLOPE = 0.0157
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.861
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 283.06 0.50 0.791 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.791
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 784.15
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.88
AVERAGE FLOW DEPTH(FEET) = 4.90 TRAVEL TIME(MIN.) = 3.09
Tc(MIN.) = 27.71
SUBAREA AREA(ACRES) = 283.06 SUBAREA RUNOFF(CFS) = 118.55
EFFECTIVE AREA(ACRES) = 1901.95 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82
TOTAL AREA(ACRES) = 3212.9 PEAK FLOW RATE(CFS) = 769.71
END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.86 FLOW VELOCITY(FEET/SEC.) = 10.84
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13110.00 = 25660.75 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13110.00 TO NODE 13111.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 509.94 DOWNSTREAM(FEET) = 461.07
CHANNEL LENGTH THRU SUBAREA(FEET) = 3058.95 CHANNEL SLOPE = 0.0160
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.795
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 248.05 0.50 0.783 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 814.77
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.06
AVERAGE FLOW DEPTH(FEET) = 4.95 TRAVEL TIME(MIN.) = 4.61
Tc(MIN.) = 32.32
SUBAREA AREA(ACRES) = 248.05 SUBAREA RUNOFF(CFS) = 90.08
EFFECTIVE AREA(ACRES) = 2150.00 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82
TOTAL AREA(ACRES) = 3460.9 PEAK FLOW RATE(CFS) = 769.71
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.85 FLOW VELOCITY(FEET/SEC.) = 10.91
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13111.00 = 28719.70 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13111.00 TO NODE 13112.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 461.07 DOWNSTREAM(FEET) = 452.77
CHANNEL LENGTH THRU SUBAREA(FEET) = 1781.78 CHANNEL SLOPE = 0.0047
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.738
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 179.91 0.50 0.694 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.694
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 801.38
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.94
AVERAGE FLOW DEPTH(FEET) = 6.21 TRAVEL TIME(MIN.) = 4.28
Tc(MIN.) = 36.60
SUBAREA AREA(ACRES) = 179.91 SUBAREA RUNOFF(CFS) = 63.32
EFFECTIVE AREA(ACRES) = 2329.91 AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 3640.9 PEAK FLOW RATE(CFS) = 769.71
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 6.11 FLOW VELOCITY(FEET/SEC.) = 6.88
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13112.00 = 30501.48 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13112.00 TO NODE 13222.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 452.77 DOWNSTREAM(FEET) = 427.51
CHANNEL LENGTH THRU SUBAREA(FEET) = 1625.01 CHANNEL SLOPE = 0.0155
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.705
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 155.96 0.50 0.836 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.836
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 789.85
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.86
AVERAGE FLOW DEPTH(FEET) = 4.92 TRAVEL TIME(MIN.) = 2.49
Tc(MIN.) = 39.09
SUBAREA AREA(ACRES) = 155.96 SUBAREA RUNOFF(CFS) = 40.27
EFFECTIVE AREA(ACRES) = 2485.87 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 3796.8 PEAK FLOW RATE(CFS) = 769.71
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.87 FLOW VELOCITY(FEET/SEC.) = 10.81
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13222.00 = 32126.49 FEET.

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 3796.8 TC(MIN.) = 39.09
EFFECTIVE AREA(ACRES) = 2485.87 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81
PEAK FLOW RATE(CFS) = 769.71

\*\* PEAK FLOW RATE TABLE \*\*
Table with 7 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap (ACRES), Ae (ACRES), HEADWATER NODE. Contains 3 rows of data.

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S32 \*  
\* Rational Method Hydrology Analysis - 5-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S32.DAT  
TIME/DATE OF STUDY: 16:20 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.184
- 2) 10.00; 1.510
- 3) 15.00; 1.203
- 4) 20.00; 1.023
- 5) 25.00; 0.902
- 6) 30.00; 0.826
- 7) 40.00; 0.693
- 8) 50.00; 0.611
- 9) 60.00; 0.546
- 10) 90.00; 0.439
- 11) 120.00; 0.374
- 12) 180.00; 0.306
- 13) 360.00; 0.211
- 14) 1440.00; 0.088

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13200.00 TO NODE 13201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 298.57  
ELEVATION DATA: UPSTREAM(FEET) = 1069.04 DOWNSTREAM(FEET) = 1005.76

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.590  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.67	0.50	1.000	0	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.66  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 0.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13201.00 TO NODE 13202.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.76 DOWNSTREAM(FEET) = 896.98  
CHANNEL LENGTH THRU SUBAREA(FEET) = 747.55 CHANNEL SLOPE = 0.1455  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.348  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.42	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.52  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.85  
AVERAGE FLOW DEPTH(FEET) = 0.55 TRAVEL TIME(MIN.) = 3.23  
Tc(MIN.) = 12.64  
SUBAREA AREA(ACRES) = 7.42 SUBAREA RUNOFF(CFS) = 5.66  
EFFECTIVE AREA(ACRES) = 8.09 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.1 PEAK FLOW RATE(CFS) = 6.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.68 FLOW VELOCITY(FEET/SEC.) = 4.42  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13202.00 = 1046.12 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 896.98 DOWNSTREAM(FEET) = 840.27
FLOW LENGTH(FEET) = 1789.59 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 5.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.53
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 6.17
PIPE TRAVEL TIME(MIN.) = 3.50 Tc(MIN.) = 16.14
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13203.00 = 2835.71 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 16.14
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.162
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 38.89 0.50 0.731 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.731
SUBAREA AREA(ACRES) = 38.89 SUBAREA RUNOFF(CFS) = 27.86
EFFECTIVE AREA(ACRES) = 46.98 AREA-AVERAGED Fm(INCH/HR) = 0.39
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.78
TOTAL AREA(ACRES) = 47.0 PEAK FLOW RATE(CFS) = 32.68

\*\*\*\*\*
FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 840.27 DOWNSTREAM(FEET) = 782.97
FLOW LENGTH(FEET) = 992.54 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 11.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.14
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 32.68
PIPE TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 17.10
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13204.00 = 3828.25 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 17.10
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.127
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 163.73 0.50 0.858 -

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 83.09 0.50 0.645 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645
SUBAREA AREA(ACRES) = 83.09 SUBAREA RUNOFF(CFS) = 60.15
EFFECTIVE AREA(ACRES) = 130.07 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 130.1 PEAK FLOW RATE(CFS) = 91.37

\*\*\*\*\*
FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 782.97 DOWNSTREAM(FEET) = 692.52
FLOW LENGTH(FEET) = 2046.57 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 21.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.28
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 91.37
PIPE TRAVEL TIME(MIN.) = 1.68 Tc(MIN.) = 18.79
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13205.00 = 5874.82 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 18.79
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.067
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 88.51 0.50 0.679 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.679
SUBAREA AREA(ACRES) = 88.51 SUBAREA RUNOFF(CFS) = 57.91
EFFECTIVE AREA(ACRES) = 218.58 AREA-AVERAGED Fm(INCH/HR) = 0.34
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 218.6 PEAK FLOW RATE(CFS) = 142.21

\*\*\*\*\*
FLOW PROCESS FROM NODE 13205.00 TO NODE 13206.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 692.52 DOWNSTREAM(FEET) = 605.24
CHANNEL LENGTH THRU SUBAREA(FEET) = 2704.69 CHANNEL SLOPE = 0.0323
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.915
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 163.73 0.50 0.858 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.858  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 178.25  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.94  
 AVERAGE FLOW DEPTH(FEET) = 2.74 TRAVEL TIME(MIN.) = 5.68  
 Tc(MIN.) = 24.47  
 SUBAREA AREA(ACRES) = 163.73 SUBAREA RUNOFF(CFS) = 71.64  
 EFFECTIVE AREA(ACRES) = 382.31 AREA-AVERAGED Fm(INCH/HR) = 0.38  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA(ACRES) = 382.3 PEAK FLOW RATE(CFS) = 184.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.77 FLOW VELOCITY(FEET/SEC.) = 8.02  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13206.00 = 8579.51 FEET.

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 FLOW PROCESS FROM NODE 13206.00 TO NODE 13207.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 605.24 DOWNSTREAM(FEET) = 555.41  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2479.15 CHANNEL SLOPE = 0.0201  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.820

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 143.41 0.50 0.888 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.888  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 208.40  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.92  
 AVERAGE FLOW DEPTH(FEET) = 3.17 TRAVEL TIME(MIN.) = 5.97  
 Tc(MIN.) = 30.44

SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 48.53  
 EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.40  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 199.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.12 FLOW VELOCITY(FEET/SEC.) = 6.83  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13207.00 = 11058.66 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 555.41 DOWNSTREAM(FEET) = 505.65  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1734.55 CHANNEL SLOPE = 0.0287  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.772

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 123.56 0.50 0.858 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.858  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 218.95  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.01  
 AVERAGE FLOW DEPTH(FEET) = 3.02 TRAVEL TIME(MIN.) = 3.61  
 Tc(MIN.) = 34.05  
 SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 38.14  
 EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.40  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 215.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.00 FLOW VELOCITY(FEET/SEC.) = 7.97  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 34.05  
 RAINFALL INTENSITY(INCH/HR) = 0.77  
 AREA-AVERAGED Fm(INCH/HR) = 0.40  
 AREA-AVERAGED Fp(INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.81  
 EFFECTIVE STREAM AREA(ACRES) = 649.28  
 TOTAL STREAM AREA(ACRES) = 649.28  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 215.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13210.00 TO NODE 13211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.51  
 ELEVATION DATA: UPSTREAM(FEET) = 949.80 DOWNSTREAM(FEET) = 828.64

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.525  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.709

SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 NATURAL FAIR COVER  
 "OPEN BRUSH" - 1.96 0.50 1.000 0 8.53  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 2.13  
 TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 2.13

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13211.00 TO NODE 13212.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 828.64 DOWNSTREAM(FEET) = 767.94
CHANNEL LENGTH THRU SUBAREA(FEET) = 652.49 CHANNEL SLOPE = 0.0930
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.430
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 11.95 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.18
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.90
AVERAGE FLOW DEPTH(FEET) = 0.78 TRAVEL TIME(MIN.) = 2.79
Tc(MIN.) = 11.31
SUBAREA AREA(ACRES) = 11.95 SUBAREA RUNOFF(CFS) = 10.00
EFFECTIVE AREA(ACRES) = 13.91 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 11.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.94 FLOW VELOCITY(FEET/SEC.) = 4.38
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13212.00 = 967.00 FEET.

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FLOW PROCESS FROM NODE 13212.00 TO NODE 13213.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 767.94 DOWNSTREAM(FEET) = 706.43
CHANNEL LENGTH THRU SUBAREA(FEET) = 967.91 CHANNEL SLOPE = 0.0635
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.204
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 27.07 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.29
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.39
AVERAGE FLOW DEPTH(FEET) = 1.24 TRAVEL TIME(MIN.) = 3.67
Tc(MIN.) = 14.98
SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 17.13
EFFECTIVE AREA(ACRES) = 40.98 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 41.0 PEAK FLOW RATE(CFS) = 25.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.36 FLOW VELOCITY(FEET/SEC.) = 4.67
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13213.00 = 1934.91 FEET.

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FLOW PROCESS FROM NODE 13213.00 TO NODE 13214.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 706.43 DOWNSTREAM(FEET) = 659.31
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.11 CHANNEL SLOPE = 0.0497
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.076
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 18.09 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.63
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.45
AVERAGE FLOW DEPTH(FEET) = 1.52 TRAVEL TIME(MIN.) = 3.55
Tc(MIN.) = 18.54
SUBAREA AREA(ACRES) = 18.09 SUBAREA RUNOFF(CFS) = 9.37
EFFECTIVE AREA(ACRES) = 59.07 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 30.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.52 FLOW VELOCITY(FEET/SEC.) = 4.44
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13214.00 = 2883.02 FEET.

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FLOW PROCESS FROM NODE 13214.00 TO NODE 13215.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 659.31 DOWNSTREAM(FEET) = 628.91
CHANNEL LENGTH THRU SUBAREA(FEET) = 970.24 CHANNEL SLOPE = 0.0313
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.964
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 71.42 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.54
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.12
AVERAGE FLOW DEPTH(FEET) = 1.92 TRAVEL TIME(MIN.) = 3.93
Tc(MIN.) = 22.46
SUBAREA AREA(ACRES) = 71.42 SUBAREA RUNOFF(CFS) = 29.79
EFFECTIVE AREA(ACRES) = 130.49 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 130.5 PEAK FLOW RATE(CFS) = 54.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.06 FLOW VELOCITY(FEET/SEC.) = 4.29
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13215.00 = 3853.26 FEET.

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FLOW PROCESS FROM NODE 13215.00 TO NODE 13216.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 628.91 DOWNSTREAM(FEET) = 598.39
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.63 CHANNEL SLOPE = 0.0331
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.889
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 36.33 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 60.79
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.52
AVERAGE FLOW DEPTH(FEET) = 2.12 TRAVEL TIME (MIN.) = 3.40
Tc (MIN.) = 25.87
SUBAREA AREA(ACRES) = 36.33 SUBAREA RUNOFF(CFS) = 12.72
EFFECTIVE AREA(ACRES) = 166.82 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 166.8 PEAK FLOW RATE(CFS) = 58.40

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.09 FLOW VELOCITY(FEET/SEC.) = 4.47
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13216.00 = 4775.89 FEET.

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FLOW PROCESS FROM NODE 13216.00 TO NODE 13217.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 598.39 DOWNSTREAM(FEET) = 568.48
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.40 CHANNEL SLOPE = 0.0470
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.858
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 42.51 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 65.25
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.26
AVERAGE FLOW DEPTH(FEET) = 2.03 TRAVEL TIME (MIN.) = 2.02
Tc (MIN.) = 27.89
SUBAREA AREA(ACRES) = 42.51 SUBAREA RUNOFF(CFS) = 13.70
EFFECTIVE AREA(ACRES) = 209.33 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 209.3 PEAK FLOW RATE(CFS) = 67.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.06 FLOW VELOCITY(FEET/SEC.) = 5.28
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13217.00 = 5412.29 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 568.48 DOWNSTREAM(FEET) = 505.65
CHANNEL LENGTH THRU SUBAREA(FEET) = 1896.50 CHANNEL SLOPE = 0.0331
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.766
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 73.24 0.50 0.951 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.951
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 77.07
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.80
AVERAGE FLOW DEPTH(FEET) = 2.31 TRAVEL TIME (MIN.) = 6.59
Tc (MIN.) = 34.48
SUBAREA AREA(ACRES) = 73.24 SUBAREA RUNOFF(CFS) = 19.16
EFFECTIVE AREA(ACRES) = 282.57 AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 282.6 PEAK FLOW RATE(CFS) = 69.32

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.22 FLOW VELOCITY(FEET/SEC.) = 4.68
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13220.00 = 7308.79 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 34.48
RAINFALL INTENSITY(INCH/HR) = 0.77
AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.99
EFFECTIVE STREAM AREA(ACRES) = 282.57
TOTAL STREAM AREA(ACRES) = 282.57
PEAK FLOW RATE(CFS) AT CONFLUENCE = 69.32

\*\* CONFLUENCE DATA \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 215.29 34.05 0.772 0.50( 0.40) 0.81 649.3 13200.00
2 69.32 34.48 0.766 0.50( 0.49) 0.99 282.6 13210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.



\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	284.60	34.05	0.772	0.50 ( 0.43)	0.86	928.3	13200.00
2	281.25	34.48	0.766	0.50 ( 0.43)	0.86	931.8	13210.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 284.60 Tc(MIN.) = 34.05  
EFFECTIVE AREA(ACRES) = 928.31 AREA-AVERAGED Fm(INCH/HR) = 0.43  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.86  
TOTAL AREA(ACRES) = 931.8  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13220.00 TO NODE 13221.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 505.65 DOWNSTREAM(FEET) = 478.94  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1949.14 CHANNEL SLOPE = 0.0137  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.719

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	108.50	0.50	0.637	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.637  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 304.15  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.17  
AVERAGE FLOW DEPTH(FEET) = 3.52 TRAVEL TIME(MIN.) = 3.97  
Tc(MIN.) = 38.02  
SUBAREA AREA(ACRES) = 108.50 SUBAREA RUNOFF(CFS) = 39.12  
EFFECTIVE AREA(ACRES) = 1036.81 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 1040.3 PEAK FLOW RATE(CFS) = 284.60  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.44 FLOW VELOCITY(FEET/SEC.) = 8.04  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13221.00 = 14742.35 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13221.00 TO NODE 13222.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 478.94 DOWNSTREAM(FEET) = 427.51  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2078.70 CHANNEL SLOPE = 0.0247  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.681

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	87.26	0.50	0.699	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.699  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 297.62  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.12  
AVERAGE FLOW DEPTH(FEET) = 3.13 TRAVEL TIME(MIN.) = 3.42  
Tc(MIN.) = 41.45  
SUBAREA AREA(ACRES) = 87.26 SUBAREA RUNOFF(CFS) = 26.04  
EFFECTIVE AREA(ACRES) = 1124.07 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.83  
TOTAL AREA(ACRES) = 1127.6 PEAK FLOW RATE(CFS) = 284.60  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.08 FLOW VELOCITY(FEET/SEC.) = 10.02  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13222.00 = 16821.05 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1127.6 TC(MIN.) = 41.45  
EFFECTIVE AREA(ACRES) = 1124.07 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.827  
PEAK FLOW RATE(CFS) = 284.60

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	284.60	41.45	0.681	0.50 ( 0.41)	0.83	1124.1	13200.00
2	281.25	41.90	0.677	0.50 ( 0.41)	0.83	1127.6	13210.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S35 \*  
\* Rational Method Hydrology Analysis - 5-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S35.DAT  
TIME/DATE OF STUDY: 16:21 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.184
- 2) 10.00; 1.510
- 3) 15.00; 1.203
- 4) 20.00; 1.023
- 5) 25.00; 0.902
- 6) 30.00; 0.826
- 7) 40.00; 0.693
- 8) 50.00; 0.611
- 9) 60.00; 0.546
- 10) 90.00; 0.439
- 11) 120.00; 0.374
- 12) 180.00; 0.306
- 13) 360.00; 0.211
- 14) 1440.00; 0.088

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.00 TO NODE 13500.50 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 548.43  
ELEVATION DATA: UPSTREAM(FEET) = 1183.47 DOWNSTREAM(FEET) = 1065.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.390  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	5.11	0.50	1.000	0	11.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 4.09  
TOTAL AREA(ACRES) = 5.11 PEAK FLOW RATE(CFS) = 4.09

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.50 TO NODE 13501.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1033.15  
CHANNEL LENGTH THRU SUBAREA(FEET) = 431.71 CHANNEL SLOPE = 0.0738  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.265  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.87	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.16  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.56  
AVERAGE FLOW DEPTH(FEET) = 0.82 TRAVEL TIME(MIN.) = 2.02  
Tc(MIN.) = 13.98  
SUBAREA AREA(ACRES) = 8.87 SUBAREA RUNOFF(CFS) = 6.11  
EFFECTIVE AREA(ACRES) = 13.98 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 9.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.91 FLOW VELOCITY(FEET/SEC.) = 3.85  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13501.00 = 980.14 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13501.00 TO NODE 13502.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1033.15 DOWNSTREAM(FEET) = 990.26  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.63 CHANNEL SLOPE = 0.0452  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.077  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 16.82 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.03  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.51  
AVERAGE FLOW DEPTH(FEET) = 1.15 TRAVEL TIME(MIN.) = 4.51  
Tc(MIN.) = 18.49  
SUBAREA AREA(ACRES) = 16.82 SUBAREA RUNOFF(CFS) = 8.74  
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 16.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.21 FLOW VELOCITY(FEET/SEC.) = 3.64  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13502.00 = 1928.77 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13502.00 TO NODE 13503.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.26 DOWNSTREAM(FEET) = 956.06  
CHANNEL LENGTH THRU SUBAREA(FEET) = 940.98 CHANNEL SLOPE = 0.0363  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.959  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 46.02 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 25.55  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.76  
AVERAGE FLOW DEPTH(FEET) = 1.51 TRAVEL TIME(MIN.) = 4.18  
Tc(MIN.) = 22.66  
SUBAREA AREA(ACRES) = 46.02 SUBAREA RUNOFF(CFS) = 18.99  
EFFECTIVE AREA(ACRES) = 76.82 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 76.8 PEAK FLOW RATE(CFS) = 31.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.63 FLOW VELOCITY(FEET/SEC.) = 3.98  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13503.00 = 2869.75 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13503.00 TO NODE 13504.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 956.06 DOWNSTREAM(FEET) = 889.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2131.31 CHANNEL SLOPE = 0.0312  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.805  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 58.46 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 39.78  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.98  
AVERAGE FLOW DEPTH(FEET) = 1.83 TRAVEL TIME(MIN.) = 8.93  
Tc(MIN.) = 31.60  
SUBAREA AREA(ACRES) = 58.46 SUBAREA RUNOFF(CFS) = 16.02  
EFFECTIVE AREA(ACRES) = 135.28 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 135.3 PEAK FLOW RATE(CFS) = 37.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.78 FLOW VELOCITY(FEET/SEC.) = 3.90  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13504.00 = 5001.06 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13504.00 TO NODE 13505.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 889.48 DOWNSTREAM(FEET) = 848.10  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1661.97 CHANNEL SLOPE = 0.0249  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.705  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 49.30 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.66  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.69  
AVERAGE FLOW DEPTH(FEET) = 1.94 TRAVEL TIME(MIN.) = 7.51  
Tc(MIN.) = 39.11  
SUBAREA AREA(ACRES) = 49.30 SUBAREA RUNOFF(CFS) = 9.08  
EFFECTIVE AREA(ACRES) = 184.58 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 184.6 PEAK FLOW RATE(CFS) = 37.08

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.86 FLOW VELOCITY(FEET/SEC.) = 3.58  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.00 = 6663.03 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13505.00 TO NODE 13505.50 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 848.10 DOWNSTREAM(FEET) = 811.10  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1234.61 CHANNEL SLOPE = 0.0300  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.658

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.35	0.50	0.811	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.811

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.54

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.95

AVERAGE FLOW DEPTH(FEET) = 1.87 TRAVEL TIME(MIN.) = 5.21

Tc(MIN.) = 44.32

SUBAREA AREA(ACRES) = 39.35 SUBAREA RUNOFF(CFS) = 8.93

EFFECTIVE AREA(ACRES) = 223.93 AREA-AVERAGED Fm(INCH/HR) = 0.48

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97

TOTAL AREA(ACRES) = 223.9 PEAK FLOW RATE(CFS) = 37.08

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.79 FLOW VELOCITY(FEET/SEC.) = 3.86

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.50 = 7897.64 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13505.50 TO NODE 13506.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 811.10 DOWNSTREAM(FEET) = 781.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1415.98 CHANNEL SLOPE = 0.0213  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.604

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	54.33	0.50	0.738	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.738

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.82

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.51

AVERAGE FLOW DEPTH(FEET) = 2.02 TRAVEL TIME(MIN.) = 6.73

Tc(MIN.) = 51.05

SUBAREA AREA(ACRES) = 54.33 SUBAREA RUNOFF(CFS) = 11.51

EFFECTIVE AREA(ACRES) = 278.26 AREA-AVERAGED Fm(INCH/HR) = 0.46

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.92  
TOTAL AREA(ACRES) = 278.3 PEAK FLOW RATE(CFS) = 37.08  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.91 FLOW VELOCITY(FEET/SEC.) = 3.38

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.00 = 9313.62 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13506.00 TO NODE 13506.50 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 781.00 DOWNSTREAM(FEET) = 743.17  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1542.62 CHANNEL SLOPE = 0.0245  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	61.33	0.50	0.783	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.69

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.68

AVERAGE FLOW DEPTH(FEET) = 1.94 TRAVEL TIME(MIN.) = 6.98

Tc(MIN.) = 58.03

SUBAREA AREA(ACRES) = 61.33 SUBAREA RUNOFF(CFS) = 9.23

EFFECTIVE AREA(ACRES) = 339.59 AREA-AVERAGED Fm(INCH/HR) = 0.45

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.90

TOTAL AREA(ACRES) = 339.6 PEAK FLOW RATE(CFS) = 37.08

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.86 FLOW VELOCITY(FEET/SEC.) = 3.58

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.50 = 10856.24 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13506.50 TO NODE 13520.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 743.17 DOWNSTREAM(FEET) = 717.04  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1370.93 CHANNEL SLOPE = 0.0191  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.528

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.86	0.50	0.848	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.848

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.95

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.29

AVERAGE FLOW DEPTH (FEET) = 1.99 TRAVEL TIME (MIN.) = 6.95  
 Tc (MIN.) = 64.97  
 SUBAREA AREA (ACRES) = 39.86 SUBAREA RUNOFF (CFS) = 3.74  
 EFFECTIVE AREA (ACRES) = 379.45 AREA-AVERAGED Fm (INCH/HR) = 0.45  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.89  
 TOTAL AREA (ACRES) = 379.5 PEAK FLOW RATE (CFS) = 37.08  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.95 FLOW VELOCITY (FEET/SEC.) = 3.25  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13520.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 64.97  
 RAINFALL INTENSITY (INCH/HR) = 0.53  
 AREA-AVERAGED Fm (INCH/HR) = 0.45  
 AREA-AVERAGED Fp (INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.89  
 EFFECTIVE STREAM AREA (ACRES) = 379.45  
 TOTAL STREAM AREA (ACRES) = 379.45  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 37.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13510.00 TO NODE 13511.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 903.68  
 ELEVATION DATA: UPSTREAM (FEET) = 1216.90 DOWNSTREAM (FEET) = 1022.78

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.615  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.226  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	6.66	0.50	1.000	0	14.62

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 4.35  
 TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 4.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13511.00 TO NODE 13512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 1022.78 DOWNSTREAM (FEET) = 954.27  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1027.63 CHANNEL SLOPE = 0.0667

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.054  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.76  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.80  
 AVERAGE FLOW DEPTH (FEET) = 0.97 TRAVEL TIME (MIN.) = 4.51  
 Tc (MIN.) = 19.12  
 SUBAREA AREA (ACRES) = 25.40 SUBAREA RUNOFF (CFS) = 12.67  
 EFFECTIVE AREA (ACRES) = 32.06 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 15.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.13 FLOW VELOCITY (FEET/SEC.) = 4.20  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13512.00 = 1931.31 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13512.00 TO NODE 13513.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 954.27 DOWNSTREAM (FEET) = 872.45  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1926.42 CHANNEL SLOPE = 0.0425  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.876  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	90.23	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.46  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.22  
 AVERAGE FLOW DEPTH (FEET) = 1.58 TRAVEL TIME (MIN.) = 7.61  
 Tc (MIN.) = 26.73  
 SUBAREA AREA (ACRES) = 90.23 SUBAREA RUNOFF (CFS) = 30.51  
 EFFECTIVE AREA (ACRES) = 122.29 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 122.3 PEAK FLOW RATE (CFS) = 41.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.75 FLOW VELOCITY (FEET/SEC.) = 4.50  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13513.00 = 3857.73 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13513.00 TO NODE 13514.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 872.45 DOWNSTREAM(FEET) = 813.12  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1895.66 CHANNEL SLOPE = 0.0313  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.774

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	135.65	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 58.18  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.39  
 AVERAGE FLOW DEPTH(FEET) = 2.10 TRAVEL TIME(MIN.) = 7.20  
 Tc(MIN.) = 33.94  
 SUBAREA AREA(ACRES) = 135.65 SUBAREA RUNOFF(CFS) = 33.38  
 EFFECTIVE AREA(ACRES) = 257.94 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 257.9 PEAK FLOW RATE(CFS) = 63.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.18 FLOW VELOCITY(FEET/SEC.) = 4.46  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13514.00 = 5753.39 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13514.00 TO NODE 13515.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 813.12 DOWNSTREAM(FEET) = 773.74  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.15 CHANNEL SLOPE = 0.0204  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.676

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	109.30	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 72.17  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.95  
 AVERAGE FLOW DEPTH(FEET) = 2.47 TRAVEL TIME(MIN.) = 8.13  
 Tc(MIN.) = 42.07  
 SUBAREA AREA(ACRES) = 109.30 SUBAREA RUNOFF(CFS) = 17.30  
 EFFECTIVE AREA(ACRES) = 367.24 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 367.2 PEAK FLOW RATE(CFS) = 63.48  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.35 FLOW VELOCITY(FEET/SEC.) = 3.82  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13515.00 = 7679.54 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 773.74 DOWNSTREAM(FEET) = 717.04  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2279.49 CHANNEL SLOPE = 0.0249  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.605

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	231.44	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 74.56  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.27  
 AVERAGE FLOW DEPTH(FEET) = 2.41 TRAVEL TIME(MIN.) = 8.91  
 Tc(MIN.) = 50.98  
 SUBAREA AREA(ACRES) = 231.44 SUBAREA RUNOFF(CFS) = 21.81  
 EFFECTIVE AREA(ACRES) = 598.68 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 598.7 PEAK FLOW RATE(CFS) = 63.48  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.27 FLOW VELOCITY(FEET/SEC.) = 4.10  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13520.00 = 9959.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 50.98  
 RAINFALL INTENSITY(INCH/HR) = 0.60  
 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 598.68  
 TOTAL STREAM AREA(ACRES) = 598.68  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 63.48

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	37.08	64.97	0.528	0.50( 0.45)	0.89	379.5	13500.00
2	63.48	50.98	0.605	0.50( 0.50)	1.00	598.7	13510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	100.55	50.98	0.605	0.50( 0.48)	0.96	896.4	13510.00

2 54.12 64.97 0.528 0.50( 0.48) 0.96 978.1 13500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 100.55 Tc(MIN.) = 50.98
EFFECTIVE AREA(ACRES) = 896.38 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 978.1
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13520.00 TO NODE 13520.50 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 717.04 DOWNSTREAM(FEET) = 700.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 2019.22 CHANNEL SLOPE = 0.0084
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.553

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 193.31 0.50 0.965 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 106.71
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.22
AVERAGE FLOW DEPTH(FEET) = 2.90 TRAVEL TIME(MIN.) = 7.97
Tc(MIN.) = 58.95
SUBAREA AREA(ACRES) = 193.31 SUBAREA RUNOFF(CFS) = 12.21
EFFECTIVE AREA(ACRES) = 1089.69 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 1171.4 PEAK FLOW RATE(CFS) = 100.55
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.84 FLOW VELOCITY(FEET/SEC.) = 4.15
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.50 = 14246.39 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13520.50 TO NODE 13521.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 661.95
CHANNEL LENGTH THRU SUBAREA(FEET) = 1622.36 CHANNEL SLOPE = 0.0235
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.534

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 129.79 0.50 0.897 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 105.55

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.18
AVERAGE FLOW DEPTH(FEET) = 2.39 TRAVEL TIME(MIN.) = 4.37
Tc(MIN.) = 63.32
SUBAREA AREA(ACRES) = 129.79 SUBAREA RUNOFF(CFS) = 9.99
EFFECTIVE AREA(ACRES) = 1219.48 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 1301.2 PEAK FLOW RATE(CFS) = 100.55
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.35 FLOW VELOCITY(FEET/SEC.) = 6.09
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13521.00 = 15868.75 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13521.00 TO NODE 13522.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 661.95 DOWNSTREAM(FEET) = 632.19
CHANNEL LENGTH THRU SUBAREA(FEET) = 2746.01 CHANNEL SLOPE = 0.0108
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.499

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 278.60 0.50 0.905 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 106.50
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.64
AVERAGE FLOW DEPTH(FEET) = 2.77 TRAVEL TIME(MIN.) = 9.87
Tc(MIN.) = 73.18
SUBAREA AREA(ACRES) = 278.60 SUBAREA RUNOFF(CFS) = 11.89
EFFECTIVE AREA(ACRES) = 1498.08 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 1579.8 PEAK FLOW RATE(CFS) = 100.55
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.71 FLOW VELOCITY(FEET/SEC.) = 4.58
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13522.00 = 18614.76 FEET.

\*\*\*\*\*

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1579.8 TC(MIN.) = 73.18
EFFECTIVE AREA(ACRES) = 1498.08 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.947
PEAK FLOW RATE(CFS) = 100.55

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 100.55 73.18 0.499 0.50( 0.47) 0.95 1498.1 13510.00



2 54.12 90.88 0.437 0.50( 0.47) 0.94 1579.8 13500.00

=====  
=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2011 Advanced Engineering Software (aes)  
Ver. 18.0 Release Date: 07/01/2011 License ID 1264

Analysis prepared by:

RBF Consulting

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 10-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P10EVAA.DAT  
TIME/DATE OF STUDY: 16:37 11/13/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.720
- 2) 10.00; 2.487
- 3) 15.00; 1.851
- 4) 20.00; 1.582
- 5) 25.00; 1.382
- 6) 30.00; 1.244
- 7) 40.00; 1.061
- 8) 50.00; 0.944
- 9) 60.00; 0.855
- 10) 90.00; 0.707
- 11) 120.00; 0.622
- 12) 180.00; 0.520
- 13) 360.00; 0.381
- 14) 1200.00; 0.166

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE/ WAY		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 571.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.305  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.151  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56	7.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 2.23  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 2.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.151  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.170  
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 9.21  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 11.43

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.151  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 2.60 0.30 0.200 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 7.23  
EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.06  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19  
TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 18.67

\*\*\*\*\*

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 571.00 DOWNSTREAM ELEVATION(FEET) = 530.50  
STREET LENGTH(FEET) = 1215.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.46

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.43  
HALFSTREET FLOOD WIDTH(FEET) = 15.20  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.98  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.16  
STREET FLOW TRAVEL TIME(MIN.) = 4.07 Tc(MIN.) = 11.37

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.312

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.20	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	2.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.135  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 7.57  
EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 21.17

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 14.80  
FLOW VELOCITY(FEET/SEC.) = 4.92 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.10  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1542.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.37  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.312  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	4.40	0.30	0.200	56
COMMERCIAL	B	18.20	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.119  
SUBAREA AREA(ACRES) = 22.60 SUBAREA RUNOFF(CFS) = 46.31  
EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.04  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.13  
TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 67.48

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.37  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.312  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	6.20	0.30	0.200	56
COMMERCIAL	B	0.10	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198  
SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 12.77  
EFFECTIVE AREA(ACRES) = 39.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
TOTAL AREA(ACRES) = 39.3 PEAK FLOW RATE(CFS) = 80.25

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.50 DOWNSTREAM(FEET) = 522.00  
FLOW LENGTH(FEET) = 837.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.19  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 80.25  
PIPE TRAVEL TIME(MIN.) = 1.25 Tc(MIN.) = 12.62  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2379.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.62  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.154  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 15.30 0.30 0.100 56  
 PUBLIC PARK B 0.70 0.30 0.850 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.133  
 SUBAREA AREA(ACRES) = 16.00 SUBAREA RUNOFF(CFS) = 30.44  
 EFFECTIVE AREA(ACRES) = 55.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA(ACRES) = 55.3 PEAK FLOW RATE(CFS) = 105.09

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 522.00 DOWNSTREAM(FEET) = 473.00  
 FLOW LENGTH(FEET) = 568.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.41  
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 105.09  
 PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 12.98  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2947.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.98  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.108

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	2.10	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
COMMERCIAL	B	0.50	0.30	0.100	56
PUBLIC PARK	B	13.00	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.820  
 SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 26.65  
 EFFECTIVE AREA(ACRES) = 71.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 71.2 PEAK FLOW RATE(CFS) = 129.47

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 127.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 435.00  
 FLOW LENGTH(FEET) = 588.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 25.31

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 129.47  
 PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 13.36  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<

=====

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 100.00 TO NODE 121.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 574.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.872

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56	8.44

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 1.52  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.52

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 574.00 DOWNSTREAM ELEVATION(FEET) = 557.00  
 STREET LENGTH(FEET) = 221.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.62

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.37  
 HALFSTREET FLOOD WIDTH(FEET) = 11.68  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.59  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.45

STREET FLOW TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 9.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.735  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 7.90 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.10 0.30 0.400 56  
 APARTMENTS B 2.20 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.257  
 SUBAREA AREA(ACRES) = 14.30 SUBAREA RUNOFF(CFS) = 34.20  
 EFFECTIVE AREA(ACRES) = 14.90 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.26  
 TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 35.64

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 15.51  
 FLOW VELOCITY(FEET/SEC.) = 7.61 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.35  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 551.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 557.00 DOWNSTREAM ELEVATION(FEET) = 527.00  
 STREET LENGTH(FEET) = 317.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 46.03  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.46  
 HALFSTREET FLOOD WIDTH(FEET) = 16.52  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.74  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.00  
 STREET FLOW TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 9.60  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.586  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.50 0.30 0.400 56  
 APARTMENTS B 0.70 0.30 0.200 56

COMMERCIAL B 0.40 0.30 0.100 56  
 CONDOMINIUMS B 3.50 0.30 0.350 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.352  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 20.76  
 EFFECTIVE AREA(ACRES) = 24.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 24.2 PEAK FLOW RATE(CFS) = 54.40

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 17.70  
 FLOW VELOCITY(FEET/SEC.) = 9.10 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.35  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 123.00 = 868.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 527.00 DOWNSTREAM ELEVATION(FEET) = 496.00  
 STREET LENGTH(FEET) = 315.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 66.47  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.50  
 HALFSTREET FLOOD WIDTH(FEET) = 19.02  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.70  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.87  
 STREET FLOW TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 10.14  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.469

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 2.90 0.30 0.400 56  
 CONDOMINIUMS B 1.40 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.00 0.30 0.400 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 CONDOMINIUMS B 2.70 0.30 0.350 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387  
 SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 24.14  
 EFFECTIVE AREA(ACRES) = 35.60 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32

TOTAL AREA (ACRES) = 35.6 PEAK FLOW RATE (CFS) = 76.00

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.52 HALFSTREET FLOOD WIDTH (FEET) = 20.04  
FLOW VELOCITY (FEET/SEC.) = 10.05 DEPTH\*VELOCITY (FT\*FT/SEC.) = 5.23  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 124.00 = 1183.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 10.14

RAINFALL INTENSITY (INCH/HR) = 2.47

AREA-AVERAGED Fm (INCH/HR) = 0.10

AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.32

EFFECTIVE STREAM AREA (ACRES) = 35.60

TOTAL STREAM AREA (ACRES) = 35.60

PEAK FLOW RATE (CFS) AT CONFLUENCE = 76.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 317.00

ELEVATION DATA: UPSTREAM (FEET) = 699.00 DOWNSTREAM (FEET) = 610.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.111

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.706

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"OPEN BRUSH"	B	1.50	0.30	1.000	66	9.11

NATURAL FAIR COVER

"OPEN BRUSH" B 1.50 0.30 1.000 66 9.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 3.25

TOTAL AREA (ACRES) = 1.50 PEAK FLOW RATE (CFS) = 3.25

\*\*\*\*\*

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 610.00 DOWNSTREAM (FEET) = 575.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 206.00 CHANNEL SLOPE = 0.1699

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.573

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.50	0.30	1.000	66

NATURAL FAIR COVER

"OPEN BRUSH" B 1.50 0.30 1.000 66 9.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 3.25

TOTAL AREA (ACRES) = 1.50 PEAK FLOW RATE (CFS) = 3.25

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 2.80 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.12

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.33

AVERAGE FLOW DEPTH (FEET) = 0.57 TRAVEL TIME (MIN.) = 0.54

Tc (MIN.) = 9.65

SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 5.73

EFFECTIVE AREA (ACRES) = 4.30 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 4.3 PEAK FLOW RATE (CFS) = 8.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.65 FLOW VELOCITY (FEET/SEC.) = 7.03

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 523.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 575.00 DOWNSTREAM (FEET) = 548.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.1350

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.470

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.30	0.30	1.000	66

NATURAL FAIR COVER

"OPEN BRUSH" B 3.30 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.02

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.93

AVERAGE FLOW DEPTH (FEET) = 0.76 TRAVEL TIME (MIN.) = 0.48

Tc (MIN.) = 10.13

SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 6.44

EFFECTIVE AREA (ACRES) = 7.60 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 7.6 PEAK FLOW RATE (CFS) = 14.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.82 FLOW VELOCITY (FEET/SEC.) = 7.34

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 723.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 548.00 DOWNSTREAM (FEET) = 524.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 318.00 CHANNEL SLOPE = 0.0755

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.359  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	2.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 16.97  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.06  
 AVERAGE FLOW DEPTH (FEET) = 0.97 TRAVEL TIME (MIN.) = 0.87  
 Tc (MIN.) = 11.01  
 SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 4.26  
 EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 18.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.99 FLOW VELOCITY (FEET/SEC.) = 6.18  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 1041.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 524.00 DOWNSTREAM (FEET) = 515.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 94.00 CHANNEL SLOPE = 0.0957  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.331  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	3.70	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 21.72  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.07  
 AVERAGE FLOW DEPTH (FEET) = 1.01 TRAVEL TIME (MIN.) = 0.22  
 Tc (MIN.) = 11.23  
 SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 6.76  
 EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 24.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.07 FLOW VELOCITY (FEET/SEC.) = 7.30  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 1135.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 507.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 207.00 CHANNEL SLOPE = 0.0386  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.251  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	8.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 32.14  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.53  
 AVERAGE FLOW DEPTH (FEET) = 1.39 TRAVEL TIME (MIN.) = 0.62  
 Tc (MIN.) = 11.85  
 SUBAREA AREA (ACRES) = 8.30 SUBAREA RUNOFF (CFS) = 14.58  
 EFFECTIVE AREA (ACRES) = 21.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 21.9 PEAK FLOW RATE (CFS) = 38.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.49 FLOW VELOCITY (FEET/SEC.) = 5.77  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 1342.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 507.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 338.00 CHANNEL SLOPE = 0.0207  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.105  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	0.60	0.30	1.000	66
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
NATURAL FAIR COVER "OPEN BRUSH"	B	13.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 49.94  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.90  
 AVERAGE FLOW DEPTH (FEET) = 1.84 TRAVEL TIME (MIN.) = 1.15  
 Tc (MIN.) = 13.00  
 SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 22.95  
 EFFECTIVE AREA (ACRES) = 36.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 36.0 PEAK FLOW RATE (CFS) = 58.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.96 FLOW VELOCITY(FEET/SEC.) = 5.09  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 1680.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 137.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 496.00  
FLOW LENGTH(FEET) = 726.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.23  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 58.53  
PIPE TRAVEL TIME(MIN.) = 1.47 Tc(MIN.) = 14.47  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.47  
RAINFALL INTENSITY(INCH/HR) = 1.92  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 36.00  
TOTAL STREAM AREA(ACRES) = 36.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 58.53

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	76.00	10.14	2.469	0.30( 0.10)	0.32	35.6	100.00
2	58.53	14.47	1.918	0.30( 0.30)	1.00	36.0	130.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	130.97	10.14	2.469	0.30( 0.18)	0.60	60.8	100.00
2	116.88	14.47	1.918	0.30( 0.20)	0.66	71.6	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 130.97 Tc(MIN.) = 10.14  
EFFECTIVE AREA(ACRES) = 60.82 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 71.6  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 444.00  
FLOW LENGTH(FEET) = 888.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.34  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 130.97  
PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 10.75  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 125.00 = 3294.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.75  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.392  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	1.00	0.30	0.400	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	7.50	0.30	0.400	56
NATURAL FAIR COVER "OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.407  
SUBAREA AREA(ACRES) = 8.60 SUBAREA RUNOFF(CFS) = 17.57  
EFFECTIVE AREA(ACRES) = 69.42 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 138.61

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 444.00 DOWNSTREAM(FEET) = 438.00  
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.20  
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 138.61  
PIPE TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 11.65  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.65



\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.277  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	4.30	0.30	0.200	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.70	0.30	0.400	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.20	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 7.10 SUBAREA RUNOFF (CFS) = 14.12  
 EFFECTIVE AREA (ACRES) = 76.52 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54  
 TOTAL AREA (ACRES) = 87.3 PEAK FLOW RATE (CFS) = 145.56

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.65  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.277  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.40  
 EFFECTIVE AREA (ACRES) = 76.72 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54  
 TOTAL AREA (ACRES) = 87.5 PEAK FLOW RATE (CFS) = 145.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 11.65  
 RAINFALL INTENSITY (INCH/HR) = 2.28  
 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.54  
 EFFECTIVE STREAM AREA (ACRES) = 76.72  
 TOTAL STREAM AREA (ACRES) = 87.50  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 145.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 557.00 DOWNSTREAM (FEET) = 546.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.105  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.447  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.50	0.30	0.100	56	6.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 1.54  
 TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 1.54

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION (FEET) = 546.00 DOWNSTREAM ELEVATION (FEET) = 488.00  
 STREET LENGTH (FEET) = 671.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.46

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.30  
 HALfstREET FLOOD WIDTH (FEET) = 7.72  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.82  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.75  
 STREET FLOW TRAVEL TIME (MIN.) = 1.92 Tc (MIN.) = 8.03  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.974

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.50	0.30	0.200	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	3.90	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293  
 SUBAREA AREA (ACRES) = 5.30 SUBAREA RUNOFF (CFS) = 13.77  
 EFFECTIVE AREA (ACRES) = 5.80 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA (ACRES) = 5.8 PEAK FLOW RATE (CFS) = 15.09

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH( FEET ) = 0.35 HALFSTREET FLOOD WIDTH( FEET ) = 10.35  
 FLOW VELOCITY( FEET/SEC. ) = 6.56 DEPTH\*VELOCITY( FT\*FT/SEC. ) = 2.28  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1001.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc( MIN. ) = 8.03  
 \* 10 YEAR RAINFALL INTENSITY( INCH/HR ) = 2.974  
 SUBAREA LOSS RATE DATA( AMC II ):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA ( ACRES )	Fp ( INCH/HR )	Ap ( DECIMAL )	SCS CN
APARTMENTS	B	14.60	0.30	0.200	56
COMMERCIAL	B	1.10	0.30	0.100	56
CONDOMINIUMS	B	4.30	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp( INCH/HR ) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.227  
 SUBAREA AREA( ACRES ) = 20.00 SUBAREA RUNOFF( CFS ) = 52.31  
 EFFECTIVE AREA( ACRES ) = 25.80 AREA-AVERAGED Fm( INCH/HR ) = 0.07  
 AREA-AVERAGED Fp( INCH/HR ) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA( ACRES ) = 25.8 PEAK FLOW RATE( CFS ) = 67.40

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

-----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>( STREET TABLE SECTION # 1 USED )<<<<

=====

UPSTREAM ELEVATION( FEET ) = 488.00 DOWNSTREAM ELEVATION( FEET ) = 460.00  
 STREET LENGTH( FEET ) = 371.00 CURB HEIGHT( INCHES ) = 8.0  
 STREET HALFWIDTH( FEET ) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK( FEET ) = 20.00  
 INSIDE STREET CROSSFALL( DECIMAL ) = 0.018  
 OUTSIDE STREET CROSSFALL( DECIMAL ) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL( DECIMAL ) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section( curb-to-curb ) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW( CFS ) = 84.34  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH( FEET ) = 0.56  
 HALFSTREET FLOOD WIDTH( FEET ) = 22.07  
 AVERAGE FLOW VELOCITY( FEET/SEC. ) = 9.28  
 PRODUCT OF DEPTH&VELOCITY( FT\*FT/SEC. ) = 5.17  
 STREET FLOW TRAVEL TIME( MIN. ) = 0.67 Tc( MIN. ) = 8.69  
 \* 10 YEAR RAINFALL INTENSITY( INCH/HR ) = 2.810

SUBAREA LOSS RATE DATA( AMC II ):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA ( ACRES )	Fp ( INCH/HR )	Ap ( DECIMAL )	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.50	0.30	0.200	56

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 10.00 0.30 0.200 56  
 APARTMENTS B 1.70 0.30 0.200 56  
 COMMERCIAL B 0.50 0.30 0.100 56  
 CONDOMINIUMS B 1.00 0.30 0.350 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp( INCH/HR ) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.207  
 SUBAREA AREA( ACRES ) = 13.70 SUBAREA RUNOFF( CFS ) = 33.88  
 EFFECTIVE AREA( ACRES ) = 39.50 AREA-AVERAGED Fm( INCH/HR ) = 0.07  
 AREA-AVERAGED Fp( INCH/HR ) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA( ACRES ) = 39.5 PEAK FLOW RATE( CFS ) = 97.46

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH( FEET ) = 0.58 HALFSTREET FLOOD WIDTH( FEET ) = 23.32  
 FLOW VELOCITY( FEET/SEC. ) = 9.65 DEPTH\*VELOCITY( FT\*FT/SEC. ) = 5.59  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1372.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 113.00 TO NODE 126.00 IS CODE = 31

-----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE( NON-PRESSURE FLOW )<<<<

=====

ELEVATION DATA: UPSTREAM( FEET ) = 460.00 DOWNSTREAM( FEET ) = 438.00  
 FLOW LENGTH( FEET ) = 500.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.1 INCHES  
 PIPE-FLOW VELOCITY( FEET/SEC. ) = 20.12  
 ESTIMATED PIPE DIAMETER( INCH ) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW( CFS ) = 97.46  
 PIPE TRAVEL TIME( MIN. ) = 0.41 Tc( MIN. ) = 9.11  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 1872.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION( MIN. ) = 9.11  
 RAINFALL INTENSITY( INCH/HR ) = 2.71  
 AREA-AVERAGED Fm( INCH/HR ) = 0.07  
 AREA-AVERAGED Fp( INCH/HR ) = 0.30  
 AREA-AVERAGED Ap = 0.23  
 EFFECTIVE STREAM AREA( ACRES ) = 39.50  
 TOTAL STREAM AREA( ACRES ) = 39.50  
 PEAK FLOW RATE( CFS ) AT CONFLUENCE = 97.46

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q ( CFS )	Tc ( MIN. )	Intensity ( INCH/HR )	Fp( Fm ) ( INCH/HR )	Ap	Ae ( ACRES )	HEADWATER NODE
1	145.96	11.65	2.277	0.30( 0.16 )	0.54	76.7	100.00
1	127.17	16.05	1.795	0.30( 0.18 )	0.60	87.5	130.00
2	97.46	9.11	2.708	0.30( 0.07 )	0.23	39.5	110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	234.76	9.11	2.708	0.30 ( 0.13)	0.42	99.5	110.00
2	227.52	11.65	2.277	0.30 ( 0.13)	0.44	116.2	100.00
3	190.92	16.05	1.795	0.30 ( 0.15)	0.48	127.0	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 234.76 Tc(MIN.) = 9.11  
EFFECTIVE AREA(ACRES) = 99.46 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 127.0  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 435.00  
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 60.0 INCH PIPE IS 46.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.41  
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 234.76  
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 9.45  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.45

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.623

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	5.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.366

SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 17.64

EFFECTIVE AREA(ACRES) = 107.26 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41

TOTAL AREA(ACRES) = 134.8 PEAK FLOW RATE(CFS) = 241.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.45

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.623

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	1.50	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519

SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 10.88

EFFECTIVE AREA(ACRES) = 112.16 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 139.7 PEAK FLOW RATE(CFS) = 252.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	252.10	9.45	2.623	0.30 ( 0.13)	0.42	112.2	110.00
2	243.98	12.00	2.233	0.30 ( 0.13)	0.44	128.9	100.00
3	205.18	16.40	1.775	0.30 ( 0.14)	0.48	139.7	130.00

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	129.47	13.36	2.059	0.30 ( 0.09)	0.29	71.2	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	369.81	9.45	2.623	0.30 ( 0.11)	0.38	162.5	110.00
2	370.44	12.00	2.233	0.30 ( 0.12)	0.39	192.8	100.00
3	361.39	13.36	2.059	0.30 ( 0.12)	0.39	203.5	100.00
4	316.02	16.40	1.775	0.30 ( 0.12)	0.42	210.9	130.00

TOTAL AREA(ACRES) = 210.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 370.44 Tc(MIN.) = 11.995

EFFECTIVE AREA(ACRES) = 192.83 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39

TOTAL AREA(ACRES) = 210.9

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

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FLOW PROCESS FROM NODE 127.00 TO NODE 127.10 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 500.20 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 42.35
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 370.44
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 12.19
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.10 = 4750.20 FEET.

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FLOW PROCESS FROM NODE 127.10 TO NODE 127.20 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 353.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 595.30 CHANNEL SLOPE = 0.0218
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.031
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         3.50   0.30  0.100  56
COMMERCIAL          B         0.10   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 373.68
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.11
AVERAGE FLOW DEPTH(FEET) = 1.01 TRAVEL TIME(MIN.) = 1.39
Tc(MIN.) = 13.59
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 6.48
EFFECTIVE AREA(ACRES) = 196.43 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 214.5 PEAK FLOW RATE(CFS) = 370.44
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.00 FLOW VELOCITY(FEET/SEC.) = 7.11
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.20 = 5345.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.20 TO NODE 127.30 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 340.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 476.00 CHANNEL SLOPE = 0.0273
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.899
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS

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LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         3.10   0.30  0.100  56
COMMERCIAL          B         0.10   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 373.13
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.64
AVERAGE FLOW DEPTH(FEET) = 0.94 TRAVEL TIME(MIN.) = 1.04
Tc(MIN.) = 14.63
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 5.38
EFFECTIVE AREA(ACRES) = 199.63 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 217.7 PEAK FLOW RATE(CFS) = 370.44
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.94 FLOW VELOCITY(FEET/SEC.) = 7.63
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.30 = 5821.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.30 TO NODE 13569.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 338.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 506.00 CHANNEL SLOPE = 0.0040
CHANNEL BASE(FEET) = 150.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.710
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         2.80   0.30  0.100  56
COMMERCIAL          B         0.60   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 373.01
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.82
AVERAGE FLOW DEPTH(FEET) = 0.87 TRAVEL TIME(MIN.) = 2.99
Tc(MIN.) = 17.62
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 5.14
EFFECTIVE AREA(ACRES) = 203.03 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 221.1 PEAK FLOW RATE(CFS) = 370.44
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.87 FLOW VELOCITY(FEET/SEC.) = 2.82
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 13569.00 = 6327.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 12
-----

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>>>>CLEAR MEMORY BANK # 1 <<<<
=====
END OF STUDY SUMMARY:

```

TOTAL AREA (ACRES) = 221.1 TC (MIN.) = 17.62  
 EFFECTIVE AREA (ACRES) = 203.03 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.374  
 PEAK FLOW RATE (CFS) = 370.44

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	369.81	15.08	1.847	0.30 ( 0.11)	0.36	172.7	110.00
2	370.44	17.62	1.710	0.30 ( 0.11)	0.37	203.0	100.00
3	361.39	19.04	1.634	0.30 ( 0.11)	0.38	213.7	100.00
4	316.02	22.37	1.487	0.30 ( 0.12)	0.40	221.1	130.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2012 Advanced Engineering Software (aes)  
Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 10-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P10EVBB.DAT  
TIME/DATE OF STUDY: 16:37 12/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.757
- 2) 10.00; 2.507
- 3) 15.00; 1.859
- 4) 20.00; 1.590
- 5) 25.00; 1.388
- 6) 30.00; 1.248
- 7) 40.00; 1.066
- 8) 50.00; 0.948
- 9) 60.00; 0.860
- 10) 90.00; 0.712
- 11) 120.00; 0.627
- 12) 180.00; 0.525
- 13) 360.00; 0.386
- 14) 1200.00; 0.169

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00  
ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 543.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.596  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.108  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.80	0.30	0.100	56	7.60

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 2.22  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 2.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 543.00 DOWNSTREAM ELEVATION(FEET) = 523.00  
STREET LENGTH(FEET) = 502.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.24  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.28  
HALFSTREET FLOOD WIDTH(FEET) = 5.96  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.90  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.08  
STREET FLOW TRAVEL TIME(MIN.) = 2.15 Tc(MIN.) = 9.74  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.571

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.20	0.30	0.200	56
COMMERCIAL	B	1.30	0.30	0.100	56

NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.261  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.04  
 EFFECTIVE AREA(ACRES) = 2.60 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 5.87

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.24  
 FLOW VELOCITY(FEET/SEC.) = 4.11 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.25  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 810.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.74  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.571  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 1.40 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 3.20  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 9.07

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 523.00 DOWNSTREAM ELEVATION(FEET) = 468.00  
 STREET LENGTH(FEET) = 987.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.91  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.36  
 HALFSTREET FLOOD WIDTH(FEET) = 9.94  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.48  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.96  
 STREET FLOW TRAVEL TIME(MIN.) = 3.00 Tc(MIN.) = 12.74  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.152  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56  
 COMMERCIAL B 2.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.426  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 7.65  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 15.21

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.70  
 FLOW VELOCITY(FEET/SEC.) = 5.70 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.12  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 1797.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 468.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.67  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.38  
 HALFSTREET FLOOD WIDTH(FEET) = 12.15  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.84  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.22  
 STREET FLOW TRAVEL TIME(MIN.) = 2.79 Tc(MIN.) = 15.53  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.831  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.10 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 COMMERCIAL B 1.90 0.30 0.100 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 4.91  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 17.75

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.15  
 FLOW VELOCITY(FEET/SEC.) = 5.87 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.23  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2774.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.53  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.831  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.30	0.30	1.000	66

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 1.79  
 EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
 TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 19.54

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 204.00 TO NODE 218.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 343.00  
 STREET LENGTH(FEET) = 1228.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.26  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.41  
 HALFSTREET FLOOD WIDTH(FEET) = 13.63  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.01  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.44  
 STREET FLOW TRAVEL TIME(MIN.) = 3.41 Tc(MIN.) = 18.94  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.647

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
COMMERCIAL	B	0.50	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.40	0.30	1.000	66
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.70	0.30	0.500	56
COMMERCIAL	B	1.50	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.80	0.30	1.000	66

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 5.44  
 EFFECTIVE AREA(ACRES) = 16.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 16.6 PEAK FLOW RATE(CFS) = 22.91

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 13.79  
 FLOW VELOCITY(FEET/SEC.) = 6.05 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.48  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.94  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.647  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.20	0.30	0.500	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
COMMERCIAL	B	0.10	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450  
 SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 2.18  
 EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 25.09

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 18.94  
 RAINFALL INTENSITY(INCH/HR) = 1.65  
 AREA-AVERAGED Fm(INCH/HR) = 0.12



AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.39  
 EFFECTIVE STREAM AREA (ACRES) = 18.20  
 TOTAL STREAM AREA (ACRES) = 18.20  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 25.09

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 268.00  
 ELEVATION DATA: UPSTREAM (FEET) = 514.00 DOWNSTREAM (FEET) = 511.50

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.724  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.076

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	B	2.30	0.30	0.500	56	9.27
APARTMENTS	B	0.40	0.30	0.200	56	7.72

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456

SUBAREA RUNOFF (CFS) = 7.14

TOTAL AREA (ACRES) = 2.70 PEAK FLOW RATE (CFS) = 7.14

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION (FEET) = 511.50 DOWNSTREAM ELEVATION (FEET) = 503.00  
 STREET LENGTH (FEET) = 503.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 14.77  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.43  
 HALFSTREET FLOOD WIDTH (FEET) = 14.73  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.47  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.48  
 STREET FLOW TRAVEL TIME (MIN.) = 2.42 Tc (MIN.) = 10.14  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.489

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.20	0.30	0.500	56

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.20	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.475  
 SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 15.20  
 EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.14  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47  
 TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 20.92

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.47 HALFSTREET FLOOD WIDTH (FEET) = 16.99  
 FLOW VELOCITY (FEET/SEC.) = 3.77 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.76  
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 771.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.14

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.489

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.281

SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 2.81

EFFECTIVE AREA (ACRES) = 11.20 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45

TOTAL AREA (ACRES) = 11.2 PEAK FLOW RATE (CFS) = 23.73

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION (FEET) = 503.00 DOWNSTREAM ELEVATION (FEET) = 476.00  
 STREET LENGTH (FEET) = 423.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.93  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.41  
HALFSTREET FLOOD WIDTH(FEET) = 13.87  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.52  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.68  
STREET FLOW TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 11.22  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.348

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 1.00 0.30 0.500 56  
COMMERCIAL B 0.10 0.30 0.100 56  
CONDOMINIUMS B 0.10 0.30 0.350 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.454  
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 2.39  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 24.71

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 13.79  
FLOW VELOCITY(FEET/SEC.) = 6.53 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.67  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 11.22  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.348  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.50 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
COMMERCIAL B 0.30 0.30 0.100 56  
CONDOMINIUMS B 3.30 0.30 0.350 56  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.332  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 9.92  
EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 34.63

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 11.22  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.348  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 3.40 0.30 0.100 56  
CONDOMINIUMS B 8.10 0.30 0.350 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.276  
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 23.45  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 58.07

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 476.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
STREET LENGTH(FEET) = 789.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 58.07  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.60  
HALFSTREET FLOOD WIDTH(FEET) = 24.65  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.17  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.11  
STREET FLOW TRAVEL TIME(MIN.) = 2.54 Tc(MIN.) = 13.77  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.019  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 58.07  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.60 HALFSTREET FLOOD WIDTH(FEET) = 24.65  
FLOW VELOCITY(FEET/SEC.) = 5.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.11  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1983.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.77  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.019  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	8.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.40	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 24.22  
 EFFECTIVE AREA(ACRES) = 43.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
 TOTAL AREA(ACRES) = 43.2 PEAK FLOW RATE(CFS) = 73.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 460.00 DOWNSTREAM ELEVATION(FEET) = 419.00  
STREET LENGTH(FEET) = 529.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 76.88  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.54  
 HALFSTREET FLOOD WIDTH(FEET) = 21.13  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.19  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.96  
 STREET FLOW TRAVEL TIME(MIN.) = 0.96 Tc(MIN.) = 14.73  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.894  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 6.28  
 EFFECTIVE AREA(ACRES) = 47.20 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 47.2 PEAK FLOW RATE(CFS) = 75.19

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 20.98  
FLOW VELOCITY(FEET/SEC.) = 9.12 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.90  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 2512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.73  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.894  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.70	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 8.79  
 EFFECTIVE AREA(ACRES) = 52.80 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
 TOTAL AREA(ACRES) = 52.8 PEAK FLOW RATE(CFS) = 83.98

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.73  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.894  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.90	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.50	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 11.77  
 EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 95.76

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 419.00 DOWNSTREAM ELEVATION(FEET) = 405.00  
STREET LENGTH(FEET) = 174.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 95.76  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.57  
HALFSTREET FLOOD WIDTH(FEET) = 22.85  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.86  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 5.63  
STREET FLOW TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 15.02  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.858  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 95.76  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.57 HALFSTREET FLOOD WIDTH(FEET) = 22.85  
FLOW VELOCITY(FEET/SEC.) = 9.86 DEPTH\*VELOCITY(FT\*FT/SEC.) = 5.63  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 2686.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 372.00  
FLOW LENGTH(FEET) = 395.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.73  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 95.76  
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 15.28  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 3081.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 15.28  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.844  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500					
SUBAREA AREA(ACRES) = 2.20		SUBAREA RUNOFF(CFS) = 3.35			
EFFECTIVE AREA(ACRES) = 62.50		AREA-AVERAGED Fm(INCH/HR) = 0.13			
AREA-AVERAGED Fp(INCH/HR) = 0.30		AREA-AVERAGED Ap = 0.44			
TOTAL AREA(ACRES) = 62.5		PEAK FLOW RATE(CFS) = 96.38			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 15.28  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.844  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 3.50 0.30 0.500 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 6.90 0.30 0.500 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 16.16  
EFFECTIVE AREA(ACRES) = 73.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 73.1 PEAK FLOW RATE(CFS) = 112.54

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 343.00  
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.80  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 112.54  
PIPE TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 15.74  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 3688.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 15.74

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.819  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.443  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.06  
 EFFECTIVE AREA (ACRES) = 73.80 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 73.8 PEAK FLOW RATE (CFS) = 112.54  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
 -----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 15.74  
 RAINFALL INTENSITY (INCH/HR) = 1.82  
 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.44  
 EFFECTIVE STREAM AREA (ACRES) = 73.80  
 TOTAL STREAM AREA (ACRES) = 73.80  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 112.54

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	25.09	18.94	1.647	0.30 ( 0.12)	0.39	18.2	200.00
2	112.54	15.74	1.819	0.30 ( 0.13)	0.44	73.8	210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	135.74	15.74	1.819	0.30 ( 0.13)	0.43	88.9	210.00
2	126.15	18.94	1.647	0.30 ( 0.13)	0.43	92.0	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 135.74 Tc (MIN.) = 15.74  
 EFFECTIVE AREA (ACRES) = 88.93 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA (ACRES) = 92.0  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 343.00 DOWNSTREAM (FEET) = 326.50  
 FLOW LENGTH (FEET) = 734.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.6 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 16.92  
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 135.74  
 PIPE TRAVEL TIME (MIN.) = 0.72 Tc (MIN.) = 16.46  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 219.00 = 4736.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 16.46  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.780  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56  
 COMMERCIAL  
 B 0.60 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.70 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.90 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 4.22  
 EFFECTIVE AREA (ACRES) = 91.83 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 94.9 PEAK FLOW RATE (CFS) = 136.26

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 16.46  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.780  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL  
 B 0.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 0.90  
 EFFECTIVE AREA (ACRES) = 92.43 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44

TOTAL AREA (ACRES) = 95.5 PEAK FLOW RATE (CFS) = 137.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 326.50 DOWNSTREAM (FEET) = 325.00
FLOW LENGTH (FEET) = 161.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 37.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 12.31
ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 137.16
PIPE TRAVEL TIME (MIN.) = 0.22 Tc (MIN.) = 16.68
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 220.00 = 4897.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 16.68
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.769
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 4.90 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 3.60 0.30 0.400 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 18.40 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 4.30 0.30 0.400 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 6.90 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462
SUBAREA AREA (ACRES) = 38.60 SUBAREA RUNOFF (CFS) = 56.63
EFFECTIVE AREA (ACRES) = 131.03 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44
TOTAL AREA (ACRES) = 134.1 PEAK FLOW RATE (CFS) = 192.81

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 245.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 325.00 DOWNSTREAM (FEET) = 315.00
FLOW LENGTH (FEET) = 1019.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 42.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.64
ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 192.81

PIPE TRAVEL TIME (MIN.) = 1.25 Tc (MIN.) = 17.93
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.93
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.702
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56
COMMERCIAL B 0.40 0.30 0.100 56
NATURAL FAIR COVER
"OPEN BRUSH" B 0.30 0.30 1.000 66
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56
COMMERCIAL B 0.40 0.30 0.100 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379
SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 4.14
EFFECTIVE AREA (ACRES) = 133.93 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44
TOTAL AREA (ACRES) = 137.0 PEAK FLOW RATE (CFS) = 192.81
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.93
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.702
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.90 0.30 0.100 56
NATURAL FAIR COVER
"OPEN BRUSH" B 0.20 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.264
SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 1.61
EFFECTIVE AREA (ACRES) = 135.03 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44
TOTAL AREA (ACRES) = 138.1 PEAK FLOW RATE (CFS) = 192.81
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.93

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.702  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.40	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.434  
 SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 4.53  
 EFFECTIVE AREA (ACRES) = 138.23 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 141.3 PEAK FLOW RATE (CFS) = 195.18

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 220.50 TO NODE 221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 251.00  
 ELEVATION DATA: UPSTREAM (FEET) = 551.00 DOWNSTREAM (FEET) = 547.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.785  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.561  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"1 DWELLING/ACRE"	B	3.10	0.30	0.800	56	9.79
RESIDENTIAL						
"1 DWELLING/ACRE"	B	3.10	0.30	0.800	56	9.79

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA RUNOFF (CFS) = 12.95  
 TOTAL AREA (ACRES) = 6.20 PEAK FLOW RATE (CFS) = 12.95

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 547.00 DOWNSTREAM (FEET) = 542.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 386.00 CHANNEL SLOPE = 0.0130

CHANNEL BASE (FEET) = 10.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 5.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.370  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.163  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.86  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.06  
 AVERAGE FLOW DEPTH (FEET) = 0.33 TRAVEL TIME (MIN.) = 1.27  
 Tc (MIN.) = 11.06  
 SUBAREA AREA (ACRES) = 4.70 SUBAREA RUNOFF (CFS) = 9.82  
 EFFECTIVE AREA (ACRES) = 10.90 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA (ACRES) = 10.9 PEAK FLOW RATE (CFS) = 21.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.37 FLOW VELOCITY (FEET/SEC.) = 5.48  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 222.00 = 637.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 542.00 DOWNSTREAM ELEVATION (FEET) = 531.00  
 STREET LENGTH (FEET) = 1146.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 35.20  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.58  
 HALFSTREET FLOOD WIDTH (FEET) = 23.48  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.44  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.00  
 STREET FLOW TRAVEL TIME (MIN.) = 5.55 Tc (MIN.) = 16.61  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.772

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	11.50	0.30	0.200	56

APARTMENTS B 2.90 0.30 0.200 56  
 COMMERCIAL B 0.70 0.30 0.100 56  
 PUBLIC PARK B 2.60 0.30 0.850 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.292  
 SUBAREA AREA (ACRES) = 17.70 SUBAREA RUNOFF (CFS) = 26.84  
 EFFECTIVE AREA (ACRES) = 28.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 28.6 PEAK FLOW RATE (CFS) = 42.68

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.61 HALFSTREET FLOOD WIDTH (FEET) = 25.27  
 FLOW VELOCITY (FEET/SEC.) = 3.62 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.22  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 223.00 = 1783.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION (FEET) = 531.00 DOWNSTREAM ELEVATION (FEET) = 520.00  
 STREET LENGTH (FEET) = 702.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 51.23  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.60  
 HALFSTREET FLOOD WIDTH (FEET) = 24.65  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.56  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.75  
 STREET FLOW TRAVEL TIME (MIN.) = 2.57 Tc (MIN.) = 19.18  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.634

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.40	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
CONDOMINIUMS	B	0.70	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175  
 SUBAREA AREA (ACRES) = 12.00 SUBAREA RUNOFF (CFS) = 17.08  
 EFFECTIVE AREA (ACRES) = 40.60 AREA-AVERAGED Fm (INCH/HR) = 0.10  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32  
 TOTAL AREA (ACRES) = 40.6 PEAK FLOW RATE (CFS) = 56.21

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.62 HALFSTREET FLOOD WIDTH (FEET) = 25.59  
 FLOW VELOCITY (FEET/SEC.) = 4.65 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.88  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 224.00 = 2485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 520.00 DOWNSTREAM (FEET) = 463.00  
 FLOW LENGTH (FEET) = 1760.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.86  
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 56.21  
 PIPE TRAVEL TIME (MIN.) = 1.85 Tc (MIN.) = 21.02  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 225.00 = 4245.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 21.02  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.549  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.20	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	0.30	0.30	0.350	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	2.00	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.235  
 SUBAREA AREA (ACRES) = 11.50 SUBAREA RUNOFF (CFS) = 15.30  
 EFFECTIVE AREA (ACRES) = 52.10 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA (ACRES) = 52.1 PEAK FLOW RATE (CFS) = 68.38

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 21.02  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.549  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.40	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
CONDOMINIUMS	B	0.70	0.30	0.350	56



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RESIDENTIAL
"5-7 DWELLINGS/ACRE"      B      6.40   0.30   0.500   56
CONDOMINIUMS              B      0.90   0.30   0.350   56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"      B      5.20   0.30   0.500   56
CONDOMINIUMS              B      0.80   0.30   0.350   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.481
SUBAREA AREA (ACRES) = 13.30   SUBAREA RUNOFF (CFS) = 16.81
EFFECTIVE AREA (ACRES) = 65.40   AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.34
TOTAL AREA (ACRES) = 65.4   PEAK FLOW RATE (CFS) = 85.19

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*****
FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 463.00   DOWNSTREAM(FEET) = 425.00
FLOW LENGTH(FEET) = 639.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 21.87
ESTIMATED PIPE DIAMETER (INCH) = 30.00   NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 85.19
PIPE TRAVEL TIME (MIN.) = 0.49   Tc (MIN.) = 21.51
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 226.00 = 4884.00 FEET.

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*****
FLOW PROCESS FROM NODE 226.00 TO NODE 226.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc (MIN.) = 21.51
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.529
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B      2.90    0.30    0.200    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B      2.90    0.30    0.500    56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B      6.30    0.30    0.200    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B      6.00    0.30    0.500    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348
SUBAREA AREA (ACRES) = 18.10   SUBAREA RUNOFF (CFS) = 23.21
EFFECTIVE AREA (ACRES) = 83.50   AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.34
TOTAL AREA (ACRES) = 83.5   PEAK FLOW RATE (CFS) = 107.24

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*****
FLOW PROCESS FROM NODE 226.00 TO NODE 243.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 425.00   DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 653.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 20.98
ESTIMATED PIPE DIAMETER (INCH) = 33.00   NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 107.24
PIPE TRAVEL TIME (MIN.) = 0.52   Tc (MIN.) = 22.03
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 243.00 = 5537.00 FEET.

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 22.03
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.508
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B      2.90    0.30    0.200    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B      1.60    0.30    0.500    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307
SUBAREA AREA (ACRES) = 4.50   SUBAREA RUNOFF (CFS) = 5.73
EFFECTIVE AREA (ACRES) = 88.00   AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.34
TOTAL AREA (ACRES) = 88.0   PEAK FLOW RATE (CFS) = 111.40

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 22.03
RAINFALL INTENSITY (INCH/HR) = 1.51
AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.34
EFFECTIVE STREAM AREA (ACRES) = 88.00
TOTAL STREAM AREA (ACRES) = 88.00
PEAK FLOW RATE (CFS) AT CONFLUENCE = 111.40

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*****
FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----

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INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 550.00   DOWNSTREAM(FEET) = 547.50

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.751

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\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.819  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 APARTMENTS B 0.60 0.30 0.200 56 8.75  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF (CFS) = 1.49  
 TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 1.49

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 547.50 DOWNSTREAM (FEET) = 541.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 802.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 3.00

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.312  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 APARTMENTS B 0.20 0.30 0.200 56  
 COMMERCIAL B 5.90 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.79  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.85  
 AVERAGE FLOW DEPTH (FEET) = 0.90 TRAVEL TIME (MIN.) = 2.75  
 Tc (MIN.) = 11.50  
 SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 12.52  
 EFFECTIVE AREA (ACRES) = 6.70 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA (ACRES) = 6.7 PEAK FLOW RATE (CFS) = 13.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.11 FLOW VELOCITY (FEET/SEC.) = 5.58  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1132.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 541.00 DOWNSTREAM (FEET) = 533.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 849.00 CHANNEL SLOPE = 0.0094  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 5.00

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.051  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 14.90 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.31  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.03  
 AVERAGE FLOW DEPTH (FEET) = 1.39 TRAVEL TIME (MIN.) = 2.01  
 Tc (MIN.) = 13.52  
 SUBAREA AREA (ACRES) = 14.90 SUBAREA RUNOFF (CFS) = 27.11  
 EFFECTIVE AREA (ACRES) = 21.60 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 21.6 PEAK FLOW RATE (CFS) = 39.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.60 FLOW VELOCITY (FEET/SEC.) = 7.70  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1981.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 13.52  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.051  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 APARTMENTS B 0.20 0.30 0.200 56  
 COMMERCIAL B 1.80 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 3.81  
 EFFECTIVE AREA (ACRES) = 23.70 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA (ACRES) = 23.7 PEAK FLOW RATE (CFS) = 43.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 13.52  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.051  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.40 0.30 0.100 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 COMMERCIAL B 1.30 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.117  
 SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 3.27  
 EFFECTIVE AREA (ACRES) = 25.50 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA (ACRES) = 25.5 PEAK FLOW RATE (CFS) = 46.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31  
 -----

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 537.00 DOWNSTREAM(FEET) = 510.00
FLOW LENGTH(FEET) = 513.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.82
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 46.35
PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 14.00
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2494.00 FEET.

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.989
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"    B        1.70     0.30     0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"   B        1.60     0.30     0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 5.50
EFFECTIVE AREA(ACRES) = 41.40 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21
TOTAL AREA(ACRES) = 41.4 PEAK FLOW RATE(CFS) = 70.03

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.989
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"    B        0.70     0.30     0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"   B        2.50     0.30     0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 5.42
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 66.15

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 478.00
FLOW LENGTH(FEET) = 474.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.61
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 66.15
PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 14.36
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 2968.00 FEET.

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*****
FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.36
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.942
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"    B        1.70     0.30     0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"   B        1.60     0.30     0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 5.50
EFFECTIVE AREA(ACRES) = 41.40 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21
TOTAL AREA(ACRES) = 41.4 PEAK FLOW RATE(CFS) = 70.03

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*****
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31
-----

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 478.00 DOWNSTREAM(FEET) = 471.00
FLOW LENGTH(FEET) = 473.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.34
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 70.03
PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 15.00
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 3441.00 FEET.

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FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.859
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"    B        1.40     0.30     0.200    56
RESIDENTIAL

```

"8-10 DWELLINGS/ACRE"	B	7.10	0.30	0.400	56
APARTMENTS	B	2.70	0.30	0.200	56
COMMERCIAL	B	1.10	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
SUBAREA AREA (ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 19.56  
EFFECTIVE AREA (ACRES) = 53.70 AREA-AVERAGED Fm (INCH/HR) = 0.07  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
TOTAL AREA (ACRES) = 53.7 PEAK FLOW RATE (CFS) = 86.51

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.859  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	5.40	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.00	0.30	0.400	56
COMMERCIAL	B	0.60	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.378  
SUBAREA AREA (ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 15.55  
EFFECTIVE AREA (ACRES) = 63.60 AREA-AVERAGED Fm (INCH/HR) = 0.08  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
TOTAL AREA (ACRES) = 63.6 PEAK FLOW RATE (CFS) = 102.06

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 471.00 DOWNSTREAM(FEET) = 468.00  
FLOW LENGTH(FEET) = 283.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.04  
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 102.06  
PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 15.39  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 237.00 = 3724.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.39  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.838  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.10	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.60	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.218  
SUBAREA AREA (ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 10.69  
EFFECTIVE AREA (ACRES) = 70.30 AREA-AVERAGED Fm (INCH/HR) = 0.07  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
TOTAL AREA (ACRES) = 70.3 PEAK FLOW RATE (CFS) = 111.54

\*\*\*\*\*  
FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 468.00 DOWNSTREAM(FEET) = 461.00  
FLOW LENGTH(FEET) = 698.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.85  
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 111.54  
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 16.37  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 238.00 = 4422.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.37  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.785  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	8.40	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.60	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.220  
SUBAREA AREA (ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 13.92  
EFFECTIVE AREA (ACRES) = 79.30 AREA-AVERAGED Fm (INCH/HR) = 0.07  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
TOTAL AREA (ACRES) = 79.3 PEAK FLOW RATE (CFS) = 122.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.37  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.785  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"11+ DWELLINGS/ACRE" B 2.10 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 3.26
EFFECTIVE AREA(ACRES) = 81.40 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25
TOTAL AREA (ACRES) = 81.4 PEAK FLOW RATE (CFS) = 125.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 461.00 DOWNSTREAM(FEET) = 440.00
FLOW LENGTH(FEET) = 582.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.10
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 125.39
PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 16.86
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 5004.00 FEET.

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FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.86
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.759
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 5.00 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 7.65
EFFECTIVE AREA(ACRES) = 86.40 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 86.4 PEAK FLOW RATE (CFS) = 131.13

\*\*\*\*\*

FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 418.00
FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.68
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 131.13
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 17.41
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 5654.00 FEET.

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FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.41
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.730
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 5.30 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 5.30 SUBAREA RUNOFF(CFS) = 7.96
EFFECTIVE AREA(ACRES) = 91.70 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 136.79

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FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.41
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.730
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.20 0.30 0.200 56
COMMERCIAL B 0.20 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186
SUBAREA AREA (ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.11
EFFECTIVE AREA(ACRES) = 93.10 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 93.1 PEAK FLOW RATE (CFS) = 138.90

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FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.41
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.730
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.20 0.30 0.200 56
SCHOOL B 0.70 0.30 0.600 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA (ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 2.78
EFFECTIVE AREA(ACRES) = 95.00 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 95.0 PEAK FLOW RATE (CFS) = 141.68

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FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 418.00 DOWNSTREAM(FEET) = 404.00
FLOW LENGTH(FEET) = 1279.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 39.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.93
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 141.68
PIPE TRAVEL TIME(MIN.) = 1.65 Tc(MIN.) = 19.05
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 241.00 = 6933.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.05

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.641

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Residential, Commercial, Public Park, School, and another Residential entry.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.488

SUBAREA AREA(ACRES) = 18.80 SUBAREA RUNOFF(CFS) = 25.29

EFFECTIVE AREA(ACRES) = 113.80 AREA-AVERAGED Fm(INCH/HR) = 0.08

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28

TOTAL AREA(ACRES) = 113.8 PEAK FLOW RATE(CFS) = 159.38

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FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.05

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.641

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Public Park and School.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.666

SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 19.06

EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33

TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 178.45

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FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 403.00
FLOW LENGTH(FEET) = 66.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.74
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 178.45
PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 19.12
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 6999.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.12

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.637

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Residential, Commercial, and another Residential entry.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.193

SUBAREA AREA(ACRES) = 19.10 SUBAREA RUNOFF(CFS) = 27.15

EFFECTIVE AREA(ACRES) = 147.60 AREA-AVERAGED Fm(INCH/HR) = 0.09

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31

TOTAL AREA(ACRES) = 147.6 PEAK FLOW RATE(CFS) = 205.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 1270.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 48.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.08
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 205.16
PIPE TRAVEL TIME(MIN.) = 1.75 Tc(MIN.) = 20.88
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

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FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 20.88
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.555
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B        1.00   0.30   0.200  56
PUBLIC PARK          B        2.00   0.30   0.850  56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B        2.80   0.30   0.200  56
COMMERCIAL           B        1.50   0.30   0.100  56
CONDOMINIUMS         B        0.10   0.30   0.350  56
PUBLIC PARK          B        1.10   0.30   0.850  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.421
SUBAREA AREA(ACRES) = 8.50   SUBAREA RUNOFF(CFS) = 10.93
EFFECTIVE AREA(ACRES) = 156.10   AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 156.1   PEAK FLOW RATE(CFS) = 205.16
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 20.88
RAINFALL INTENSITY(INCH/HR) = 1.55
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA(ACRES) = 156.10
TOTAL STREAM AREA(ACRES) = 156.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 205.16

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\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	111.40	22.03	1.508	0.30( 0.10)	0.34	88.0	220.50
2	205.16	20.88	1.555	0.30( 0.09)	0.32	156.1	230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	314.22	20.88	1.555	0.30( 0.10)	0.32	239.5	230.00
2	310.01	22.03	1.508	0.30( 0.10)	0.32	244.1	220.50

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

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PEAK FLOW RATE(CFS) = 314.22   Tc(MIN.) = 20.88
EFFECTIVE AREA(ACRES) = 239.49   AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.32

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TOTAL AREA(ACRES) = 244.1
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

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FLOW PROCESS FROM NODE 243.00 TO NODE 244.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 394.00   DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 849.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 31.01
ESTIMATED PIPE DIAMETER(INCH) = 48.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 314.22
PIPE TRAVEL TIME(MIN.) = 0.46   Tc(MIN.) = 21.33
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 244.00 = 9118.00 FEET.

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FLOW PROCESS FROM NODE 244.00 TO NODE 244.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 21.33
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.536
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B        0.10   0.30   0.200  56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B        1.70   0.30   0.500  56
PUBLIC PARK          B        0.30   0.30   0.850  56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B        0.80   0.30   0.500  56
PUBLIC PARK          B        0.10   0.30   0.850  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.537
SUBAREA AREA(ACRES) = 3.00   SUBAREA RUNOFF(CFS) = 3.71
EFFECTIVE AREA(ACRES) = 242.49   AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 247.1   PEAK FLOW RATE(CFS) = 314.22
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 244.00 TO NODE 245.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 340.00   DOWNSTREAM(FEET) = 315.00
FLOW LENGTH(FEET) = 777.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 41.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.92
ESTIMATED PIPE DIAMETER(INCH) = 54.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 314.22
PIPE TRAVEL TIME(MIN.) = 0.54   Tc(MIN.) = 21.88
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

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\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.88

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.514

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56

PUBLIC PARK B 0.20 0.30 0.850 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56

PUBLIC PARK B 0.10 0.30 0.850 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631

SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 0.95

EFFECTIVE AREA(ACRES) = 243.29 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33

TOTAL AREA(ACRES) = 247.9 PEAK FLOW RATE(CFS) = 314.22

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
------------------	------------	--------------	------------------------	---------------------	----	---------------	-------------------

1 314.22 21.88 1.514 0.30( 0.10) 0.33 243.3 230.00

2 310.01 23.03 1.468 0.30( 0.10) 0.33 247.9 220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
------------------	------------	--------------	------------------------	---------------------	----	---------------	-------------------

1 195.18 17.93 1.702 0.30( 0.13) 0.44 138.2 210.00

2 179.35 21.17 1.543 0.30( 0.13) 0.44 141.3 200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
------------------	------------	--------------	------------------------	---------------------	----	---------------	-------------------

1 486.75 17.93 1.702 0.30( 0.11) 0.37 337.6 210.00

2 489.59 21.17 1.543 0.30( 0.11) 0.37 376.8 200.00

3 489.97 21.88 1.514 0.30( 0.11) 0.37 384.6 230.00

4 479.83 23.03 1.468 0.30( 0.11) 0.37 389.2 220.50

TOTAL AREA(ACRES) = 389.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 489.97 Tc(MIN.) = 21.875

EFFECTIVE AREA(ACRES) = 384.59 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 389.2

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 3 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 246.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 306.00

FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 75.0 INCH PIPE IS 56.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 19.94

ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 489.97

PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 22.39

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 246.00 = 10514.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.39

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.493

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.90 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.50 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56

CONDOMINIUMS B 9.10 0.30 0.350 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.80 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.410

SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 20.10

EFFECTIVE AREA(ACRES) = 400.89 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 405.5 PEAK FLOW RATE(CFS) = 498.72

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
------------------	------------	--------------	------------------------	---------------------	----	---------------	-------------------

1 497.21 18.45 1.674 0.30( 0.11) 0.38 353.9 210.00

2 498.95 21.69 1.522 0.30( 0.11) 0.37 393.1 200.00

3 498.72 22.39 1.493 0.30( 0.11) 0.37 400.9 230.00



4 487.31 23.56 1.446 0.30( 0.11) 0.37 405.5 220.50  
NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 498.95 Tc(MIN.) = 21.69  
AREA-AVERAGED Fm(INCH/HR) = 0.11 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.37 EFFECTIVE AREA(ACRES) = 393.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 21.69  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.522  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.60	0.30	0.400	56
CONDOMINIUMS	B	7.40	0.30	0.350	56
PUBLIC PARK	B	0.30	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.375  
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 11.80  
EFFECTIVE AREA(ACRES) = 402.40 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 414.8 PEAK FLOW RATE(CFS) = 510.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 246.00 TO NODE 247.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 306.00 DOWNSTREAM(FEET) = 300.00  
FLOW LENGTH(FEET) = 185.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 66.0 INCH PIPE IS 48.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.29  
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 510.74  
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 21.80  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 247.00 = 10699.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 21.80  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.517  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
PUBLIC PARK	B	0.10	0.30	0.850	56

RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 1.30 0.30 0.400 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.413  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 2.51  
EFFECTIVE AREA(ACRES) = 404.40 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 416.8 PEAK FLOW RATE(CFS) = 511.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 21.80  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.517  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.40	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.80	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.365  
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 3.29  
EFFECTIVE AREA(ACRES) = 407.00 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 419.4 PEAK FLOW RATE(CFS) = 514.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 247.00 TO NODE 248.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 271.00  
FLOW LENGTH(FEET) = 859.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 63.0 INCH PIPE IS 51.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.23  
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 514.89  
PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 22.33  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 22.33  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.496

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.60	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.60	0.30	0.400	56
COMMERCIAL	B	1.00	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356  
SUBAREA AREA(ACRES) = 4.80 SUBAREA RUNOFF(CFS) = 6.00  
EFFECTIVE AREA(ACRES) = 411.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 424.2 PEAK FLOW RATE(CFS) = 514.89  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.33

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.496

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.50	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.12  
EFFECTIVE AREA(ACRES) = 412.70 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 425.1 PEAK FLOW RATE(CFS) = 514.89  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.33

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.496

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.70	0.30	0.400	56

RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.20	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.80	0.30	0.400	56
CONDOMINIUMS	B	0.20	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	3.20	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.466  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 10.01  
EFFECTIVE AREA(ACRES) = 420.90 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 433.3 PEAK FLOW RATE(CFS) = 524.24

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (INCH/HR)	Ae (ACRES)	HEADWATER NODE
1	524.27	19.08	1.639	0.30( 0.11)	0.38	381.7	210.00
2	524.24	22.33	1.496	0.30( 0.11)	0.37	420.9	200.00
3	523.12	23.03	1.468	0.30( 0.11)	0.37	428.7	230.00
4	510.38	24.20	1.420	0.30( 0.11)	0.37	433.3	220.50

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 524.27 Tc(MIN.) = 19.08

AREA-AVERAGED Fm(INCH/HR) = 0.11 AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.38 EFFECTIVE AREA(ACRES) = 381.71

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.08

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.639

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	5.70	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 7.79  
EFFECTIVE AREA(ACRES) = 387.41 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA(ACRES) = 439.0 PEAK FLOW RATE(CFS) = 532.07

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.08

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.639

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	6.40	0.30	1.000	66
NATURAL FAIR COVER					

"OPEN BRUSH" B 1.40 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.60 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 10.13  
 EFFECTIVE AREA (ACRES) = 395.81 AREA-AVERAGED Fm (INCH/HR) = 0.12  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA (ACRES) = 447.4 PEAK FLOW RATE (CFS) = 542.19

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 10  
 -----  
 >>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<<  
 =====

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21  
 -----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 413.04 DOWNSTREAM (FEET) = 405.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.928  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.275  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
CONDOMINIUMS	B	0.20	0.30	0.350	56	7.70
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56	6.93
CONDOMINIUMS	B	0.10	0.30	0.350	56	7.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.312  
 SUBAREA RUNOFF (CFS) = 1.15  
 TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 1.15

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62  
 -----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<<  
 =====

UPSTREAM ELEVATION (FEET) = 405.00 DOWNSTREAM ELEVATION (FEET) = 385.00  
 STREET LENGTH (FEET) = 587.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.22  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.28  
 HALFSTREET FLOOD WIDTH (FEET) = 6.72  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.54  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.00  
 STREET FLOW TRAVEL TIME (MIN.) = 2.77 Tc (MIN.) = 9.69  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.583

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.20	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.224  
 SUBAREA AREA (ACRES) = 2.70 SUBAREA RUNOFF (CFS) = 6.11  
 EFFECTIVE AREA (ACRES) = 3.10 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 3.1 PEAK FLOW RATE (CFS) = 7.01

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.32 HALFSTREET FLOOD WIDTH (FEET) = 8.91  
 FLOW VELOCITY (FEET/SEC.) = 3.89 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.25  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 917.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31  
 -----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 385.00 DOWNSTREAM (FEET) = 378.50  
 FLOW LENGTH (FEET) = 162.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.4 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.30  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 7.01  
 PIPE TRAVEL TIME (MIN.) = 0.26 Tc (MIN.) = 9.96  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1079.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81  
 -----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
 =====

MAINLINE Tc (MIN.) = 9.96  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.518  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56

COMMERCIAL B 1.30 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA (ACRES) = 2.40 SUBAREA RUNOFF (CFS) = 5.37  
 EFFECTIVE AREA (ACRES) = 5.50 AREA-AVERAGED Fm (INCH/HR) = 0.05  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
 TOTAL AREA (ACRES) = 5.5 PEAK FLOW RATE (CFS) = 12.20

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 378.50 DOWNSTREAM (FEET) = 348.50  
 FLOW LENGTH (FEET) = 637.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.61  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 12.20  
 PIPE TRAVEL TIME (MIN.) = 0.84 Tc (MIN.) = 10.80  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 1716.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 10.80  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.404  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.60	0.30	0.500	56
COMMERCIAL	B	1.70	0.30	0.100	56
CONDOMINIUMS	B	1.00	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
COMMERCIAL	B	0.70	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.240  
 SUBAREA AREA (ACRES) = 4.50 SUBAREA RUNOFF (CFS) = 9.44  
 EFFECTIVE AREA (ACRES) = 10.00 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA (ACRES) = 10.0 PEAK FLOW RATE (CFS) = 21.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 304.00 TO NODE 421.10 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 348.50 DOWNSTREAM (FEET) = 306.00  
 FLOW LENGTH (FEET) = 944.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.7 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 13.64  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 21.08  
 PIPE TRAVEL TIME (MIN.) = 1.15 Tc (MIN.) = 11.95  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 11.95  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.254  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.20	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.50	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.90	0.30	0.400	56
COMMERCIAL	B	2.00	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
 SUBAREA AREA (ACRES) = 7.30 SUBAREA RUNOFF (CFS) = 14.12  
 EFFECTIVE AREA (ACRES) = 17.30 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.27  
 TOTAL AREA (ACRES) = 17.3 PEAK FLOW RATE (CFS) = 33.86

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 11.95  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.254  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	4.40	0.30	0.200	56
COMMERCIAL	B	0.10	0.30	0.100	56
APARTMENTS	B	6.70	0.30	0.200	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.199  
 SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 22.12  
 EFFECTIVE AREA (ACRES) = 28.50 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 28.5 PEAK FLOW RATE (CFS) = 55.98

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 11.95  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.254  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 3.10 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 5.45  
 EFFECTIVE AREA(ACRES) = 31.60 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 61.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 11.95  
 RAINFALL INTENSITY(INCH/HR) = 2.25  
 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.31  
 EFFECTIVE STREAM AREA(ACRES) = 31.60  
 TOTAL STREAM AREA(ACRES) = 31.60  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 61.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 400.00 TO NODE 420.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 300.40  
 ELEVATION DATA: UPSTREAM(FEET) = 312.80 DOWNSTREAM(FEET) = 310.80

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.115  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.978  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 COMMERCIAL B 0.50 0.30 0.100 56 8.11  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF(CFS) = 1.33  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.33

\*\*\*\*\*

FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 307.00

STREET LENGTH(FEET) = 266.50 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 67.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 62.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.00

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.31  
 HALFSTREET FLOOD WIDTH(FEET) = 8.60  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.43  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.75  
 STREET FLOW TRAVEL TIME(MIN.) = 1.83 Tc(MIN.) = 9.95  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.520

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.60 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.34  
 EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 2.47

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 9.63  
 FLOW VELOCITY(FEET/SEC.) = 2.51 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.82  
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.00 = 566.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 307.00 DOWNSTREAM(FEET) = 305.50  
 FLOW LENGTH(FEET) = 105.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.31  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 2.47  
 PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 10.28  
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.10 = 671.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

\*\*\*\*\*

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 10.28  
 RAINFALL INTENSITY (INCH/HR) = 2.47  
 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.10  
 EFFECTIVE STREAM AREA (ACRES) = 1.10  
 TOTAL STREAM AREA (ACRES) = 1.10  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 2.47

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	61.43	11.95	2.254	0.30 ( 0.09)	0.31	31.6	300.00
2	2.47	10.28	2.471	0.30 ( 0.03)	0.10	1.1	400.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	60.59	10.28	2.471	0.30 ( 0.09)	0.31	28.3	400.00
2	63.67	11.95	2.254	0.30 ( 0.09)	0.31	32.7	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 63.67 Tc (MIN.) = 11.95  
 EFFECTIVE AREA (ACRES) = 32.70 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA (ACRES) = 32.7  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 426.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 305.50 DOWNSTREAM (FEET) = 301.00  
 FLOW LENGTH (FEET) = 261.40 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.1 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.63  
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 63.67  
 PIPE TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 12.30  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.10 = 2921.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc (MIN.) = 12.30  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.209  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.38  
 EFFECTIVE AREA (ACRES) = 32.90 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA (ACRES) = 32.9 PEAK FLOW RATE (CFS) = 63.67  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.20 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 301.00 DOWNSTREAM (FEET) = 289.00  
 FLOW LENGTH (FEET) = 448.56 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 21.8 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.26  
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 63.67  
 PIPE TRAVEL TIME (MIN.) = 0.49 Tc (MIN.) = 12.79  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.20 = 3369.96 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.20 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc (MIN.) = 12.79  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.146  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 0.50 SUBAREA RUNOFF (CFS) = 0.91  
 EFFECTIVE AREA (ACRES) = 33.40 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA (ACRES) = 33.4 PEAK FLOW RATE (CFS) = 63.67  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.30 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 289.00 DOWNSTREAM (FEET) = 282.00  
 FLOW LENGTH (FEET) = 260.45 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.5 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.81  
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 63.67  
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 13.08  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.30 = 3630.41 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.30 TO NODE 426.30 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.08

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.108

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.80	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400

SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 1.97

EFFECTIVE AREA(ACRES) = 34.50 AREA-AVERAGED Fm(INCH/HR) = 0.09

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31

TOTAL AREA(ACRES) = 34.5 PEAK FLOW RATE(CFS) = 63.67

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.30 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 271.00

FLOW LENGTH(FEET) = 411.44 MANNING'S N = 0.013

DEPTH OF FLOW IN 33.0 INCH PIPE IS 21.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.26

ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 63.67

PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 13.53

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 13.53

RAINFALL INTENSITY(INCH/HR) = 2.05

AREA-AVERAGED Fm(INCH/HR) = 0.09

AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.31

EFFECTIVE STREAM AREA(ACRES) = 34.50

TOTAL STREAM AREA(ACRES) = 34.50

PEAK FLOW RATE(CFS) AT CONFLUENCE = 63.67

\*\*\*\*\*

FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 233.60

ELEVATION DATA: UPSTREAM(FEET) = 306.50 DOWNSTREAM(FEET) = 301.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.882

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.536

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.20	0.30	0.100	56	5.88
COMMERCIAL	B	0.20	0.30	0.100	56	5.88

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF(CFS) = 1.26

TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.26

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.00 TO NODE 427.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STANDARD CURB SECTION USED)<<<<

UPSTREAM ELEVATION(FEET) = 301.80 DOWNSTREAM ELEVATION(FEET) = 294.00

STREET LENGTH(FEET) = 478.70 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.13

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.31

HALFSTREET FLOOD WIDTH(FEET) = 8.64

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.56

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.80

STREET FLOW TRAVEL TIME(MIN.) = 3.11 Tc(MIN.) = 8.99

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.759

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.20	0.30	0.100	56
COMMERCIAL	B	0.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.72

EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.03

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10

TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 2.70

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.33 HALFSTREET FLOOD WIDTH (FEET) = 9.73
FLOW VELOCITY (FEET/SEC.) = 2.70 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.89
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 427.00 = 712.30 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 427.00 TO NODE 428.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<

UPSTREAM ELEVATION (FEET) = 294.00 DOWNSTREAM ELEVATION (FEET) = 286.00
STREET LENGTH (FEET) = 300.80 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 55.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.25
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.33
HALFSTREET FLOOD WIDTH (FEET) = 9.46
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.39
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.10
STREET FLOW TRAVEL TIME (MIN.) = 1.48 Tc (MIN.) = 10.47
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.446

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.10 0.30 0.100 56
COMMERCIAL B 0.40 0.30 0.100 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.50 SUBAREA RUNOFF (CFS) = 1.09
EFFECTIVE AREA (ACRES) = 1.60 AREA-AVERAGED Fm (INCH/HR) = 0.03
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 1.6 PEAK FLOW RATE (CFS) = 3.48

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.33 HALFSTREET FLOOD WIDTH (FEET) = 9.78
FLOW VELOCITY (FEET/SEC.) = 3.45 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.14
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 428.00 = 1013.10 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 428.00 TO NODE 429.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<

UPSTREAM ELEVATION (FEET) = 286.00 DOWNSTREAM ELEVATION (FEET) = 276.00

STREET LENGTH (FEET) = 242.40 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 55.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.89
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.32
HALFSTREET FLOOD WIDTH (FEET) = 9.24
AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.22
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.36
STREET FLOW TRAVEL TIME (MIN.) = 0.96 Tc (MIN.) = 11.43
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.322

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.40 0.30 0.100 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.83
EFFECTIVE AREA (ACRES) = 2.00 AREA-AVERAGED Fm (INCH/HR) = 0.03
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 4.13

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.33 HALFSTREET FLOOD WIDTH (FEET) = 9.57
FLOW VELOCITY (FEET/SEC.) = 4.24 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.39
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 429.00 = 1255.50 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 429.00 TO NODE 429.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.43
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.322

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.50 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 1.50 0.30 0.400 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 3.96
EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.08
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25
TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 8.09

\*\*\*\*\*



FLOW PROCESS FROM NODE 429.00 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 273.00
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.61
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.09
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 11.60
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 248.00 = 1355.50 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 11.60
RAINFALL INTENSITY(INCH/HR) = 2.30
AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.25
EFFECTIVE STREAM AREA(ACRES) = 4.00
TOTAL STREAM AREA(ACRES) = 4.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.09

\*\* CONFLUENCE DATA \*\*

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1, 1, 2.

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1, 2, 3.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 70.85 Tc(MIN.) = 13.53
EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 38.5
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1, 2, 3.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1, 2, 3, 4.

\*\* PEAK FLOW RATE TABLE \*\*

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1, 2, 3, 4, 5, 6, 7.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 598.20 Tc(MIN.) = 19.084
EFFECTIVE AREA(ACRES) = 434.31 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 485.9
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 249.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 261.00
FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 55.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.80
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 598.20

PIPE TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 19.30  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 429.00 TO NODE 430.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 262.70

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.459  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.392  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.20	0.30	0.100	56	6.46
COMMERCIAL	B	0.40	0.30	0.100	56	6.46

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 1.82  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<

\*\*\*\*\*  
UPSTREAM ELEVATION(FEET) = 262.70 DOWNSTREAM ELEVATION(FEET) = 258.98  
STREET LENGTH(FEET) = 345.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.55  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 10.43  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.28  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.78  
STREET FLOW TRAVEL TIME(MIN.) = 2.53 Tc(MIN.) = 8.99  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.761

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.50	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.47  
EFFECTIVE AREA(ACRES) = 1.20 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 2.95

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.23  
FLOW VELOCITY(FEET/SEC.) = 2.33 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.83  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.00 = 675.60 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.00 TO NODE 431.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 258.98 DOWNSTREAM(FEET) = 258.00  
FLOW LENGTH(FEET) = 91.03 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.05  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 2.95  
PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 9.29  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.10 = 766.63 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

\*\*\*\*\*  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 9.29  
RAINFALL INTENSITY(INCH/HR) = 2.69  
AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 1.20  
TOTAL STREAM AREA(ACRES) = 1.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.95

\*\*\*\*\*  
FLOW PROCESS FROM NODE 410.00 TO NODE 440.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 299.70  
ELEVATION DATA: UPSTREAM(FEET) = 312.69 DOWNSTREAM(FEET) = 310.80

Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.196  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.958  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.40	0.30	0.100	56	8.20

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF(CFS) = 1.05  
 TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.05

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 61  
 \*\*\*\*\*

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 306.50  
 STREET LENGTH(FEET) = 299.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.49  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.29  
 HALfstREET FLOOD WIDTH(FEET) = 7.31  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.30  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.66  
 STREET FLOW TRAVEL TIME(MIN.) = 2.17 Tc(MIN.) = 10.37  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.460

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.87  
 EFFECTIVE AREA(ACRES) = 0.80 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 1.75

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.30 HALfstREET FLOOD WIDTH(FEET) = 7.95  
 FLOW VELOCITY(FEET/SEC.) = 2.39 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.71  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 441.00 = 598.70 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 61  
 \*\*\*\*\*

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 306.50 DOWNSTREAM ELEVATION(FEET) = 299.00  
 STREET LENGTH(FEET) = 341.60 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.34  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.31  
 HALfstREET FLOOD WIDTH(FEET) = 8.34  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.97  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.91  
 STREET FLOW TRAVEL TIME(MIN.) = 1.91 Tc(MIN.) = 12.28  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.212

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.20	0.30	0.100	56
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.18  
 EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 2.75

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.32 HALfstREET FLOOD WIDTH(FEET) = 9.13  
 FLOW VELOCITY(FEET/SEC.) = 3.04 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.97  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 442.00 = 940.30 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 61  
 \*\*\*\*\*

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 299.00 DOWNSTREAM ELEVATION(FEET) = 288.50  
 STREET LENGTH(FEET) = 390.10 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.27  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 9.43  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.44  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.12  
STREET FLOW TRAVEL TIME(MIN.) = 1.89 Tc(MIN.) = 14.17  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.967

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.30 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.05  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 3.49

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 9.73  
FLOW VELOCITY(FEET/SEC.) = 3.48 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.15  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 443.00 = 1330.40 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 443.00 TO NODE 444.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 288.50 DOWNSTREAM ELEVATION(FEET) = 281.00  
STREET LENGTH(FEET) = 272.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.81  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 10.13  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.57  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.20  
STREET FLOW TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 15.44  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.835  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

COMMERCIAL B 0.40 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.65  
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 3.90

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 10.23  
FLOW VELOCITY(FEET/SEC.) = 3.59 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.22  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 444.00 = 1603.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 444.00 TO NODE 445.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 281.00 DOWNSTREAM ELEVATION(FEET) = 268.10  
STREET LENGTH(FEET) = 462.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.43  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 10.83  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.72  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.30  
STREET FLOW TRAVEL TIME(MIN.) = 2.07 Tc(MIN.) = 17.52  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.724  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.70 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.07  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 4.72

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 11.13  
FLOW VELOCITY(FEET/SEC.) = 3.79 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.34  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 445.00 = 2065.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 445.00 TO NODE 446.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 268.10 DOWNSTREAM ELEVATION(FEET) = 257.00  
STREET LENGTH(FEET) = 532.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.43

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 12.68  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.47  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.32  
STREET FLOW TRAVEL TIME(MIN.) = 2.56 Tc(MIN.) = 20.08

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.587

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.60	0.30	0.100	56
COMMERCIAL	B	0.30	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 1.40

EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.03

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 5.75

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 13.00  
FLOW VELOCITY(FEET/SEC.) = 3.52 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.36  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 446.00 = 2598.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 446.00 TO NODE 431.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 257.00 DOWNSTREAM(FEET) = 256.50

FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 4.44

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 5.75

PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 20.45

LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 20.45

RAINFALL INTENSITY(INCH/HR) = 1.57

AREA-AVERAGED Fm(INCH/HR) = 0.03

AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.10

EFFECTIVE STREAM AREA(ACRES) = 4.10

TOTAL STREAM AREA(ACRES) = 4.10

PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.75

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2.95	9.29	2.685	0.30( 0.03)	0.10	1.2	429.00
2	5.75	20.45	1.572	0.30( 0.03)	0.10	4.1	410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	7.44	9.29	2.685	0.30( 0.03)	0.10	3.1	429.00
2	7.46	20.45	1.572	0.30( 0.03)	0.10	5.3	410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 7.46 Tc(MIN.) = 20.45

EFFECTIVE AREA(ACRES) = 5.30 AREA-AVERAGED Fm(INCH/HR) = 0.03

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 5.3

LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 249.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 258.00 DOWNSTREAM(FEET) = 257.00

FLOW LENGTH(FEET) = 230.42 MANNING'S N = 0.013

DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 4.52

ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 7.46

PIPE TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 21.30

LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

=====  
\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	7.44	10.14	2.489	0.30( 0.03)	0.10	3.1	429.00
2	7.46	21.30	1.537	0.30( 0.03)	0.10	5.3	410.00

LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	540.80	11.82	2.271	0.30( 0.11)	0.38	273.9	425.00
2	544.54	12.10	2.234	0.30( 0.11)	0.38	280.6	400.00
3	558.86	13.74	2.022	0.30( 0.11)	0.38	319.1	300.00
4	598.20	19.30	1.628	0.30( 0.11)	0.38	434.3	210.00
5	591.15	22.55	1.487	0.30( 0.11)	0.38	473.5	200.00
6	588.65	23.25	1.459	0.30( 0.11)	0.38	481.3	230.00
7	573.61	24.41	1.412	0.30( 0.11)	0.38	485.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	518.09	10.14	2.489	0.30( 0.11)	0.38	237.9	429.00
2	548.24	11.82	2.271	0.30( 0.11)	0.38	277.3	425.00
3	551.99	12.10	2.234	0.30( 0.11)	0.38	284.1	400.00
4	566.31	13.74	2.022	0.30( 0.11)	0.38	322.9	300.00
5	605.65	19.30	1.628	0.30( 0.11)	0.38	439.2	210.00
6	601.31	21.30	1.537	0.30( 0.11)	0.38	463.8	410.00
7	598.36	22.55	1.487	0.30( 0.11)	0.38	478.8	200.00
8	595.72	23.25	1.459	0.30( 0.11)	0.38	486.6	230.00
9	580.44	24.41	1.412	0.30( 0.11)	0.37	491.2	220.50

TOTAL AREA (ACRES) = 491.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 605.65 Tc (MIN.) = 19.298  
EFFECTIVE AREA (ACRES) = 439.21 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA (ACRES) = 491.2  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<<

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 491.2 TC (MIN.) = 19.30  
EFFECTIVE AREA (ACRES) = 439.21 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.380  
PEAK FLOW RATE (CFS) = 605.65

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	518.09	10.14	2.489	0.30( 0.11)	0.38	237.9	429.00

2	548.24	11.82	2.271	0.30( 0.11)	0.38	277.3	425.00
3	551.99	12.10	2.234	0.30( 0.11)	0.38	284.1	400.00
4	566.31	13.74	2.022	0.30( 0.11)	0.38	322.9	300.00
5	605.65	19.30	1.628	0.30( 0.11)	0.38	439.2	210.00
6	601.31	21.30	1.537	0.30( 0.11)	0.38	463.8	410.00
7	598.36	22.55	1.487	0.30( 0.11)	0.38	478.8	200.00
8	595.72	23.25	1.459	0.30( 0.11)	0.38	486.6	230.00
9	580.44	24.41	1.412	0.30( 0.11)	0.37	491.2	220.50

=====  
END OF RATIONAL METHOD ANALYSIS  
=====



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506101E.DAT  
TIME/DATE OF STUDY: 12:42 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 3.190
- 2) 6.00; 2.880
- 3) 7.00; 2.640
- 4) 8.00; 2.450
- 5) 9.00; 2.290
- 6) 10.00; 2.160
- 7) 11.00; 2.050
- 8) 12.00; 1.950
- 9) 13.00; 1.860
- 10) 14.00; 1.790
- 11) 15.00; 1.720
- 12) 20.00; 1.460
- 13) 25.00; 1.290
- 14) 30.00; 1.160
- 15) 40.00; 0.990
- 16) 50.00; 0.870
- 17) 60.00; 0.790
- 18) 90.00; 0.630
- 19) 120.00; 0.530
- 20) 180.00; 0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10100.00 TO NODE 10101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 820.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.606  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.211  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.10	0.30	1.000	98	9.61
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.30	1.000	98	9.61

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
 SUBAREA RUNOFF(CFS) = 0.69  
 TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 0.69

\*\*\*\*\*

FLOW PROCESS FROM NODE 10101.00 TO NODE 10102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 790.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 152.00 CHANNEL SLOPE = 0.1974  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 0.69  
 FLOW VELOCITY(FEET/SEC.) = 3.94 FLOW DEPTH(FEET) = 0.24  
 TRAVEL TIME(MIN.) = 0.64  $T_c$ (MIN.) = 10.25  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10102.00 = 479.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10102.00 TO NODE 10102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 10.25  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.133  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------



LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.50 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.80 SUBAREA RUNOFF (CFS) = 1.32  
 EFFECTIVE AREA (ACRES) = 1.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.2 PEAK FLOW RATE (CFS) = 1.98

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10102.00 TO NODE 10103.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 762.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.1400  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.98  
 FLOW VELOCITY(FEET/SEC.) = 4.47 FLOW DEPTH(FEET) = 0.38  
 TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 10.99  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10103.00 = 679.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10103.00 TO NODE 10103.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 10.99  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.051  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 1.89  
 EFFECTIVE AREA (ACRES) = 2.40 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.4 PEAK FLOW RATE (CFS) = 3.78

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10103.00 TO NODE 10104.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 762.00 DOWNSTREAM(FEET) = 754.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 124.00 CHANNEL SLOPE = 0.0645  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 3.78  
 FLOW VELOCITY(FEET/SEC.) = 3.91 FLOW DEPTH(FEET) = 0.57  
 TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 11.52  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10104.00 = 803.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10104.00 TO NODE 10104.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 11.52  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.998  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.70 0.30 1.000 -  
 USER-DEFINED - 1.10 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 3.51  
 EFFECTIVE AREA (ACRES) = 4.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 4.7 PEAK FLOW RATE (CFS) = 7.18

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10104.00 TO NODE 10105.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 754.00 DOWNSTREAM(FEET) = 740.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00 CHANNEL SLOPE = 0.0255  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 7.18  
 FLOW VELOCITY(FEET/SEC.) = 3.26 FLOW DEPTH(FEET) = 0.86  
 TRAVEL TIME(MIN.) = 2.81 Tc(MIN.) = 14.34  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10105.00 = 1353.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10105.00 TO NODE 10105.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.34  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.766  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.40 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 6.00 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 10.60 SUBAREA RUNOFF (CFS) = 13.99  
 EFFECTIVE AREA (ACRES) = 15.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 15.3 PEAK FLOW RATE (CFS) = 20.19

```

*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10106.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 740.00 DOWNSTREAM(FEET) = 623.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 929.00 CHANNEL SLOPE = 0.1259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 20.19
FLOW VELOCITY(FEET/SEC.) = 7.69 FLOW DEPTH(FEET) = 0.94
TRAVEL TIME(MIN.) = 2.01 Tc(MIN.) = 16.35
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10106.00 = 2282.00 FEET.
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10106.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.35
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.650
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 10.40 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 4.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 18.83
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 37.42
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 592.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 417.00 CHANNEL SLOPE = 0.0743
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 37.42
FLOW VELOCITY(FEET/SEC.) = 7.36 FLOW DEPTH(FEET) = 1.30
TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 17.30
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10107.00 = 2699.00 FEET.
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10107.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.30

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* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.601
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 5.10 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 2.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 11.12
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 47.18
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 592.00 DOWNSTREAM(FEET) = 590.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0333
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.000
CHANNEL FLOW THRU SUBAREA(CFS) = 47.18
FLOW VELOCITY(FEET/SEC.) = 5.77 FLOW DEPTH(FEET) = 1.65
TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 17.47
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10108.00 = 2759.00 FEET.
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.47
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.592
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 7.00 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 7.50 0.30 1.000 -
USER-DEFINED - 1.80 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 21.04
EFFECTIVE AREA(ACRES) = 58.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.4 PEAK FLOW RATE(CFS) = 67.89
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 17.47
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.592
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.20     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20     SUBAREA RUNOFF(CFS) = 0.23
EFFECTIVE AREA(ACRES) = 58.60   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.6     PEAK FLOW RATE(CFS) = 68.13

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*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10109.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 590.00  DOWNSTREAM(FEET) = 526.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 973.00  CHANNEL SLOPE = 0.0658
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 68.13
FLOW VELOCITY(FEET/SEC.) = 8.16  FLOW DEPTH(FEET) = 1.67
TRAVEL TIME(MIN.) = 1.99  Tc(MIN.) = 19.46
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10109.00 = 3732.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 10109.00 TO NODE 10109.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 19.46
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.488
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -        16.40     0.30     1.000     -
USER-DEFINED        -         0.60     0.30     1.000     -
USER-DEFINED        -         3.00     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.00     SUBAREA RUNOFF(CFS) = 21.39
EFFECTIVE AREA(ACRES) = 78.60   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.6     PEAK FLOW RATE(CFS) = 84.07

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*****
FLOW PROCESS FROM NODE 10109.00 TO NODE 10110.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 526.00  DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1045.00  CHANNEL SLOPE = 0.0679

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```

CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 84.07
FLOW VELOCITY(FEET/SEC.) = 8.69  FLOW DEPTH(FEET) = 1.80
TRAVEL TIME(MIN.) = 2.00  Tc(MIN.) = 21.46
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10110.00 = 4777.00 FEET.

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*****
FLOW PROCESS FROM NODE 10110.00 TO NODE 10110.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN.) = 21.46
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.410
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         1.00     0.30     1.000     -
USER-DEFINED        -         0.50     0.30     1.000     -
USER-DEFINED        -        31.60     0.30     1.000     -
USER-DEFINED        -         1.60     0.30     1.000     -
USER-DEFINED        -         0.40     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.10     SUBAREA RUNOFF(CFS) = 35.08
EFFECTIVE AREA(ACRES) = 113.70  AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.7     PEAK FLOW RATE(CFS) = 113.63

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*****
FLOW PROCESS FROM NODE 10110.00 TO NODE 10111.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 455.00  DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 675.00  CHANNEL SLOPE = 0.0667
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 113.63
FLOW VELOCITY(FEET/SEC.) = 9.31  FLOW DEPTH(FEET) = 2.02
TRAVEL TIME(MIN.) = 1.21  Tc(MIN.) = 22.67
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10111.00 = 5452.00 FEET.

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*****
FLOW PROCESS FROM NODE 10111.00 TO NODE 10111.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 22.67
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.369
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         7.40     0.30     1.000     -
USER-DEFINED        -         6.00     0.30     1.000     -
USER-DEFINED        -        24.80     0.30     1.000     -
USER-DEFINED        -         0.90     0.30     1.000     -

```

USER-DEFINED - 4.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 43.20 SUBAREA RUNOFF (CFS) = 41.58  
EFFECTIVE AREA (ACRES) = 156.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 156.9 PEAK FLOW RATE (CFS) = 151.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10111.00 TO NODE 10112.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 410.00 DOWNSTREAM (FEET) = 405.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 143.00 CHANNEL SLOPE = 0.0350  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 151.01  
FLOW VELOCITY (FEET/SEC.) = 7.86 FLOW DEPTH (FEET) = 2.53  
TRAVEL TIME (MIN.) = 0.30 Tc (MIN.) = 22.97  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10112.00 = 5595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 22.97

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.359

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	7.90	0.30	1.000	-
USER-DEFINED	-	25.90	0.30	1.000	-
USER-DEFINED	-	19.30	0.30	1.000	-
USER-DEFINED	-	2.10	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 56.20 SUBAREA RUNOFF (CFS) = 53.57

EFFECTIVE AREA (ACRES) = 213.10 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 213.1 PEAK FLOW RATE (CFS) = 203.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10113.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 363.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1642.00 CHANNEL SLOPE = 0.0256  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 203.12  
FLOW VELOCITY (FEET/SEC.) = 7.52 FLOW DEPTH (FEET) = 3.00

TRAVEL TIME (MIN.) = 3.64 Tc (MIN.) = 26.61  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10113.00 = 7237.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 26.61

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.248

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	33.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 35.40 SUBAREA RUNOFF (CFS) = 30.21  
EFFECTIVE AREA (ACRES) = 248.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 248.5 PEAK FLOW RATE (CFS) = 212.06

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10114.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 363.00 DOWNSTREAM (FEET) = 340.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 918.00 CHANNEL SLOPE = 0.0251  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 212.06  
FLOW VELOCITY (FEET/SEC.) = 7.54 FLOW DEPTH (FEET) = 3.06  
TRAVEL TIME (MIN.) = 2.03 Tc (MIN.) = 28.64  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10114.00 = 8155.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 28.64

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.195

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	10.10	0.30	1.000	-
USER-DEFINED	-	17.70	0.30	1.000	-
USER-DEFINED	-	52.90	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 83.10 SUBAREA RUNOFF (CFS) = 66.97

EFFECTIVE AREA(ACRES) = 331.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 331.6 PEAK FLOW RATE(CFS) = 267.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 28.64  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.195  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 1.21  
EFFECTIVE AREA(ACRES) = 333.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 333.1 PEAK FLOW RATE(CFS) = 268.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10114.00 TO NODE 10115.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 301.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1467.00 CHANNEL SLOPE = 0.0266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 268.43  
FLOW VELOCITY(FEET/SEC.) = 8.18 FLOW DEPTH(FEET) = 3.31  
TRAVEL TIME(MIN.) = 2.99 Tc(MIN.) = 31.63  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10115.00 = 9622.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10115.00 TO NODE 10115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 31.63  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.132  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.60 0.30 1.000 -  
USER-DEFINED - 24.30 0.30 1.000 -  
USER-DEFINED - 47.70 0.30 1.000 -  
USER-DEFINED - 9.80 0.30 1.000 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 94.00 SUBAREA RUNOFF(CFS) = 70.41  
EFFECTIVE AREA(ACRES) = 427.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 427.1 PEAK FLOW RATE(CFS) = 319.94

\*\*\*\*\*

FLOW PROCESS FROM NODE 10115.00 TO NODE 10116.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 272.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1696.00 CHANNEL SLOPE = 0.0171  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 319.94  
FLOW VELOCITY(FEET/SEC.) = 7.25 FLOW DEPTH(FEET) = 3.83  
TRAVEL TIME(MIN.) = 3.90 Tc(MIN.) = 35.53  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10116.00 = 11318.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 35.53  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.066  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.90 0.30 1.000 -  
USER-DEFINED - 4.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 32.00 0.30 1.000 -  
USER-DEFINED - 3.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 45.60 SUBAREA RUNOFF(CFS) = 31.44  
EFFECTIVE AREA(ACRES) = 472.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 472.7 PEAK FLOW RATE(CFS) = 325.91

\*\*\*\*\*

FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 35.53  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.066  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 1.000 -  
USER-DEFINED - 7.70 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.70 SUBAREA RUNOFF(CFS) = 6.69  
EFFECTIVE AREA(ACRES) = 482.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 482.4 PEAK FLOW RATE(CFS) = 332.59

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*****
FLOW PROCESS FROM NODE 10116.00 TO NODE 10117.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 272.00 DOWNSTREAM(FEET) = 252.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 878.00 CHANNEL SLOPE = 0.0228
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 332.59
FLOW VELOCITY(FEET/SEC.) = 8.14 FLOW DEPTH(FEET) = 3.69
TRAVEL TIME(MIN.) = 1.80 Tc(MIN.) = 37.33
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10117.00 = 12196.00 FEET.
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 37.33
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.035
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 8.20 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 8.17
EFFECTIVE AREA(ACRES) = 494.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 494.7 PEAK FLOW RATE(CFS) = 332.59
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 37.33
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.035
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 14.60 0.30 1.000 -
USER-DEFINED - 6.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 3.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996
SUBAREA AREA(ACRES) = 25.00 SUBAREA RUNOFF(CFS) = 16.57
EFFECTIVE AREA(ACRES) = 519.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

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AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 519.7 PEAK FLOW RATE(CFS) = 344.07
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10118.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 252.00 DOWNSTREAM(FEET) = 249.00
FLOW LENGTH(FEET) = 280.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 52.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.23
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 344.07
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 37.61
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10118.00 = 12476.00 FEET.
*****
FLOW PROCESS FROM NODE 10118.00 TO NODE 10119.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 249.00 DOWNSTREAM(FEET) = 240.00
FLOW LENGTH(FEET) = 892.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.79
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 344.07
PIPE TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 38.56
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10119.00 = 13368.00 FEET.
*****
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 38.56
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.015
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.100 -
USER-DEFINED - 1.00 0.30 0.600 -
USER-DEFINED - 0.80 0.30 0.850 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.706
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 2.60
EFFECTIVE AREA(ACRES) = 523.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 523.3 PEAK FLOW RATE(CFS) = 344.07
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****

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FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 38.56  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.015  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	9.60	0.30	0.600	-
USER-DEFINED	-	1.00	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.627  
 SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 10.12  
 EFFECTIVE AREA(ACRES) = 536.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 536.9 PEAK FLOW RATE(CFS) = 347.02

FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 38.56  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.015  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.06  
 EFFECTIVE AREA(ACRES) = 537.00 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 537.0 PEAK FLOW RATE(CFS) = 347.08

FLOW PROCESS FROM NODE 10119.00 TO NODE 10120.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 240.00 DOWNSTREAM(FEET) = 239.00  
 FLOW LENGTH(FEET) = 120.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 55.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.76  
 ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 347.08  
 PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 38.69  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10120.00 = 13488.00 FEET.

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 38.69  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.012  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.657  
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 4.11  
 EFFECTIVE AREA(ACRES) = 542.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 542.6 PEAK FLOW RATE(CFS) = 350.08

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 38.69  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.012  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.717  
 SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 3.66  
 EFFECTIVE AREA(ACRES) = 547.70 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 547.7 PEAK FLOW RATE(CFS) = 353.74

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 38.69  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.012  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	2.70	0.30	1.000	-
USER-DEFINED	-	11.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 10.13  
EFFECTIVE AREA(ACRES) = 563.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 563.5 PEAK FLOW RATE(CFS) = 363.87

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10121.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	239.00	DOWNSTREAM(FEET) =	213.00
FLOW LENGTH(FEET) =	194.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	45.0 INCH PIPE IS	32.4 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) =	42.81		
ESTIMATED PIPE DIAMETER(INCH) =	45.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	363.87		
PIPE TRAVEL TIME(MIN.) =	0.08	Tc(MIN.) =	38.77
LONGEST FLOWPATH FROM NODE	10100.00 TO NODE	10121.00 =	13682.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10121.00 TO NODE 10122.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	213.00	DOWNSTREAM(FEET) =	176.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	995.00	CHANNEL SLOPE =	0.0372
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	6.00
CHANNEL FLOW THRU SUBAREA(CFS) =	363.87		
FLOW VELOCITY(FEET/SEC.) =	10.00	FLOW DEPTH(FEET) =	3.48
TRAVEL TIME(MIN.) =	1.66	Tc(MIN.) =	40.42
LONGEST FLOWPATH FROM NODE	10100.00 TO NODE	10122.00 =	14677.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	40.42				
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	0.985				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	4.80	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	1.000				
SUBAREA AREA(ACRES) =	7.30	SUBAREA RUNOFF(CFS) =	4.50		
EFFECTIVE AREA(ACRES) =	570.80	AREA-AVERAGED Fm(INCH/HR) =	0.29		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.98		

TOTAL AREA(ACRES) = 570.8 PEAK FLOW RATE(CFS) = 363.87  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	40.42				
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	0.985				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	3.00	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	1.000				
SUBAREA AREA(ACRES) =	10.50	SUBAREA RUNOFF(CFS) =	6.47		
EFFECTIVE AREA(ACRES) =	581.30	AREA-AVERAGED Fm(INCH/HR) =	0.29		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.98		
TOTAL AREA(ACRES) =	581.3	PEAK FLOW RATE(CFS) =	363.87		
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE					

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	40.42				
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	0.985				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	1.000				
SUBAREA AREA(ACRES) =	7.90	SUBAREA RUNOFF(CFS) =	4.87		
EFFECTIVE AREA(ACRES) =	589.20	AREA-AVERAGED Fm(INCH/HR) =	0.30		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.98		
TOTAL AREA(ACRES) =	589.2	PEAK FLOW RATE(CFS) =	365.84		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	40.42				
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	0.985				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN



USER-DEFINED - 1.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$  (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 1.11  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.98  
TOTAL AREA (ACRES) = 591.0 PEAK FLOW RATE (CFS) = 366.95

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 591.0 TC (MIN.) = 40.42  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.984  
PEAK FLOW RATE (CFS) = 366.95

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2007 Advanced Engineering Software (aes)  
Ver. 13.4 Release Date: 01/25/2007 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506102E.DAT  
TIME/DATE OF STUDY: 13:59 01/08/2009  
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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.120
- 2) 10.00; 2.158
- 3) 15.00; 1.718
- 4) 20.00; 1.461
- 5) 25.00; 1.289
- 6) 30.00; 1.180
- 7) 40.00; 0.990
- 8) 50.00; 0.873
- 9) 60.00; 0.780
- 10) 90.00; 0.628
- 11) 120.00; 0.534
- 12) 180.00; 0.437
- 13) 360.00; 0.302
- 14) 1440.00; 0.126

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10200.00 TO NODE 10201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 293.00  
ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 617.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.991

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.160

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
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RESIDENTIAL

"3-4 DWELLINGS/ACRE" - 0.73 0.30 0.600 0 9.99

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600

SUBAREA RUNOFF(CFS) = 1.30

TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 1.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10201.00 TO NODE 10202.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 617.00 DOWNSTREAM ELEVATION(FEET) = 613.00  
STREET LENGTH(FEET) = 323.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.01

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.32

HALFSTREET FLOOD WIDTH(FEET) = 8.10

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.38

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.76

STREET FLOW TRAVEL TIME(MIN.) = 2.26 Tc(MIN.) = 12.25

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.960

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED - 0.88 0.30 0.600 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 1.42  
EFFECTIVE AREA(ACRES) = 1.62 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 2.59

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 9.19  
FLOW VELOCITY(FEET/SEC.) = 2.50 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.86  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10202.00 = 616.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10202.00 TO NODE 10203.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 613.00 DOWNSTREAM ELEVATION(FEET) = 594.00  
STREET LENGTH(FEET) = 613.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.86  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 8.92  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.92  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.32  
STREET FLOW TRAVEL TIME(MIN.) = 2.61 Tc(MIN.) = 14.86  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.730

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.82 0.30 0.614 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.614  
SUBAREA AREA(ACRES) = 1.82 SUBAREA RUNOFF(CFS) = 2.54  
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 4.79

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 9.90  
FLOW VELOCITY(FEET/SEC.) = 4.09 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.46  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10203.00 = 1229.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10203.00 TO NODE 10204.00 IS CODE = 63  
-----

-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 594.00 DOWNSTREAM ELEVATION(FEET) = 578.00  
STREET LENGTH(FEET) = 433.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.58  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 10.23  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.51  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.64  
STREET FLOW TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 16.46  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.643

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.21 0.30 0.655 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.655  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 1.57  
EFFECTIVE AREA(ACRES) = 4.64 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 6.09

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.61  
FLOW VELOCITY(FEET/SEC.) = 4.63 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.72  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10204.00 = 1662.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 578.00 DOWNSTREAM(FEET) = 575.00  
FLOW LENGTH(FEET) = 147.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.74  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 6.09  
PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 16.78  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10205.00 = 1809.00 FEET.

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*****
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.78
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.627
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.61    0.30    0.917   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917
SUBAREA AREA(ACRES) = 3.61      SUBAREA RUNOFF(CFS) = 4.39
EFFECTIVE AREA(ACRES) = 8.25    AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75
TOTAL AREA(ACRES) = 8.3        PEAK FLOW RATE(CFS) = 10.41
*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 563.00
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.94
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.41
PIPE TRAVEL TIME(MIN.) = 1.05 Tc(MIN.) = 17.83
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10206.00 = 2374.00 FEET.
*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.83
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.573
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         4.75    0.30    0.669   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.669
SUBAREA AREA(ACRES) = 4.75      SUBAREA RUNOFF(CFS) = 5.86
EFFECTIVE AREA(ACRES) = 13.00   AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 13.0        PEAK FLOW RATE(CFS) = 15.87
*****
FLOW PROCESS FROM NODE 10206.00 TO NODE 10207.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 563.00 DOWNSTREAM(FEET) = 547.00

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FLOW LENGTH(FEET) = 599.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.50
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 15.87
PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 18.78
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10207.00 = 2973.00 FEET.
*****
FLOW PROCESS FROM NODE 10206.10 TO NODE 10207.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.78
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.524
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         4.59    0.30    0.664   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.664
SUBAREA AREA(ACRES) = 4.59      SUBAREA RUNOFF(CFS) = 5.47
EFFECTIVE AREA(ACRES) = 17.58   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 17.6        PEAK FLOW RATE(CFS) = 20.76
*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 516.00
FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.54
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.76
PIPE TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 19.47
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10208.00 = 3573.00 FEET.
*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.47
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.488
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.60    0.30    0.697   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.697
SUBAREA AREA(ACRES) = 3.60      SUBAREA RUNOFF(CFS) = 4.14
EFFECTIVE AREA(ACRES) = 21.18   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 21.2        PEAK FLOW RATE(CFS) = 24.35

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*****
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 516.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 604.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.32
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 24.35
PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 20.08
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10209.00 = 4177.00 FEET.

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*****
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.08
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.458
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED      -      8.21   0.30 0.645 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645
SUBAREA AREA(ACRES) = 8.21 SUBAREA RUNOFF(CFS) = 9.35
EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 33.12

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*****
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 678.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.56
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 33.12
PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 20.73
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10210.00 = 4855.00 FEET.

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*****
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.73
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.436
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS

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LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED      -      10.49   0.30 0.986 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 10.49 SUBAREA RUNOFF(CFS) = 10.77
EFFECTIVE AREA(ACRES) = 39.89 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 39.9 PEAK FLOW RATE(CFS) = 43.30

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*****
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 280.00
FLOW LENGTH(FEET) = 2662.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.60
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 43.30
PIPE TRAVEL TIME(MIN.) = 2.39 Tc(MIN.) = 23.11
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10211.00 = 7517.00 FEET.

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*****
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 23.11
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.354
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED      -      10.00   0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 9.49
EFFECTIVE AREA(ACRES) = 49.89 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 49.9 PEAK FLOW RATE(CFS) = 49.85

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*****
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 280.00 DOWNSTREAM(FEET) = 176.00
FLOW LENGTH(FEET) = 935.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 17.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.76
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 49.85
PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 23.77
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10212.00 = 8452.00 FEET.

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FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.77
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.331
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 18.37 0.30 0.926 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.926
SUBAREA AREA(ACRES) = 18.37 SUBAREA RUNOFF(CFS) = 17.42
EFFECTIVE AREA(ACRES) = 68.26 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 68.3 PEAK FLOW RATE(CFS) = 66.25

\*\*\*\*\*
FLOW PROCESS FROM NODE 10212.00 TO NODE 10242.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 176.00 DOWNSTREAM(FEET) = 169.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00 CHANNEL SLOPE = 0.0211
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.295
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.97 0.30 0.970 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 67.14
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.30
AVERAGE FLOW DEPTH(FEET) = 2.06 TRAVEL TIME(MIN.) = 1.04
Tc(MIN.) = 24.81
SUBAREA AREA(ACRES) = 1.97 SUBAREA RUNOFF(CFS) = 1.78
EFFECTIVE AREA(ACRES) = 70.23 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 66.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.04 FLOW VELOCITY(FEET/SEC.) = 5.30
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<

\*\*\*\*\*
FLOW PROCESS FROM NODE 10220.00 TO NODE 10221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 308.00 DOWNSTREAM(FEET) = 300.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.111
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.712
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"GRASS" - 1.03 0.30 1.000 0 15.11
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.31
TOTAL AREA(ACRES) = 1.03 PEAK FLOW RATE(CFS) = 1.31

\*\*\*\*\*
FLOW PROCESS FROM NODE 10221.10 TO NODE 10222.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 300.00 DOWNSTREAM ELEVATION(FEET) = 261.00
STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.31
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.51
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.29
STREET FLOW TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 16.22
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.655

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.64 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 2.00
EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 3.25

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.22 HALFSTREET FLOOD WIDTH(FEET) = 3.04  
FLOW VELOCITY(FEET/SEC.) = 5.77 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.26  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10222.00 = 764.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10221.20 TO NODE 10222.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 16.22  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.655  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.12 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.12 SUBAREA RUNOFF(CFS) = 3.80  
EFFECTIVE AREA(ACRES) = 5.78 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 7.05

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.10 TO NODE 10223.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 261.00 DOWNSTREAM ELEVATION(FEET) = 208.00  
STREET LENGTH(FEET) = 622.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.05

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.30  
HALFSTREET FLOOD WIDTH(FEET) = 7.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.92  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.77  
STREET FLOW TRAVEL TIME(MIN.) = 1.75 Tc(MIN.) = 17.97  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.565

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.75 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 2.00  
EFFECTIVE AREA(ACRES) = 7.54 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.5 PEAK FLOW RATE(CFS) = 8.58

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.26  
FLOW VELOCITY(FEET/SEC.) = 5.99 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.82  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10223.00 = 1386.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.20 TO NODE 10223.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 17.97  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.565  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.91 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.91 SUBAREA RUNOFF(CFS) = 9.01  
EFFECTIVE AREA(ACRES) = 15.45 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 17.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 10223.10 TO NODE 10224.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 208.00 DOWNSTREAM ELEVATION(FEET) = 204.00  
STREET LENGTH(FEET) = 758.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.82

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.55  
HALFSTREET FLOOD WIDTH(FEET) = 19.60  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.46  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.35  
STREET FLOW TRAVEL TIME(MIN.) = 5.14 Tc(MIN.) = 23.11  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.354

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.70 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 4.46  
EFFECTIVE AREA(ACRES) = 20.15 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.1 PEAK FLOW RATE(CFS) = 19.11

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 19.31  
FLOW VELOCITY(FEET/SEC.) = 2.44 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.33  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10224.00 = 2144.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.20 TO NODE 10224.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 23.11  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.354  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.21	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 1.15  
EFFECTIVE AREA(ACRES) = 21.35 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 20.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 204.00 DOWNSTREAM(FEET) = 201.00  
FLOW LENGTH(FEET) = 422.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.95  
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 20.26  
PIPE TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 24.12  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10225.00 = 2566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 24.12  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.319  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.81	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 4.81 SUBAREA RUNOFF(CFS) = 4.42  
EFFECTIVE AREA(ACRES) = 26.17 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 26.2 PEAK FLOW RATE(CFS) = 24.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 201.00 DOWNSTREAM(FEET) = 197.00  
FLOW LENGTH(FEET) = 799.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.32  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 24.01  
PIPE TRAVEL TIME(MIN.) = 2.11 Tc(MIN.) = 26.23  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10238.00 = 3365.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 26.23  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.262  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.24	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.24 SUBAREA RUNOFF(CFS) = 3.67  
EFFECTIVE AREA(ACRES) = 30.41 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.4 PEAK FLOW RATE(CFS) = 26.34

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 26.23  
RAINFALL INTENSITY(INCH/HR) = 1.26  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 30.41  
TOTAL STREAM AREA(ACRES) = 30.41  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 26.34

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10230.00 TO NODE 10231.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<



>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 276.00
ELEVATION DATA: UPSTREAM (FEET) = 503.00 DOWNSTREAM (FEET) = 390.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.944
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.938

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

AGRICULTURAL POOR COVER
"FALLOW" - 0.95 0.30 1.000 0 5.94

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 2.26

TOTAL AREA (ACRES) = 0.95 PEAK FLOW RATE (CFS) = 2.26

\*\*\*\*\*
FLOW PROCESS FROM NODE 10231.10 TO NODE 10232.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 390.00 DOWNSTREAM (FEET) = 301.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 394.00 CHANNEL SLOPE = 0.2259

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.779

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 1.68 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.14

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.94

AVERAGE FLOW DEPTH (FEET) = 0.42 TRAVEL TIME (MIN.) = 0.83

Tc (MIN.) = 6.77

SUBAREA AREA (ACRES) = 1.68 SUBAREA RUNOFF (CFS) = 3.76

EFFECTIVE AREA (ACRES) = 2.63 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 2.6 PEAK FLOW RATE (CFS) = 5.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.48 FLOW VELOCITY (FEET/SEC.) = 8.65

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10232.00 = 670.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10231.20 TO NODE 10232.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 6.77

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.779

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 6.38 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 6.38 SUBAREA RUNOFF (CFS) = 14.23
EFFECTIVE AREA (ACRES) = 9.01 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 9.0 PEAK FLOW RATE (CFS) = 20.11

\*\*\*\*\*
FLOW PROCESS FROM NODE 10232.00 TO NODE 10233.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION (FEET) = 301.00 DOWNSTREAM ELEVATION (FEET) = 277.00

STREET LENGTH (FEET) = 341.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.61

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.77

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.41

HALFSTREET FLOOD WIDTH (FEET) = 12.38

AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.90

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.80

STREET FLOW TRAVEL TIME (MIN.) = 0.82 Tc (MIN.) = 7.60

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.621

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 3.50 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 3.50 SUBAREA RUNOFF (CFS) = 7.32

EFFECTIVE AREA (ACRES) = 12.52 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 12.5 PEAK FLOW RATE (CFS) = 26.14

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 12.89

FLOW VELOCITY (FEET/SEC.) = 7.06 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.94

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10233.00 = 1011.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10233.10 TO NODE 10234.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION (FEET) = 277.00 DOWNSTREAM ELEVATION (FEET) = 226.00  
STREET LENGTH (FEET) = 682.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 30.04

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.43  
HALFSTREET FLOOD WIDTH (FEET) = 13.50  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.46  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.20  
STREET FLOW TRAVEL TIME (MIN.) = 1.52 Tc (MIN.) = 9.12

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.328

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.27	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.27 SUBAREA RUNOFF (CFS) = 7.79  
EFFECTIVE AREA (ACRES) = 16.78 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 16.8 PEAK FLOW RATE (CFS) = 30.63

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.43 HALFSTREET FLOOD WIDTH (FEET) = 13.60  
FLOW VELOCITY (FEET/SEC.) = 7.51 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.23  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10234.00 = 1693.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10233.20 TO NODE 10234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.12

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.328

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 15.60 SUBAREA RUNOFF (CFS) = 28.47  
EFFECTIVE AREA (ACRES) = 32.38 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 32.4 PEAK FLOW RATE (CFS) = 59.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.10 TO NODE 10235.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 3 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 226.00 DOWNSTREAM ELEVATION (FEET) = 205.00  
STREET LENGTH (FEET) = 759.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 62.84

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.60  
HALFSTREET FLOOD WIDTH (FEET) = 22.30  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.08  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.68  
STREET FLOW TRAVEL TIME (MIN.) = 2.08 Tc (MIN.) = 11.20

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.053

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.74	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.74 SUBAREA RUNOFF (CFS) = 7.48  
EFFECTIVE AREA (ACRES) = 37.13 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 37.1 PEAK FLOW RATE (CFS) = 59.10

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.59 HALFSTREET FLOOD WIDTH (FEET) = 21.76  
FLOW VELOCITY (FEET/SEC.) = 6.00 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.56  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10235.00 = 2452.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.20 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.20

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.053

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 8.02 SUBAREA RUNOFF (CFS) = 12.65  
EFFECTIVE AREA (ACRES) = 45.15 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.1 PEAK FLOW RATE (CFS) = 71.21

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.30 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.20  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.053  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.62 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.62 SUBAREA RUNOFF (CFS) = 4.12  
EFFECTIVE AREA (ACRES) = 47.76 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 75.34

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.00 TO NODE 10236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 205.00 DOWNSTREAM (FEET) = 201.00  
FLOW LENGTH (FEET) = 489.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.11  
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 75.34  
PIPE TRAVEL TIME (MIN.) = 0.81 Tc (MIN.) = 12.00  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10236.00 = 2941.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.10 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 12.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.982  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.89 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.89 SUBAREA RUNOFF (CFS) = 4.38  
EFFECTIVE AREA (ACRES) = 50.65 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 50.7 PEAK FLOW RATE (CFS) = 76.67

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.20 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 12.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.982  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.84 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.84 SUBAREA RUNOFF (CFS) = 7.32  
EFFECTIVE AREA (ACRES) = 55.49 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 83.99

\*\*\*\*\*

FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 201.00 DOWNSTREAM (FEET) = 199.00  
FLOW LENGTH (FEET) = 278.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.3 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.91  
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 83.99  
PIPE TRAVEL TIME (MIN.) = 0.47 Tc (MIN.) = 12.47  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10237.00 = 3219.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 12.47  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.941  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.62 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.62 SUBAREA RUNOFF (CFS) = 2.39  
EFFECTIVE AREA (ACRES) = 57.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 57.1 PEAK FLOW RATE (CFS) = 84.33

\*\*\*\*\*

FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 199.00 DOWNSTREAM (FEET) = 197.00  
FLOW LENGTH (FEET) = 345.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.6 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.01  
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 84.33  
 PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 13.11  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.11  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.884  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.38 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.38 SUBAREA RUNOFF(CFS) = 1.97  
 EFFECTIVE AREA(ACRES) = 58.49 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 84.33  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 13.11  
 RAINFALL INTENSITY(INCH/HR) = 1.88  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 58.49  
 TOTAL STREAM AREA(ACRES) = 58.49  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 84.33

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	26.34	26.23	1.262	0.30( 0.30)	1.00	30.4	10220.00
2	84.33	13.11	1.884	0.30( 0.30)	1.00	58.5	10230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	106.00	13.11	1.884	0.30( 0.30)	1.00	73.7	10230.00
2	77.55	26.23	1.262	0.30( 0.30)	1.00	88.9	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 106.00 Tc(MIN.) = 13.11  
 EFFECTIVE AREA(ACRES) = 73.69 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 88.9  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.00 TO NODE 10239.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 197.00 DOWNSTREAM(FEET) = 193.00  
 FLOW LENGTH(FEET) = 753.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.32  
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 106.00  
 PIPE TRAVEL TIME(MIN.) = 1.35 Tc(MIN.) = 14.46  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10239.00 = 4317.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.10 TO NODE 10239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.46  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.766  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.72 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.72 SUBAREA RUNOFF(CFS) = 3.59  
 EFFECTIVE AREA(ACRES) = 76.41 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 91.6 PEAK FLOW RATE(CFS) = 106.00  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.20 TO NODE 10239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.46  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.766  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 34.37 0.30 0.991 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991  
 SUBAREA AREA(ACRES) = 34.37 SUBAREA RUNOFF(CFS) = 45.43  
 EFFECTIVE AREA(ACRES) = 110.78 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 126.0 PEAK FLOW RATE(CFS) = 146.24

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FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 193.00 DOWNSTREAM(FEET) = 191.00
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 42.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.89
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 146.24
PIPE TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 14.92
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10240.00 = 4618.00 FEET.

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*****
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.92
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.725
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.22     0.30    0.916   -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.916
SUBAREA AREA(ACRES) = 2.22 SUBAREA RUNOFF(CFS) = 2.90
EFFECTIVE AREA(ACRES) = 113.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 128.2 PEAK FLOW RATE(CFS) = 146.24
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10240.00 TO NODE 10241.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 191.00 DOWNSTREAM(FEET) = 180.00
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.23
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 146.24
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 15.01
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10241.00 = 4768.00 FEET.

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*****
FLOW PROCESS FROM NODE 10241.00 TO NODE 10242.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 169.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 267.00 CHANNEL SLOPE = 0.0412
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.695

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.16     0.30    0.958   -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.958
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 147.61
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.31
AVERAGE FLOW DEPTH(FEET) = 2.18 TRAVEL TIME(MIN.) = 0.43
Tc(MIN.) = 15.44
SUBAREA AREA(ACRES) = 2.16 SUBAREA RUNOFF(CFS) = 2.74
EFFECTIVE AREA(ACRES) = 115.16 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 130.4 PEAK FLOW RATE(CFS) = 146.24
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.18 FLOW VELOCITY(FEET/SEC.) = 10.28
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

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*****
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 11
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>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<
=====

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** MAIN STREAM CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap      Ae      HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1           146.24 15.44  1.695  0.30( 0.30) 0.99  115.2  10230.00
2           106.60 28.76  1.207  0.30( 0.30) 1.00  130.4  10220.00
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

```

```

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap      Ae      HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1           66.25 24.81  1.295  0.30( 0.25) 0.85  70.2  10200.00
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

```

```

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap      Ae      HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1           203.30 15.44  1.695  0.30( 0.29) 0.95  158.9  10230.00
2           184.59 24.81  1.295  0.30( 0.28) 0.94  196.1  10200.00
3           167.24 28.76  1.207  0.30( 0.28) 0.94  200.6  10220.00
TOTAL AREA(ACRES) = 200.6

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```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 203.30 Tc(MIN.) = 15.440
EFFECTIVE AREA(ACRES) = 158.86 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 200.6
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

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*****
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 12
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>>>>CLEAR MEMORY BANK # 1 <<<<

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*****
FLOW PROCESS FROM NODE 10242.00 TO NODE 10256.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 169.00 DOWNSTREAM(FEET) = 163.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 315.00 CHANNEL SLOPE = 0.0190
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.663
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 9.10 0.30 0.995 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 208.89
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.40
AVERAGE FLOW DEPTH(FEET) = 2.88 TRAVEL TIME(MIN.) = 0.63
Tc(MIN.) = 16.06
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 11.18
EFFECTIVE AREA(ACRES) = 167.97 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 209.7 PEAK FLOW RATE(CFS) = 208.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.87 FLOW VELOCITY(FEET/SEC.) = 8.40
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

*****
FLOW PROCESS FROM NODE 10243.00 TO NODE 10256.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 16.06
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.663
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.01 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.01 SUBAREA RUNOFF(CFS) = 8.60
EFFECTIVE AREA(ACRES) = 174.97 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 216.7 PEAK FLOW RATE(CFS) = 216.67

*****
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 16.06

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RAINFALL INTENSITY(INCH/HR) = 1.66
AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 174.97
TOTAL STREAM AREA(ACRES) = 216.71
PEAK FLOW RATE(CFS) AT CONFLUENCE = 216.67

*****
FLOW PROCESS FROM NODE 10250.00 TO NODE 10251.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----
INITIAL SUBAREA FLOW-LENGTH(FEET) = 284.00
ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 243.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.802
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.625
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"WOODLAND,GRASS" - 1.04 0.30 1.000 0 16.80
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.24
TOTAL AREA(ACRES) = 1.04 PEAK FLOW RATE(CFS) = 1.24

*****
FLOW PROCESS FROM NODE 10251.00 TO NODE 10252.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 243.00 DOWNSTREAM ELEVATION(FEET) = 240.00
STREET LENGTH(FEET) = 301.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.03
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.27
HALFSTREET FLOOD WIDTH(FEET) = 5.78
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.94
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.53
STREET FLOW TRAVEL TIME(MIN.) = 2.59 Tc(MIN.) = 19.39
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.492

```

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.47	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 1.58  
EFFECTIVE AREA(ACRES) = 2.51 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 2.69

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 6.91  
FLOW VELOCITY(FEET/SEC.) = 2.02 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.60  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10252.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10252.00 TO NODE 10253.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 240.00 DOWNSTREAM ELEVATION(FEET) = 234.00  
STREET LENGTH(FEET) = 544.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.87

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 9.16  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.37  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.81

STREET FLOW TRAVEL TIME(MIN.) = 3.83 Tc(MIN.) = 23.22  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.350

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.60 SUBAREA RUNOFF(CFS) = 4.35  
EFFECTIVE AREA(ACRES) = 7.12 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 6.73

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.66  
FLOW VELOCITY(FEET/SEC.) = 2.53 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.94

LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10253.00 = 1129.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 234.00 DOWNSTREAM(FEET) = 219.00  
FLOW LENGTH(FEET) = 362.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.31  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 6.73  
PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 23.80  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10254.00 = 1491.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.80  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.330  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.55	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 7.93  
EFFECTIVE AREA(ACRES) = 15.66 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.7 PEAK FLOW RATE(CFS) = 14.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 10254.00 TO NODE 10255.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 219.00 DOWNSTREAM(FEET) = 182.00  
FLOW LENGTH(FEET) = 716.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.60  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 14.52  
PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 24.68  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10255.00 = 2207.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10255.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 182.00 DOWNSTREAM(FEET) = 163.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 228.00 CHANNEL SLOPE = 0.0833  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.286  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	13.88	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 20.68  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.17  
 AVERAGE FLOW DEPTH (FEET) = 0.92 TRAVEL TIME (MIN.) = 0.46  
 Tc (MIN.) = 25.14  
 SUBAREA AREA (ACRES) = 13.88 SUBAREA RUNOFF (CFS) = 12.32  
 EFFECTIVE AREA (ACRES) = 29.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 29.5 PEAK FLOW RATE (CFS) = 26.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.00 FLOW VELOCITY (FEET/SEC.) = 8.70  
 LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10256.00 = 2435.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 25.14  
 RAINFALL INTENSITY (INCH/HR) = 1.29  
 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 29.54  
 TOTAL STREAM AREA (ACRES) = 29.54  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 26.21

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	216.67	16.06	1.663	0.30 ( 0.29)	0.96	175.0	10230.00
1	190.09	25.45	1.279	0.30 ( 0.28)	0.95	212.2	10200.00
1	177.22	29.41	1.193	0.30 ( 0.28)	0.95	216.7	10220.00
2	26.21	25.14	1.286	0.30 ( 0.30)	1.00	29.5	10250.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	239.83	16.06	1.663	0.30 ( 0.29)	0.96	193.8	10230.00
2	217.18	25.14	1.286	0.30 ( 0.29)	0.95	240.5	10250.00
3	216.13	25.45	1.279	0.30 ( 0.29)	0.95	241.8	10200.00
4	200.96	29.41	1.193	0.30 ( 0.29)	0.95	246.3	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 239.83 Tc (MIN.) = 16.06  
 EFFECTIVE AREA (ACRES) = 193.85 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 246.3  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 246.3 TC (MIN.) = 16.06  
 EFFECTIVE AREA (ACRES) = 193.85 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.962  
 PEAK FLOW RATE (CFS) = 239.83

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	239.83	16.06	1.663	0.30 ( 0.29)	0.96	193.8	10230.00
2	217.18	25.14	1.286	0.30 ( 0.29)	0.95	240.5	10250.00
3	216.13	25.45	1.279	0.30 ( 0.29)	0.95	241.8	10200.00
4	200.96	29.41	1.193	0.30 ( 0.29)	0.95	246.3	10220.00

=====

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506103E.DAT  
TIME/DATE OF STUDY: 12:44 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 3.190
- 2) 6.00; 2.880
- 3) 7.00; 2.640
- 4) 8.00; 2.450
- 5) 9.00; 2.290
- 6) 10.00; 2.160
- 7) 11.00; 2.050
- 8) 12.00; 1.950
- 9) 13.00; 1.860
- 10) 14.00; 1.790
- 11) 15.00; 1.720
- 12) 20.00; 1.460
- 13) 25.00; 1.290
- 14) 30.00; 1.160
- 15) 40.00; 0.990
- 16) 50.00; 0.870
- 17) 60.00; 0.790
- 18) 90.00; 0.630
- 19) 120.00; 0.530
- 20) 180.00; 0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10300.00 TO NODE 10301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 627.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 5.147  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.144  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "5-7 DWELLINGS/ACRE"	-	1.20	0.30	0.500	95	5.15

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.500  
 SUBAREA RUNOFF(CFS) = 3.23  
 TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 3.23

\*\*\*\*\*

FLOW PROCESS FROM NODE 10301.00 TO NODE 10302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 510.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.2609  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 3.23  
 FLOW VELOCITY(FEET/SEC.) = 6.44 FLOW DEPTH(FEET) = 0.41  
 TRAVEL TIME(MIN.) = 0.30  $T_c$ (MIN.) = 5.44  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10302.00 = 443.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10302.00 TO NODE 10302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 5.44  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.052  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 3.92  
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 7.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10302.00 TO NODE 10303.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 467.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.2575  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.05  
FLOW VELOCITY(FEET/SEC.) = 7.71 FLOW DEPTH(FEET) = 0.55  
TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 5.81  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10303.00 = 610.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10303.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.81  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.940  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 5.52  
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 12.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10304.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 467.00 DOWNSTREAM(FEET) = 446.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 12.30  
FLOW VELOCITY(FEET/SEC.) = 7.75 FLOW DEPTH(FEET) = 0.73  
TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 6.05  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10304.00 = 725.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10304.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.05  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.867  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.500 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 5.82  
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 17.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10305.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 446.00 DOWNSTREAM(FEET) = 366.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 423.00 CHANNEL SLOPE = 0.1891  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 17.80  
FLOW VELOCITY(FEET/SEC.) = 8.68 FLOW DEPTH(FEET) = 0.83  
TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 6.87  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10305.00 = 1148.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10305.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.87  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.672  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.912  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 7.34  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.65  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 23.86

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10306.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 300.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 574.00 CHANNEL SLOPE = 0.1150  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 23.86  
 FLOW VELOCITY (FEET/SEC.) = 7.77 FLOW DEPTH (FEET) = 1.01  
 TRAVEL TIME (MIN.) = 1.23 Tc (MIN.) = 8.10  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10306.00 = 1722.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10306.00 TO NODE 10306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 8.10  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.434  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
 SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 6.93  
 EFFECTIVE AREA (ACRES) = 14.30 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 14.3 PEAK FLOW RATE (CFS) = 28.50

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10306.00 TO NODE 10307.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 300.00 DOWNSTREAM (FEET) = 293.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0350  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 28.50  
 FLOW VELOCITY (FEET/SEC.) = 5.17 FLOW DEPTH (FEET) = 1.36  
 TRAVEL TIME (MIN.) = 0.64 Tc (MIN.) = 8.74  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10307.00 = 1922.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10307.00 TO NODE 10307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 8.74  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.331  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.28  
 EFFECTIVE AREA (ACRES) = 15.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
 TOTAL AREA (ACRES) = 15.0 PEAK FLOW RATE (CFS) = 28.50  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10307.00 TO NODE 10308.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 293.00 DOWNSTREAM (FEET) = 276.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0850  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 28.50  
 FLOW VELOCITY (FEET/SEC.) = 9.00 FLOW DEPTH (FEET) = 1.03  
 TRAVEL TIME (MIN.) = 0.37 Tc (MIN.) = 9.11  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10308.00 = 2122.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10308.00 TO NODE 10308.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 9.11  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.275  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	8.50	0.30	0.500	-
USER-DEFINED	-	3.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.696  
 SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 26.04  
 EFFECTIVE AREA (ACRES) = 29.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 29.0 PEAK FLOW RATE (CFS) = 53.73

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10308.00 TO NODE 10309.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 250.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 600.00 CHANNEL SLOPE = 0.0433  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 53.73  
 FLOW VELOCITY (FEET/SEC.) = 8.14 FLOW DEPTH (FEET) = 1.48  
 TRAVEL TIME (MIN.) = 1.23 Tc (MIN.) = 10.34  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10309.00 = 2722.00 FEET.

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*****
FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.34
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.123
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         6.00     0.30     0.600    -
USER-DEFINED        -         1.80     0.30     0.850    -
USER-DEFINED        -         1.40     0.30     1.000    -
USER-DEFINED        -         0.70     0.30     1.000    -
USER-DEFINED        -         3.40     0.30     0.500    -
USER-DEFINED        -         2.10     0.30     0.600    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.662
SUBAREA AREA(ACRES) = 15.40   SUBAREA RUNOFF(CFS) = 26.67
EFFECTIVE AREA(ACRES) = 44.40   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 44.4       PEAK FLOW RATE(CFS) = 76.41
*****
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*****
FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.34
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.123
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.50     0.30     0.850    -
USER-DEFINED        -         8.80     0.30     1.000    -
USER-DEFINED        -         3.50     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.967
SUBAREA AREA(ACRES) = 15.80   SUBAREA RUNOFF(CFS) = 26.06
EFFECTIVE AREA(ACRES) = 60.20   AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 60.2       PEAK FLOW RATE(CFS) = 102.47
*****
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*****
FLOW PROCESS FROM NODE 10309.00 TO NODE 10310.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 250.00   DOWNSTREAM(FEET) = 208.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1021.00   CHANNEL SLOPE = 0.0411
CHANNEL BASE(FEET) = 0.00   "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 102.47
FLOW VELOCITY(FEET/SEC.) = 9.42   FLOW DEPTH(FEET) = 1.90
TRAVEL TIME(MIN.) = 1.81   Tc(MIN.) = 12.15
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10310.00 = 3743.00 FEET.
*****
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*****
FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.15
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.937
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     0.100    -
USER-DEFINED        -         0.10     0.30     0.500    -
USER-DEFINED        -         4.00     0.30     0.600    -
USER-DEFINED        -         1.80     0.30     0.850    -
USER-DEFINED        -         0.40     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     0.100    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.668
SUBAREA AREA(ACRES) = 6.60   SUBAREA RUNOFF(CFS) = 10.31
EFFECTIVE AREA(ACRES) = 66.80   AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.76
TOTAL AREA(ACRES) = 66.8       PEAK FLOW RATE(CFS) = 102.72
*****
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*****
FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.15
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.937
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     0.500    -
USER-DEFINED        -         8.00     0.30     0.600    -
USER-DEFINED        -         7.10     0.30     0.850    -
USER-DEFINED        -         8.20     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814
SUBAREA AREA(ACRES) = 23.50   SUBAREA RUNOFF(CFS) = 35.80
EFFECTIVE AREA(ACRES) = 90.30   AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 90.3       PEAK FLOW RATE(CFS) = 138.52
*****
```

```
*****
FLOW PROCESS FROM NODE 10310.00 TO NODE 10335.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 208.00   DOWNSTREAM(FEET) = 189.00
FLOW LENGTH(FEET) = 1595.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.45
ESTIMATED PIPE DIAMETER(INCH) = 48.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 138.52
PIPE TRAVEL TIME(MIN.) = 1.98   Tc(MIN.) = 14.12
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10335.00 = 5338.00 FEET.
*****
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*****
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 14.12
RAINFALL INTENSITY(INCH/HR) = 1.78
AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.77
EFFECTIVE STREAM AREA(ACRES) = 90.30
TOTAL STREAM AREA(ACRES) = 90.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 138.52

*****
FLOW PROCESS FROM NODE 10320.00 TO NODE 10321.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----
INITIAL SUBAREA FLOW-LENGTH( FEET) = 330.00
ELEVATION DATA: UPSTREAM( FEET) = 671.00 DOWNSTREAM( FEET) = 622.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.795
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.944
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.00 0.30 0.500 95 5.79
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 2.51
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.51

*****
FLOW PROCESS FROM NODE 10321.00 TO NODE 10322.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM( FEET) = 622.00 DOWNSTREAM( FEET) = 599.00
CHANNEL LENGTH THRU SUBAREA( FEET) = 227.00 CHANNEL SLOPE = 0.1013
CHANNEL BASE( FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH( FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.51
FLOW VELOCITY( FEET/SEC.) = 5.20 FLOW DEPTH( FEET) = 0.40
TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 6.52
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10322.00 = 557.00 FEET.

*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10322.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 6.52
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.755
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.30 0.500 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 3.28
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 5.63

*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10323.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM( FEET) = 599.00 DOWNSTREAM( FEET) = 539.00
FLOW LENGTH( FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.7 INCHES
PIPE-FLOW VELOCITY( FEET/SEC.) = 21.46
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.63
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 6.65
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10323.00 = 719.00 FEET.

*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10323.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 6.65
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.724
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.30 0.500 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.16
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 6.72

*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10324.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM( FEET) = 539.00 DOWNSTREAM( FEET) = 530.00
CHANNEL LENGTH THRU SUBAREA( FEET) = 97.00 CHANNEL SLOPE = 0.0928
CHANNEL BASE( FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH( FEET) = 1.00

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CHANNEL FLOW THRU SUBAREA(CFS) = 6.72  
FLOW VELOCITY(FEET/SEC.) = 5.16 FLOW DEPTH(FEET) = 0.66  
TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 6.96  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10324.00 = 816.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10324.00 TO NODE 10324.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 6.96  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.649  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.80 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.05  
EFFECTIVE AREA(ACRES) = 4.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.7 PEAK FLOW RATE(CFS) = 10.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10324.00 TO NODE 10325.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 530.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 210.00 CHANNEL SLOPE = 0.1429  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.57  
FLOW VELOCITY(FEET/SEC.) = 6.80 FLOW DEPTH(FEET) = 0.72  
TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 7.48  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10325.00 = 1026.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10325.00 TO NODE 10325.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 7.48  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.549  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 3.67  
EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 13.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10325.00 TO NODE 10326.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 460.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 345.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 13.82  
FLOW VELOCITY(FEET/SEC.) = 6.74 FLOW DEPTH(FEET) = 0.83  
TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 8.33  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10326.00 = 1371.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10326.00 TO NODE 10326.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 8.33  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.397  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.90 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 3.84  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 16.79

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10326.00 TO NODE 10327.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 430.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 263.00 CHANNEL SLOPE = 0.1141  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 16.79  
FLOW VELOCITY(FEET/SEC.) = 7.07 FLOW DEPTH(FEET) = 0.89  
TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 8.95  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10327.00 = 1634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10327.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 8.95  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.298  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 7.93  
EFFECTIVE AREA (ACRES) = 12.40 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 12.4 PEAK FLOW RATE (CFS) = 23.97

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10328.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 430.00 DOWNSTREAM (FEET) = 375.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 437.00 CHANNEL SLOPE = 0.1259  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 23.97  
FLOW VELOCITY (FEET/SEC.) = 9.92 FLOW DEPTH (FEET) = 0.90  
TRAVEL TIME (MIN.) = 0.73 Tc (MIN.) = 9.68  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10328.00 = 2071.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 9.68  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.201  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.500 -  
USER-DEFINED - 1.20 0.30 0.850 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.772  
SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 5.67  
EFFECTIVE AREA (ACRES) = 15.60 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 15.6 PEAK FLOW RATE (CFS) = 28.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10329.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 375.00 DOWNSTREAM (FEET) = 372.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 224.00 CHANNEL SLOPE = 0.0134  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 28.56  
FLOW VELOCITY (FEET/SEC.) = 4.47 FLOW DEPTH (FEET) = 1.46  
TRAVEL TIME (MIN.) = 0.84 Tc (MIN.) = 10.52  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10329.00 = 2295.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10329.00 TO NODE 10329.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 10.52  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.103  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.20 0.30 0.500 -  
USER-DEFINED - 1.40 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.571  
SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 19.47  
EFFECTIVE AREA (ACRES) = 26.80 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 26.8 PEAK FLOW RATE (CFS) = 46.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10329.00 TO NODE 10330.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 372.00 DOWNSTREAM (FEET) = 300.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 452.00 CHANNEL SLOPE = 0.1593  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 46.66  
FLOW VELOCITY (FEET/SEC.) = 12.82 FLOW DEPTH (FEET) = 1.10  
TRAVEL TIME (MIN.) = 0.59 Tc (MIN.) = 11.11  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10330.00 = 2747.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10330.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 11.11  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.039  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 4.20 0.30 0.500 -  
USER-DEFINED - 2.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.673  
SUBAREA AREA (ACRES) = 7.80 SUBAREA RUNOFF (CFS) = 12.90  
EFFECTIVE AREA (ACRES) = 34.60 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 34.6 PEAK FLOW RATE (CFS) = 58.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10331.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<



>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 295.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 182.00 CHANNEL SLOPE = 0.0275  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 58.02  
FLOW VELOCITY(FEET/SEC.) = 7.02 FLOW DEPTH(FEET) = 1.66  
TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 11.54  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10331.00 = 2929.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10331.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 11.54  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.996  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.850	-
USER-DEFINED	-	11.30	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	4.20	0.30	0.850	-
USER-DEFINED	-	1.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.652  
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 30.79  
EFFECTIVE AREA(ACRES) = 53.60 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 53.6 PEAK FLOW RATE(CFS) = 87.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10332.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 295.00 DOWNSTREAM(FEET) = 245.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.00 CHANNEL SLOPE = 0.0542  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 87.46  
FLOW VELOCITY(FEET/SEC.) = 10.02 FLOW DEPTH(FEET) = 1.71  
TRAVEL TIME(MIN.) = 1.53 Tc(MIN.) = 13.07  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10332.00 = 3851.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10332.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 13.07  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.855  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 1.40 0.30 0.500 -  
USER-DEFINED - 15.40 0.30 0.850 -  
USER-DEFINED - 8.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.881  
SUBAREA AREA(ACRES) = 25.60 SUBAREA RUNOFF(CFS) = 36.65  
EFFECTIVE AREA(ACRES) = 79.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 79.2 PEAK FLOW RATE(CFS) = 117.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10333.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 199.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 564.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 117.30  
FLOW VELOCITY(FEET/SEC.) = 12.55 FLOW DEPTH(FEET) = 1.77  
TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 13.82  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10333.00 = 4415.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10333.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 13.82  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.802  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.500	-
USER-DEFINED	-	0.50	0.30	0.850	-
USER-DEFINED	-	0.60	0.30	0.500	-
USER-DEFINED	-	5.70	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.761  
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 11.76  
EFFECTIVE AREA(ACRES) = 87.50 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 87.5 PEAK FLOW RATE(CFS) = 125.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10334.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 195.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 454.00 CHANNEL SLOPE = 0.0088  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 125.32

FLOW VELOCITY(FEET/SEC.) = 5.55 FLOW DEPTH(FEET) = 2.74  
TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 15.19  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10334.00 = 4869.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10334.00 TO NODE 10334.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.19  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.710  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.800 -  
USER-DEFINED - 2.60 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 4.86  
EFFECTIVE AREA(ACRES) = 91.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71  
TOTAL AREA(ACRES) = 91.2 PEAK FLOW RATE(CFS) = 125.32  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10334.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 195.00 DOWNSTREAM(FEET) = 189.00  
FLOW LENGTH(FEET) = 1291.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.12  
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 125.32  
PIPE TRAVEL TIME(MIN.) = 2.36 Tc(MIN.) = 17.55  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 17.55  
RAINFALL INTENSITY(INCH/HR) = 1.59  
AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.71  
EFFECTIVE STREAM AREA(ACRES) = 91.20  
TOTAL STREAM AREA(ACRES) = 91.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 125.32

\*\* CONFLUENCE DATA \*\*

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
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NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	138.52	14.12	1.781	0.30( 0.23)	0.77	90.3 10300.00
2	125.32	17.55	1.588	0.30( 0.21)	0.71	91.2 10320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	253.60	14.12	1.781	0.30( 0.22)	0.75	163.7	10300.00
2	246.50	17.55	1.588	0.30( 0.22)	0.74	181.5	10320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 253.60 Tc(MIN.) = 14.12  
EFFECTIVE AREA(ACRES) = 163.71 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA(ACRES) = 181.5  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10336.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 189.00 DOWNSTREAM(FEET) = 188.00  
FLOW LENGTH(FEET) = 103.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.52  
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 253.60  
PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 14.24  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10336.00 = 6263.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10336.00 TO NODE 10337.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.99  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 253.60  
PIPE TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 14.39  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10337.00 = 6475.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10337.00 TO NODE 10338.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 161.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0218

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 253.60  
FLOW VELOCITY (FEET/SEC.) = 9.29 FLOW DEPTH (FEET) = 3.02  
TRAVEL TIME (MIN.) = 1.56 Tc (MIN.) = 15.95  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10338.00 = 7347.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 15.95  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.670  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.850 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.943  
SUBAREA AREA (ACRES) = 4.20 SUBAREA RUNOFF (CFS) = 5.25  
EFFECTIVE AREA (ACRES) = 167.91 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 185.7 PEAK FLOW RATE (CFS) = 253.60  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 15.95  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.670  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 6.17  
EFFECTIVE AREA (ACRES) = 172.91 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 190.7 PEAK FLOW RATE (CFS) = 253.60  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10339.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 161.00 DOWNSTREAM (FEET) = 159.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 328.00 CHANNEL SLOPE = 0.0061  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 253.60  
FLOW VELOCITY (FEET/SEC.) = 5.75 FLOW DEPTH (FEET) = 3.83  
TRAVEL TIME (MIN.) = 0.95 Tc (MIN.) = 16.90  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10339.00 = 7675.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 16.90  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.621  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 2.30 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.767  
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 8.64  
EFFECTIVE AREA (ACRES) = 179.81 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 253.60  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 16.90  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.621  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 6.30 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 2.20 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.876  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 11.25  
EFFECTIVE AREA (ACRES) = 189.01 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 206.8 PEAK FLOW RATE (CFS) = 253.60  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10390.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 159.00 DOWNSTREAM(FEET) = 155.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 782.00 CHANNEL SLOPE = 0.0051
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 253.60
FLOW VELOCITY(FEET/SEC.) = 5.40 FLOW DEPTH(FEET) = 3.96
TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 19.32
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

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FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 19.32
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.495
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.30   0.30   0.800  -
USER-DEFINED        -         3.70   0.30   0.850  -
USER-DEFINED        -         0.10   0.30   1.000  -
USER-DEFINED        -         2.10   0.30   1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.901
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 6.84
EFFECTIVE AREA(ACRES) = 195.21 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 213.0 PEAK FLOW RATE(CFS) = 253.60
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
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*****
FLOW PROCESS FROM NODE 10340.00 TO NODE 10341.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 585.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.581
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.096
SUBAREA Tc AND LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"1 DWELLING/ACRE"	-	0.10	0.30	0.800	95	10.58
PUBLIC PARK	-	0.50	0.30	0.850	95	10.90

```

AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW" - 0.40 0.30 1.000 95 21.09
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA RUNOFF(CFS) = 1.64
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 1.64

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*****
FLOW PROCESS FROM NODE 10341.00 TO NODE 10342.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
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UPSTREAM ELEVATION(FEET) = 585.00 DOWNSTREAM ELEVATION(FEET) = 570.00
STREET LENGTH(FEET) = 250.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.27
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.24
HALFSTREET FLOOD WIDTH(FEET) = 4.11
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.56
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.10
STREET FLOW TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 11.49
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.001
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	0.800	-
USER-DEFINED	-	1.40	0.30	1.000	-

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 3.25
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 4.81

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 5.68
FLOW VELOCITY(FEET/SEC.) = 4.69 DEPTH*VELOCITY(FT*FT/SEC.) = 1.28
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10342.00 = 558.00 FEET.

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*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====

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UPSTREAM ELEVATION(FEET) = 570.00 DOWNSTREAM ELEVATION(FEET) = 560.00  
STREET LENGTH(FEET) = 415.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.51

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.33  
HALFSTREET FLOOD WIDTH(FEET) = 8.73  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.42  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.14  
STREET FLOW TRAVEL TIME(MIN.) = 2.02 Tc(MIN.) = 13.51

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.824

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.800	-
USER-DEFINED	-	1.20	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.825

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 3.41  
EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 7.72

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 9.49  
FLOW VELOCITY(FEET/SEC.) = 3.54 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.23  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10343.00 = 973.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10343.00 TO NODE 10344.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 560.00 DOWNSTREAM ELEVATION(FEET) = 550.00  
STREET LENGTH(FEET) = 616.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.53

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.47  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.17  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.23  
STREET FLOW TRAVEL TIME(MIN.) = 3.24 Tc(MIN.) = 16.76

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.629

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.30	0.800	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 3.61  
EFFECTIVE AREA(ACRES) = 8.40 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 10.37

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 11.88  
FLOW VELOCITY(FEET/SEC.) = 3.24 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.28  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10344.00 = 1589.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10344.00 TO NODE 10345.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 550.00 DOWNSTREAM ELEVATION(FEET) = 510.00  
STREET LENGTH(FEET) = 474.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.15

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.33  
HALFSTREET FLOOD WIDTH(FEET) = 8.73  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.39  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.13  
STREET FLOW TRAVEL TIME(MIN.) = 1.24 Tc(MIN.) = 18.00

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.564

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.80	0.30	0.800	-

USER-DEFINED - 0.20 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803  
SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 3.57  
EFFECTIVE AREA (ACRES) = 11.40 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA (ACRES) = 11.4 PEAK FLOW RATE (CFS) = 13.45

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.34 HALFSTREET FLOOD WIDTH (FEET) = 9.19  
FLOW VELOCITY (FEET/SEC.) = 6.51 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.23  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10345.00 = 2063.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10345.00 TO NODE 10346.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 510.00 DOWNSTREAM ELEVATION (FEET) = 484.00  
STREET LENGTH (FEET) = 231.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.54

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 14.86  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.34  
HALFSTREET FLOOD WIDTH (FEET) = 8.98  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.45  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.52  
STREET FLOW TRAVEL TIME (MIN.) = 0.52 Tc (MIN.) = 18.51  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.537

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.40 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 2.40 SUBAREA RUNOFF (CFS) = 2.80  
EFFECTIVE AREA (ACRES) = 13.80 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA (ACRES) = 13.8 PEAK FLOW RATE (CFS) = 15.98

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.34 HALFSTREET FLOOD WIDTH (FEET) = 9.29  
FLOW VELOCITY (FEET/SEC.) = 7.60 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.61  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10346.00 = 2294.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10346.00 TO NODE 10347.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 484.00 DOWNSTREAM ELEVATION (FEET) = 378.00  
STREET LENGTH (FEET) = 995.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.55

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.19  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.36  
HALFSTREET FLOOD WIDTH (FEET) = 10.00  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.65  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.74  
STREET FLOW TRAVEL TIME (MIN.) = 2.17 Tc (MIN.) = 20.68  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.437

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 4.42  
EFFECTIVE AREA (ACRES) = 17.90 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA (ACRES) = 17.9 PEAK FLOW RATE (CFS) = 19.15

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.36 HALFSTREET FLOOD WIDTH (FEET) = 10.25  
FLOW VELOCITY (FEET/SEC.) = 7.72 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.80  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10347.00 = 3289.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10347.00 TO NODE 10348.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 378.00 DOWNSTREAM ELEVATION (FEET) = 303.00  
STREET LENGTH (FEET) = 751.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.56

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.37

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.37  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.88  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.04

STREET FLOW TRAVEL TIME(MIN.) = 1.59 Tc(MIN.) = 22.27

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.383

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.20	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 8.43  
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 26.71

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 12.08  
FLOW VELOCITY(FEET/SEC.) = 8.10 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.24  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10348.00 = 4040.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10348.00 TO NODE 10349.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 303.00 DOWNSTREAM ELEVATION(FEET) = 252.00  
STREET LENGTH(FEET) = 607.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.79

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.43  
HALFSTREET FLOOD WIDTH(FEET) = 13.50  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.90  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.38

STREET FLOW TRAVEL TIME(MIN.) = 1.28 Tc(MIN.) = 23.55

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.339

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.30	0.30	0.800	-
USER-DEFINED	-	3.00	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.815  
SUBAREA AREA(ACRES) = 10.30 SUBAREA RUNOFF(CFS) = 10.15  
EFFECTIVE AREA(ACRES) = 36.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 36.4 PEAK FLOW RATE(CFS) = 35.84

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 14.21  
FLOW VELOCITY(FEET/SEC.) = 8.11 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.59  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10349.00 = 4647.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10349.00 TO NODE 10350.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 252.00 DOWNSTREAM ELEVATION(FEET) = 246.00  
STREET LENGTH(FEET) = 224.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.18

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.54  
HALFSTREET FLOOD WIDTH(FEET) = 19.19  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.45  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.95

STREET FLOW TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 24.23

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.316

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	12.60	0.30	0.800	-
USER-DEFINED	-	0.50	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.802  
SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 12.68  
EFFECTIVE AREA(ACRES) = 49.50 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 49.5 PEAK FLOW RATE(CFS) = 47.76

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.56 HALFSTREET FLOOD WIDTH(FEET) = 20.13

FLOW VELOCITY(FEET/SEC.) = 5.63 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.16  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10350.00 = 4871.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10350.00 TO NODE 10351.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 237.00  
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.86  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 47.76  
PIPE TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 24.96  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10351.00 = 5390.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10351.00 TO NODE 10351.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 24.96  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.291  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	5.60	0.30	0.800	-
USER-DEFINED	-	0.70	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.784  
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 6.18  
EFFECTIVE AREA(ACRES) = 56.00 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 56.0 PEAK FLOW RATE(CFS) = 52.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10351.00 TO NODE 10352.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 237.00 DOWNSTREAM(FEET) = 230.00  
FLOW LENGTH(FEET) = 675.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.17  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 52.83  
PIPE TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 26.07  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10352.00 = 6065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 26.07  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.262  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.300  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.48  
EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 52.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 26.07  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.262  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	0.100	-
USER-DEFINED	-	9.40	0.30	0.800	-
USER-DEFINED	-	1.10	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755  
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 10.53  
EFFECTIVE AREA(ACRES) = 68.70 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
TOTAL AREA(ACRES) = 68.7 PEAK FLOW RATE(CFS) = 63.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10352.00 TO NODE 10353.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 230.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 30.34  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 63.38  
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 26.23  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10353.00 = 6366.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10353.00 TO NODE 10353.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 26.23  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.258  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL	AREA	Fp	Ap	SCS
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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 6.00 0.30 0.800 -  
 USER-DEFINED - 1.30 0.30 0.850 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.799  
 SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 6.78  
 EFFECTIVE AREA(ACRES) = 76.10 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 76.1 PEAK FLOW RATE(CFS) = 69.89

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10353.00 TO NODE 10354.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 172.00  
 FLOW LENGTH(FEET) = 458.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.24  
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 69.89  
 PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 26.81  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10354.00 = 6824.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10354.00 TO NODE 10390.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 172.00 DOWNSTREAM(FEET) = 155.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00 CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 69.89  
 FLOW VELOCITY(FEET/SEC.) = 8.53 FLOW DEPTH(FEET) = 1.65  
 TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 27.62  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 27.62  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.222  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 0.100 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.100 -  
 USER-DEFINED - 0.90 0.30 0.850 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 1.92  
 EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
 TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 69.89  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 27.62  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.222  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 2.10 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.964  
 SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 3.19  
 EFFECTIVE AREA(ACRES) = 81.90 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 81.9 PEAK FLOW RATE(CFS) = 72.53

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 27.62  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.222  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.50 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 2.07  
 EFFECTIVE AREA(ACRES) = 84.40 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 84.4 PEAK FLOW RATE(CFS) = 74.61

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
 =====

\*\* MAIN STREAM CONFLUENCE DATA \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 74.61 27.62 1.222 0.30( 0.24) 0.80 84.4 10340.00  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	253.60	19.32	1.495	0.30 ( 0.23)	0.77	195.2	10300.00
2	246.50	22.78	1.366	0.30 ( 0.23)	0.76	213.0	10320.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	320.32	19.32	1.495	0.30 ( 0.23)	0.78	254.2	10300.00
2	317.03	22.78	1.366	0.30 ( 0.23)	0.77	282.6	10320.00
3	289.96	27.62	1.222	0.30 ( 0.23)	0.77	297.4	10340.00

TOTAL AREA (ACRES) = 297.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 320.32 Tc (MIN.) = 19.317  
EFFECTIVE AREA (ACRES) = 254.24 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
TOTAL AREA (ACRES) = 297.4  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10360.00 TO NODE 10361.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
ELEVATION DATA: UPSTREAM (FEET) = 337.00 DOWNSTREAM (FEET) = 292.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.697

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.083

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.30	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"GRASS"	-	0.50	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.10	0.30	1.000	95	10.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 1.44  
TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 1.44

\*\*\*\*\*

FLOW PROCESS FROM NODE 10361.00 TO NODE 10362.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 292.00 DOWNSTREAM (FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 199.00 CHANNEL SLOPE = 0.0101  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 1.44  
FLOW VELOCITY (FEET/SEC.) = 1.92 FLOW DEPTH (FEET) = 0.50  
TRAVEL TIME (MIN.) = 1.73 Tc (MIN.) = 12.42  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10362.00 = 529.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.42

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.912

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986

SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 1.60

EFFECTIVE AREA (ACRES) = 2.00 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 2.91

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10363.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 290.00 DOWNSTREAM (FEET) = 288.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.91  
FLOW VELOCITY (FEET/SEC.) = 2.56 FLOW DEPTH (FEET) = 0.62  
TRAVEL TIME (MIN.) = 0.96 Tc (MIN.) = 13.38  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10363.00 = 676.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10363.00 TO NODE 10363.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.38  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.833  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 3.32  
 EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 6.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10363.00 TO NODE 10364.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 288.00 DOWNSTREAM(FEET) = 286.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 6.08  
 FLOW VELOCITY(FEET/SEC.) = 3.06 FLOW DEPTH(FEET) = 0.81  
 TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 14.18  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10364.00 = 823.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10364.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.18  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.777  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
 SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 2.53  
 EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 8.40

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10365.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 286.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.40  
 FLOW VELOCITY(FEET/SEC.) = 2.73 FLOW DEPTH(FEET) = 1.01  
 TRAVEL TIME(MIN.) = 1.51 Tc(MIN.) = 15.69  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10365.00 = 1071.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10365.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.69  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.684  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.50	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 4.37  
 EFFECTIVE AREA(ACRES) = 9.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 12.24

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10366.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 12.24  
 FLOW VELOCITY(FEET/SEC.) = 3.01 FLOW DEPTH(FEET) = 1.16  
 TRAVEL TIME(MIN.) = 1.37 Tc(MIN.) = 17.07  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10366.00 = 1319.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10366.00 TO NODE 10366.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.07  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.613  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	2.30	0.30	1.000	-

USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 2.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995  
SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 10.05  
EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 21.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10366.00 TO NODE 10367.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 279.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 292.00 CHANNEL SLOPE = 0.0103  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 21.66  
FLOW VELOCITY (FEET/SEC.) = 3.77 FLOW DEPTH (FEET) = 1.38  
TRAVEL TIME (MIN.) = 1.29 Tc (MIN.) = 18.36  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10367.00 = 1611.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10367.00 TO NODE 10367.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 18.36  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.545  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972  
SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 1.81  
EFFECTIVE AREA (ACRES) = 19.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 19.9 PEAK FLOW RATE (CFS) = 22.36

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10367.00 TO NODE 10368.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 279.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 378.00 CHANNEL SLOPE = 0.0079  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 22.36  
FLOW VELOCITY (FEET/SEC.) = 3.46 FLOW DEPTH (FEET) = 1.47

TRAVEL TIME (MIN.) = 1.82 Tc (MIN.) = 20.18  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10368.00 = 1989.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10368.00 TO NODE 10368.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 20.18  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.454  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 0.850 -  
USER-DEFINED - 0.90 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.973  
SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 2.30  
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 23.03

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10368.00 TO NODE 10369.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 247.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 229.00 CHANNEL SLOPE = 0.1266  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 23.03  
FLOW VELOCITY (FEET/SEC.) = 9.86 FLOW DEPTH (FEET) = 0.88  
TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 20.56  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10369.00 = 2218.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10369.00 TO NODE 10369.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 20.56  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.441  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 0.850 -  
USER-DEFINED - 9.70 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996  
SUBAREA AREA (ACRES) = 11.60 SUBAREA RUNOFF (CFS) = 11.92  
EFFECTIVE AREA (ACRES) = 33.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 33.7 PEAK FLOW RATE (CFS) = 34.69

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10370.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 247.00 DOWNSTREAM(FEET) = 226.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 179.00 CHANNEL SLOPE = 0.1173
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 34.69
FLOW VELOCITY(FEET/SEC.) = 10.64 FLOW DEPTH(FEET) = 1.04
TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 20.84
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10370.00 = 2397.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10370.00 TO NODE 10370.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.84

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.431

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 0.850 -
USER-DEFINED - 3.60 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 5.60 0.30 1.000 -
USER-DEFINED - 1.50 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997

SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 11.31

EFFECTIVE AREA(ACRES) = 44.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 44.8 PEAK FLOW RATE(CFS) = 45.71

\*\*\*\*\*

FLOW PROCESS FROM NODE 10370.00 TO NODE 10371.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 226.00 DOWNSTREAM(FEET) = 188.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 434.00 CHANNEL SLOPE = 0.0876
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 45.71
FLOW VELOCITY(FEET/SEC.) = 10.18 FLOW DEPTH(FEET) = 1.22
TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 21.55
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10371.00 = 2831.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10371.00 TO NODE 10371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.55

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.407

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 0.100 -
USER-DEFINED - 1.20 0.30 0.850 -
USER-DEFINED - 1.60 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 0.20 0.30 0.100 -
USER-DEFINED - 7.20 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958

SUBAREA AREA(ACRES) = 10.70 SUBAREA RUNOFF(CFS) = 10.78

EFFECTIVE AREA(ACRES) = 55.50 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 55.5 PEAK FLOW RATE(CFS) = 55.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 10371.00 TO NODE 10389.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 157.00
FLOW LENGTH(FEET) = 1918.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.10
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 55.52
PIPE TRAVEL TIME(MIN.) = 2.64 Tc(MIN.) = 24.20
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 24.20

RAINFALL INTENSITY(INCH/HR) = 1.32

AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.99

EFFECTIVE STREAM AREA(ACRES) = 55.50

TOTAL STREAM AREA(ACRES) = 55.50

PEAK FLOW RATE(CFS) AT CONFLUENCE = 55.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 10380.00 TO NODE 10381.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 241.00

ELEVATION DATA: UPSTREAM(FEET) = 275.00 DOWNSTREAM(FEET) = 273.00

Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.110  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.619  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.30	0.100	95	7.11
PUBLIC PARK	-	1.10	0.30	0.850	95	11.30

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.735  
 SUBAREA RUNOFF(CFS) = 2.81  
 TOTAL AREA(ACRES) = 1.30 PEAK FLOW RATE(CFS) = 2.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10381.00 TO NODE 10382.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 273.00 DOWNSTREAM ELEVATION(FEET) = 271.00  
 STREET LENGTH(FEET) = 238.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.39  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.35  
 HALFSTREET FLOOD WIDTH(FEET) = 9.34  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.07  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.71  
 STREET FLOW TRAVEL TIME(MIN.) = 1.92 Tc(MIN.) = 9.03  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.286

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	1.40	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.718  
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 3.17  
 EFFECTIVE AREA(ACRES) = 3.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 5.59

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.43  
 FLOW VELOCITY(FEET/SEC.) = 2.19 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.80  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10382.00 = 479.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10382.00 TO NODE 10383.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 271.00 DOWNSTREAM ELEVATION(FEET) = 268.00  
 STREET LENGTH(FEET) = 357.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.10  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.40  
 HALFSTREET FLOOD WIDTH(FEET) = 12.30  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.38  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.96  
 STREET FLOW TRAVEL TIME(MIN.) = 2.50 Tc(MIN.) = 11.53  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.997

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	1.30	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.452  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.03  
 EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 9.83

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 13.40  
 FLOW VELOCITY(FEET/SEC.) = 2.48 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.06  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10383.00 = 836.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10383.00 TO NODE 10384.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 268.00 DOWNSTREAM ELEVATION(FEET) = 264.00  
 STREET LENGTH(FEET) = 473.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.91  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.46  
 HALFSTREET FLOOD WIDTH(FEET) = 14.96  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.66  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.22  
 STREET FLOW TRAVEL TIME(MIN.) = 2.96 Tc(MIN.) = 14.50  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.755

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.60	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 6.16  
 EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.57  
 TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 14.68

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 15.82  
 FLOW VELOCITY(FEET/SEC.) = 2.73 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.29  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10384.00 = 1309.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10384.00 TO NODE 10385.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 264.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
 STREET LENGTH(FEET) = 463.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.71  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.53  
 HALFSTREET FLOOD WIDTH(FEET) = 18.40  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.62  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.38  
 STREET FLOW TRAVEL TIME(MIN.) = 2.95 Tc(MIN.) = 17.44  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.593

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.600	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.650  
 SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 8.05  
 EFFECTIVE AREA(ACRES) = 16.70 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.7 PEAK FLOW RATE(CFS) = 21.23

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 19.34  
 FLOW VELOCITY(FEET/SEC.) = 2.70 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.47  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10385.00 = 1772.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10385.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 17.44  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.593  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.26  
 EFFECTIVE AREA(ACRES) = 16.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.9 PEAK FLOW RATE(CFS) = 21.49

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10386.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 261.00 DOWNSTREAM(FEET) = 200.00  
 FLOW LENGTH(FEET) = 712.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 18.05  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 21.49  
 PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 18.10

LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10386.00 = 2484.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.10

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.561

SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.75

EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60

TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 22.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.10

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	1.70	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.544

SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 5.15

EFFECTIVE AREA(ACRES) = 22.40 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59

TOTAL AREA(ACRES) = 22.4 PEAK FLOW RATE(CFS) = 27.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.10

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED	-	2.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223

SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 4.70

EFFECTIVE AREA(ACRES) = 25.90 AREA-AVERAGED Fm(INCH/HR) = 0.16

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54

TOTAL AREA(ACRES) = 25.9 PEAK FLOW RATE(CFS) = 32.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.10

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.228

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 2.68

EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52

TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 35.25

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.10

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	0.850	-
USER-DEFINED	-	2.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225

SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 4.03

EFFECTIVE AREA(ACRES) = 30.90 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49

TOTAL AREA(ACRES) = 30.9 PEAK FLOW RATE(CFS) = 39.28

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81



>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.10
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.559
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.00 0.30 0.100 -
USER-DEFINED - 1.50 0.30 0.600 -
USER-DEFINED - 1.70 0.30 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.204
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 9.70
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 48.98

\*\*\*\*\*
FLOW PROCESS FROM NODE 10386.00 TO NODE 10387.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 200.00 DOWNSTREAM(FEET) = 163.00
FLOW LENGTH(FEET) = 1145.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.08
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 48.98
PIPE TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 19.37
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10387.00 = 3629.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.37
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.493
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.30 0.100 -
USER-DEFINED - 23.80 0.30 0.850 -
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 0.80 0.30 1.000 -
USER-DEFINED - 0.60 0.30 0.100 -
USER-DEFINED - 6.90 0.30 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.830
SUBAREA AREA(ACRES) = 32.90 SUBAREA RUNOFF(CFS) = 36.83
EFFECTIVE AREA(ACRES) = 71.00 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62
TOTAL AREA(ACRES) = 71.0 PEAK FLOW RATE(CFS) = 83.56

\*\*\*\*\*
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.37
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.493
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 0.20 0.30 0.850 -
USER-DEFINED - 1.20 0.30 0.100 -
USER-DEFINED - 1.70 0.30 0.850 -
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.641
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 4.45
EFFECTIVE AREA(ACRES) = 74.80 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62
TOTAL AREA(ACRES) = 74.8 PEAK FLOW RATE(CFS) = 88.01

\*\*\*\*\*
FLOW PROCESS FROM NODE 10387.00 TO NODE 10388.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 163.00 DOWNSTREAM(FEET) = 158.00
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.56
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 88.01
PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 19.51
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10388.00 = 3779.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.51
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.486
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.80 0.30 0.100 -
USER-DEFINED - 0.40 0.30 0.400 -
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 7.79
EFFECTIVE AREA(ACRES) = 80.90 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59
TOTAL AREA(ACRES) = 80.9 PEAK FLOW RATE(CFS) = 95.30

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*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.51
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.486
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.30     0.100    -
USER-DEFINED        -        10.70     0.30     0.400    -
USER-DEFINED        -         2.30     0.30     0.850    -
USER-DEFINED        -         0.50     0.30     1.000    -
USER-DEFINED        -         0.30     0.30     1.000    -
USER-DEFINED        -         0.70     0.30     0.400    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.502
SUBAREA AREA(ACRES) = 14.60   SUBAREA RUNOFF(CFS) = 17.54
EFFECTIVE AREA(ACRES) = 95.50  AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 95.5     PEAK FLOW RATE(CFS) = 112.84

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.51
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.486
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70     0.30     0.850    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.70   SUBAREA RUNOFF(CFS) = 0.78
EFFECTIVE AREA(ACRES) = 96.20  AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 96.2     PEAK FLOW RATE(CFS) = 113.62

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10389.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 158.00  DOWNSTREAM(FEET) = 157.00
FLOW LENGTH(FEET) = 51.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.59
ESTIMATED PIPE DIAMETER(INCH) = 42.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 113.62
PIPE TRAVEL TIME(MIN.) = 0.05  Tc(MIN.) = 19.56
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10389.00 = 3830.00 FEET.

*****
FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1

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-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 19.56
RAINFALL INTENSITY(INCH/HR) = 1.48
AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.58
EFFECTIVE STREAM AREA(ACRES) = 96.20
TOTAL STREAM AREA(ACRES) = 96.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 113.62

** CONFLUENCE DATA **
STREAM   Q      Tc  Intensity  Fp(Fm)   Ap   Ae   HEADWATER
NUMBER  (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1       55.52 24.20  1.317  0.30( 0.30) 0.99  55.5 10360.00
2      113.62 19.56  1.483  0.30( 0.17) 0.58  96.2 10380.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM   Q      Tc  Intensity  Fp(Fm)   Ap   Ae   HEADWATER
NUMBER  (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1      165.77 19.56  1.483  0.30( 0.21) 0.71 141.1 10380.00
2      154.79 24.20  1.317  0.30( 0.22) 0.73 151.7 10360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 165.77  Tc(MIN.) = 19.56
EFFECTIVE AREA(ACRES) = 141.07  AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 151.7
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

*****
FLOW PROCESS FROM NODE 10389.00 TO NODE 10390.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 157.00  DOWNSTREAM(FEET) = 155.00
FLOW LENGTH(FEET) = 312.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 44.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.09
ESTIMATED PIPE DIAMETER(INCH) = 57.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 165.77
PIPE TRAVEL TIME(MIN.) = 0.47  Tc(MIN.) = 20.03
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.03

```

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.459  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 5.70 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.997  
 SUBAREA AREA (ACRES) = 9.50 SUBAREA RUNOFF (CFS) = 9.92  
 EFFECTIVE AREA (ACRES) = 150.57 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 161.2 PEAK FLOW RATE (CFS) = 168.21

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 20.03  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.459  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.20 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 2.29  
 EFFECTIVE AREA (ACRES) = 152.77 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 163.4 PEAK FLOW RATE (CFS) = 170.50

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	170.50	20.03	1.459	0.30 ( 0.22)	0.73	152.8	10380.00
2	158.45	24.67	1.301	0.30 ( 0.22)	0.75	163.4	10360.00

LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	320.32	19.32	1.495	0.30 ( 0.23)	0.78	254.2	10300.00
2	317.03	22.78	1.366	0.30 ( 0.23)	0.77	282.6	10320.00
3	289.96	27.62	1.222	0.30 ( 0.23)	0.77	297.4	10340.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM	Q	Tc	Intensity	Fp (Fm)	Ap	Ae	HEADWATER
--------	---	----	-----------	---------	----	----	-----------

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	489.59	19.32	1.495	0.30 ( 0.23)	0.76	401.6 10300.00
2	490.14	20.03	1.459	0.30 ( 0.23)	0.76	412.9 10380.00
3	480.40	22.78	1.366	0.30 ( 0.23)	0.76	441.7 10320.00
4	464.91	24.67	1.301	0.30 ( 0.23)	0.76	451.8 10360.00
5	436.74	27.62	1.222	0.30 ( 0.23)	0.76	460.8 10340.00
TOTAL AREA (ACRES) =			460.8			

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 490.14 Tc (MIN.) = 20.033  
 EFFECTIVE AREA (ACRES) = 412.87 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA (ACRES) = 460.8  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12  
 -----

>>>>CLEAR MEMORY BANK # 1 <<<<<

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 460.8 TC (MIN.) = 20.03  
 EFFECTIVE AREA (ACRES) = 412.87 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.758  
 PEAK FLOW RATE (CFS) = 490.14

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	489.59	19.32	1.495	0.30 ( 0.23)	0.76	401.6	10300.00
2	490.14	20.03	1.459	0.30 ( 0.23)	0.76	412.9	10380.00
3	480.40	22.78	1.366	0.30 ( 0.23)	0.76	441.7	10320.00
4	464.91	24.67	1.301	0.30 ( 0.23)	0.76	451.8	10360.00
5	436.74	27.62	1.222	0.30 ( 0.23)	0.76	460.8	10340.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506104E.DAT  
TIME/DATE OF STUDY: 12:47 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 3.190
- 2) 6.00; 2.880
- 3) 7.00; 2.640
- 4) 8.00; 2.450
- 5) 9.00; 2.290
- 6) 10.00; 2.160
- 7) 11.00; 2.050
- 8) 12.00; 1.950
- 9) 13.00; 1.860
- 10) 14.00; 1.790
- 11) 15.00; 1.720
- 12) 20.00; 1.460
- 13) 25.00; 1.290
- 14) 30.00; 1.160
- 15) 40.00; 0.990
- 16) 50.00; 0.870
- 17) 60.00; 0.790
- 18) 90.00; 0.630
- 19) 120.00; 0.530
- 20) 180.00; 0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10400.00 TO NODE 10401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00  
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.434  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.776  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
PUBLIC PARK	-	0.50	0.30	0.850	95	6.43

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.850  
 SUBAREA RUNOFF(CFS) = 1.13  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.13

\*\*\*\*\*

FLOW PROCESS FROM NODE 10401.00 TO NODE 10402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.3419  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.13  
 FLOW VELOCITY(FEET/SEC.) = 5.42 FLOW DEPTH(FEET) = 0.26  
 TRAVEL TIME(MIN.) = 0.36  $T_c$ (MIN.) = 6.79  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10402.00 = 424.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 6.79  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.690  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.940  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.08  
EFFECTIVE AREA(ACRES) = 1.00 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 2.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10402.00 TO NODE 10403.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.2439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.18  
FLOW VELOCITY(FEET/SEC.) = 5.56 FLOW DEPTH(FEET) = 0.36  
TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 7.16  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10403.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10403.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.16  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.609  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.89  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 4.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10404.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 420.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 266.00 CHANNEL SLOPE = 0.1880  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.00  
FLOW VELOCITY(FEET/SEC.) = 5.88 FLOW DEPTH(FEET) = 0.48  
TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 7.92  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10404.00 = 813.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.92  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.466  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.863  
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 4.57  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 8.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10405.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 370.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 289.00 CHANNEL SLOPE = 0.1730  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 8.32  
FLOW VELOCITY(FEET/SEC.) = 6.98 FLOW DEPTH(FEET) = 0.63  
TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 8.61  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10405.00 = 1102.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.61  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.353  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 7.55  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 15.45

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10406.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 367.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 23.00 CHANNEL SLOPE = 0.1304

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 15.45  
FLOW VELOCITY (FEET/SEC.) = 7.26 FLOW DEPTH (FEET) = 0.84  
TRAVEL TIME (MIN.) = 0.05 Tc (MIN.) = 8.66  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10406.00 = 1125.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10406.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 8.66  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.345  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 3.95  
EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 19.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10407.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 367.00 DOWNSTREAM (FEET) = 344.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 214.00 CHANNEL SLOPE = 0.1075  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 19.33  
FLOW VELOCITY (FEET/SEC.) = 7.16 FLOW DEPTH (FEET) = 0.95  
TRAVEL TIME (MIN.) = 0.50 Tc (MIN.) = 9.16  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10407.00 = 1339.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10407.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 9.16  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.270  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 3.63  
EFFECTIVE AREA (ACRES) = 12.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 22.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10408.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 344.00 DOWNSTREAM (FEET) = 327.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 919.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 22.27  
FLOW VELOCITY (FEET/SEC.) = 4.76 FLOW DEPTH (FEET) = 1.25  
TRAVEL TIME (MIN.) = 3.22 Tc (MIN.) = 12.37  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10408.00 = 2258.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10408.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 12.37  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.916  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.800 -  
USER-DEFINED - 7.90 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.849  
SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 11.96  
EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 30.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 327.00 DOWNSTREAM (FEET) = 314.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 807.00 CHANNEL SLOPE = 0.0161  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 30.32  
FLOW VELOCITY (FEET/SEC.) = 4.88 FLOW DEPTH (FEET) = 1.44  
TRAVEL TIME (MIN.) = 2.76 Tc (MIN.) = 15.13  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10409.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10409.00 TO NODE 10409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 15.13  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.713  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.90 0.30 0.800 -  
 USER-DEFINED - 5.70 0.30 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.823  
 SUBAREA AREA (ACRES) = 12.60 SUBAREA RUNOFF (CFS) = 16.63  
 EFFECTIVE AREA (ACRES) = 32.90 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA (ACRES) = 32.9 PEAK FLOW RATE (CFS) = 43.24

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10409.00 TO NODE 10410.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 314.00 DOWNSTREAM(FEET) = 266.00  
 FLOW LENGTH(FEET) = 213.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 30.35  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 43.24  
 PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 15.25  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10410.00 = 3278.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10410.00 TO NODE 10411.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 266.00 DOWNSTREAM(FEET) = 170.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1470.00 CHANNEL SLOPE = 0.0653  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 43.24  
 FLOW VELOCITY(FEET/SEC.) = 9.03 FLOW DEPTH(FEET) = 1.26  
 TRAVEL TIME(MIN.) = 2.71 Tc(MIN.) = 17.96  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10411.00 = 4748.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10411.00 TO NODE 10411.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.96  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.566  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	6.60	0.30	0.800	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.723  
 SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 10.32

EFFECTIVE AREA (ACRES) = 41.40 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 41.4 PEAK FLOW RATE (CFS) = 49.20

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10411.00 TO NODE 10412.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 170.00 DOWNSTREAM(FEET) = 161.00  
 FLOW LENGTH(FEET) = 1129.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.00  
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 49.20  
 PIPE TRAVEL TIME(MIN.) = 2.09 Tc(MIN.) = 20.05  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10412.00 = 5877.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10412.00 TO NODE 10413.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 161.00 DOWNSTREAM(FEET) = 141.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 360.00 CHANNEL SLOPE = 0.0556  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 49.20  
 FLOW VELOCITY(FEET/SEC.) = 8.76 FLOW DEPTH(FEET) = 1.37  
 TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 20.74  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10413.00 = 6237.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10413.00 TO NODE 10413.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 20.74  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.435  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.509  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 3.35  
 EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA (ACRES) = 44.3 PEAK FLOW RATE (CFS) = 49.20  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:



TOTAL AREA (ACRES) = 44.3 TC (MIN.) = 20.74  
EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.798  
PEAK FLOW RATE (CFS) = 49.20

=====  
=====  
END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

FILE NAME: 0506105L.DAT
TIME/DATE OF STUDY: 12:50 04/15/2013

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 3.190
2) 6.00; 2.880
3) 7.00; 2.640
4) 8.00; 2.450
5) 9.00; 2.290
6) 10.00; 2.160
7) 11.00; 2.050
8) 12.00; 1.950
9) 13.00; 1.860
10) 14.00; 1.790
11) 15.00; 1.720
12) 20.00; 1.460
13) 25.00; 1.290
14) 30.00; 1.160
15) 40.00; 0.990
16) 50.00; 0.870
17) 60.00; 0.790
18) 90.00; 0.630
19) 120.00; 0.530
20) 180.00; 0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

Table with 10 columns: NO., HALF-WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-SIDE, PARK-/SIDE/WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), GUTTER LIP (FT), GUTTER HIKE (FT), MANNING FACTOR (n)

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10500.00 TO NODE 10501.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00
ELEVATION DATA: UPSTREAM(FEET) = 1123.00 DOWNSTREAM(FEET) = 1085.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.984
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.052
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"GRASS" - 0.20 0.30 1.000 95 10.98
NATURAL FAIR COVER
"GRASS" - 0.30 0.30 1.000 95 10.98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.79
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.79

\*\*\*\*\*

FLOW PROCESS FROM NODE 10501.00 TO NODE 10502.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1085.00 DOWNSTREAM(FEET) = 1050.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 181.00 CHANNEL SLOPE = 0.1934
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.79
FLOW VELOCITY(FEET/SEC.) = 3.99 FLOW DEPTH(FEET) = 0.26
TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 11.74
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10502.00 = 507.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10502.00 TO NODE 10502.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.74
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.976
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

```

LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.10     0.30      1.000     -
USER-DEFINED  -        0.80     0.30      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 1.36
EFFECTIVE AREA (ACRES) = 1.40  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.4    PEAK FLOW RATE (CFS) = 2.11

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FLOW PROCESS FROM NODE 10502.00 TO NODE 10503.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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```

ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1025.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 193.00  CHANNEL SLOPE = 0.1295
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.11
FLOW VELOCITY(FEET/SEC.) = 4.41  FLOW DEPTH(FEET) = 0.40
TRAVEL TIME(MIN.) = 0.73  Tc(MIN.) = 12.47
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10503.00 = 700.00 FEET.

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10503.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.47
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.908
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.50   0.30  1.000  -
USER-DEFINED      -        1.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 3.33
EFFECTIVE AREA (ACRES) = 3.70  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 3.7    PEAK FLOW RATE (CFS) = 5.35

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10504.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 1025.00  DOWNSTREAM(FEET) = 1020.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00  CHANNEL SLOPE = 0.0151
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.35
FLOW VELOCITY(FEET/SEC.) = 3.09  FLOW DEPTH(FEET) = 0.76
TRAVEL TIME(MIN.) = 1.79  Tc(MIN.) = 14.26
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10504.00 = 1032.00 FEET.

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10504.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.26
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.772
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.10   0.30  1.000  -
USER-DEFINED      -        0.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 1.19
EFFECTIVE AREA (ACRES) = 4.60  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.6    PEAK FLOW RATE (CFS) = 6.09

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10505.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1020.00  DOWNSTREAM(FEET) = 975.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 397.00  CHANNEL SLOPE = 0.1134
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 6.09
FLOW VELOCITY(FEET/SEC.) = 6.80  FLOW DEPTH(FEET) = 0.55
TRAVEL TIME(MIN.) = 0.97  Tc(MIN.) = 15.23
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10505.00 = 1429.00 FEET.

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10505.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.23
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.708
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.20   0.30  1.000  -
USER-DEFINED      -        1.20   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.40  SUBAREA RUNOFF (CFS) = 1.77
EFFECTIVE AREA (ACRES) = 6.00  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.0    PEAK FLOW RATE (CFS) = 7.60

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10506.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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```
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 905.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 334.00 CHANNEL SLOPE = 0.2096
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.60
FLOW VELOCITY(FEET/SEC.) = 9.05 FLOW DEPTH(FEET) = 0.53
TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 15.85
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10506.00 = 1763.00 FEET.
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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10506.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.85
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.676
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.10 0.30 1.000 -
USER-DEFINED - 3.70 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 12.14
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 19.57
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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10507.00 IS CODE = 51
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```
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 790.00 CHANNEL SLOPE = 0.0380
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 19.57
FLOW VELOCITY(FEET/SEC.) = 4.87 FLOW DEPTH(FEET) = 1.16
TRAVEL TIME(MIN.) = 2.70 Tc(MIN.) = 18.55
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10507.00 = 2553.00 FEET.
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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10507.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.55
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.535
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.70 0.30 1.000 -
USER-DEFINED - 6.30 0.30 1.000 -
USER-DEFINED - 0.30 0.30 1.000 -
```

```
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 10.34
EFFECTIVE AREA(ACRES) = 25.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 27.91
```

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10508.00 IS CODE = 51
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```
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 755.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 27.91
FLOW VELOCITY(FEET/SEC.) = 7.86 FLOW DEPTH(FEET) = 1.09
TRAVEL TIME(MIN.) = 2.38 Tc(MIN.) = 20.93
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10508.00 = 3673.00 FEET.
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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10508.00 IS CODE = 81
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```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.93
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.428
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.80 0.30 1.000 -
USER-DEFINED - 11.10 0.30 1.000 -
USER-DEFINED - 3.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 15.24
EFFECTIVE AREA(ACRES) = 40.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 40.73
```

```
*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10509.00 IS CODE = 51
-----
```

```
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 755.00 DOWNSTREAM(FEET) = 533.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1578.00 CHANNEL SLOPE = 0.1407
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 40.73
FLOW VELOCITY(FEET/SEC.) = 9.54 FLOW DEPTH(FEET) = 1.19
TRAVEL TIME(MIN.) = 2.76 Tc(MIN.) = 23.68
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10509.00 = 5251.00 FEET.
```

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*****
```

FLOW PROCESS FROM NODE 10509.00 TO NODE 10509.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.68

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.335

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.80	0.30	1.000	-
USER-DEFINED	-	11.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	8.30	0.30	1.000	-
USER-DEFINED	-	38.10	0.30	1.000	-
USER-DEFINED	-	8.70	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 77.40 SUBAREA RUNOFF (CFS) = 72.09

EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 109.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10509.00 TO NODE 10510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 415.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1236.00 CHANNEL SLOPE = 0.0955  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 109.43  
 FLOW VELOCITY (FEET/SEC.) = 10.56 FLOW DEPTH (FEET) = 1.86  
 TRAVEL TIME (MIN.) = 1.95 Tc (MIN.) = 25.63  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10510.00 = 6487.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 25.63

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.273

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	30.10	0.30	1.000	-
USER-DEFINED	-	15.30	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	11.30	0.30	1.000	-
USER-DEFINED	-	5.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 64.90 SUBAREA RUNOFF (CFS) = 56.87

EFFECTIVE AREA (ACRES) = 182.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 182.4 PEAK FLOW RATE (CFS) = 159.82

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10511.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1161.00 CHANNEL SLOPE = 0.0973  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 159.82  
 FLOW VELOCITY (FEET/SEC.) = 11.71 FLOW DEPTH (FEET) = 2.13  
 TRAVEL TIME (MIN.) = 1.65 Tc (MIN.) = 27.29  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10511.00 = 7648.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10511.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 27.29

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.231

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.50	0.30	1.000	-
USER-DEFINED	-	10.80	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	22.10	0.30	1.000	-
USER-DEFINED	-	4.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 54.80 SUBAREA RUNOFF (CFS) = 45.90

EFFECTIVE AREA (ACRES) = 237.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 237.2 PEAK FLOW RATE (CFS) = 198.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 302.00 DOWNSTREAM (FEET) = 190.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1644.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 198.66  
 FLOW VELOCITY (FEET/SEC.) = 10.80 FLOW DEPTH (FEET) = 2.48  
 TRAVEL TIME (MIN.) = 2.54 Tc (MIN.) = 29.83  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10512.00 = 9292.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10512.00 TO NODE 10512.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 29.83
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.165
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        0.50     0.30     1.000     -
USER-DEFINED          -        0.20     0.30     1.000     -
USER-DEFINED          -        1.70     0.30     1.000     -
USER-DEFINED          -        0.10     0.30     1.000     -
USER-DEFINED          -       14.20     0.30     1.000     -
USER-DEFINED          -        2.80     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 19.50      SUBAREA RUNOFF(CFS) = 15.17
EFFECTIVE AREA(ACRES) = 256.70   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 256.7        PEAK FLOW RATE(CFS) = 199.75

*****
FLOW PROCESS FROM NODE 10512.00 TO NODE 10513.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 190.00  DOWNSTREAM(FEET) = 183.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 86.00  CHANNEL SLOPE = 0.0814
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 4.00
CHANNEL FLOW THRU SUBAREA(CFS) = 199.75
FLOW VELOCITY(FEET/SEC.) = 11.56  FLOW DEPTH(FEET) = 2.40
TRAVEL TIME(MIN.) = 0.12  Tc(MIN.) = 29.95
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10513.00 = 9378.00 FEET.

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 29.95
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.161
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        0.10     0.30     0.100     -
USER-DEFINED          -        1.30     0.30     1.000     -
USER-DEFINED          -       29.90     0.30     1.000     -
USER-DEFINED          -       11.90     0.30     1.000     -
USER-DEFINED          -        1.70     0.30     1.000     -
USER-DEFINED          -        0.60     0.30     0.100     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 45.50      SUBAREA RUNOFF(CFS) = 35.44
EFFECTIVE AREA(ACRES) = 302.20   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 302.2        PEAK FLOW RATE(CFS) = 234.45

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FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 29.95
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.161
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        9.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30      SUBAREA RUNOFF(CFS) = 7.21
EFFECTIVE AREA(ACRES) = 311.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 311.5        PEAK FLOW RATE(CFS) = 241.65

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10514.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 183.00  DOWNSTREAM(FEET) = 171.00
FLOW LENGTH(FEET) = 1209.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 48.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.29
ESTIMATED PIPE DIAMETER(INCH) = 60.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 241.65
PIPE TRAVEL TIME(MIN.) = 1.41  Tc(MIN.) = 31.36
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10514.00 = 10587.00 FEET.

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10514.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 31.36
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.137
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        0.20     0.30     0.100     -
USER-DEFINED          -        0.40     0.30     1.000     -
USER-DEFINED          -        1.70     0.30     0.100     -
USER-DEFINED          -       31.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 33.60      SUBAREA RUNOFF(CFS) = 25.77
EFFECTIVE AREA(ACRES) = 345.10   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 345.1        PEAK FLOW RATE(CFS) = 260.58

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10515.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

ELEVATION DATA: UPSTREAM(FEET) = 171.00 DOWNSTREAM(FEET) = 165.00  
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 63.0 INCH PIPE IS 46.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.16  
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 260.58  
PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 31.98  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10515.00 = 11152.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10515.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 31.98  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.126  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 1.30 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 15.30 0.30 0.100 -  
USER-DEFINED - 1.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.202  
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 18.41  
EFFECTIVE AREA(ACRES) = 364.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 364.3 PEAK FLOW RATE(CFS) = 275.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10525.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 709.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 63.0 INCH PIPE IS 50.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.72  
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 275.71  
PIPE TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 32.78  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 32.78  
RAINFALL INTENSITY(INCH/HR) = 1.11  
AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.95  
EFFECTIVE STREAM AREA(ACRES) = 364.30  
TOTAL STREAM AREA(ACRES) = 364.30  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 275.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10520.00 TO NODE 10521.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 289.00  
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 180.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.311  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.581  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL - 0.30 0.30 0.100 95 7.31  
PUBLIC PARK - 1.20 0.30 0.850 95 11.62  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.700  
SUBAREA RUNOFF(CFS) = 3.20  
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 3.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10521.00 TO NODE 10522.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 180.00 DOWNSTREAM ELEVATION(FEET) = 176.00  
STREET LENGTH(FEET) = 408.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.43  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 9.97  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.29  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.82  
STREET FLOW TRAVEL TIME(MIN.) = 2.96 Tc(MIN.) = 10.27  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.130

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.60	0.30	0.100	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520  
 SUBAREA AREA (ACRES) = 2.50 SUBAREA RUNOFF (CFS) = 4.44  
 EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 7.03

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.38 HALFSTREET FLOOD WIDTH (FEET) = 11.21  
 FLOW VELOCITY (FEET/SEC.) = 2.43 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.93  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10522.00 = 697.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10522.00 TO NODE 10523.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 176.00 DOWNSTREAM ELEVATION (FEET) = 173.00  
 STREET LENGTH (FEET) = 333.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.61  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.44  
 HALFSTREET FLOOD WIDTH (FEET) = 14.18  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.64  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.17  
 STREET FLOW TRAVEL TIME (MIN.) = 2.10 Tc (MIN.) = 12.38  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.916

SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	4.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.109  
 SUBAREA AREA (ACRES) = 5.40 SUBAREA RUNOFF (CFS) = 9.15  
 EFFECTIVE AREA (ACRES) = 9.40 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA (ACRES) = 9.4 PEAK FLOW RATE (CFS) = 15.42

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.48 HALFSTREET FLOOD WIDTH (FEET) = 15.90  
 FLOW VELOCITY (FEET/SEC.) = 2.84 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.35  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10523.00 = 1030.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10523.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.38  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.916  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.90	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	0.100	-
USER-DEFINED	-	4.80	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	4.90	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.785  
 SUBAREA AREA (ACRES) = 12.70 SUBAREA RUNOFF (CFS) = 19.21  
 EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 34.62

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10524.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 173.00 DOWNSTREAM (FEET) = 165.00  
 FLOW LENGTH (FEET) = 736.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.28  
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 34.62  
 PIPE TRAVEL TIME (MIN.) = 1.32 Tc (MIN.) = 13.70  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10524.00 = 1766.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10524.00 TO NODE 10524.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.70  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.811  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.850	-



SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.308  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 2.78  
EFFECTIVE AREA(ACRES) = 23.90 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 23.9 PEAK FLOW RATE(CFS) = 35.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10524.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 623.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.44  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 35.32  
PIPE TRAVEL TIME(MIN.) = 1.10 Tc(MIN.) = 14.80  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10525.00 = 2389.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.80  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.734  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	6.80	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 12.11  
EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64  
TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 45.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.80  
RAINFALL INTENSITY(INCH/HR) = 1.73  
AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.64  
EFFECTIVE STREAM AREA(ACRES) = 33.00

TOTAL STREAM AREA(ACRES) = 33.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 45.77

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	275.71	32.78	1.113	0.30( 0.29)	0.95	364.3	10500.00
2	45.77	14.80	1.734	0.30( 0.19)	0.64	33.0	10520.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	263.72	14.80	1.734	0.30( 0.27)	0.90	197.4	10520.00
2	303.03	32.78	1.113	0.30( 0.28)	0.93	397.3	10500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 303.03 Tc(MIN.) = 32.78  
EFFECTIVE AREA(ACRES) = 397.30 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
TOTAL AREA(ACRES) = 397.3  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10526.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 158.00 DOWNSTREAM(FEET) = 148.00  
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 57.78  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 303.03  
PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 32.79  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10526.00 = 11891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10526.00 TO NODE 10527.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 148.00 DOWNSTREAM(FEET) = 135.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 296.00 CHANNEL SLOPE = 0.0439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 303.03  
FLOW VELOCITY(FEET/SEC.) = 12.63 FLOW DEPTH(FEET) = 2.83  
TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 33.18  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10527.00 = 12187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 33.18  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.106  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.02  
 EFFECTIVE AREA(ACRES) = 398.70 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 398.7 PEAK FLOW RATE(CFS) = 303.03  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 33.18  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.106  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
 SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 3.58  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 403.6 PEAK FLOW RATE(CFS) = 303.03  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 403.6 TC(MIN.) = 33.18  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.927  
 PEAK FLOW RATE(CFS) = 303.03

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	263.73	15.21	1.709	0.30( 0.27)	0.90	203.7	10520.00
2	303.03	33.18	1.106	0.30( 0.28)	0.93	403.6	10500.00

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506106E.DAT  
TIME/DATE OF STUDY: 12:52 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 3.190
- 2) 6.00; 2.880
- 3) 7.00; 2.640
- 4) 8.00; 2.450
- 5) 9.00; 2.290
- 6) 10.00; 2.160
- 7) 11.00; 2.050
- 8) 12.00; 1.950
- 9) 13.00; 1.860
- 10) 14.00; 1.790
- 11) 15.00; 1.720
- 12) 20.00; 1.460
- 13) 25.00; 1.290
- 14) 30.00; 1.160
- 15) 40.00; 0.990
- 16) 50.00; 0.870
- 17) 60.00; 0.790
- 18) 90.00; 0.630
- 19) 120.00; 0.530
- 20) 180.00; 0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10600.00 TO NODE 10601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 311.00  
ELEVATION DATA: UPSTREAM(FEET) = 166.00 DOWNSTREAM(FEET) = 164.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.602  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.094  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	-	0.50	0.30	0.500	95	10.60
PUBLIC PARK	-	0.60	0.30	0.850	95	13.16

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 0.691  
 SUBAREA RUNOFF(CFS) = 1.87  
 TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 1.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 10601.00 TO NODE 10602.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 164.00 DOWNSTREAM ELEVATION(FEET) = 162.00  
STREET LENGTH(FEET) = 220.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.53  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 8.22  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.04

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.66  
 STREET FLOW TRAVEL TIME (MIN.) = 1.80 Tc (MIN.) = 12.40  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.914  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.517  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 3.32  
 EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.17  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 5.01

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.35 HALFSTREET FLOOD WIDTH (FEET) = 9.72  
 FLOW VELOCITY (FEET/SEC.) = 2.21 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.78  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10602.00 = 531.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10602.00 TO NODE 10603.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 162.00 DOWNSTREAM ELEVATION (FEET) = 159.00  
 STREET LENGTH (FEET) = 328.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.80  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.40  
 HALFSTREET FLOOD WIDTH (FEET) = 11.91  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.42  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.96  
 STREET FLOW TRAVEL TIME (MIN.) = 2.25 Tc (MIN.) = 14.65  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.744

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.500	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	2.40	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527  
 SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 5.57

EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 10.09

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 13.32  
 FLOW VELOCITY (FEET/SEC.) = 2.57 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.09  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10603.00 = 859.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10603.00 TO NODE 10604.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 159.00 DOWNSTREAM ELEVATION (FEET) = 155.00  
 STREET LENGTH (FEET) = 465.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 14.95  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.47  
 HALFSTREET FLOOD WIDTH (FEET) = 15.82  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.78  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.32  
 STREET FLOW TRAVEL TIME (MIN.) = 2.79 Tc (MIN.) = 17.44  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.593

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.30	0.500	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.513  
 SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 9.71  
 EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 18.84

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.51 HALFSTREET FLOOD WIDTH (FEET) = 17.38  
 FLOW VELOCITY (FEET/SEC.) = 2.93 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.48  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10604.00 = 1324.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10604.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.44
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.593
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.30    0.850   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.10    SUBAREA RUNOFF(CFS) = 0.12
EFFECTIVE AREA(ACRES) = 14.70  AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 14.7    PEAK FLOW RATE(CFS) = 18.96

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10605.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 155.00  DOWNSTREAM(FEET) = 140.00
FLOW LENGTH(FEET) = 214.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.24
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 18.96
PIPE TRAVEL TIME(MIN.) = 0.22  Tc(MIN.) = 17.66
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10605.00 = 1538.00 FEET.

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10605.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.66
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.581
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20    0.30    0.100   -
USER-DEFINED        -         1.70    0.30    0.100   -
USER-DEFINED        -        10.20    0.30    0.800   -
USER-DEFINED        -         2.90    0.30    0.850   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.682
SUBAREA AREA(ACRES) = 16.00  SUBAREA RUNOFF(CFS) = 19.83
EFFECTIVE AREA(ACRES) = 30.70  AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 30.7    PEAK FLOW RATE(CFS) = 38.64

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10606.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 140.00  DOWNSTREAM(FEET) = 133.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00  CHANNEL SLOPE = 0.0400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 38.64
FLOW VELOCITY(FEET/SEC.) = 7.28  FLOW DEPTH(FEET) = 1.33
TRAVEL TIME(MIN.) = 0.40  Tc(MIN.) = 18.06
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10606.00 = 1713.00 FEET.

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.06
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.561
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.30    0.500   -
USER-DEFINED        -         0.30    0.30    0.850   -
USER-DEFINED        -         0.10    0.30    1.000   -
USER-DEFINED        -         1.10    0.30    1.000   -
USER-DEFINED        -         0.10    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 1.80    SUBAREA RUNOFF(CFS) = 2.08
EFFECTIVE AREA(ACRES) = 32.50  AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 32.5    PEAK FLOW RATE(CFS) = 40.14

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.06
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.561
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.30    0.850   -
USER-DEFINED        -         1.20    0.30    1.000   -
USER-DEFINED        -         0.10    0.30    1.000   -
USER-DEFINED        -         1.80    0.30    1.000   -
USER-DEFINED        -         0.10    0.30    0.850   -
USER-DEFINED        -         0.20    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 4.33
EFFECTIVE AREA(ACRES) = 36.30  AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.66
TOTAL AREA(ACRES) = 36.3    PEAK FLOW RATE(CFS) = 44.47

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81

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-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 18.06

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.561

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.68

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.67

TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 45.15  
=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 36.9 TC(MIN.) = 18.06

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.670

PEAK FLOW RATE(CFS) = 45.15  
=====

END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 10 Yr \*  
\* From Node: 50100 To Node: 50167 \*  
\*\*\*\*\*

FILE NAME: 0610501V.DAT  
TIME/DATE OF STUDY: 10:00 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.886
- 2) 10.00; 2.578
- 3) 15.00; 1.888
- 4) 20.00; 1.616
- 5) 25.00; 1.408
- 6) 30.00; 1.262
- 7) 40.00; 1.081
- 8) 50.00; 0.963
- 9) 60.00; 0.876
- 10) 90.00; 0.729
- 11) 120.00; 0.646
- 12) 180.00; 0.543
- 13) 360.00; 0.403
- 14) 1440.00; 0.177

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50100.00 TO NODE 50101.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00  
ELEVATION DATA: UPSTREAM(FEET) = 1072.00 DOWNSTREAM(FEET) = 1063.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.598  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.943  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.30	1.000	0	14.60

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.89  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50101.00 TO NODE 50102.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1063.00 DOWNSTREAM(FEET) = 975.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 273.00 CHANNEL SLOPE = 0.3223  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.862  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.29	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.10  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.26  
AVERAGE FLOW DEPTH(FEET) = 0.26 TRAVEL TIME(MIN.) = 0.87  
Tc(MIN.) = 15.46  
SUBAREA AREA(ACRES) = 0.29 SUBAREA RUNOFF(CFS) = 0.41  
EFFECTIVE AREA(ACRES) = 0.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 1.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.28 FLOW VELOCITY(FEET/SEC.) = 5.47  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50102.00 = 597.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50102.00 TO NODE 50103.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 948.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 111.00 CHANNEL SLOPE = 0.2432  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.842

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.22	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.42

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.98

AVERAGE FLOW DEPTH(FEET) = 0.31 TRAVEL TIME(MIN.) = 0.37

Tc(MIN.) = 15.83

SUBAREA AREA(ACRES) = 0.22 SUBAREA RUNOFF(CFS) = 0.31

EFFECTIVE AREA(ACRES) = 1.12 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 1.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 5.20

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50103.00 = 708.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50103.00 TO NODE 50104.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 948.00 DOWNSTREAM(FEET) = 914.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 136.00 CHANNEL SLOPE = 0.2500  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.820

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.96

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.45

AVERAGE FLOW DEPTH(FEET) = 0.35 TRAVEL TIME(MIN.) = 0.42

Tc(MIN.) = 16.25

SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 0.81

EFFECTIVE AREA(ACRES) = 1.71 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 2.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 FLOW VELOCITY(FEET/SEC.) = 5.73

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50104.00 = 844.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50104.00 TO NODE 50105.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 914.00 DOWNSTREAM(FEET) = 895.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 52.00 CHANNEL SLOPE = 0.3654  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.813

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.73	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.52

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.34

AVERAGE FLOW DEPTH(FEET) = 0.40 TRAVEL TIME(MIN.) = 0.12

Tc(MIN.) = 16.37

SUBAREA AREA(ACRES) = 1.73 SUBAREA RUNOFF(CFS) = 2.35

EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 4.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 7.87

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50105.00 = 896.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50106.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 835.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00 CHANNEL SLOPE = 0.2143  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.778

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.22

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.23

AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 0.65

Tc(MIN.) = 17.01

SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 5.06

EFFECTIVE AREA(ACRES) = 7.24 AREA-AVERAGED Fm(INCH/HR) = 0.30



AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 7.2 PEAK FLOW RATE (CFS) = 9.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.64 FLOW VELOCITY (FEET/SEC.) = 7.75  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50106.00 = 1176.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50106.00 TO NODE 50107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 835.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 413.00 CHANNEL SLOPE = 0.2179  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.733

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.53	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.56  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.38  
AVERAGE FLOW DEPTH (FEET) = 0.71 TRAVEL TIME (MIN.) = 0.82  
Tc (MIN.) = 17.84  
SUBAREA AREA (ACRES) = 4.53 SUBAREA RUNOFF (CFS) = 5.84  
EFFECTIVE AREA (ACRES) = 11.77 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.8 PEAK FLOW RATE (CFS) = 15.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.76 FLOW VELOCITY (FEET/SEC.) = 8.77  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50107.00 = 1589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50107.00 TO NODE 50108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 302.00 CHANNEL SLOPE = 0.2318  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.705

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.76	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.84  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.49  
AVERAGE FLOW DEPTH (FEET) = 0.81 TRAVEL TIME (MIN.) = 0.53  
Tc (MIN.) = 18.37

SUBAREA AREA (ACRES) = 5.76 SUBAREA RUNOFF (CFS) = 7.29  
EFFECTIVE AREA (ACRES) = 17.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.5 PEAK FLOW RATE (CFS) = 22.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.86 FLOW VELOCITY (FEET/SEC.) = 9.88  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50108.00 = 1891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50108.00 TO NODE 50109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 655.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 81.00 CHANNEL SLOPE = 0.2469  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.698

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.77	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 32.09  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.11  
AVERAGE FLOW DEPTH (FEET) = 0.98 TRAVEL TIME (MIN.) = 0.12  
Tc (MIN.) = 18.49  
SUBAREA AREA (ACRES) = 15.77 SUBAREA RUNOFF (CFS) = 19.84  
EFFECTIVE AREA (ACRES) = 33.31 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 33.3 PEAK FLOW RATE (CFS) = 41.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.09 FLOW VELOCITY (FEET/SEC.) = 11.84  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50109.00 = 1972.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 655.00 DOWNSTREAM (FEET) = 590.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 379.00 CHANNEL SLOPE = 0.1715  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.666

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.53	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 49.00  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.74

AVERAGE FLOW DEPTH(FEET) = 1.23 TRAVEL TIME(MIN.) = 0.59  
Tc(MIN.) = 19.08  
SUBAREA AREA(ACRES) = 11.53 SUBAREA RUNOFF(CFS) = 14.18  
EFFECTIVE AREA(ACRES) = 44.84 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 44.8 PEAK FLOW RATE(CFS) = 55.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.29 FLOW VELOCITY(FEET/SEC.) = 11.10  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50110.00 = 2351.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50110.00 TO NODE 50111.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 570.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 340.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.627

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 27.15 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 71.35  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.90  
AVERAGE FLOW DEPTH(FEET) = 1.73 TRAVEL TIME(MIN.) = 0.72  
Tc(MIN.) = 19.79  
SUBAREA AREA(ACRES) = 27.15 SUBAREA RUNOFF(CFS) = 32.43  
EFFECTIVE AREA(ACRES) = 71.99 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 72.0 PEAK FLOW RATE(CFS) = 85.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.86 FLOW VELOCITY(FEET/SEC.) = 8.30  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50111.00 = 2691.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50111.00 TO NODE 50112.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 567.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 403.00 CHANNEL SLOPE = 0.0074  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.558

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 66.68 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 123.74  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.18  
AVERAGE FLOW DEPTH(FEET) = 3.14 TRAVEL TIME(MIN.) = 1.61  
Tc(MIN.) = 21.40  
SUBAREA AREA(ACRES) = 66.68 SUBAREA RUNOFF(CFS) = 75.49  
EFFECTIVE AREA(ACRES) = 138.68 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 138.7 PEAK FLOW RATE(CFS) = 156.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.44 FLOW VELOCITY(FEET/SEC.) = 4.43  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50112.00 = 3094.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50112.00 TO NODE 50140.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 21.40  
RAINFALL INTENSITY(INCH/HR) = 1.56  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 138.68  
TOTAL STREAM AREA(ACRES) = 138.68  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 156.98

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50120.00 TO NODE 50121.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00  
ELEVATION DATA: UPSTREAM(FEET) = 1068.00 DOWNSTREAM(FEET) = 968.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.018  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.835

SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER  
"CHAPARRAL, BROADLEAF" - 0.29 0.30 1.000 0 9.02  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.66  
TOTAL AREA(ACRES) = 0.29 PEAK FLOW RATE(CFS) = 0.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50121.00 TO NODE 50122.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 968.00 DOWNSTREAM(FEET) = 916.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 242.00 CHANNEL SLOPE = 0.2149  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.611  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.55 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.23  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.71  
AVERAGE FLOW DEPTH (FEET) = 0.29 TRAVEL TIME (MIN.) = 0.86  
Tc (MIN.) = 9.88  
SUBAREA AREA (ACRES) = 0.55 SUBAREA RUNOFF (CFS) = 1.14  
EFFECTIVE AREA (ACRES) = 0.83 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 0.8 PEAK FLOW RATE (CFS) = 1.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.34 FLOW VELOCITY (FEET/SEC.) = 5.05  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50122.00 = 566.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50122.00 TO NODE 50123.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 916.00 DOWNSTREAM (FEET) = 906.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 111.00 CHANNEL SLOPE = 0.0901  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.532  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.68 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.42  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.03  
AVERAGE FLOW DEPTH (FEET) = 0.45 TRAVEL TIME (MIN.) = 0.46  
Tc (MIN.) = 10.33  
SUBAREA AREA (ACRES) = 0.68 SUBAREA RUNOFF (CFS) = 1.36  
EFFECTIVE AREA (ACRES) = 1.51 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 1.5 PEAK FLOW RATE (CFS) = 3.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.49 FLOW VELOCITY (FEET/SEC.) = 4.20  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50123.00 = 677.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50123.00 TO NODE 50124.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 906.00 DOWNSTREAM (FEET) = 903.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 60.00 CHANNEL SLOPE = 0.0500  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.493  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.59 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.62  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.53  
AVERAGE FLOW DEPTH (FEET) = 0.58 TRAVEL TIME (MIN.) = 0.28  
Tc (MIN.) = 10.62  
SUBAREA AREA (ACRES) = 0.59 SUBAREA RUNOFF (CFS) = 1.16  
EFFECTIVE AREA (ACRES) = 2.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 2.1 PEAK FLOW RATE (CFS) = 4.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.62 FLOW VELOCITY (FEET/SEC.) = 3.65  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50124.00 = 737.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50124.00 TO NODE 50125.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 903.00 DOWNSTREAM (FEET) = 901.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 29.00 CHANNEL SLOPE = 0.0690  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.478  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.44 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.56  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.44  
AVERAGE FLOW DEPTH (FEET) = 0.65 TRAVEL TIME (MIN.) = 0.11  
Tc (MIN.) = 10.73  
SUBAREA AREA (ACRES) = 1.44 SUBAREA RUNOFF (CFS) = 2.82  
EFFECTIVE AREA (ACRES) = 3.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 3.5 PEAK FLOW RATE (CFS) = 6.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.70 FLOW VELOCITY (FEET/SEC.) = 4.66  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50125.00 = 766.00 FEET.

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FLOW PROCESS FROM NODE 50125.00 TO NODE 50126.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 901.00 DOWNSTREAM(FEET) = 889.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 130.00 CHANNEL SLOPE = 0.0923
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.424
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.69 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.52
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.63
AVERAGE FLOW DEPTH(FEET) = 0.75 TRAVEL TIME(MIN.) = 0.38
Tc(MIN.) = 11.11
SUBAREA AREA(ACRES) = 2.69 SUBAREA RUNOFF(CFS) = 5.15
EFFECTIVE AREA(ACRES) = 6.23 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.2 PEAK FLOW RATE(CFS) = 11.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.81 FLOW VELOCITY(FEET/SEC.) = 6.00
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50126.00 = 896.00 FEET.

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FLOW PROCESS FROM NODE 50126.00 TO NODE 50127.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 889.00 DOWNSTREAM(FEET) = 855.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 231.00 CHANNEL SLOPE = 0.1472
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.353
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.18 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.94
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.43
AVERAGE FLOW DEPTH(FEET) = 0.79 TRAVEL TIME(MIN.) = 0.52
Tc(MIN.) = 11.63
SUBAREA AREA(ACRES) = 2.18 SUBAREA RUNOFF(CFS) = 4.03
EFFECTIVE AREA(ACRES) = 8.41 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 15.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.83 FLOW VELOCITY(FEET/SEC.) = 7.58
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50127.00 = 1127.00 FEET.

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FLOW PROCESS FROM NODE 50127.00 TO NODE 50128.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 855.00 DOWNSTREAM(FEET) = 793.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 211.00 CHANNEL SLOPE = 0.2938
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.307
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 5.70 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.69
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.62
AVERAGE FLOW DEPTH(FEET) = 0.81 TRAVEL TIME(MIN.) = 0.33
Tc(MIN.) = 11.96
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 10.29
EFFECTIVE AREA(ACRES) = 14.11 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.1 PEAK FLOW RATE(CFS) = 25.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.87 FLOW VELOCITY(FEET/SEC.) = 11.16
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50128.00 = 1338.00 FEET.

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FLOW PROCESS FROM NODE 50128.00 TO NODE 50129.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 793.00 DOWNSTREAM(FEET) = 708.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 353.00 CHANNEL SLOPE = 0.2408
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.234
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 9.99 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.19
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.17
AVERAGE FLOW DEPTH(FEET) = 1.01 TRAVEL TIME(MIN.) = 0.53
Tc(MIN.) = 12.49
SUBAREA AREA(ACRES) = 9.99 SUBAREA RUNOFF(CFS) = 17.40
EFFECTIVE AREA(ACRES) = 24.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 41.96

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.09 FLOW VELOCITY(FEET/SEC.) = 11.69
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50129.00 = 1691.00 FEET.

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FLOW PROCESS FROM NODE 50129.00 TO NODE 50130.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 708.00 DOWNSTREAM(FEET) = 571.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 735.00 CHANNEL SLOPE = 0.1864  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.085  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	13.71	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 52.99  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.33  
 AVERAGE FLOW DEPTH(FEET) = 1.25 TRAVEL TIME(MIN.) = 1.08  
 Tc(MIN.) = 13.57  
 SUBAREA AREA(ACRES) = 13.71 SUBAREA RUNOFF(CFS) = 22.03  
 EFFECTIVE AREA(ACRES) = 37.82 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 60.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.32 FLOW VELOCITY(FEET/SEC.) = 11.71  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50130.00 = 2426.00 FEET.

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FLOW PROCESS FROM NODE 50130.00 TO NODE 50131.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 571.00 DOWNSTREAM(FEET) = 566.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 709.00 CHANNEL SLOPE = 0.0071  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.787  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	20.71	0.30	0.986	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 74.68  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.61  
 AVERAGE FLOW DEPTH(FEET) = 2.63 TRAVEL TIME(MIN.) = 3.28  
 Tc(MIN.) = 16.85  
 SUBAREA AREA(ACRES) = 20.71 SUBAREA RUNOFF(CFS) = 27.79  
 EFFECTIVE AREA(ACRES) = 58.52 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 78.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.67 FLOW VELOCITY(FEET/SEC.) = 3.66  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50131.00 = 3135.00 FEET.

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FLOW PROCESS FROM NODE 50132.00 TO NODE 50131.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.85  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.787  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	154.02	0.30	0.949	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949  
 SUBAREA AREA(ACRES) = 154.02 SUBAREA RUNOFF(CFS) = 208.29  
 EFFECTIVE AREA(ACRES) = 212.54 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 212.5 PEAK FLOW RATE(CFS) = 286.70

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FLOW PROCESS FROM NODE 50131.00 TO NODE 50140.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 16.85  
 RAINFALL INTENSITY(INCH/HR) = 1.79  
 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96  
 EFFECTIVE STREAM AREA(ACRES) = 212.54  
 TOTAL STREAM AREA(ACRES) = 212.54  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 286.70

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	156.98	21.40	1.558	0.30( 0.30)	1.00	138.7	50100.00
2	286.70	16.85	1.787	0.30( 0.29)	0.96	212.5	50120.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	432.84	16.85	1.787	0.30( 0.29)	0.97	321.7	50120.00
2	399.78	21.40	1.558	0.30( 0.29)	0.98	351.2	50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 432.84 Tc(MIN.) = 16.85  
 EFFECTIVE AREA(ACRES) = 321.72 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 351.2

LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50140.00 = 3135.00 FEET.

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FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 566.00 DOWNSTREAM(FEET) = 416.00
FLOW LENGTH(FEET) = 376.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 67.23
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 432.84
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 16.94
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50141.00 = 3511.00 FEET.

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FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.94
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.782
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 48.73 0.30 0.922 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.922
SUBAREA AREA(ACRES) = 48.73 SUBAREA RUNOFF(CFS) = 66.03
EFFECTIVE AREA(ACRES) = 370.45 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 400.0 PEAK FLOW RATE(CFS) = 497.40

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FLOW PROCESS FROM NODE 50141.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 416.00 DOWNSTREAM(FEET) = 404.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 972.00 CHANNEL SLOPE = 0.0123
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.659
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.56 0.30 0.610 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.610
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 502.43
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.17
AVERAGE FLOW DEPTH(FEET) = 4.83 TRAVEL TIME(MIN.) = 2.26
Tc(MIN.) = 19.20
SUBAREA AREA(ACRES) = 7.56 SUBAREA RUNOFF(CFS) = 10.05
EFFECTIVE AREA(ACRES) = 378.01 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 407.5 PEAK FLOW RATE(CFS) = 497.40
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.81 FLOW VELOCITY(FEET/SEC.) = 7.16
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50162.00 = 4483.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 497.40 19.20 1.659 0.30( 0.29) 0.96 378.0 50120.00
2 454.56 23.80 1.458 0.30( 0.29) 0.96 407.5 50100.00

NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 497.40 Tc(MIN.) = 19.20
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 378.01

\*\*\*\*\*

FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 19.20
RAINFALL INTENSITY(INCH/HR) = 1.66
AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 378.01
TOTAL STREAM AREA(ACRES) = 407.52
PEAK FLOW RATE(CFS) AT CONFLUENCE = 497.40

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FLOW PROCESS FROM NODE 50150.00 TO NODE 50151.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00
ELEVATION DATA: UPSTREAM(FEET) = 1076.00 DOWNSTREAM(FEET) = 988.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.235
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.778
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" - 0.46 0.30 1.000 0 9.23
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.02
TOTAL AREA(ACRES) = 0.46 PEAK FLOW RATE(CFS) = 1.02

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FLOW PROCESS FROM NODE 50151.00 TO NODE 50152.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	988.00	DOWNSTREAM(FEET) =	938.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	220.00	CHANNEL SLOPE =	0.2273
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.591		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.62  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.12  
AVERAGE FLOW DEPTH(FEET) = 0.33 TRAVEL TIME(MIN.) = 0.72  
Tc(MIN.) = 9.95  
SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 1.21  
EFFECTIVE AREA(ACRES) = 1.04 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 2.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 FLOW VELOCITY(FEET/SEC.) = 5.49  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50152.00 = 543.00 FEET.

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FLOW PROCESS FROM NODE 50152.00 TO NODE 50153.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	938.00	DOWNSTREAM(FEET) =	904.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	218.00	CHANNEL SLOPE =	0.1560
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.489		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.13	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.27  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.27  
AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.69  
Tc(MIN.) = 10.64  
SUBAREA AREA(ACRES) = 1.13 SUBAREA RUNOFF(CFS) = 2.23  
EFFECTIVE AREA(ACRES) = 2.18 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.2 PEAK FLOW RATE(CFS) = 4.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.50 FLOW VELOCITY(FEET/SEC.) = 5.70  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50153.00 = 761.00 FEET.

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FLOW PROCESS FROM NODE 50153.00 TO NODE 50154.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) =	904.00	DOWNSTREAM(FEET) =	881.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	212.00	CHANNEL SLOPE =	0.1085
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.402		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.13  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.60  
AVERAGE FLOW DEPTH(FEET) = 0.65 TRAVEL TIME(MIN.) = 0.63  
Tc(MIN.) = 11.27  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.67  
EFFECTIVE AREA(ACRES) = 5.18 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.2 PEAK FLOW RATE(CFS) = 9.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.74 FLOW VELOCITY(FEET/SEC.) = 6.04  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50154.00 = 973.00 FEET.

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FLOW PROCESS FROM NODE 50154.00 TO NODE 50155.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	881.00	DOWNSTREAM(FEET) =	877.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	158.00	CHANNEL SLOPE =	0.0253
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.306		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.78  
AVERAGE FLOW DEPTH(FEET) = 1.08 TRAVEL TIME(MIN.) = 0.70  
Tc(MIN.) = 11.97  
SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 6.89  
EFFECTIVE AREA(ACRES) = 8.99 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 9.0 PEAK FLOW RATE(CFS) = 16.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.16 FLOW VELOCITY(FEET/SEC.) = 3.99

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50155.00 = 1131.00 FEET.

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FLOW PROCESS FROM NODE 50155.00 TO NODE 50156.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 877.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 195.00 CHANNEL SLOPE = 0.0103
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.153

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.32 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.00
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.94
AVERAGE FLOW DEPTH(FEET) = 1.47 TRAVEL TIME(MIN.) = 1.11
Tc(MIN.) = 13.07
SUBAREA AREA(ACRES) = 3.32 SUBAREA RUNOFF(CFS) = 5.54
EFFECTIVE AREA(ACRES) = 12.31 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 20.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.51 FLOW VELOCITY(FEET/SEC.) = 3.01
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50156.00 = 1326.00 FEET.

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FLOW PROCESS FROM NODE 50156.00 TO NODE 50157.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 850.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 424.00 CHANNEL SLOPE = 0.0590
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.990

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.78 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.41
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.99
AVERAGE FLOW DEPTH(FEET) = 1.14 TRAVEL TIME(MIN.) = 1.18
Tc(MIN.) = 14.25
SUBAREA AREA(ACRES) = 3.78 SUBAREA RUNOFF(CFS) = 5.75
EFFECTIVE AREA(ACRES) = 16.09 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 24.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.16 FLOW VELOCITY(FEET/SEC.) = 6.04
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50157.00 = 1750.00 FEET.

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FLOW PROCESS FROM NODE 50157.00 TO NODE 50158.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 835.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0949
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.944

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 11.22 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 32.78
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.78
AVERAGE FLOW DEPTH(FEET) = 1.19 TRAVEL TIME(MIN.) = 0.34
Tc(MIN.) = 14.59
SUBAREA AREA(ACRES) = 11.22 SUBAREA RUNOFF(CFS) = 16.59
EFFECTIVE AREA(ACRES) = 27.31 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 27.3 PEAK FLOW RATE(CFS) = 40.40

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.28 FLOW VELOCITY(FEET/SEC.) = 8.23
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50158.00 = 1908.00 FEET.

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FLOW PROCESS FROM NODE 50158.00 TO NODE 50159.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 835.00 DOWNSTREAM(FEET) = 680.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 721.00 CHANNEL SLOPE = 0.2150
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.855

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.87 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 55.01
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.06
AVERAGE FLOW DEPTH(FEET) = 1.23 TRAVEL TIME(MIN.) = 1.00
Tc(MIN.) = 15.59
SUBAREA AREA(ACRES) = 20.87 SUBAREA RUNOFF(CFS) = 29.22
EFFECTIVE AREA(ACRES) = 48.18 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00



TOTAL AREA (ACRES) = 48.2 PEAK FLOW RATE (CFS) = 67.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.33 FLOW VELOCITY (FEET/SEC.) = 12.67  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50159.00 = 2629.00 FEET.

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FLOW PROCESS FROM NODE 50159.00 TO NODE 50160.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 680.00 DOWNSTREAM (FEET) = 558.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 874.00 CHANNEL SLOPE = 0.1396

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.787

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	32.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 88.88

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.58

AVERAGE FLOW DEPTH (FEET) = 1.60 TRAVEL TIME (MIN.) = 1.26

Tc (MIN.) = 16.85

SUBAREA AREA (ACRES) = 32.02 SUBAREA RUNOFF (CFS) = 42.86

EFFECTIVE AREA (ACRES) = 80.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 80.2 PEAK FLOW RATE (CFS) = 107.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.72 FLOW VELOCITY (FEET/SEC.) = 12.10  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50160.00 = 3503.00 FEET.

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FLOW PROCESS FROM NODE 50160.00 TO NODE 50161.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 558.00 DOWNSTREAM (FEET) = 463.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 1013.00 CHANNEL SLOPE = 0.0938

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.701

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	13.52	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 115.86

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.65

AVERAGE FLOW DEPTH (FEET) = 1.90 TRAVEL TIME (MIN.) = 1.59

Tc (MIN.) = 18.43

SUBAREA AREA (ACRES) = 13.52 SUBAREA RUNOFF (CFS) = 17.05

EFFECTIVE AREA (ACRES) = 93.72 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 93.7 PEAK FLOW RATE (CFS) = 118.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.92 FLOW VELOCITY (FEET/SEC.) = 10.69

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50161.00 = 4516.00 FEET.

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FLOW PROCESS FROM NODE 50161.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 463.00 DOWNSTREAM (FEET) = 404.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 1126.00 CHANNEL SLOPE = 0.0524

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.592

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	19.35	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 129.42

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.79

AVERAGE FLOW DEPTH (FEET) = 2.22 TRAVEL TIME (MIN.) = 2.13

Tc (MIN.) = 20.57

SUBAREA AREA (ACRES) = 19.35 SUBAREA RUNOFF (CFS) = 22.50

EFFECTIVE AREA (ACRES) = 113.07 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 113.1 PEAK FLOW RATE (CFS) = 131.50

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.23 FLOW VELOCITY (FEET/SEC.) = 8.81

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

\*\*\*\*\*

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION (MIN.) = 20.57

RAINFALL INTENSITY (INCH/HR) = 1.59

AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00

EFFECTIVE STREAM AREA (ACRES) = 113.07

TOTAL STREAM AREA (ACRES) = 113.07

PEAK FLOW RATE (CFS) AT CONFLUENCE = 131.50

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
------------------	------------	--------------	------------------------	----------------------	----	---------------	-------------------

1	497.40	19.20	1.659	0.30( 0.29)	0.96	378.0	50120.00
1	454.56	23.80	1.458	0.30( 0.29)	0.96	407.5	50100.00
2	131.50	20.57	1.592	0.30( 0.30)	1.00	113.1	50150.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	626.52	19.20	1.659	0.30( 0.29)	0.97	483.5	50120.00
2	616.16	20.57	1.592	0.30( 0.29)	0.97	499.9	50150.00
3	572.37	23.80	1.458	0.30( 0.29)	0.97	520.6	50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 626.52 Tc(MIN.) = 19.20  
EFFECTIVE AREA(ACRES) = 483.54 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 520.6  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50162.00 TO NODE 50163.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 378.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1158.00 CHANNEL SLOPE = 0.0225  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.567

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	151.93	0.30	0.990	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 713.40  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.80  
AVERAGE FLOW DEPTH(FEET) = 4.93 TRAVEL TIME(MIN.) = 1.97  
Tc(MIN.) = 21.17  
SUBAREA AREA(ACRES) = 151.93 SUBAREA RUNOFF(CFS) = 173.70  
EFFECTIVE AREA(ACRES) = 635.47 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 672.5 PEAK FLOW RATE(CFS) = 729.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 4.96 FLOW VELOCITY(FEET/SEC.) = 9.87  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50163.00 = 6800.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	729.27	21.17	1.567	0.30( 0.29)	0.97	635.5	50120.00
2	714.27	22.55	1.510	0.30( 0.29)	0.97	651.8	50150.00
3	660.60	25.82	1.384	0.30( 0.29)	0.98	672.5	50100.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 729.27 Tc(MIN.) = 21.17  
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.97 EFFECTIVE AREA(ACRES) = 635.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50163.00 TO NODE 50164.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 378.00 DOWNSTREAM(FEET) = 356.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 886.00 CHANNEL SLOPE = 0.0248  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.509

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	177.01	0.30	0.989	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.989  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 825.87  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.56  
AVERAGE FLOW DEPTH(FEET) = 5.11 TRAVEL TIME(MIN.) = 1.40  
Tc(MIN.) = 22.57  
SUBAREA AREA(ACRES) = 177.01 SUBAREA RUNOFF(CFS) = 193.17  
EFFECTIVE AREA(ACRES) = 812.48 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 849.5 PEAK FLOW RATE(CFS) = 889.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 5.25 FLOW VELOCITY(FEET/SEC.) = 10.75  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50164.00 = 7686.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	889.21	22.57	1.509	0.30( 0.29)	0.98	812.5	50120.00
2	863.96	23.95	1.452	0.30( 0.29)	0.98	828.8	50150.00
3	801.76	27.26	1.342	0.30( 0.29)	0.98	849.5	50100.00

NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 889.21 Tc(MIN.) = 22.57  
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 812.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50164.00 TO NODE 50165.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 356.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1762.00 CHANNEL SLOPE = 0.0233  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.399

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	177.01	0.30	0.989	-

LAND USE            GROUP    (ACRES)   (INCH/HR)   (DECIMAL)   CN  
 USER-DEFINED       -       155.27    0.30    1.000    -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 966.03  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.71  
 AVERAGE FLOW DEPTH(FEET) = 5.48    TRAVEL TIME(MIN.) = 2.74  
 Tc(MIN.) = 25.31  
 SUBAREA AREA(ACRES) = 155.27        SUBAREA RUNOFF(CFS) = 153.61  
 EFFECTIVE AREA(ACRES) = 967.75        AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1004.8        PEAK FLOW RATE(CFS) = 962.32

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 5.47    FLOW VELOCITY(FEET/SEC.) = 10.71  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50165.00 = 9448.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	962.32	25.31	1.399	0.30( 0.29)	0.98	967.8	50120.00
2	942.04	26.71	1.358	0.30( 0.29)	0.98	984.1	50150.00
3	873.79	30.07	1.261	0.30( 0.29)	0.98	1004.8	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 962.32    Tc(MIN.) = 25.31  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.98    EFFECTIVE AREA(ACRES) = 967.75

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50165.00 TO NODE 50166.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 315.00    DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 893.00    CHANNEL SLOPE = 0.0347  
 CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040    MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.364  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	50.24	0.30	0.997	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 986.40  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.52  
 AVERAGE FLOW DEPTH(FEET) = 5.12    TRAVEL TIME(MIN.) = 1.19  
 Tc(MIN.) = 26.50  
 SUBAREA AREA(ACRES) = 50.24        SUBAREA RUNOFF(CFS) = 48.17  
 EFFECTIVE AREA(ACRES) = 1017.99        AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1055.0        PEAK FLOW RATE(CFS) = 980.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 5.11    FLOW VELOCITY(FEET/SEC.) = 12.49  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50166.00 = 10341.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	980.25	26.50	1.364	0.30( 0.29)	0.98	1018.0	50120.00
2	957.41	27.91	1.323	0.30( 0.29)	0.98	1034.3	50150.00
3	896.35	31.29	1.239	0.30( 0.29)	0.98	1055.0	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 980.25    Tc(MIN.) = 26.50  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.98    EFFECTIVE AREA(ACRES) = 1017.99

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50166.00 TO NODE 50167.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 284.00    DOWNSTREAM(FEET) = 240.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00    CHANNEL SLOPE = 0.0437  
 CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040    MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.328  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.36	0.30	0.892	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.892  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 984.24  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.62  
 AVERAGE FLOW DEPTH(FEET) = 4.91    TRAVEL TIME(MIN.) = 1.23  
 Tc(MIN.) = 27.73  
 SUBAREA AREA(ACRES) = 8.36        SUBAREA RUNOFF(CFS) = 7.98  
 EFFECTIVE AREA(ACRES) = 1026.35        AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1063.4        PEAK FLOW RATE(CFS) = 980.25  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 4.90    FLOW VELOCITY(FEET/SEC.) = 13.60  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50167.00 = 11349.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	980.25	27.73	1.328	0.30( 0.29)	0.98	1026.3	50120.00
2	957.41	29.15	1.287	0.30( 0.29)	0.98	1042.7	50150.00
3	896.35	32.55	1.216	0.30( 0.29)	0.98	1063.4	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 980.25    Tc(MIN.) = 27.73  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.98    EFFECTIVE AREA(ACRES) = 1026.35

\*\*\*\*\*  
 END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1063.4    TC(MIN.) = 27.73  
 EFFECTIVE AREA(ACRES) = 1026.35    AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.981  
 PEAK FLOW RATE(CFS) = 980.25

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	980.25	27.73	1.328	0.30 ( 0.29)	0.98	1026.3	50120.00
2	957.41	29.15	1.287	0.30 ( 0.29)	0.98	1042.7	50150.00
3	896.35	32.55	1.216	0.30 ( 0.29)	0.98	1063.4	50100.00

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=====  
END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 10 Yr \*  
\* From Node: 50400 To Node: 50412 \*  
\*\*\*\*\*

FILE NAME: 0610504V.DAT  
TIME/DATE OF STUDY: 10:01 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.855
- 2) 10.00; 2.561
- 3) 15.00; 1.881
- 4) 20.00; 1.610
- 5) 25.00; 1.403
- 6) 30.00; 1.259
- 7) 40.00; 1.077
- 8) 50.00; 0.959
- 9) 60.00; 0.872
- 10) 90.00; 0.725
- 11) 120.00; 0.642
- 12) 180.00; 0.539
- 13) 360.00; 0.399
- 14) 1440.00; 0.175

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.482  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.496  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.49	0.30	1.000	0	10.48

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.96  
TOTAL AREA(ACRES) = 0.49 PEAK FLOW RATE(CFS) = 0.96

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.379  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.33  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.10  
AVERAGE FLOW DEPTH(FEET) = 0.29 TRAVEL TIME(MIN.) = 0.86  
Tc(MIN.) = 11.34  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.74  
EFFECTIVE AREA(ACRES) = 0.88 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 1.65

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 5.26  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 239.00 CHANNEL SLOPE = 0.4184  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.299

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.43	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.03

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.80

AVERAGE FLOW DEPTH(FEET) = 0.32 TRAVEL TIME(MIN.) = 0.59

Tc(MIN.) = 11.92

SUBAREA AREA(ACRES) = 0.43 SUBAREA RUNOFF(CFS) = 0.77

EFFECTIVE AREA(ACRES) = 1.31 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.3 PEAK FLOW RATE(CFS) = 2.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.33 FLOW VELOCITY(FEET/SEC.) = 7.08

LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 550.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 71.00 CHANNEL SLOPE = 0.7042  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.283

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.26	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.47

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.56

AVERAGE FLOW DEPTH(FEET) = 0.35 TRAVEL TIME(MIN.) = 0.12

Tc(MIN.) = 12.05

SUBAREA AREA(ACRES) = 1.26 SUBAREA RUNOFF(CFS) = 2.24

EFFECTIVE AREA(ACRES) = 2.57 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 4.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 FLOW VELOCITY(FEET/SEC.) = 10.23

LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 145.00 CHANNEL SLOPE = 0.3448  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.242

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.11	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.55

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.10

AVERAGE FLOW DEPTH(FEET) = 0.48 TRAVEL TIME(MIN.) = 0.30

Tc(MIN.) = 12.35

SUBAREA AREA(ACRES) = 1.11 SUBAREA RUNOFF(CFS) = 1.94

EFFECTIVE AREA(ACRES) = 3.68 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.7 PEAK FLOW RATE(CFS) = 6.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.51 FLOW VELOCITY(FEET/SEC.) = 8.35

LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.199

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.45

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.37

AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 0.31

Tc(MIN.) = 12.66

SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 2.05

EFFECTIVE AREA(ACRES) = 4.88 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 4.9 PEAK FLOW RATE (CFS) = 8.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.57 FLOW VELOCITY (FEET/SEC.) = 8.63  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 450.00 DOWNSTREAM (FEET) = 400.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 228.00 CHANNEL SLOPE = 0.2193  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.139

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.33	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 13.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.54  
AVERAGE FLOW DEPTH (FEET) = 0.73 TRAVEL TIME (MIN.) = 0.44  
Tc (MIN.) = 13.11

SUBAREA AREA (ACRES) = 6.33 SUBAREA RUNOFF (CFS) = 10.47  
EFFECTIVE AREA (ACRES) = 11.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.2 PEAK FLOW RATE (CFS) = 18.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.82 FLOW VELOCITY (FEET/SEC.) = 9.21  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 400.00 DOWNSTREAM (FEET) = 325.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 490.00 CHANNEL SLOPE = 0.1531  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.007

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.78	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 22.22  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.46  
AVERAGE FLOW DEPTH (FEET) = 0.94 TRAVEL TIME (MIN.) = 0.97  
Tc (MIN.) = 14.07

SUBAREA AREA (ACRES) = 4.78 SUBAREA RUNOFF (CFS) = 7.35  
EFFECTIVE AREA (ACRES) = 15.99 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 16.0 PEAK FLOW RATE (CFS) = 24.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.97 FLOW VELOCITY (FEET/SEC.) = 8.67  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 325.00 DOWNSTREAM (FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.984

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 36.32  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.08  
AVERAGE FLOW DEPTH (FEET) = 1.31 TRAVEL TIME (MIN.) = 0.17  
Tc (MIN.) = 14.24

SUBAREA AREA (ACRES) = 15.51 SUBAREA RUNOFF (CFS) = 23.50  
EFFECTIVE AREA (ACRES) = 31.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 31.5 PEAK FLOW RATE (CFS) = 47.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.45 FLOW VELOCITY (FEET/SEC.) = 7.60  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 320.00 DOWNSTREAM (FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.956

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.01	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 52.95  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.17

AVERAGE FLOW DEPTH (FEET) = 1.47 TRAVEL TIME (MIN.) = 0.21  
Tc (MIN.) = 14.45  
SUBAREA AREA (ACRES) = 7.01 SUBAREA RUNOFF (CFS) = 10.44  
EFFECTIVE AREA (ACRES) = 38.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.5 PEAK FLOW RATE (CFS) = 57.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.51 FLOW VELOCITY (FEET/SEC.) = 8.35  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 312.00 DOWNSTREAM (FEET) = 282.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 566.00 CHANNEL SLOPE = 0.0530  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.843  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 15.49 0.30 0.921 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.921  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 68.29  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.55  
AVERAGE FLOW DEPTH (FEET) = 1.74 TRAVEL TIME (MIN.) = 1.25  
Tc (MIN.) = 15.70  
SUBAREA AREA (ACRES) = 15.49 SUBAREA RUNOFF (CFS) = 21.85  
EFFECTIVE AREA (ACRES) = 54.00 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 54.0 PEAK FLOW RATE (CFS) = 75.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.81 FLOW VELOCITY (FEET/SEC.) = 7.70  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 216.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 954.00 CHANNEL SLOPE = 0.0692  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.763  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 14.29 0.30 0.971 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.971

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 84.78  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.87  
AVERAGE FLOW DEPTH (FEET) = 1.61 TRAVEL TIME (MIN.) = 1.46  
Tc (MIN.) = 17.16  
SUBAREA AREA (ACRES) = 14.29 SUBAREA RUNOFF (CFS) = 18.93  
EFFECTIVE AREA (ACRES) = 68.28 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 68.3 PEAK FLOW RATE (CFS) = 90.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.65 FLOW VELOCITY (FEET/SEC.) = 11.06  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 17.16  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.763  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.39 0.30 0.933 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933  
SUBAREA AREA (ACRES) = 2.39 SUBAREA RUNOFF (CFS) = 3.20  
EFFECTIVE AREA (ACRES) = 70.68 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA (ACRES) = 70.7 PEAK FLOW RATE (CFS) = 93.58

-----  
END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 70.7 TC (MIN.) = 17.16  
EFFECTIVE AREA (ACRES) = 70.68 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.975  
PEAK FLOW RATE (CFS) = 93.58

-----  
END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 10 Yr \*  
\* From Node: 50500 To Node: 50513 \*  
\*\*\*\*\*

FILE NAME: 0610505V.DAT  
TIME/DATE OF STUDY: 10:01 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.759
- 2) 10.00; 2.509
- 3) 15.00; 1.860
- 4) 20.00; 1.590
- 5) 25.00; 1.388
- 6) 30.00; 1.248
- 7) 40.00; 1.066
- 8) 50.00; 0.948
- 9) 60.00; 0.860
- 10) 90.00; 0.712
- 11) 120.00; 0.628
- 12) 180.00; 0.525
- 13) 360.00; 0.386
- 14) 1440.00; 0.169

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50500.00 TO NODE 50501.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 1122.00 DOWNSTREAM(FEET) = 980.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.501  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.884  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.67	0.30	1.000	0	8.50

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.55  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 1.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50501.00 TO NODE 50502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 832.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 500.00 CHANNEL SLOPE = 0.2960  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.543  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.83	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.40  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.13  
AVERAGE FLOW DEPTH(FEET) = 0.36 TRAVEL TIME(MIN.) = 1.36  
Tc(MIN.) = 9.86  
SUBAREA AREA(ACRES) = 0.83 SUBAREA RUNOFF(CFS) = 1.69  
EFFECTIVE AREA(ACRES) = 1.50 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.5 PEAK FLOW RATE(CFS) = 3.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 FLOW VELOCITY(FEET/SEC.) = 6.58  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50502.00 = 830.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50502.00 TO NODE 50503.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	832.00	DOWNSTREAM(FEET) =	779.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	255.00	CHANNEL SLOPE =	0.2078
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.448		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.76	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.67

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.04

AVERAGE FLOW DEPTH(FEET) = 0.56 TRAVEL TIME(MIN.) = 0.60

Tc(MIN.) = 10.46

SUBAREA AREA(ACRES) = 3.76 SUBAREA RUNOFF(CFS) = 7.26

EFFECTIVE AREA(ACRES) = 5.26 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.3 PEAK FLOW RATE(CFS) = 10.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.66 FLOW VELOCITY(FEET/SEC.) = 7.81

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50503.00 = 1085.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50503.00 TO NODE 50504.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	779.00	DOWNSTREAM(FEET) =	765.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	382.00	CHANNEL SLOPE =	0.0366
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.261		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.56	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.20

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.42

AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 1.44

Tc(MIN.) = 11.90

SUBAREA AREA(ACRES) = 4.56 SUBAREA RUNOFF(CFS) = 8.05

EFFECTIVE AREA(ACRES) = 9.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 17.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.12 FLOW VELOCITY(FEET/SEC.) = 4.63

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50504.00 = 1467.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50504.00 TO NODE 50505.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	765.00	DOWNSTREAM(FEET) =	750.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	355.00	CHANNEL SLOPE =	0.0423
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.111		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.79	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.42

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.10

AVERAGE FLOW DEPTH(FEET) = 1.15 TRAVEL TIME(MIN.) = 1.16

Tc(MIN.) = 13.06

SUBAREA AREA(ACRES) = 3.79 SUBAREA RUNOFF(CFS) = 6.18

EFFECTIVE AREA(ACRES) = 13.61 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 13.6 PEAK FLOW RATE(CFS) = 22.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.19 FLOW VELOCITY(FEET/SEC.) = 5.19

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50505.00 = 1822.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50505.00 TO NODE 50506.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	750.00	DOWNSTREAM(FEET) =	712.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	261.00	CHANNEL SLOPE =	0.1456
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.046		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.43	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.23

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.73

AVERAGE FLOW DEPTH(FEET) = 1.02 TRAVEL TIME(MIN.) = 0.50

Tc(MIN.) = 13.56

SUBAREA AREA(ACRES) = 6.43 SUBAREA RUNOFF(CFS) = 10.10

EFFECTIVE AREA(ACRES) = 20.03 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.0 PEAK FLOW RATE (CFS) = 31.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.08 FLOW VELOCITY (FEET/SEC.) = 9.02  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50506.00 = 2083.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50506.00 TO NODE 50507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 464.00 CHANNEL SLOPE = 0.2414  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.956

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.57	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 33.40  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.08  
AVERAGE FLOW DEPTH (FEET) = 1.00 TRAVEL TIME (MIN.) = 0.70  
Tc (MIN.) = 14.26

SUBAREA AREA (ACRES) = 2.57 SUBAREA RUNOFF (CFS) = 3.83  
EFFECTIVE AREA (ACRES) = 22.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.6 PEAK FLOW RATE (CFS) = 33.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.00 FLOW VELOCITY (FEET/SEC.) = 11.13  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50507.00 = 2547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50507.00 TO NODE 50508.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 535.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 310.00 CHANNEL SLOPE = 0.2097  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.894

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.09	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 38.05  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.90  
AVERAGE FLOW DEPTH (FEET) = 1.08 TRAVEL TIME (MIN.) = 0.47  
Tc (MIN.) = 14.73

SUBAREA AREA (ACRES) = 6.09 SUBAREA RUNOFF (CFS) = 8.74  
EFFECTIVE AREA (ACRES) = 28.69 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 28.7 PEAK FLOW RATE (CFS) = 41.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.11 FLOW VELOCITY (FEET/SEC.) = 11.12  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50508.00 = 2857.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50508.00 TO NODE 50509.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 405.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.2658  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.839

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 48.11  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.64  
AVERAGE FLOW DEPTH (FEET) = 1.13 TRAVEL TIME (MIN.) = 0.64  
Tc (MIN.) = 15.38

SUBAREA AREA (ACRES) = 10.02 SUBAREA RUNOFF (CFS) = 13.89  
EFFECTIVE AREA (ACRES) = 38.72 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.7 PEAK FLOW RATE (CFS) = 53.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.17 FLOW VELOCITY (FEET/SEC.) = 13.02  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50509.00 = 3346.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50509.00 TO NODE 50510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 285.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 706.00 CHANNEL SLOPE = 0.1700  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.782

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 58.04  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.19

AVERAGE FLOW DEPTH (FEET) = 1.32 TRAVEL TIME (MIN.) = 1.05  
Tc (MIN.) = 16.43  
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 8.80  
EFFECTIVE AREA (ACRES) = 45.32 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 60.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.34 FLOW VELOCITY (FEET/SEC.) = 11.26  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50510.00 = 4052.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50510.00 TO NODE 50511.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 285.00 DOWNSTREAM (FEET) = 238.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1169.00 CHANNEL SLOPE = 0.0402  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.660  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 22.45 0.30 0.991 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 74.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.60  
AVERAGE FLOW DEPTH (FEET) = 1.70 TRAVEL TIME (MIN.) = 2.27  
Tc (MIN.) = 18.70  
SUBAREA AREA (ACRES) = 22.45 SUBAREA RUNOFF (CFS) = 27.55  
EFFECTIVE AREA (ACRES) = 67.77 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 67.8 PEAK FLOW RATE (CFS) = 83.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.77 FLOW VELOCITY (FEET/SEC.) = 8.86  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50511.00 = 5221.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50511.00 TO NODE 50512.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 238.00 DOWNSTREAM (FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.0102  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.584  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 39.83 0.30 0.990 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 106.11  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.63  
AVERAGE FLOW DEPTH (FEET) = 2.51 TRAVEL TIME (MIN.) = 1.45  
Tc (MIN.) = 20.15  
SUBAREA AREA (ACRES) = 39.83 SUBAREA RUNOFF (CFS) = 46.15  
EFFECTIVE AREA (ACRES) = 107.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 107.6 PEAK FLOW RATE (CFS) = 124.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.67 FLOW VELOCITY (FEET/SEC.) = 5.84  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50512.00 = 5710.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50512.00 TO NODE 50513.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 233.00 DOWNSTREAM (FEET) = 209.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 537.00 CHANNEL SLOPE = 0.0447  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.549  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 128.70  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.23  
AVERAGE FLOW DEPTH (FEET) = 2.05 TRAVEL TIME (MIN.) = 0.87  
Tc (MIN.) = 21.02  
SUBAREA AREA (ACRES) = 7.40 SUBAREA RUNOFF (CFS) = 8.32  
EFFECTIVE AREA (ACRES) = 114.99 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 115.0 PEAK FLOW RATE (CFS) = 129.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.05 FLOW VELOCITY (FEET/SEC.) = 10.27  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50513.00 = 6247.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50513.00 TO NODE 50513.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 21.02  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.549  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.19 0.30 0.961 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.961  
SUBAREA AREA (ACRES) = 38.19 SUBAREA RUNOFF (CFS) = 43.34  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.99  
TOTAL AREA (ACRES) = 153.2 PEAK FLOW RATE (CFS) = 172.78

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 153.2 TC (MIN.) = 21.02  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.986  
PEAK FLOW RATE (CFS) = 172.78  
=====

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
 RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
 (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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 Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
 \* Rancho Mission Viejo ROMP Study \*  
 \* Storm Event: 10 Yr \*  
 \* From Node: 50600 To Node: 50610 \*  
 \*\*\*\*\*

FILE NAME: 0610506V.DAT  
 TIME/DATE OF STUDY: 10:01 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
 \*USER-DEFINED TABLED RAINFALL USED\*  
 NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.759
- 2) 10.00; 2.509
- 3) 15.00; 1.860
- 4) 20.00; 1.590
- 5) 25.00; 1.388
- 6) 30.00; 1.248
- 7) 40.00; 1.066
- 8) 50.00; 0.948
- 9) 60.00; 0.860
- 10) 90.00; 0.712
- 11) 120.00; 0.628
- 12) 180.00; 0.525
- 13) 360.00; 0.386
- 14) 1440.00; 0.169

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
- \*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50600.00 TO NODE 50601.00 IS CODE = 21

-----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00  
 ELEVATION DATA: UPSTREAM(FEET) = 780.00 DOWNSTREAM(FEET) = 730.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.166  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.487  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	1.44	0.30	1.000	0	10.17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 2.83  
 TOTAL AREA(ACRES) = 1.44 PEAK FLOW RATE(CFS) = 2.83

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50601.00 TO NODE 50602.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 675.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.1541  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.347  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.27	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.00  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.53  
 AVERAGE FLOW DEPTH(FEET) = 0.49 TRAVEL TIME(MIN.) = 1.08  
 Tc(MIN.) = 11.24  
 SUBAREA AREA(ACRES) = 1.27 SUBAREA RUNOFF(CFS) = 2.34  
 EFFECTIVE AREA(ACRES) = 2.71 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 4.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.53 FLOW VELOCITY(FEET/SEC.) = 5.89  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50602.00 = 671.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50602.00 TO NODE 50603.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	675.00	DOWNSTREAM(FEET) =	600.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	258.00	CHANNEL SLOPE =	0.2907
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.275		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.31	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.16

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.77

AVERAGE FLOW DEPTH(FEET) = 0.51 TRAVEL TIME(MIN.) = 0.55

Tc(MIN.) = 11.80

SUBAREA AREA(ACRES) = 1.31 SUBAREA RUNOFF(CFS) = 2.33

EFFECTIVE AREA(ACRES) = 4.02 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 7.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.54 FLOW VELOCITY(FEET/SEC.) = 8.03

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50603.00 = 929.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50603.00 TO NODE 50604.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	600.00	DOWNSTREAM(FEET) =	585.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	116.00	CHANNEL SLOPE =	0.1293
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.235		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.58	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.52

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.25

AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 0.31

Tc(MIN.) = 12.11

SUBAREA AREA(ACRES) = 1.58 SUBAREA RUNOFF(CFS) = 2.76

EFFECTIVE AREA(ACRES) = 5.60 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.6 PEAK FLOW RATE(CFS) = 9.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.71 FLOW VELOCITY(FEET/SEC.) = 6.51

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50604.00 = 1045.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50604.00 TO NODE 50605.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	585.00	DOWNSTREAM(FEET) =	584.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	16.00	CHANNEL SLOPE =	0.0625
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.229		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.98	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.08

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.38

AVERAGE FLOW DEPTH(FEET) = 0.93 TRAVEL TIME(MIN.) = 0.05

Tc(MIN.) = 12.16

SUBAREA AREA(ACRES) = 4.98 SUBAREA RUNOFF(CFS) = 8.65

EFFECTIVE AREA(ACRES) = 10.58 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 10.6 PEAK FLOW RATE(CFS) = 18.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.03 FLOW VELOCITY(FEET/SEC.) = 5.74

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50605.00 = 1061.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50605.00 TO NODE 50606.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	584.00	DOWNSTREAM(FEET) =	579.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	122.00	CHANNEL SLOPE =	0.0410
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.178		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.18	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.75

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.19

AVERAGE FLOW DEPTH(FEET) = 1.21 TRAVEL TIME(MIN.) = 0.39

Tc(MIN.) = 12.55

SUBAREA AREA(ACRES) = 5.18 SUBAREA RUNOFF(CFS) = 8.76

EFFECTIVE AREA(ACRES) = 15.76 AREA-AVERAGED Fm(INCH/HR) = 0.30



AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 15.8 PEAK FLOW RATE (CFS) = 26.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.28 FLOW VELOCITY (FEET/SEC.) = 5.38  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50606.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50606.00 TO NODE 50607.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 579.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 637.00 CHANNEL SLOPE = 0.0801  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.988

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.34	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 32.23  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.27  
AVERAGE FLOW DEPTH (FEET) = 1.22 TRAVEL TIME (MIN.) = 1.46  
Tc (MIN.) = 14.01  
SUBAREA AREA (ACRES) = 7.34 SUBAREA RUNOFF (CFS) = 11.16  
EFFECTIVE AREA (ACRES) = 23.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 23.1 PEAK FLOW RATE (CFS) = 35.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.25 FLOW VELOCITY (FEET/SEC.) = 7.44  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50607.00 = 1820.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50607.00 TO NODE 50608.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 422.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 529.00 CHANNEL SLOPE = 0.2004  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.881

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.99	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 37.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.63  
AVERAGE FLOW DEPTH (FEET) = 1.08 TRAVEL TIME (MIN.) = 0.83  
Tc (MIN.) = 14.84

SUBAREA AREA (ACRES) = 2.99 SUBAREA RUNOFF (CFS) = 4.26  
EFFECTIVE AREA (ACRES) = 26.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.1 PEAK FLOW RATE (CFS) = 37.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.08 FLOW VELOCITY (FEET/SEC.) = 10.64  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50608.00 = 2349.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50608.00 TO NODE 50609.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 422.00 DOWNSTREAM (FEET) = 297.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 708.00 CHANNEL SLOPE = 0.1766  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.809

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.94	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 45.23  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.70  
AVERAGE FLOW DEPTH (FEET) = 1.19 TRAVEL TIME (MIN.) = 1.10  
Tc (MIN.) = 15.94  
SUBAREA AREA (ACRES) = 11.94 SUBAREA RUNOFF (CFS) = 16.22  
EFFECTIVE AREA (ACRES) = 38.04 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.0 PEAK FLOW RATE (CFS) = 51.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.25 FLOW VELOCITY (FEET/SEC.) = 11.05  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50609.00 = 3057.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50609.00 TO NODE 50610.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 297.00 DOWNSTREAM (FEET) = 207.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1321.00 CHANNEL SLOPE = 0.0681  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.689

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.38	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 58.15  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.88

AVERAGE FLOW DEPTH (FEET) = 1.40 TRAVEL TIME (MIN.) = 2.23  
Tc (MIN.) = 18.17  
SUBAREA AREA (ACRES) = 10.38 SUBAREA RUNOFF (CFS) = 12.98  
EFFECTIVE AREA (ACRES) = 48.42 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 60.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.42 FLOW VELOCITY (FEET/SEC.) = 9.95  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50610.00 = 4378.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 18.17  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.689  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.17 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.17 SUBAREA RUNOFF (CFS) = 1.46  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 49.6 PEAK FLOW RATE (CFS) = 61.99

=====

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 49.6 TC (MIN.) = 18.17  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.000  
PEAK FLOW RATE (CFS) = 61.99

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END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 10 Yr \*  
\* From Node: 50700 To Node: 50716 \*  
\*\*\*\*\*

FILE NAME: 0610507V.DAT  
TIME/DATE OF STUDY: 10:01 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.759
- 2) 10.00; 2.509
- 3) 15.00; 1.860
- 4) 20.00; 1.590
- 5) 25.00; 1.388
- 6) 30.00; 1.248
- 7) 40.00; 1.066
- 8) 50.00; 0.948
- 9) 60.00; 0.860
- 10) 90.00; 0.712
- 11) 120.00; 0.628
- 12) 180.00; 0.525
- 13) 360.00; 0.386
- 14) 1440.00; 0.169

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50700.00 TO NODE 50701.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00  
ELEVATION DATA: UPSTREAM(FEET) = 1121.00 DOWNSTREAM(FEET) = 870.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.572  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.116  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.18	0.30	1.000	0	7.57

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.47  
TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 0.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50701.00 TO NODE 50702.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 827.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.3386  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.016  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.98  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.28  
AVERAGE FLOW DEPTH(FEET) = 0.25 TRAVEL TIME(MIN.) = 0.40  
Tc(MIN.) = 7.97  
SUBAREA AREA(ACRES) = 0.42 SUBAREA RUNOFF(CFS) = 1.03  
EFFECTIVE AREA(ACRES) = 0.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 1.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.29 FLOW VELOCITY(FEET/SEC.) = 5.76  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50702.00 = 456.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50702.00 TO NODE 50703.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 827.00 DOWNSTREAM(FEET) = 815.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 94.00 CHANNEL SLOPE = 0.1277  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.923

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.34	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.88

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.25

AVERAGE FLOW DEPTH(FEET) = 0.38 TRAVEL TIME(MIN.) = 0.37

Tc(MIN.) = 8.34

SUBAREA AREA(ACRES) = 0.34 SUBAREA RUNOFF(CFS) = 0.80

EFFECTIVE AREA(ACRES) = 0.94 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 2.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 FLOW VELOCITY(FEET/SEC.) = 4.44

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50703.00 = 550.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50703.00 TO NODE 50704.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 815.00 DOWNSTREAM(FEET) = 800.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 169.00 CHANNEL SLOPE = 0.0888  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.768

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.72	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.14

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.53

AVERAGE FLOW DEPTH(FEET) = 0.55 TRAVEL TIME(MIN.) = 0.62

Tc(MIN.) = 8.96

SUBAREA AREA(ACRES) = 1.72 SUBAREA RUNOFF(CFS) = 3.82

EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 5.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.63 FLOW VELOCITY(FEET/SEC.) = 4.97

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50704.00 = 719.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50704.00 TO NODE 50705.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 800.00 DOWNSTREAM(FEET) = 785.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 128.00 CHANNEL SLOPE = 0.1172  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.679

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.12	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.19

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.97

AVERAGE FLOW DEPTH(FEET) = 0.68 TRAVEL TIME(MIN.) = 0.36

Tc(MIN.) = 9.32

SUBAREA AREA(ACRES) = 2.12 SUBAREA RUNOFF(CFS) = 4.54

EFFECTIVE AREA(ACRES) = 4.79 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 10.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.74 FLOW VELOCITY(FEET/SEC.) = 6.32

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50705.00 = 847.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50705.00 TO NODE 50706.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 775.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.543

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.64	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.92

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.24

AVERAGE FLOW DEPTH(FEET) = 0.94 TRAVEL TIME(MIN.) = 0.54

Tc(MIN.) = 9.86

SUBAREA AREA(ACRES) = 3.64 SUBAREA RUNOFF(CFS) = 7.34

EFFECTIVE AREA(ACRES) = 8.42 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.4 PEAK FLOW RATE (CFS) = 17.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.01 FLOW VELOCITY (FEET/SEC.) = 5.54  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50706.00 = 1017.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50706.00 TO NODE 50707.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 775.00 DOWNSTREAM (FEET) = 772.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 162.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.435

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.65	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 21.47  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.81  
AVERAGE FLOW DEPTH (FEET) = 1.37 TRAVEL TIME (MIN.) = 0.71  
Tc (MIN.) = 10.57

SUBAREA AREA (ACRES) = 4.65 SUBAREA RUNOFF (CFS) = 8.93  
EFFECTIVE AREA (ACRES) = 13.07 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 13.1 PEAK FLOW RATE (CFS) = 25.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.45 FLOW VELOCITY (FEET/SEC.) = 3.96  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50707.00 = 1179.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50707.00 TO NODE 50708.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 772.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 357.00 CHANNEL SLOPE = 0.0756  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.323

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.55	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 28.35  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.90  
AVERAGE FLOW DEPTH (FEET) = 1.17 TRAVEL TIME (MIN.) = 0.86  
Tc (MIN.) = 11.43

SUBAREA AREA (ACRES) = 3.55 SUBAREA RUNOFF (CFS) = 6.46  
EFFECTIVE AREA (ACRES) = 16.62 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 16.6 PEAK FLOW RATE (CFS) = 30.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.20 FLOW VELOCITY (FEET/SEC.) = 7.00  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50708.00 = 1536.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50708.00 TO NODE 50709.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 733.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 444.00 CHANNEL SLOPE = 0.0270  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.128

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.58	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 34.85  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.92  
AVERAGE FLOW DEPTH (FEET) = 1.54 TRAVEL TIME (MIN.) = 1.50  
Tc (MIN.) = 12.94

SUBAREA AREA (ACRES) = 5.58 SUBAREA RUNOFF (CFS) = 9.18  
EFFECTIVE AREA (ACRES) = 22.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.2 PEAK FLOW RATE (CFS) = 36.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.56 FLOW VELOCITY (FEET/SEC.) = 4.99  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50709.00 = 1980.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50709.00 TO NODE 50710.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 733.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 467.00 CHANNEL SLOPE = 0.1242  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.016

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.17	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 39.74  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.05

AVERAGE FLOW DEPTH (FEET) = 1.21 TRAVEL TIME (MIN.) = 0.86  
Tc (MIN.) = 13.80  
SUBAREA AREA (ACRES) = 4.17 SUBAREA RUNOFF (CFS) = 6.44  
EFFECTIVE AREA (ACRES) = 26.38 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.4 PEAK FLOW RATE (CFS) = 40.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.22 FLOW VELOCITY (FEET/SEC.) = 9.07  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50710.00 = 2447.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50710.00 TO NODE 50711.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 619.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 516.00 CHANNEL SLOPE = 0.1085  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.896  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 21.41 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 56.12  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.35  
AVERAGE FLOW DEPTH (FEET) = 1.41 TRAVEL TIME (MIN.) = 0.92  
Tc (MIN.) = 14.72  
SUBAREA AREA (ACRES) = 21.41 SUBAREA RUNOFF (CFS) = 30.76  
EFFECTIVE AREA (ACRES) = 47.78 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 68.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.52 FLOW VELOCITY (FEET/SEC.) = 9.87  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50711.00 = 2963.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50711.00 TO NODE 50712.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 619.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 650.00 CHANNEL SLOPE = 0.0292  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.798  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.43 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 73.67  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.61  
AVERAGE FLOW DEPTH (FEET) = 1.80 TRAVEL TIME (MIN.) = 1.42  
Tc (MIN.) = 16.14  
SUBAREA AREA (ACRES) = 7.43 SUBAREA RUNOFF (CFS) = 10.01  
EFFECTIVE AREA (ACRES) = 55.21 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.2 PEAK FLOW RATE (CFS) = 74.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.80 FLOW VELOCITY (FEET/SEC.) = 7.63  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50712.00 = 3613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50713.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 794.00 CHANNEL SLOPE = 0.0907  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.741  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 36.47 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 98.11  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.46  
AVERAGE FLOW DEPTH (FEET) = 1.62 TRAVEL TIME (MIN.) = 1.06  
Tc (MIN.) = 17.20  
SUBAREA AREA (ACRES) = 36.47 SUBAREA RUNOFF (CFS) = 47.31  
EFFECTIVE AREA (ACRES) = 91.68 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 118.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.74 FLOW VELOCITY (FEET/SEC.) = 13.14  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50713.00 = 4407.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50713.00 TO NODE 50714.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 423.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1215.00 CHANNEL SLOPE = 0.0864  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.658  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.52 0.30 0.998 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.998  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 130.24  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.21  
 AVERAGE FLOW DEPTH(FEET) = 1.81 TRAVEL TIME(MIN.) = 1.53  
 Tc(MIN.) = 18.73  
 SUBAREA AREA(ACRES) = 18.52 SUBAREA RUNOFF(CFS) = 22.66  
 EFFECTIVE AREA(ACRES) = 110.22 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 110.2 PEAK FLOW RATE(CFS) = 134.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.84 FLOW VELOCITY(FEET/SEC.) = 13.33  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50714.00 = 5622.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50714.00 TO NODE 50715.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 319.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 768.00 CHANNEL SLOPE = 0.1354  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.615  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.31	0.30	0.993	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 137.91  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 15.83  
 AVERAGE FLOW DEPTH(FEET) = 1.70 TRAVEL TIME(MIN.) = 0.81  
 Tc(MIN.) = 19.54  
 SUBAREA AREA(ACRES) = 5.31 SUBAREA RUNOFF(CFS) = 6.30  
 EFFECTIVE AREA(ACRES) = 115.52 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 115.5 PEAK FLOW RATE(CFS) = 136.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.70 FLOW VELOCITY(FEET/SEC.) = 15.80  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50715.00 = 6390.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50715.00 TO NODE 50716.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 319.00 DOWNSTREAM(FEET) = 182.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1513.00 CHANNEL SLOPE = 0.0905  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.539  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.31	0.30	0.993	-

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	79.09	0.30	0.979	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 181.06  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 14.59  
 AVERAGE FLOW DEPTH(FEET) = 2.03 TRAVEL TIME(MIN.) = 1.73  
 Tc(MIN.) = 21.27  
 SUBAREA AREA(ACRES) = 79.09 SUBAREA RUNOFF(CFS) = 88.64  
 EFFECTIVE AREA(ACRES) = 194.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 194.6 PEAK FLOW RATE(CFS) = 217.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.18 FLOW VELOCITY(FEET/SEC.) = 15.27  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50716.00 = 7903.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50716.00 TO NODE 50716.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 21.27  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.539  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	42.18	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 42.18 SUBAREA RUNOFF(CFS) = 47.04  
 EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 236.8 PEAK FLOW RATE(CFS) = 264.52

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 236.8 TC(MIN.) = 21.27  
 EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.993  
 PEAK FLOW RATE(CFS) = 264.52

=====

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 10 Yr \*  
\* From Node: 50800 To Node: 50811 \*  
\*\*\*\*\*

FILE NAME: 0610508V.DAT  
TIME/DATE OF STUDY: 10:02 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.759
- 2) 10.00; 2.509
- 3) 15.00; 1.860
- 4) 20.00; 1.590
- 5) 25.00; 1.388
- 6) 30.00; 1.248
- 7) 40.00; 1.066
- 8) 50.00; 0.948
- 9) 60.00; 0.860
- 10) 90.00; 0.712
- 11) 120.00; 0.628
- 12) 180.00; 0.525
- 13) 360.00; 0.386
- 14) 1440.00; 0.169

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50800.00 TO NODE 50801.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00  
ELEVATION DATA: UPSTREAM(FEET) = 795.00 DOWNSTREAM(FEET) = 745.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.302  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.469  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.60	0.30	1.000	0	10.30

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.16  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50801.00 TO NODE 50802.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 725.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 245.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.349  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.35	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.25  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.40  
AVERAGE FLOW DEPTH(FEET) = 0.57 TRAVEL TIME(MIN.) = 0.93  
Tc(MIN.) = 11.23  
SUBAREA AREA(ACRES) = 3.35 SUBAREA RUNOFF(CFS) = 6.18  
EFFECTIVE AREA(ACRES) = 3.94 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 3.9 PEAK FLOW RATE(CFS) = 7.28

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.69 FLOW VELOCITY(FEET/SEC.) = 5.07  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50802.00 = 566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50802.00 TO NODE 50803.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	725.00	DOWNSTREAM(FEET) =	700.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	325.00	CHANNEL SLOPE =	0.0769
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	2.213		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.52	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.59

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.16

AVERAGE FLOW DEPTH(FEET) = 0.74 TRAVEL TIME(MIN.) = 1.05

Tc(MIN.) = 12.28

SUBAREA AREA(ACRES) = 1.52 SUBAREA RUNOFF(CFS) = 2.62

EFFECTIVE AREA(ACRES) = 5.47 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 9.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.77 FLOW VELOCITY(FEET/SEC.) = 5.25

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50803.00 = 891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50803.00 TO NODE 50804.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	700.00	DOWNSTREAM(FEET) =	652.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	594.00	CHANNEL SLOPE =	0.0808
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	1.996		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.12	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.10

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.93

AVERAGE FLOW DEPTH(FEET) = 0.89 TRAVEL TIME(MIN.) = 1.67

Tc(MIN.) = 13.95

SUBAREA AREA(ACRES) = 6.12 SUBAREA RUNOFF(CFS) = 9.35

EFFECTIVE AREA(ACRES) = 11.59 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 11.6 PEAK FLOW RATE(CFS) = 17.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.97 FLOW VELOCITY(FEET/SEC.) = 6.32

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50804.00 = 1485.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50804.00 TO NODE 50805.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	652.00	DOWNSTREAM(FEET) =	542.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	499.00	CHANNEL SLOPE =	0.2204
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	1.884		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.17	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.38

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.65

AVERAGE FLOW DEPTH(FEET) = 0.86 TRAVEL TIME(MIN.) = 0.86

Tc(MIN.) = 14.81

SUBAREA AREA(ACRES) = 5.17 SUBAREA RUNOFF(CFS) = 7.38

EFFECTIVE AREA(ACRES) = 16.76 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 23.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.90 FLOW VELOCITY(FEET/SEC.) = 9.89

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50805.00 = 1984.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50805.00 TO NODE 50806.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	542.00	DOWNSTREAM(FEET) =	450.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	650.00	CHANNEL SLOPE =	0.1415
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	1.803		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.22	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.44

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.67

AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 1.25

Tc(MIN.) = 16.06

SUBAREA AREA(ACRES) = 5.22 SUBAREA RUNOFF(CFS) = 7.06

EFFECTIVE AREA(ACRES) = 21.99 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 29.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.06 FLOW VELOCITY (FEET/SEC.) = 8.86  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50806.00 = 2634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50806.00 TO NODE 50807.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 450.00 DOWNSTREAM (FEET) = 400.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 639.00 CHANNEL SLOPE = 0.0782  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.727

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.83	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 39.90  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.60  
AVERAGE FLOW DEPTH (FEET) = 1.32 TRAVEL TIME (MIN.) = 1.40  
Tc (MIN.) = 17.46  
SUBAREA AREA (ACRES) = 15.83 SUBAREA RUNOFF (CFS) = 20.34  
EFFECTIVE AREA (ACRES) = 37.82 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 37.8 PEAK FLOW RATE (CFS) = 48.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.42 FLOW VELOCITY (FEET/SEC.) = 7.99  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50807.00 = 3273.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50807.00 TO NODE 50808.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 400.00 DOWNSTREAM (FEET) = 350.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 448.00 CHANNEL SLOPE = 0.1116  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.684

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 53.22  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.34  
AVERAGE FLOW DEPTH (FEET) = 1.38 TRAVEL TIME (MIN.) = 0.80  
Tc (MIN.) = 18.26

SUBAREA AREA (ACRES) = 7.46 SUBAREA RUNOFF (CFS) = 9.29  
EFFECTIVE AREA (ACRES) = 45.28 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 56.40

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.41 FLOW VELOCITY (FEET/SEC.) = 9.48  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50808.00 = 3721.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50808.00 TO NODE 50809.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 350.00 DOWNSTREAM (FEET) = 283.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 438.00 CHANNEL SLOPE = 0.1530  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.648

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.20	0.30	0.972	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 60.80  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.91  
AVERAGE FLOW DEPTH (FEET) = 1.36 TRAVEL TIME (MIN.) = 0.67  
Tc (MIN.) = 18.93  
SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 8.79  
EFFECTIVE AREA (ACRES) = 52.48 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 52.5 PEAK FLOW RATE (CFS) = 63.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.39 FLOW VELOCITY (FEET/SEC.) = 10.97  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50809.00 = 4159.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50809.00 TO NODE 50810.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 283.00 DOWNSTREAM (FEET) = 243.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 665.00 CHANNEL SLOPE = 0.0602  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.593

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	63.52	0.30	0.983	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.983  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 100.83  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.79

AVERAGE FLOW DEPTH (FEET) = 1.77 TRAVEL TIME (MIN.) = 1.03  
Tc (MIN.) = 19.95  
SUBAREA AREA (ACRES) = 63.52 SUBAREA RUNOFF (CFS) = 74.20  
EFFECTIVE AREA (ACRES) = 116.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 116.0 PEAK FLOW RATE (CFS) = 135.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.97 FLOW VELOCITY (FEET/SEC.) = 11.61  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50810.00 = 4824.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50810.00 TO NODE 50811.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 243.00 DOWNSTREAM (FEET) = 173.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1122.00 CHANNEL SLOPE = 0.0624  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.514

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.57	0.30	0.980	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 141.66  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.60  
AVERAGE FLOW DEPTH (FEET) = 2.22 TRAVEL TIME (MIN.) = 1.95  
Tc (MIN.) = 21.90  
SUBAREA AREA (ACRES) = 11.57 SUBAREA RUNOFF (CFS) = 12.70  
EFFECTIVE AREA (ACRES) = 127.57 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 127.6 PEAK FLOW RATE (CFS) = 139.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.21 FLOW VELOCITY (FEET/SEC.) = 9.56  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50811.00 = 5946.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 21.90  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.514  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 4.04  
EFFECTIVE AREA (ACRES) = 131.27 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 131.3 PEAK FLOW RATE (CFS) = 143.78

=====

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 131.3 TC (MIN.) = 21.90  
EFFECTIVE AREA (ACRES) = 131.27 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.988  
PEAK FLOW RATE (CFS) = 143.78

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 2 \*  
\* HYDROLOGIC ANALYSIS - 10-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E502XX10.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	3.190
2)	6.000;	2.880
3)	7.000;	2.640
4)	8.000;	2.450
5)	9.000;	2.290
6)	10.000;	2.160
7)	11.000;	2.050
8)	12.000;	1.950
9)	13.000;	1.860
10)	14.000;	1.790
11)	15.000;	1.720
12)	20.000;	1.460
13)	25.000;	1.290
14)	30.000;	1.160
15)	40.000;	0.990
16)	50.000;	0.870
17)	60.000;	0.790
18)	90.000;	0.630
19)	120.000;	0.530
20)	180.000;	0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50200.00 TO NODE 50201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 497.00 DOWNSTREAM(FEET) = 365.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.563  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.30	1.000	95	8.56
NATURAL FAIR COVER "OPEN BRUSH"	-	0.60	0.30	1.000	95	8.56
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.20	0.30	1.000	95	8.56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.60  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 2.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50201.00 TO NODE 50202.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 365.00 DOWNSTREAM(FEET) = 335.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 259.00 CHANNEL SLOPE = 0.1158  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.60  
FLOW VELOCITY(FEET/SEC.) = 4.48 FLOW DEPTH(FEET) = 0.44  
TRAVEL TIME(MIN.) = 0.96  $T_c$ (MIN.) = 9.53  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50202.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50202.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.53  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.221  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 4.67  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 7.09

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50203.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 335.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.1020  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.09  
FLOW VELOCITY(FEET/SEC.) = 5.44 FLOW DEPTH(FEET) = 0.66  
TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 10.13  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50203.00 = 781.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50203.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.13  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.146  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 6.98  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 13.79

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50204.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 304.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0696  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 13.79  
FLOW VELOCITY(FEET/SEC.) = 5.61 FLOW DEPTH(FEET) = 0.91  
TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 10.60  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50204.00 = 939.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50204.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.60  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.094  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 7.11  
EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 20.52

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50205.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 304.00 DOWNSTREAM(FEET) = 234.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 487.00 CHANNEL SLOPE = 0.1437  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 20.52  
FLOW VELOCITY(FEET/SEC.) = 10.00 FLOW DEPTH(FEET) = 0.83  
TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 11.41  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50205.00 = 1426.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 11.41  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.009  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.100 -

USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.90 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 5.51  
 EFFECTIVE AREA(ACRES) = 16.10 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 25.06

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 11.41  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.009  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	4.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.850	-
USER-DEFINED	-	3.70	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.882  
 SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 19.78  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
 TOTAL AREA(ACRES) = 28.7 PEAK FLOW RATE(CFS) = 44.85

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 28.7 TC(MIN.) = 11.41  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.910  
 PEAK FLOW RATE(CFS) = 44.85

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 3 \*  
\* HYDROLOGIC ANALYSIS - 10-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E503XX10.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	3.190
2)	6.000;	2.880
3)	7.000;	2.640
4)	8.000;	2.450
5)	9.000;	2.290
6)	10.000;	2.160
7)	11.000;	2.050
8)	12.000;	1.950
9)	13.000;	1.860
10)	14.000;	1.790
11)	15.000;	1.720
12)	20.000;	1.460
13)	25.000;	1.290
14)	30.000;	1.160
15)	40.000;	0.990
16)	50.000;	0.870
17)	60.000;	0.790
18)	90.000;	0.630
19)	120.000;	0.530
20)	180.000;	0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50300.00 TO NODE 50301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00  
ELEVATION DATA: UPSTREAM(FEET) = 1110.00 DOWNSTREAM(FEET) = 1035.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.517  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.223  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.60	0.30	1.000	95	9.52
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.52

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.56  
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 1.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50301.00 TO NODE 50302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 960.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 225.00 CHANNEL SLOPE = 0.3333  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.56  
FLOW VELOCITY(FEET/SEC.) = 5.75 FLOW DEPTH(FEET) = 0.30  
TRAVEL TIME(MIN.) = 0.65  $T_c$ (MIN.) = 10.17  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50302.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50302.00 TO NODE 50302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN) = 10.17
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.141
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.30    1.000   -
USER-DEFINED        -         1.00    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.10   SUBAREA RUNOFF(CFS) = 1.82
EFFECTIVE AREA(ACRES) = 2.00   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.0       PEAK FLOW RATE(CFS) = 3.31

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*****
FLOW PROCESS FROM NODE 50302.00 TO NODE 50303.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 84.00 CHANNEL SLOPE = 0.1190
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.31
FLOW VELOCITY(FEET/SEC.) = 4.84 FLOW DEPTH(FEET) = 0.48
TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 10.46
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50303.00 = 631.00 FEET.

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*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50303.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 10.46
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.110
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.30    1.000   -
USER-DEFINED        -         0.30    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.70   SUBAREA RUNOFF(CFS) = 1.14
EFFECTIVE AREA(ACRES) = 2.70   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.7       PEAK FLOW RATE(CFS) = 4.40

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```

*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50304.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 940.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 72.00 CHANNEL SLOPE = 0.1389
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

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MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.40
FLOW VELOCITY(FEET/SEC.) = 5.39 FLOW DEPTH(FEET) = 0.52
TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 10.68
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50304.00 = 703.00 FEET.

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*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50304.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.68
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.085
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.30    0.30    1.000   -
USER-DEFINED        -         0.90    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.20   SUBAREA RUNOFF(CFS) = 3.53
EFFECTIVE AREA(ACRES) = 4.90   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.9       PEAK FLOW RATE(CFS) = 7.87

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*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50305.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 940.00 DOWNSTREAM(FEET) = 890.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.2941
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.87
FLOW VELOCITY(FEET/SEC.) = 8.32 FLOW DEPTH(FEET) = 0.56
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 11.02
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50305.00 = 873.00 FEET.

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*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.02
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.048
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00    0.30    1.000   -
USER-DEFINED        -         0.80    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.80   SUBAREA RUNOFF(CFS) = 4.40
EFFECTIVE AREA(ACRES) = 7.70   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 7.7       PEAK FLOW RATE(CFS) = 12.11

```

```

*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50306.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 890.00 DOWNSTREAM(FEET) = 785.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 439.00 CHANNEL SLOPE = 0.2392
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 12.11
FLOW VELOCITY(FEET/SEC.) = 8.64 FLOW DEPTH(FEET) = 0.68
TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 11.87
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50306.00 = 1312.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 11.87
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.963
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.80   0.30  1.000  -
USER-DEFINED        -         3.30   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 10.63
EFFECTIVE AREA(ACRES) = 14.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.8 PEAK FLOW RATE(CFS) = 22.15

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*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50307.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 737.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 213.00 CHANNEL SLOPE = 0.2254
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 22.15
FLOW VELOCITY(FEET/SEC.) = 9.83 FLOW DEPTH(FEET) = 0.87
TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 12.23
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50307.00 = 1525.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.23
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.929
SUBAREA LOSS RATE DATA(AMC II):

```

```

DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00   0.30  1.000  -
USER-DEFINED        -         0.90   0.30  1.000  -
USER-DEFINED        -         0.20   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 4.55
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 26.25

```

```

*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50308.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 737.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 527.00 CHANNEL SLOPE = 0.2600
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 26.25
FLOW VELOCITY(FEET/SEC.) = 10.73 FLOW DEPTH(FEET) = 0.90
TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 13.05
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50308.00 = 2052.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 13.05
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.857
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         5.70   0.30  1.000  -
USER-DEFINED        -         1.00   0.30  1.000  -
USER-DEFINED        -         3.30   0.30  1.000  -
USER-DEFINED        -         0.40   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 14.57
EFFECTIVE AREA(ACRES) = 28.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 28.3 PEAK FLOW RATE(CFS) = 39.65

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*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50309.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 555.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 561.00 CHANNEL SLOPE = 0.0802
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00

```

CHANNEL FLOW THRU SUBAREA(CFS) = 39.65  
FLOW VELOCITY(FEET/SEC.) = 7.64 FLOW DEPTH(FEET) = 1.32  
TRAVEL TIME(MIN.) = 1.22 Tc(MIN.) = 14.27  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 2613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 14.27  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.771  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 4.10  
EFFECTIVE AREA(ACRES) = 31.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.4 PEAK FLOW RATE(CFS) = 41.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50310.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 555.00 DOWNSTREAM(FEET) = 509.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 401.00 CHANNEL SLOPE = 0.1147  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 41.57  
FLOW VELOCITY(FEET/SEC.) = 8.89 FLOW DEPTH(FEET) = 1.25  
TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 15.02  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50310.00 = 3014.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN) = 15.02  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.719  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	7.60	0.30	1.000	-
USER-DEFINED	-	6.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 22.09

EFFECTIVE AREA(ACRES) = 48.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 48.7 PEAK FLOW RATE(CFS) = 62.19

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50311.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 509.00 DOWNSTREAM(FEET) = 395.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 685.00 CHANNEL SLOPE = 0.1664  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 62.19  
FLOW VELOCITY(FEET/SEC.) = 11.29 FLOW DEPTH(FEET) = 1.36  
TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 16.04  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50311.00 = 3699.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50311.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 16.04  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.666  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 11.56  
EFFECTIVE AREA(ACRES) = 58.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 58.1 PEAK FLOW RATE(CFS) = 71.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50312.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 383.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 216.00 CHANNEL SLOPE = 0.0556  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 71.44  
FLOW VELOCITY(FEET/SEC.) = 7.76 FLOW DEPTH(FEET) = 1.75  
TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 16.50  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50312.00 = 3915.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.50

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.642

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	18.40	0.30	1.000	-
USER-DEFINED	-	11.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 37.70 SUBAREA RUNOFF(CFS) = 45.54

EFFECTIVE AREA(ACRES) = 95.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 95.8 PEAK FLOW RATE(CFS) = 115.71

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.50

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.642

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 4.11

EFFECTIVE AREA(ACRES) = 99.20 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 99.2 PEAK FLOW RATE(CFS) = 119.82

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50313.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 383.00 DOWNSTREAM(FEET) = 350.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 762.00 CHANNEL SLOPE = 0.0433

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00

CHANNEL FLOW THRU SUBAREA(CFS) = 119.82

FLOW VELOCITY( FEET/SEC.) = 8.03 FLOW DEPTH( FEET) = 2.23

TRAVEL TIME(MIN.) = 1.58 Tc(MIN.) = 18.08

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50313.00 = 4677.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 18.08

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.560

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 7.14

EFFECTIVE AREA(ACRES) = 105.50 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 105.5 PEAK FLOW RATE(CFS) = 119.82

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 18.08

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.560

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 10.90 SUBAREA RUNOFF(CFS) = 12.36

EFFECTIVE AREA(ACRES) = 116.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 116.4 PEAK FLOW RATE(CFS) = 131.98

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50314.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 318.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 957.00 CHANNEL SLOPE = 0.0334

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00

CHANNEL FLOW THRU SUBAREA(CFS) = 131.98

FLOW VELOCITY( FEET/SEC.) = 7.46 FLOW DEPTH( FEET) = 2.43

TRAVEL TIME(MIN.) = 2.14 Tc(MIN.) = 20.22

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50314.00 = 5634.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 20.22  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.452  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 3.70 0.30 1.000 -  
USER-DEFINED - 3.40 0.30 1.000 -  
USER-DEFINED - 2.00 0.30 1.000 -  
USER-DEFINED - 10.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 21.80 SUBAREA RUNOFF(CFS) = 22.61  
EFFECTIVE AREA(ACRES) = 138.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 138.2 PEAK FLOW RATE(CFS) = 143.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 20.22  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.452  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.80 0.30 1.000 -  
USER-DEFINED - 15.20 0.30 1.000 -  
USER-DEFINED - 5.90 0.30 1.000 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 34.70 SUBAREA RUNOFF(CFS) = 35.99  
EFFECTIVE AREA(ACRES) = 172.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 172.9 PEAK FLOW RATE(CFS) = 179.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 20.22  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.452  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 0.83

EFFECTIVE AREA(ACRES) = 173.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 173.7 PEAK FLOW RATE(CFS) = 180.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50314.00 TO NODE 50315.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 318.00 DOWNSTREAM(FEET) = 313.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00 CHANNEL SLOPE = 0.0179  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 180.18  
FLOW VELOCITY(FEET/SEC.) = 6.37 FLOW DEPTH(FEET) = 3.07  
TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 20.95  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50315.00 = 5914.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50315.00 TO NODE 50315.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 20.95  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.428  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 0.50 0.30 1.000 -  
USER-DEFINED - 2.40 0.30 1.000 -  
USER-DEFINED - 2.00 0.30 1.000 -  
USER-DEFINED - 0.50 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 6.80  
EFFECTIVE AREA(ACRES) = 180.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 180.4 PEAK FLOW RATE(CFS) = 183.09

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50315.00 TO NODE 50316.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 313.00 DOWNSTREAM(FEET) = 285.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 642.00 CHANNEL SLOPE = 0.0436  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 183.09  
FLOW VELOCITY(FEET/SEC.) = 8.94 FLOW DEPTH(FEET) = 2.61  
TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 22.15  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50316.00 = 6556.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.15

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.387

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 7.14

EFFECTIVE AREA(ACRES) = 187.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 187.7 PEAK FLOW RATE(CFS) = 183.62

\*\*\*\*\*

FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.15

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.387

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 2.15

EFFECTIVE AREA(ACRES) = 189.90 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 189.9 PEAK FLOW RATE(CFS) = 185.78

\*\*\*\*\*

FLOW PROCESS FROM NODE 50316.00 TO NODE 50317.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 282.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 448.00 CHANNEL SLOPE = 0.0067

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00

CHANNEL FLOW THRU SUBAREA(CFS) = 185.78

FLOW VELOCITY(FEET/SEC.) = 4.44 FLOW DEPTH(FEET) = 3.73

TRAVEL TIME(MIN.) = 1.68 Tc(MIN.) = 23.83

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50317.00 = 7004.00 FEET.

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FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 23.83

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.330

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	2.60	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	10.20	0.30	1.000	-
USER-DEFINED	-	42.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.997

SUBAREA AREA(ACRES) = 59.70 SUBAREA RUNOFF(CFS) = 55.38

EFFECTIVE AREA(ACRES) = 249.60 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 249.6 PEAK FLOW RATE(CFS) = 231.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 23.83

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.330

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.30	1.000	-
USER-DEFINED	-	17.50	0.30	1.000	-
USER-DEFINED	-	22.00	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 65.80 SUBAREA RUNOFF(CFS) = 60.99

EFFECTIVE AREA(ACRES) = 315.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 315.4 PEAK FLOW RATE(CFS) = 292.38

\*\*\*\*\*

FLOW PROCESS FROM NODE 50317.00 TO NODE 50318.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 233.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 600.00 CHANNEL SLOPE = 0.0817

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00

CHANNEL FLOW THRU SUBAREA(CFS) = 292.38

FLOW VELOCITY(FEET/SEC.) = 12.73 FLOW DEPTH(FEET) = 2.77

TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 24.62

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50318.00 = 7604.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 24.62

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.303

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	0.100	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.839

SUBAREA AREA (ACRES) = 6.70 SUBAREA RUNOFF (CFS) = 6.34

EFFECTIVE AREA (ACRES) = 322.10 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 322.1 PEAK FLOW RATE (CFS) = 292.38

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 24.62

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.303

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	5.00	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.935

SUBAREA AREA (ACRES) = 7.60 SUBAREA RUNOFF (CFS) = 7.00

EFFECTIVE AREA (ACRES) = 329.70 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 329.7 PEAK FLOW RATE (CFS) = 298.13

\*\*\*\*\*

FLOW PROCESS FROM NODE 50318.00 TO NODE 50319.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 233.00 DOWNSTREAM (FEET) = 228.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 201.00 CHANNEL SLOPE = 0.0249

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00

CHANNEL FLOW THRU SUBAREA (CFS) = 298.13

FLOW VELOCITY (FEET/SEC.) = 10.18 FLOW DEPTH (FEET) = 3.13

TRAVEL TIME (MIN.) = 0.33 Tc (MIN.) = 24.94

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50319.00 = 7805.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 24.94

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.292

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 5.94

EFFECTIVE AREA (ACRES) = 336.00 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 336.0 PEAK FLOW RATE (CFS) = 300.75

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 24.94

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.292

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.994

SUBAREA AREA (ACRES) = 7.80 SUBAREA RUNOFF (CFS) = 6.98

EFFECTIVE AREA (ACRES) = 343.80 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 343.8 PEAK FLOW RATE (CFS) = 307.73

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50320.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 228.00 DOWNSTREAM (FEET) = 214.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 809.00 CHANNEL SLOPE = 0.0173

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00



CHANNEL FLOW THRU SUBAREA(CFS) = 307.73  
FLOW VELOCITY(FEET/SEC.) = 8.95 FLOW DEPTH(FEET) = 3.38  
TRAVEL TIME(MIN.) = 1.51 Tc(MIN.) = 26.45  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50320.00 = 8614.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 26.45

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.252

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	4.80	0.30	0.850	-
USER-DEFINED	-	5.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.929

SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 9.99

EFFECTIVE AREA(ACRES) = 355.20 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 355.2 PEAK FLOW RATE(CFS) = 307.73

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 26.45

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.252

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.90	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.854

SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 10.04

EFFECTIVE AREA(ACRES) = 366.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 366.4 PEAK FLOW RATE(CFS) = 315.51

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 366.4 TC(MIN.) = 26.45

EFFECTIVE AREA(ACRES) = 366.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.985

PEAK FLOW RATE(CFS) = 315.51

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 4 \*  
\* HYDROLOGIC ANALYSIS - 10-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E504XX10.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.000; 3.190
- 2) 6.000; 2.880
- 3) 7.000; 2.640
- 4) 8.000; 2.450
- 5) 9.000; 2.290
- 6) 10.000; 2.160
- 7) 11.000; 2.050
- 8) 12.000; 1.950
- 9) 13.000; 1.860
- 10) 14.000; 1.790
- 11) 15.000; 1.720
- 12) 20.000; 1.460
- 13) 25.000; 1.290
- 14) 30.000; 1.160
- 15) 40.000; 0.990
- 16) 50.000; 0.870
- 17) 60.000; 0.790
- 18) 90.000; 0.630
- 19) 120.000; 0.530
- 20) 180.000; 0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.482  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.107  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.50	0.30	1.000	95	10.48

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.81  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.81

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.81  
FLOW VELOCITY(FEET/SEC.) = 4.44 FLOW DEPTH(FEET) = 0.25  
TRAVEL TIME(MIN.) = 0.98  $T_c$ (MIN.) = 11.46  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.46

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.004  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.61  
 EFFECTIVE AREA (ACRES) = 0.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 1.38

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 239.00 CHANNEL SLOPE = 0.4184  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1.38  
 FLOW VELOCITY (FEET/SEC.) = 6.23 FLOW DEPTH (FEET) = 0.27  
 TRAVEL TIME (MIN.) = 0.64 Tc (MIN.) = 12.10  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50403.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.10  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.941  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.59  
 EFFECTIVE AREA (ACRES) = 1.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.3 PEAK FLOW RATE (CFS) = 1.92

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00 CHANNEL SLOPE = 0.7042  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1.92

FLOW VELOCITY (FEET/SEC.) = 8.20 FLOW DEPTH (FEET) = 0.28  
 TRAVEL TIME (MIN.) = 0.14 Tc (MIN.) = 12.25  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50404.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.25  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.928  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 1.76  
 EFFECTIVE AREA (ACRES) = 2.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.5 PEAK FLOW RATE (CFS) = 3.66

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 145.00 CHANNEL SLOPE = 0.3448  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 3.66  
 FLOW VELOCITY (FEET/SEC.) = 7.29 FLOW DEPTH (FEET) = 0.41  
 TRAVEL TIME (MIN.) = 0.33 Tc (MIN.) = 12.58  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50405.00 TO NODE 50405.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.58  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.898  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 1.58  
 EFFECTIVE AREA (ACRES) = 3.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.6 PEAK FLOW RATE (CFS) = 5.18

```

*****
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.18
FLOW VELOCITY(FEET/SEC.) = 7.81 FLOW DEPTH(FEET) = 0.47
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 12.92
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50406.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.92
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.867
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.30  1.000  -
USER-DEFINED        -         0.20   0.30  1.000  -
USER-DEFINED        -         0.80   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 1.69
EFFECTIVE AREA(ACRES) = 4.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 6.77

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.2193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 6.77
FLOW VELOCITY(FEET/SEC.) = 7.20 FLOW DEPTH(FEET) = 0.56
TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 13.45
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50407.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 13.45
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.829
SUBAREA LOSS RATE DATA(AMC II):

```

```

DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.50   0.30  1.000  -
USER-DEFINED        -         1.20   0.30  1.000  -
USER-DEFINED        -         1.70   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 8.81
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 15.41

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 325.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 490.00 CHANNEL SLOPE = 0.1531
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 15.41
FLOW VELOCITY(FEET/SEC.) = 7.76 FLOW DEPTH(FEET) = 0.81
TRAVEL TIME(MIN.) = 1.05 Tc(MIN.) = 14.50
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.50
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.755
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.30  1.000  -
USER-DEFINED        -         0.10   0.30  1.000  -
USER-DEFINED        -         0.60   0.30  1.000  -
USER-DEFINED        -         1.30   0.30  1.000  -
USER-DEFINED        -         0.50   0.30  1.000  -
USER-DEFINED        -         1.20   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 4.98
EFFECTIVE AREA(ACRES) = 15.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.0 PEAK FLOW RATE(CFS) = 19.65

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.50
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.755
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.18  
EFFECTIVE AREA(ACRES) = 15.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.9 PEAK FLOW RATE(CFS) = 20.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 20.82  
FLOW VELOCITY(FEET/SEC.) = 6.14 FLOW DEPTH(FEET) = 1.06  
TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 14.70  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.70  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.741  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	6.40	0.30	1.000	-
USER-DEFINED	-	6.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 14.80 SUBAREA RUNOFF(CFS) = 19.20  
EFFECTIVE AREA(ACRES) = 30.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.7 PEAK FLOW RATE(CFS) = 39.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.70  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.741  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.78  
EFFECTIVE AREA(ACRES) = 31.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.3 PEAK FLOW RATE(CFS) = 40.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 40.60  
FLOW VELOCITY(FEET/SEC.) = 7.65 FLOW DEPTH(FEET) = 1.33  
TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 14.92  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.92  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.726  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 8.21  
EFFECTIVE AREA(ACRES) = 37.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 37.7 PEAK FLOW RATE(CFS) = 48.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.92  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.726  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.77  
 EFFECTIVE AREA(ACRES) = 38.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 38.3 PEAK FLOW RATE(CFS) = 49.15

\*\*\*\*\*

FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 312.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 566.00 CHANNEL SLOPE = 0.0530  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 49.15  
 FLOW VELOCITY(FEET/SEC.) = 6.92 FLOW DEPTH(FEET) = 1.54  
 TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 16.28  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 16.28  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.653  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.30 0.100 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 USER-DEFINED - 1.60 0.30 1.000 -  
 USER-DEFINED - 0.90 0.30 1.000 -  
 USER-DEFINED - 1.50 0.30 0.100 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658  
 SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 6.55  
 EFFECTIVE AREA(ACRES) = 43.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 43.3 PEAK FLOW RATE(CFS) = 53.21

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 16.28  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.653  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.80 0.30 1.000 -

USER-DEFINED - 5.80 0.30 1.000 -  
 USER-DEFINED - 0.50 0.30 1.000 -  
 USER-DEFINED - 3.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 12.79  
 EFFECTIVE AREA(ACRES) = 53.80 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 53.8 PEAK FLOW RATE(CFS) = 66.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 216.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 954.00 CHANNEL SLOPE = 0.0692  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 66.00  
 FLOW VELOCITY(FEET/SEC.) = 10.21 FLOW DEPTH(FEET) = 1.47  
 TRAVEL TIME(MIN.) = 1.56 Tc(MIN.) = 17.84  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.84  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.572  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.30 0.100 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 1.00 0.30 1.000 -  
 USER-DEFINED - 1.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875  
 SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 4.24  
 EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 66.32

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.84  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.572  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.30 0.30 1.000 -  
 USER-DEFINED - 9.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 12.14  
 EFFECTIVE AREA(ACRES) = 68.00 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 68.0 PEAK FLOW RATE(CFS) = 78.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.84  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.572  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.934  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 2.91  
 EFFECTIVE AREA(ACRES) = 70.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 70.5 PEAK FLOW RATE(CFS) = 81.37

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 70.5 TC(MIN.) = 17.84  
 EFFECTIVE AREA(ACRES) = 70.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.967  
 PEAK FLOW RATE(CFS) = 81.37

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 2 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 10-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P201XX10.DAT  
TIME/DATE OF STUDY: 10:20 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.000; 3.190  
2) 6.000; 2.880  
3) 7.000; 2.640  
4) 8.000; 2.450  
5) 9.000; 2.290  
6) 10.000; 2.160  
7) 11.000; 2.050  
8) 12.000; 1.950  
9) 13.000; 1.860  
10) 14.000; 1.790  
11) 15.000; 1.720  
12) 20.000; 1.460  
13) 25.000; 1.290  
14) 30.000; 1.160  
15) 40.000; 0.990  
16) 50.000; 0.870  
17) 60.000; 0.790  
18) 90.000; 0.630  
19) 120.000; 0.530  
20) 180.000; 0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20100.00 TO NODE 20101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 830.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.230  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.260  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.30	1.000	95	9.23
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.23

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.06  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.06

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20101.00 TO NODE 20102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 276.00 CHANNEL SLOPE = 0.2899  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.06  
FLOW VELOCITY(FEET/SEC.) = 5.06 FLOW DEPTH(FEET) = 0.26  
TRAVEL TIME(MIN.) = 0.91  $T_c$ (MIN.) = 10.14  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20102.00 = 595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20102.00 TO NODE 20102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<



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=====
MAINLINE Tc(MIN) = 10.14
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.145
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.80   0.30   1.000   -
USER-DEFINED        -         0.20   0.30   1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.00   SUBAREA RUNOFF(CFS) = 1.66
EFFECTIVE AREA(ACRES) = 1.60   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6   PEAK FLOW RATE(CFS) = 2.66

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*****
FLOW PROCESS FROM NODE 20102.00 TO NODE 20103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.1863
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.66
FLOW VELOCITY(FEET/SEC.) = 5.34 FLOW DEPTH(FEET) = 0.41
TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 10.64
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20103.00 = 756.00 FEET.

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.64
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.089
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50   0.30   1.000   -
USER-DEFINED        -         0.10   0.30   1.000   -
USER-DEFINED        -         0.30   0.30   1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90   SUBAREA RUNOFF(CFS) = 1.45
EFFECTIVE AREA(ACRES) = 2.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.5   PEAK FLOW RATE(CFS) = 4.03

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 690.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 64.00 CHANNEL SLOPE = 0.4688

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CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.03
FLOW VELOCITY(FEET/SEC.) = 8.41 FLOW DEPTH(FEET) = 0.40
TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 10.77
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20104.00 = 820.00 FEET.

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.77
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.075
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40   0.30   1.000   -
USER-DEFINED        -         3.30   0.30   1.000   -
USER-DEFINED        -         0.10   0.30   1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80   SUBAREA RUNOFF(CFS) = 6.07
EFFECTIVE AREA(ACRES) = 6.30   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.3   PEAK FLOW RATE(CFS) = 10.07

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 690.00 DOWNSTREAM(FEET) = 670.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 159.00 CHANNEL SLOPE = 0.1258
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.07
FLOW VELOCITY(FEET/SEC.) = 6.44 FLOW DEPTH(FEET) = 0.72
TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 11.18
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20105.00 = 979.00 FEET.

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*****
FLOW PROCESS FROM NODE 20105.00 TO NODE 20105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.18
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.032
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.30   1.000   -
USER-DEFINED        -         1.50   0.30   1.000   -
USER-DEFINED        -         2.20   0.30   1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90   SUBAREA RUNOFF(CFS) = 6.08

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EFFECTIVE AREA (ACRES) = 10.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 10.2 PEAK FLOW RATE (CFS) = 15.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 20105.00 TO NODE 20106.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 670.00 DOWNSTREAM (FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 192.00 CHANNEL SLOPE = 0.1042  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 15.90  
FLOW VELOCITY (FEET/SEC.) = 6.72 FLOW DEPTH (FEET) = 0.89  
TRAVEL TIME (MIN.) = 0.48 Tc (MIN.) = 11.66  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20106.00 = 1171.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 11.66  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.984  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.10 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 3.80 SUBAREA RUNOFF (CFS) = 5.76  
EFFECTIVE AREA (ACRES) = 14.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 14.0 PEAK FLOW RATE (CFS) = 21.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 650.00 DOWNSTREAM (FEET) = 640.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 156.00 CHANNEL SLOPE = 0.0641  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 21.22  
FLOW VELOCITY (FEET/SEC.) = 6.06 FLOW DEPTH (FEET) = 1.08  
TRAVEL TIME (MIN.) = 0.43 Tc (MIN.) = 12.09  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20107.00 = 1327.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 12.09  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.942

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.20 0.30 1.000 -  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 5.91  
EFFECTIVE AREA (ACRES) = 18.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 18.0 PEAK FLOW RATE (CFS) = 26.61

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 640.00 DOWNSTREAM (FEET) = 609.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 512.00 CHANNEL SLOPE = 0.0605  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 26.61  
FLOW VELOCITY (FEET/SEC.) = 6.23 FLOW DEPTH (FEET) = 1.19  
TRAVEL TIME (MIN.) = 1.37 Tc (MIN.) = 13.46  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20108.00 = 1839.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20108.00 TO NODE 20108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 13.46  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.828  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.200 -  
USER-DEFINED - 1.50 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970  
SUBAREA AREA (ACRES) = 2.70 SUBAREA RUNOFF (CFS) = 3.74  
EFFECTIVE AREA (ACRES) = 20.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.7 PEAK FLOW RATE (CFS) = 28.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 600.00  
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.19  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 28.49  
PIPE TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 13.67  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20109.00 = 2033.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20109.00 TO NODE 20109.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN) = 13.67  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.813  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.200 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.10  
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 29.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20109.00 TO NODE 20110.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 594.00  
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.53  
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 29.32  
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 14.24  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20110.00 = 2393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20110.00 TO NODE 20110.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN) = 14.24  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.773  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 0.100 -  
USER-DEFINED - 3.50 0.30 0.200 -  
USER-DEFINED - 2.70 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.20 0.30 1.000 -

USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 11.70  
EFFECTIVE AREA(ACRES) = 29.60 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 29.6 PEAK FLOW RATE(CFS) = 40.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20110.00 TO NODE 20111.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 594.00 DOWNSTREAM(FEET) = 590.00  
FLOW LENGTH(FEET) = 246.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.26  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 40.25  
PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 14.60  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20111.00 = 2639.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20111.00 TO NODE 20111.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN) = 14.60  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.748  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 2.10 0.30 0.200 -  
USER-DEFINED - 2.10 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 4.70 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.792  
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 15.09  
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 54.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20111.00 TO NODE 20112.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 580.00  
FLOW LENGTH(FEET) = 628.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.99  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 54.66

PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 15.47  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20112.00 = 3267.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.47

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.695

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.200	-
USER-DEFINED	-	4.40	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	7.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.797

SUBAREA AREA(ACRES) = 15.20 SUBAREA RUNOFF(CFS) = 19.92

EFFECTIVE AREA(ACRES) = 55.90 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 55.9 PEAK FLOW RATE(CFS) = 72.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.47

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.695

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 3.05

EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 75.71

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20113.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 580.00 DOWNSTREAM(FEET) = 570.00

FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 13.98

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 75.71  
PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 16.09  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20113.00 = 3786.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.09

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.663

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.100	-
USER-DEFINED	-	4.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.877

SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 15.88

EFFECTIVE AREA(ACRES) = 70.90 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 89.89

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.09

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.663

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	1.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.787

SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 4.62

EFFECTIVE AREA(ACRES) = 74.50 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 74.5 PEAK FLOW RATE(CFS) = 94.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20114.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00

FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.68

ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 94.52  
PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 17.04  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20114.00 = 4393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.04

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.614

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	4.00	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.747

SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 9.88

EFFECTIVE AREA(ACRES) = 82.40 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 82.4 PEAK FLOW RATE(CFS) = 101.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.04

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.614

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	1.000	-
USER-DEFINED	-	8.20	0.30	1.000	-
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	3.70	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.932

SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 21.01

EFFECTIVE AREA(ACRES) = 99.90 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 99.9 PEAK FLOW RATE(CFS) = 122.11

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20115.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 560.00  
FLOW LENGTH(FEET) = 461.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.70  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 122.11  
PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 17.65  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20115.00 = 4854.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.65

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.582

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.60	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	0.100	-
USER-DEFINED	-	6.20	0.30	0.850	-
USER-DEFINED	-	2.20	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798

SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 15.47

EFFECTIVE AREA(ACRES) = 112.70 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 112.7 PEAK FLOW RATE(CFS) = 134.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.65

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.582

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.81

EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 135.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20116.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 560.00 DOWNSTREAM(FEET) = 528.00  
FLOW LENGTH(FEET) = 219.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 34.34

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 135.56  
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 17.75  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20116.00 = 5073.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20116.00 TO NODE 20117.00 IS CODE = 51

=====  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====  
ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 489.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 174.00 CHANNEL SLOPE = 0.2241  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 135.56  
FLOW VELOCITY(FEET/SEC.) = 19.10 FLOW DEPTH(FEET) = 1.54  
TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 17.90  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20117.00 = 5247.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====  
MAINLINE Tc(MIN) = 17.90  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.569  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.40 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.910  
SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 2.92  
EFFECTIVE AREA(ACRES) = 115.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 115.9 PEAK FLOW RATE(CFS) = 137.11

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====  
MAINLINE Tc(MIN) = 17.90  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.569  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 0.200 -  
USER-DEFINED - 3.30 0.30 0.850 -  
USER-DEFINED - 0.90 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 6.50 0.30 1.000 -

USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.855  
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 15.12  
EFFECTIVE AREA(ACRES) = 128.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 128.7 PEAK FLOW RATE(CFS) = 152.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====  
MAINLINE Tc(MIN) = 17.90  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.569  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 5.85  
EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 133.8 PEAK FLOW RATE(CFS) = 158.08

=====  
END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 133.8 TC(MIN.) = 17.90  
EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.854  
PEAK FLOW RATE(CFS) = 158.08

=====  
END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S31 \*  
\* Rational Method Hydrology Analysis - 10-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S31.DAT  
TIME/DATE OF STUDY: 16:17 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.120
- 2) 10.00; 2.158
- 3) 15.00; 1.718
- 4) 20.00; 1.461
- 5) 25.00; 1.289
- 6) 30.00; 1.180
- 7) 40.00; 0.990
- 8) 50.00; 0.873
- 9) 60.00; 0.780
- 10) 90.00; 0.628
- 11) 120.00; 0.534
- 12) 180.00; 0.437
- 13) 360.00; 0.302
- 14) 1440.00; 0.126

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13100.00 TO NODE 13101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.58  
ELEVATION DATA: UPSTREAM(FEET) = 1069.66 DOWNSTREAM(FEET) = 969.92

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.312  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.482  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.94	0.30	1.000	0	8.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.85  
TOTAL AREA(ACRES) = 0.94 PEAK FLOW RATE(CFS) = 1.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13101.00 TO NODE 13102.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 969.92 DOWNSTREAM(FEET) = 807.20  
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.89 CHANNEL SLOPE = 0.2444  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.21  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.060  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.67	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.98  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.97  
AVERAGE FLOW DEPTH(FEET) = 0.19 TRAVEL TIME(MIN.) = 2.80  
Tc(MIN.) = 11.11  
SUBAREA AREA(ACRES) = 7.67 SUBAREA RUNOFF(CFS) = 12.15  
EFFECTIVE AREA(ACRES) = 8.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 13.64  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:



DEPTH(FEET) = 0.26 FLOW VELOCITY(FEET/SEC.) = 4.90  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13102.00 = 948.47 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13102.00 TO NODE 13103.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 807.20 DOWNSTREAM(FEET) = 769.94  
CHANNEL LENGTH THRU SUBAREA(FEET) = 691.01 CHANNEL SLOPE = 0.0539  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.66  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.800

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 20.65 0.30 0.999 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.65  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.90  
AVERAGE FLOW DEPTH(FEET) = 0.63 TRAVEL TIME(MIN.) = 2.96  
Tc(MIN.) = 14.06

SUBAREA AREA(ACRES) = 20.65 SUBAREA RUNOFF(CFS) = 27.89  
EFFECTIVE AREA(ACRES) = 29.26 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 29.3 PEAK FLOW RATE(CFS) = 39.51  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.78 FLOW VELOCITY(FEET/SEC.) = 4.38  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13103.00 = 1639.48 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 769.94 DOWNSTREAM(FEET) = 693.88  
FLOW LENGTH(FEET) = 1563.10 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 13.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.99  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 39.51  
PIPE TRAVEL TIME(MIN.) = 1.53 Tc(MIN.) = 15.60  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13104.00 = 3202.58 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.60  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.687

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 28.00 0.30 0.750 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750  
SUBAREA AREA(ACRES) = 28.00 SUBAREA RUNOFF(CFS) = 36.85  
EFFECTIVE AREA(ACRES) = 57.26 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 57.3 PEAK FLOW RATE(CFS) = 73.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 693.88 DOWNSTREAM(FEET) = 645.69  
FLOW LENGTH(FEET) = 1068.98 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 19.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.43  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 73.39  
PIPE TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 16.52  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13105.00 = 4271.56 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.52  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.640

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 35.28 0.30 0.867 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867  
SUBAREA AREA(ACRES) = 35.28 SUBAREA RUNOFF(CFS) = 43.82  
EFFECTIVE AREA(ACRES) = 92.54 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 114.79

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 645.69 DOWNSTREAM(FEET) = 608.48  
FLOW LENGTH(FEET) = 1127.55 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 29.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.54  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 114.79  
 PIPE TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 17.53  
 LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.53  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.588  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 37.68 0.30 0.889 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.889  
 SUBAREA AREA(ACRES) = 37.68 SUBAREA RUNOFF(CFS) = 44.82  
 EFFECTIVE AREA(ACRES) = 130.22 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
 TOTAL AREA(ACRES) = 130.2 PEAK FLOW RATE(CFS) = 155.28

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 15.1

>>>>DEFINE MEMORY BANK # 2 <<<<<

PEAK FLOWRATE TABLE FILE NAME: S30.DNA  
 MEMORY BANK # 2 DEFINED AS FOLLOWS:  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1311.19	41.63	0.30( 0.24)	0.81	1997.4	13000.00
2	1279.41	43.72	0.30( 0.24)	0.81	2016.1	13010.00

 TOTAL AREA(ACRES) = 2016.1

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 14.0

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<<

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1311.19	41.63	0.30( 0.24)	0.81	1997.4	13000.00
2	1279.41	43.72	0.30( 0.24)	0.81	2016.1	13010.00

 TOTAL AREA(ACRES) = 2016.1

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13026.00 TO NODE 13106.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 662.66 DOWNSTREAM(FEET) = 608.48  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 3098.88 CHANNEL SLOPE = 0.0175  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.26  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.913

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	75.28	0.30	0.755	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1334.45  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.39  
 AVERAGE FLOW DEPTH(FEET) = 2.26 TRAVEL TIME(MIN.) = 4.97  
 Tc(MIN.) = 46.60  
 SUBAREA AREA(ACRES) = 75.28 SUBAREA RUNOFF(CFS) = 46.51  
 EFFECTIVE AREA(ACRES) = 2072.73 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 2091.4 PEAK FLOW RATE(CFS) = 1311.19

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.24 FLOW VELOCITY(FEET/SEC.) = 10.33  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1311.19	46.60	0.913	0.30( 0.24)	0.80	2072.7	13000.00
2	1279.41	48.74	0.888	0.30( 0.24)	0.80	2091.4	13010.00

 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1311.19 Tc(MIN.) = 46.60  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA(ACRES) = 2072.73

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1311.19	46.60	0.913	0.30( 0.24)	0.80	2072.7	13000.00
2	1279.41	48.74	0.888	0.30( 0.24)	0.80	2091.4	13010.00

 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	155.28	17.53	1.588	0.30( 0.26)	0.88	130.2	13100.00

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1144.18	17.53	1.588	0.30 ( 0.24)	0.81	909.9	13100.00
2	1387.33	46.60	0.913	0.30 ( 0.24)	0.81	2202.9	13000.00
3	1352.62	48.74	0.888	0.30 ( 0.24)	0.81	2221.6	13010.00
TOTAL AREA (ACRES) =		2221.6					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1387.33 Tc (MIN.) = 46.599  
EFFECTIVE AREA (ACRES) = 2202.95 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA (ACRES) = 2221.6  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13106.00 TO NODE 13107.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 608.48 DOWNSTREAM (FEET) = 584.29  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1650.20 CHANNEL SLOPE = 0.0147  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT (FEET) = 2.50  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.881  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 190.45 0.30 0.755 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1443.44  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.08  
AVERAGE FLOW DEPTH (FEET) = 2.49 TRAVEL TIME (MIN.) = 2.73  
Tc (MIN.) = 49.33

SUBAREA AREA (ACRES) = 190.45 SUBAREA RUNOFF (CFS) = 112.21  
EFFECTIVE AREA (ACRES) = 2393.40 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA (ACRES) = 2412.1 PEAK FLOW RATE (CFS) = 1387.33  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT (FEET) = 2.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.44 FLOW VELOCITY (FEET/SEC.) = 9.93  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13107.00 = 20924.84 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1194.92	20.40	1.448	0.30 ( 0.24)	0.80	1100.4	13100.00
2	1387.33	49.33	0.881	0.30 ( 0.24)	0.80	2393.4	13000.00
3	1352.62	51.49	0.859	0.30 ( 0.24)	0.80	2412.1	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1387.33 Tc (MIN.) = 49.33  
AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA (ACRES) = 2393.40

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13107.00 TO NODE 13108.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 584.29 DOWNSTREAM (FEET) = 563.78  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1061.67 CHANNEL SLOPE = 0.0193  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT (FEET) = 2.33  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.865  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 314.12 0.30 0.939 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.939  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1469.75  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.10  
AVERAGE FLOW DEPTH (FEET) = 2.32 TRAVEL TIME (MIN.) = 1.59  
Tc (MIN.) = 50.92  
SUBAREA AREA (ACRES) = 314.12 SUBAREA RUNOFF (CFS) = 164.83  
EFFECTIVE AREA (ACRES) = 2707.52 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA (ACRES) = 2726.2 PEAK FLOW RATE (CFS) = 1508.10  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT (FEET) = 2.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.36 FLOW VELOCITY (FEET/SEC.) = 11.19  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13108.00 = 21986.51 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1452.54	22.04	1.391	0.30 ( 0.25)	0.83	1414.5	13100.00
2	1508.10	50.92	0.865	0.30 ( 0.25)	0.82	2707.5	13000.00
3	1468.97	53.10	0.844	0.30 ( 0.25)	0.82	2726.2	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1508.10 Tc (MIN.) = 50.92  
AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2707.52

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13108.00 TO NODE 13109.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 563.78 DOWNSTREAM (FEET) = 541.61  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1657.28 CHANNEL SLOPE = 0.0134

GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.68  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.839  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	203.63	0.30	0.785	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1563.41  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.05  
 AVERAGE FLOW DEPTH (FEET) = 2.68 TRAVEL TIME (MIN.) = 2.75  
 Tc (MIN.) = 53.67  
 SUBAREA AREA (ACRES) = 203.63 SUBAREA RUNOFF (CFS) = 110.62  
 EFFECTIVE AREA (ACRES) = 2911.15 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 2929.8 PEAK FLOW RATE (CFS) = 1556.24  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.67

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.67 FLOW VELOCITY (FEET/SEC.) = 10.03  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13109.00 = 23643.79 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap (INCH/HR)	Ae (ACRES)	HEADWATER NODE
1	1525.99	24.80	1.296	0.30 (0.25)	0.83	1618.1	13100.00
2	1556.24	53.67	0.839	0.30 (0.25)	0.82	2911.1	13000.00
3	1512.41	55.87	0.819	0.30 (0.24)	0.82	2929.8	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1556.24 Tc (MIN.) = 53.67  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2911.15

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13109.00 TO NODE 13110.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 541.61 DOWNSTREAM (FEET) = 509.94  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 2016.96 CHANNEL SLOPE = 0.0157  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.62  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.810  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	283.06	0.30	0.791	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.791  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1629.18  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.75  
 AVERAGE FLOW DEPTH (FEET) = 2.62 TRAVEL TIME (MIN.) = 3.13

Tc (MIN.) = 56.80  
 SUBAREA AREA (ACRES) = 283.06 SUBAREA RUNOFF (CFS) = 145.88  
 EFFECTIVE AREA (ACRES) = 3194.21 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3212.9 PEAK FLOW RATE (CFS) = 1625.67  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.62 FLOW VELOCITY (FEET/SEC.) = 10.73  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13110.00 = 25660.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap (INCH/HR)	Ae (ACRES)	HEADWATER NODE
1	1674.98	27.91	1.226	0.30 (0.25)	0.82	1901.2	13100.00
2	1625.67	56.80	0.810	0.30 (0.24)	0.81	3194.2	13000.00
3	1575.31	59.03	0.789	0.30 (0.24)	0.81	3212.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1674.98 Tc (MIN.) = 27.91  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 1901.17

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13110.00 TO NODE 13111.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 509.94 DOWNSTREAM (FEET) = 461.07  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 3058.95 CHANNEL SLOPE = 0.0160  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.75  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.132  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	248.05	0.30	0.783	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1775.19  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.12  
 AVERAGE FLOW DEPTH (FEET) = 2.74 TRAVEL TIME (MIN.) = 4.58  
 Tc (MIN.) = 32.50  
 SUBAREA AREA (ACRES) = 248.05 SUBAREA RUNOFF (CFS) = 200.40  
 EFFECTIVE AREA (ACRES) = 2149.22 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 3460.9 PEAK FLOW RATE (CFS) = 1716.14  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.69

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.69 FLOW VELOCITY (FEET/SEC.) = 10.99  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13111.00 = 28719.70 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1716.14	32.50	1.132	0.30 ( 0.25)	0.82	2149.2	13100.00
2	1638.51	61.46	0.773	0.30 ( 0.24)	0.81	3442.3	13000.00
3	1611.59	63.74	0.761	0.30 ( 0.24)	0.81	3460.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1716.14 Tc(MIN.) = 32.50  
 AREA-AVERAGED Fm(INCH/HR) = 0.25 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA(ACRES) = 2149.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 13111.00 TO NODE 13112.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 461.07 DOWNSTREAM(FEET) = 452.77  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1781.78 CHANNEL SLOPE = 0.0047  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.92

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.056

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	179.91	0.30	0.694	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.694

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1784.80

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.39

AVERAGE FLOW DEPTH(FEET) = 3.91 TRAVEL TIME(MIN.) = 4.02

Tc(MIN.) = 36.52

SUBAREA AREA(ACRES) = 179.91 SUBAREA RUNOFF(CFS) = 137.31

EFFECTIVE AREA(ACRES) = 2329.13 AREA-AVERAGED Fm(INCH/HR) = 0.24

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81

TOTAL AREA(ACRES) = 3640.9 PEAK FLOW RATE(CFS) = 1716.14

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.83 FLOW VELOCITY(FEET/SEC.) = 7.30

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13112.00 = 30501.48 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1716.14	36.52	1.056	0.30 ( 0.24)	0.81	2329.1	13100.00
2	1662.11	65.56	0.752	0.30 ( 0.24)	0.81	3622.2	13000.00
3	1632.52	67.86	0.740	0.30 ( 0.24)	0.81	3640.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1716.14 Tc(MIN.) = 36.52  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 2329.13

\*\*\*\*\*

FLOW PROCESS FROM NODE 13112.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 452.77 DOWNSTREAM(FEET) = 427.51

CHANNEL LENGTH THRU SUBAREA(FEET) = 1625.01 CHANNEL SLOPE = 0.0155

GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.76

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.009

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	155.96	0.30	0.836	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.836

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1769.39

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.01

AVERAGE FLOW DEPTH(FEET) = 2.76 TRAVEL TIME(MIN.) = 2.46

Tc(MIN.) = 38.98

SUBAREA AREA(ACRES) = 155.96 SUBAREA RUNOFF(CFS) = 106.49

EFFECTIVE AREA(ACRES) = 2485.09 AREA-AVERAGED Fm(INCH/HR) = 0.24

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81

TOTAL AREA(ACRES) = 3796.8 PEAK FLOW RATE(CFS) = 1716.14

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.71 FLOW VELOCITY(FEET/SEC.) = 10.91

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13222.00 = 32126.49 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1716.14	38.98	1.009	0.30 ( 0.24)	0.81	2485.1	13100.00
2	1689.35	68.05	0.739	0.30 ( 0.24)	0.81	3778.1	13000.00
3	1657.69	70.37	0.727	0.30 ( 0.24)	0.81	3796.8	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1716.14 Tc(MIN.) = 38.98

AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 2485.09

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 3796.8 TC(MIN.) = 38.98

EFFECTIVE AREA(ACRES) = 2485.09 AREA-AVERAGED Fm(INCH/HR) = 0.24

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.810

PEAK FLOW RATE(CFS) = 1716.14

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1716.14	38.98	1.009	0.30 ( 0.24)	0.81	2485.1	13100.00
2	1689.35	68.05	0.739	0.30 ( 0.24)	0.81	3778.1	13000.00
3	1657.69	70.37	0.727	0.30 ( 0.24)	0.81	3796.8	13010.00

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S32 \*  
\* Rational Method Hydrology Analysis - 10-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S32.DAT  
TIME/DATE OF STUDY: 16:17 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.120
- 2) 10.00; 2.158
- 3) 15.00; 1.718
- 4) 20.00; 1.461
- 5) 25.00; 1.289
- 6) 30.00; 1.180
- 7) 40.00; 0.990
- 8) 50.00; 0.873
- 9) 60.00; 0.780
- 10) 90.00; 0.628
- 11) 120.00; 0.534
- 12) 180.00; 0.437
- 13) 360.00; 0.302
- 14) 1440.00; 0.126

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13200.00 TO NODE 13201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 298.57  
ELEVATION DATA: UPSTREAM(FEET) = 1069.04 DOWNSTREAM(FEET) = 1005.76

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.271  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.67	0.30	1.000	0	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.19  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 1.19

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13201.00 TO NODE 13202.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.76 DOWNSTREAM(FEET) = 896.98  
CHANNEL LENGTH THRU SUBAREA(FEET) = 747.55 CHANNEL SLOPE = 0.1455  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.22  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.855  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.46  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.09  
AVERAGE FLOW DEPTH(FEET) = 0.20 TRAVEL TIME(MIN.) = 4.04  
Tc(MIN.) = 13.45  
SUBAREA AREA(ACRES) = 7.42 SUBAREA RUNOFF(CFS) = 10.38  
EFFECTIVE AREA(ACRES) = 8.09 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.1 PEAK FLOW RATE(CFS) = 11.32  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.28

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.28 FLOW VELOCITY(FEET/SEC.) = 3.86  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13202.00 = 1046.12 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 896.98 DOWNSTREAM(FEET) = 840.27  
FLOW LENGTH(FEET) = 1789.59 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 7.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.20  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 11.32  
PIPE TRAVEL TIME(MIN.) = 2.92 Tc(MIN.) = 16.37  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13203.00 = 2835.71 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.37  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.648  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.89 0.30 0.731 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.731  
SUBAREA AREA(ACRES) = 38.89 SUBAREA RUNOFF(CFS) = 50.00  
EFFECTIVE AREA(ACRES) = 46.98 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
TOTAL AREA(ACRES) = 47.0 PEAK FLOW RATE(CFS) = 59.81

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 840.27 DOWNSTREAM(FEET) = 782.97  
FLOW LENGTH(FEET) = 992.54 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 15.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.22  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 59.81  
PIPE TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 17.19  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13204.00 = 3828.25 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.19  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.606  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 83.09 0.30 0.645 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645  
SUBAREA AREA(ACRES) = 83.09 SUBAREA RUNOFF(CFS) = 105.62  
EFFECTIVE AREA(ACRES) = 130.07 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 130.1 PEAK FLOW RATE(CFS) = 163.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 782.97 DOWNSTREAM(FEET) = 692.52  
FLOW LENGTH(FEET) = 2046.57 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.63  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 163.65  
PIPE TRAVEL TIME(MIN.) = 1.51 Tc(MIN.) = 18.69  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13205.00 = 5874.82 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.69  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.528  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 88.51 0.30 0.679 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.679  
SUBAREA AREA(ACRES) = 88.51 SUBAREA RUNOFF(CFS) = 105.53  
EFFECTIVE AREA(ACRES) = 218.58 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 218.6 PEAK FLOW RATE(CFS) = 260.14

\*\*\*\*\*

FLOW PROCESS FROM NODE 13205.00 TO NODE 13206.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 692.52 DOWNSTREAM(FEET) = 605.24  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2704.69 CHANNEL SLOPE = 0.0323  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.47  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.344



SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	163.73	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 340.38  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.55  
AVERAGE FLOW DEPTH(FEET) = 2.41 TRAVEL TIME(MIN.) = 4.72  
Tc(MIN.) = 23.41  
SUBAREA AREA(ACRES) = 163.73 SUBAREA RUNOFF(CFS) = 160.11  
EFFECTIVE AREA(ACRES) = 382.31 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 382.3 PEAK FLOW RATE(CFS) = 383.93  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.57 FLOW VELOCITY(FEET/SEC.) = 9.89  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13206.00 = 8579.51 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13206.00 TO NODE 13207.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 605.24 DOWNSTREAM(FEET) = 555.41  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2479.15 CHANNEL SLOPE = 0.0201  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.18  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.220

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 445.54  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.71  
AVERAGE FLOW DEPTH(FEET) = 3.14 TRAVEL TIME(MIN.) = 4.74  
Tc(MIN.) = 28.16  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 123.13  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 464.53  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.21 FLOW VELOCITY(FEET/SEC.) = 8.82  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13207.00 = 11058.66 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 555.41 DOWNSTREAM(FEET) = 505.65  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1734.55 CHANNEL SLOPE = 0.0287  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.10  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.162

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 514.83  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.31  
AVERAGE FLOW DEPTH(FEET) = 3.09 TRAVEL TIME(MIN.) = 2.80  
Tc(MIN.) = 30.96  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 100.58  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 537.42  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.16 FLOW VELOCITY(FEET/SEC.) = 10.44  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 30.96  
RAINFALL INTENSITY(INCH/HR) = 1.16  
AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.81  
EFFECTIVE STREAM AREA(ACRES) = 649.28  
TOTAL STREAM AREA(ACRES) = 649.28  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 537.42

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13210.00 TO NODE 13211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.51  
ELEVATION DATA: UPSTREAM(FEET) = 949.80 DOWNSTREAM(FEET) = 828.64

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.525  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.441  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 NATURAL FAIR COVER  
 "OPEN BRUSH" - 1.96 0.30 1.000 0 8.53  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 3.78  
 TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 3.78

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13211.00 TO NODE 13212.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 828.64 DOWNSTREAM(FEET) = 767.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 652.49 CHANNEL SLOPE = 0.0930  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.38  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.017  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 11.95 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.10  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.54  
 AVERAGE FLOW DEPTH(FEET) = 0.35 TRAVEL TIME(MIN.) = 3.07  
 Tc(MIN.) = 11.60  
 SUBAREA AREA(ACRES) = 11.95 SUBAREA RUNOFF(CFS) = 18.47  
 EFFECTIVE AREA(ACRES) = 13.91 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 21.50  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.46 FLOW VELOCITY(FEET/SEC.) = 4.25  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13212.00 = 967.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13212.00 TO NODE 13213.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 767.94 DOWNSTREAM(FEET) = 706.43  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 967.91 CHANNEL SLOPE = 0.0635  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.77  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.712

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 27.07 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.77  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.60  
 AVERAGE FLOW DEPTH(FEET) = 0.74 TRAVEL TIME(MIN.) = 3.51  
 Tc(MIN.) = 15.11  
 SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 34.41  
 EFFECTIVE AREA(ACRES) = 40.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 41.0 PEAK FLOW RATE(CFS) = 52.09  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.87 FLOW VELOCITY(FEET/SEC.) = 5.08  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13213.00 = 1934.91 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13213.00 TO NODE 13214.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 706.43 DOWNSTREAM(FEET) = 659.31  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 948.11 CHANNEL SLOPE = 0.0497  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.05  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.550  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 18.09 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 62.27  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.99  
 AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 3.17  
 Tc(MIN.) = 18.28  
 SUBAREA AREA(ACRES) = 18.09 SUBAREA RUNOFF(CFS) = 20.35  
 EFFECTIVE AREA(ACRES) = 59.07 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 66.45  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.08 FLOW VELOCITY(FEET/SEC.) = 5.07  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13214.00 = 2883.02 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13214.00 TO NODE 13215.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 659.31 DOWNSTREAM(FEET) = 628.91  
CHANNEL LENGTH THRU SUBAREA(FEET) = 970.24 CHANNEL SLOPE = 0.0313  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.61

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.409

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	71.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 102.13

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.96

AVERAGE FLOW DEPTH(FEET) = 1.57 TRAVEL TIME(MIN.) = 3.26

Tc(MIN.) = 21.54

SUBAREA AREA(ACRES) = 71.42 SUBAREA RUNOFF(CFS) = 71.26

EFFECTIVE AREA(ACRES) = 130.49 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 130.5 PEAK FLOW RATE(CFS) = 130.20

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.79 FLOW VELOCITY(FEET/SEC.) = 5.36

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13215.00 = 3853.26 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13215.00 TO NODE 13216.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 628.91 DOWNSTREAM(FEET) = 598.39  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.63 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.89

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.315

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	36.33	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 146.80

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.67

AVERAGE FLOW DEPTH(FEET) = 1.88 TRAVEL TIME(MIN.) = 2.71

Tc(MIN.) = 24.25

SUBAREA AREA(ACRES) = 36.33 SUBAREA RUNOFF(CFS) = 33.19

EFFECTIVE AREA(ACRES) = 166.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 166.8 PEAK FLOW RATE(CFS) = 152.42

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.93 FLOW VELOCITY(FEET/SEC.) = 5.72

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13216.00 = 4775.89 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13216.00 TO NODE 13217.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 598.39 DOWNSTREAM(FEET) = 568.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.40 CHANNEL SLOPE = 0.0470  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.87

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.271

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	42.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 171.00

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.71

AVERAGE FLOW DEPTH(FEET) = 1.86 TRAVEL TIME(MIN.) = 1.58

Tc(MIN.) = 25.83

SUBAREA AREA(ACRES) = 42.51 SUBAREA RUNOFF(CFS) = 37.16

EFFECTIVE AREA(ACRES) = 209.33 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 209.3 PEAK FLOW RATE(CFS) = 182.97

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.93 FLOW VELOCITY(FEET/SEC.) = 6.83

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13217.00 = 5412.29 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 568.48 DOWNSTREAM(FEET) = 505.65  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1896.50 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.32

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.164

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	73.24	0.30	0.951	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.951  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 211.95  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.31  
 AVERAGE FLOW DEPTH(FEET) = 2.30 TRAVEL TIME(MIN.) = 5.01  
 Tc(MIN.) = 30.84  
 SUBAREA AREA(ACRES) = 73.24 SUBAREA RUNOFF(CFS) = 57.93  
 EFFECTIVE AREA(ACRES) = 282.57 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 282.6 PEAK FLOW RATE(CFS) = 220.72  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.35 FLOW VELOCITY(FEET/SEC.) = 6.38  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13220.00 = 7308.79 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

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TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 30.84  
 RAINFALL INTENSITY(INCH/HR) = 1.16  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.99  
 EFFECTIVE STREAM AREA(ACRES) = 282.57  
 TOTAL STREAM AREA(ACRES) = 282.57  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 220.72

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	537.42	30.96	1.162	0.30( 0.24)	0.81	649.3	13200.00
2	220.72	30.84	1.164	0.30( 0.30)	0.99	282.6	13210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	757.39	30.84	1.164	0.30( 0.26)	0.86	929.4	13210.00
2	757.56	30.96	1.162	0.30( 0.26)	0.86	931.8	13200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 757.56 Tc(MIN.) = 30.96  
 EFFECTIVE AREA(ACRES) = 931.85 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA(ACRES) = 931.8  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13220.00 TO NODE 13221.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 505.65 DOWNSTREAM(FEET) = 478.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1949.14 CHANNEL SLOPE = 0.0137  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 4.04  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.106

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 108.50 0.30 0.637 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.637  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 802.21  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.98  
 AVERAGE FLOW DEPTH(FEET) = 4.04 TRAVEL TIME(MIN.) = 2.96  
 Tc(MIN.) = 33.92

SUBAREA AREA(ACRES) = 108.50 SUBAREA RUNOFF(CFS) = 89.30  
 EFFECTIVE AREA(ACRES) = 1040.35 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA(ACRES) = 1040.3 PEAK FLOW RATE(CFS) = 799.71  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 4.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 4.03 FLOW VELOCITY(FEET/SEC.) = 10.98  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13221.00 = 14742.35 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	799.87	33.80	1.108	0.30( 0.25)	0.84	1037.9	13210.00
2	799.71	33.92	1.106	0.30( 0.25)	0.84	1040.3	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 799.87 Tc(MIN.) = 33.80  
 AREA-AVERAGED Fm(INCH/HR) = 0.25 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.84 EFFECTIVE AREA(ACRES) = 1037.87

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13221.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 478.94 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2078.70 CHANNEL SLOPE = 0.0247  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.54  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.060

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 87.26 0.30 0.699 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.699  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 833.26  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.75  
 AVERAGE FLOW DEPTH (FEET) = 3.54 TRAVEL TIME (MIN.) = 2.52  
 Tc (MIN.) = 36.32  
 SUBAREA AREA (ACRES) = 87.26 SUBAREA RUNOFF (CFS) = 66.77  
 EFFECTIVE AREA (ACRES) = 1125.13 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA (ACRES) = 1127.6 PEAK FLOW RATE (CFS) = 821.94  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.52 FLOW VELOCITY (FEET/SEC.) = 13.69  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13222.00 = 16821.05 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	821.94	36.32	1.060	0.30 (0.25)	0.83	1125.1	13210.00
2	821.47	36.44	1.058	0.30 (0.25)	0.83	1127.6	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 821.94 Tc (MIN.) = 36.32  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.83 EFFECTIVE AREA (ACRES) = 1125.13

=====  
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1127.6 TC (MIN.) = 36.32  
 EFFECTIVE AREA (ACRES) = 1125.13 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.828  
 PEAK FLOW RATE (CFS) = 821.94

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	821.94	36.32	1.060	0.30 (0.25)	0.83	1125.1	13210.00
2	821.47	36.44	1.058	0.30 (0.25)	0.83	1127.6	13200.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S35 \*  
\* Rational Method Hydrology Analysis - 10-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S35.DAT  
TIME/DATE OF STUDY: 16:17 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.120
- 2) 10.00; 2.158
- 3) 15.00; 1.718
- 4) 20.00; 1.461
- 5) 25.00; 1.289
- 6) 30.00; 1.180
- 7) 40.00; 0.990
- 8) 50.00; 0.873
- 9) 60.00; 0.780
- 10) 90.00; 0.628
- 11) 120.00; 0.534
- 12) 180.00; 0.437
- 13) 360.00; 0.302
- 14) 1440.00; 0.126

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.00 TO NODE 13500.50 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 548.43  
ELEVATION DATA: UPSTREAM(FEET) = 1183.47 DOWNSTREAM(FEET) = 1065.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.986  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	5.11	0.30	1.000	0	11.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 7.75  
TOTAL AREA(ACRES) = 5.11 PEAK FLOW RATE(CFS) = 7.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.50 TO NODE 13501.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1033.15  
CHANNEL LENGTH THRU SUBAREA(FEET) = 431.71 CHANNEL SLOPE = 0.0738  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.39  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.795  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.87	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.74  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.32  
AVERAGE FLOW DEPTH(FEET) = 0.38 TRAVEL TIME(MIN.) = 2.17  
Tc(MIN.) = 14.12  
SUBAREA AREA(ACRES) = 8.87 SUBAREA RUNOFF(CFS) = 11.94  
EFFECTIVE AREA(ACRES) = 13.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 18.81  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.46 FLOW VELOCITY(FEET/SEC.) = 3.74  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13501.00 = 980.14 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13501.00 TO NODE 13502.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1033.15 DOWNSTREAM(FEET) = 990.26  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.63 CHANNEL SLOPE = 0.0452  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.70

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.543

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.82	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 28.26  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.69

AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 4.28  
Tc(MIN.) = 18.40

SUBAREA AREA(ACRES) = 16.82 SUBAREA RUNOFF(CFS) = 18.82  
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 34.47

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.76 FLOW VELOCITY(FEET/SEC.) = 3.95  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13502.00 = 1928.77 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13502.00 TO NODE 13503.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.26 DOWNSTREAM(FEET) = 956.06  
CHANNEL LENGTH THRU SUBAREA(FEET) = 940.98 CHANNEL SLOPE = 0.0363  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.11

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.393

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	46.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 57.14  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.36

AVERAGE FLOW DEPTH(FEET) = 1.08 TRAVEL TIME(MIN.) = 3.60

Tc(MIN.) = 22.00  
SUBAREA AREA(ACRES) = 46.02 SUBAREA RUNOFF(CFS) = 45.25  
EFFECTIVE AREA(ACRES) = 76.82 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 76.8 PEAK FLOW RATE(CFS) = 75.54  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.26 FLOW VELOCITY(FEET/SEC.) = 4.77  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13503.00 = 2869.75 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13503.00 TO NODE 13504.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 956.06 DOWNSTREAM(FEET) = 889.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2131.31 CHANNEL SLOPE = 0.0312  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.58

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.197

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	58.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 99.21  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.93

AVERAGE FLOW DEPTH(FEET) = 1.54 TRAVEL TIME(MIN.) = 7.20  
Tc(MIN.) = 29.20

SUBAREA AREA(ACRES) = 58.46 SUBAREA RUNOFF(CFS) = 47.22  
EFFECTIVE AREA(ACRES) = 135.28 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 135.3 PEAK FLOW RATE(CFS) = 109.27

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.63 FLOW VELOCITY(FEET/SEC.) = 5.06  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13504.00 = 5001.06 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13504.00 TO NODE 13505.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 889.48 DOWNSTREAM(FEET) = 848.10  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1661.97 CHANNEL SLOPE = 0.0249  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.90

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.088  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	49.30	0.30	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 126.76  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.90  
 AVERAGE FLOW DEPTH (FEET) = 1.88 TRAVEL TIME (MIN.) = 5.65  
 Tc (MIN.) = 34.86  
 SUBAREA AREA (ACRES) = 49.30 SUBAREA RUNOFF (CFS) = 34.95  
 EFFECTIVE AREA (ACRES) = 184.58 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 184.6 PEAK FLOW RATE (CFS) = 130.87  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 1.91  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.91 FLOW VELOCITY (FEET/SEC.) = 4.95  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.00 = 6663.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13505.00 TO NODE 13505.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 848.10 DOWNSTREAM (FEET) = 811.10  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1234.61 CHANNEL SLOPE = 0.0300  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 1.92  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.016  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.35	0.30	0.811	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.811  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 144.55  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.44  
 AVERAGE FLOW DEPTH (FEET) = 1.92 TRAVEL TIME (MIN.) = 3.78  
 Tc (MIN.) = 38.64  
 SUBAREA AREA (ACRES) = 39.35 SUBAREA RUNOFF (CFS) = 27.36  
 EFFECTIVE AREA (ACRES) = 223.93 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 223.9 PEAK FLOW RATE (CFS) = 146.29  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 1.93  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.93 FLOW VELOCITY (FEET/SEC.) = 5.46  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.50 = 7897.64 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13505.50 TO NODE 13506.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 811.10 DOWNSTREAM (FEET) = 781.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1415.98 CHANNEL SLOPE = 0.0213  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.26  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.951  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	54.33	0.30	0.738	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.738  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 164.12  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.00  
 AVERAGE FLOW DEPTH (FEET) = 2.26 TRAVEL TIME (MIN.) = 4.72  
 Tc (MIN.) = 43.36  
 SUBAREA AREA (ACRES) = 54.33 SUBAREA RUNOFF (CFS) = 35.67  
 EFFECTIVE AREA (ACRES) = 278.26 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
 TOTAL AREA (ACRES) = 278.3 PEAK FLOW RATE (CFS) = 168.84  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.29  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.29 FLOW VELOCITY (FEET/SEC.) = 5.05  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.00 = 9313.62 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13506.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 781.00 DOWNSTREAM (FEET) = 743.17  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1542.62 CHANNEL SLOPE = 0.0245  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.34  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.896  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	61.33	0.30	0.783	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 187.08  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.47  
 AVERAGE FLOW DEPTH (FEET) = 2.33 TRAVEL TIME (MIN.) = 4.70  
 Tc (MIN.) = 48.06  
 SUBAREA AREA (ACRES) = 61.33 SUBAREA RUNOFF (CFS) = 36.49  
 EFFECTIVE AREA (ACRES) = 339.59 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90



TOTAL AREA (ACRES) = 339.6 PEAK FLOW RATE (CFS) = 191.60  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.36  
  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.36 FLOW VELOCITY (FEET/SEC.) = 5.51  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.50 = 10856.24 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.50 TO NODE 13520.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 743.17 DOWNSTREAM (FEET) = 717.04  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1370.93 CHANNEL SLOPE = 0.0191  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.61  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.850  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.86	0.30	0.848	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.848  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 202.28  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.11  
 AVERAGE FLOW DEPTH (FEET) = 2.60 TRAVEL TIME (MIN.) = 4.47  
 Tc (MIN.) = 52.53  
 SUBAREA AREA (ACRES) = 39.86 SUBAREA RUNOFF (CFS) = 21.36  
 EFFECTIVE AREA (ACRES) = 379.45 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
 TOTAL AREA (ACRES) = 379.5 PEAK FLOW RATE (CFS) = 198.81  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.58 FLOW VELOCITY (FEET/SEC.) = 5.09  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 52.53  
 RAINFALL INTENSITY (INCH/HR) = 0.85  
 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.89  
 EFFECTIVE STREAM AREA (ACRES) = 379.45  
 TOTAL STREAM AREA (ACRES) = 379.45  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 198.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13510.00 TO NODE 13511.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

ELEVATION DATA: UPSTREAM (FEET) = 1216.90 DOWNSTREAM (FEET) = 1022.78

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.615  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.752  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	6.66	0.30	1.000	0	14.62

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 8.70  
 TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 8.70

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13511.00 TO NODE 13512.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1022.78 DOWNSTREAM (FEET) = 954.27  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1027.63 CHANNEL SLOPE = 0.0667  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.56  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.511  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.30	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 22.66  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.87  
 AVERAGE FLOW DEPTH (FEET) = 0.53 TRAVEL TIME (MIN.) = 4.42  
 Tc (MIN.) = 19.04  
 SUBAREA AREA (ACRES) = 25.40 SUBAREA RUNOFF (CFS) = 27.68  
 EFFECTIVE AREA (ACRES) = 32.06 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 34.94  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.68 FLOW VELOCITY (FEET/SEC.) = 4.51  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13512.00 = 1931.31 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13512.00 TO NODE 13513.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 954.27 DOWNSTREAM(FEET) = 872.45
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.42 CHANNEL SLOPE = 0.0425
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.29
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.280

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 90.23 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 74.92
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.02
AVERAGE FLOW DEPTH(FEET) = 1.20 TRAVEL TIME(MIN.) = 6.39
Tc(MIN.) = 25.43

SUBAREA AREA(ACRES) = 90.23 SUBAREA RUNOFF(CFS) = 79.57
EFFECTIVE AREA(ACRES) = 122.29 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 122.3 PEAK FLOW RATE(CFS) = 107.84
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.48 FLOW VELOCITY(FEET/SEC.) = 5.61
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13513.00 = 3857.73 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13513.00 TO NODE 13514.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 872.45 DOWNSTREAM(FEET) = 813.12
CHANNEL LENGTH THRU SUBAREA(FEET) = 1895.66 CHANNEL SLOPE = 0.0313
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.06
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.161

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 135.65 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 160.51
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.70
AVERAGE FLOW DEPTH(FEET) = 2.01 TRAVEL TIME(MIN.) = 5.54
Tc(MIN.) = 30.98

SUBAREA AREA(ACRES) = 135.65 SUBAREA RUNOFF(CFS) = 105.17
EFFECTIVE AREA(ACRES) = 257.94 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 257.9 PEAK FLOW RATE(CFS) = 199.99
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.26 FLOW VELOCITY(FEET/SEC.) = 6.08
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13514.00 = 5753.39 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13514.00 TO NODE 13515.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 813.12 DOWNSTREAM(FEET) = 773.74
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.15 CHANNEL SLOPE = 0.0204
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.81
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.050

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 109.30 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 236.93
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.48
AVERAGE FLOW DEPTH(FEET) = 2.78 TRAVEL TIME(MIN.) = 5.86
Tc(MIN.) = 36.84

SUBAREA AREA(ACRES) = 109.30 SUBAREA RUNOFF(CFS) = 73.79
EFFECTIVE AREA(ACRES) = 367.24 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 367.2 PEAK FLOW RATE(CFS) = 247.92
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.84 FLOW VELOCITY(FEET/SEC.) = 5.56
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13515.00 = 7679.54 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 773.74 DOWNSTREAM(FEET) = 717.04
CHANNEL LENGTH THRU SUBAREA(FEET) = 2279.49 CHANNEL SLOPE = 0.0249
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.12
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.957

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

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USER-DEFINED          -      231.44      0.30      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      316.46
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =      6.38
AVERAGE FLOW DEPTH(FEET) =      3.07      TRAVEL TIME(MIN.) =      5.95
Tc(MIN.) =      42.79
SUBAREA AREA(ACRES) =      231.44      SUBAREA RUNOFF(CFS) =      136.94
EFFECTIVE AREA(ACRES) =      598.68      AREA-AVERAGED Fm(INCH/HR) =      0.30
AREA-AVERAGED Fp(INCH/HR) =      0.30      AREA-AVERAGED Ap =      1.00
TOTAL AREA(ACRES) =      598.7      PEAK FLOW RATE(CFS) =      354.24
GIVEN CHANNEL BASE(FEET) =      10.00      CHANNEL FREEBOARD(FEET) =      0.0
"Z" FACTOR =      2.000      MANNING'S FACTOR =      0.060
*ESTIMATED CHANNEL HEIGHT(FEET) =      3.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =      3.25      FLOW VELOCITY(FEET/SEC.) =      6.59
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13520.00 =      9959.03 FEET.

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*****
FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 42.79
RAINFALL INTENSITY(INCH/HR) = 0.96
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 598.68
TOTAL STREAM AREA(ACRES) = 598.68
PEAK FLOW RATE(CFS) AT CONFLUENCE = 354.24

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** CONFLUENCE DATA **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	198.81	52.53	0.850	0.30( 0.27)	0.89	379.5	13500.00
2	354.24	42.79	0.957	0.30( 0.30)	1.00	598.7	13510.00

```

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

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** PEAK FLOW RATE TABLE **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	546.15	42.79	0.957	0.30( 0.29)	0.96	907.8	13510.00
2	495.01	52.53	0.850	0.30( 0.29)	0.96	978.1	13500.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 546.15      Tc(MIN.) = 42.79
EFFECTIVE AREA(ACRES) = 907.77      AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 978.1
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

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*****
FLOW PROCESS FROM NODE 13520.00 TO NODE 13520.50 IS CODE = 56
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 717.04 DOWNSTREAM(FEET) = 700.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 2019.22 CHANNEL SLOPE = 0.0084
GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040
*ESTIMATED CHANNEL HEIGHT(FEET) = 2.73
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.889
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN

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DEVELOPMENT TYPE/LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 598.35
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.77
AVERAGE FLOW DEPTH(FEET) = 2.72 TRAVEL TIME(MIN.) = 5.84
Tc(MIN.) = 48.63
SUBAREA AREA(ACRES) = 193.31 SUBAREA RUNOFF(CFS) = 104.36
EFFECTIVE AREA(ACRES) = 1101.08 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 1171.4 PEAK FLOW RATE(CFS) = 594.89
GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040
*ESTIMATED CHANNEL HEIGHT(FEET) = 2.71

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.71 FLOW VELOCITY(FEET/SEC.) = 5.75
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.50 = 14246.39 FEET.

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** PEAK FLOW RATE TABLE **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	594.89	48.63	0.889	0.30( 0.29)	0.96	1101.1	13510.00
2	533.21	58.56	0.793	0.30( 0.29)	0.96	1171.4	13500.00

```

NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 594.89 Tc(MIN.) = 48.63
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 1101.08

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*****
FLOW PROCESS FROM NODE 13520.50 TO NODE 13521.00 IS CODE = 56
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 661.95
CHANNEL LENGTH THRU SUBAREA(FEET) = 1622.36 CHANNEL SLOPE = 0.0235
GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040
*ESTIMATED CHANNEL HEIGHT(FEET) = 2.10
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.856
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS

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DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
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LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -        129.79      0.30        0.897       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 629.16  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.28  
 AVERAGE FLOW DEPTH(FEET) = 2.09    TRAVEL TIME(MIN.) = 3.26  
 Tc(MIN.) = 51.89  
 SUBAREA AREA(ACRES) = 129.79        SUBAREA RUNOFF(CFS) = 68.52  
 EFFECTIVE AREA(ACRES) = 1230.87    AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 1301.2        PEAK FLOW RATE(CFS) = 630.06  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.10

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.10    FLOW VELOCITY(FEET/SEC.) = 8.29  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13521.00 = 15868.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	630.06	51.89	0.856	0.30( 0.29)	0.96	1230.9	13510.00
2	567.14	61.95	0.770	0.30( 0.29)	0.95	1301.2	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 630.06    Tc(MIN.) = 51.89  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96    EFFECTIVE AREA(ACRES) = 1230.87

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13521.00 TO NODE 13522.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 661.95    DOWNSTREAM(FEET) = 632.19  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2746.01    CHANNEL SLOPE = 0.0108  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.77  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.791  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	278.60	0.30	0.905	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 695.20  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.59  
 AVERAGE FLOW DEPTH(FEET) = 2.76    TRAVEL TIME(MIN.) = 6.95  
 Tc(MIN.) = 58.84  
 SUBAREA AREA(ACRES) = 278.60        SUBAREA RUNOFF(CFS) = 130.24  
 EFFECTIVE AREA(ACRES) = 1509.47    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.95  
 TOTAL AREA(ACRES) = 1579.8        PEAK FLOW RATE(CFS) = 688.52  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.74  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.74    FLOW VELOCITY(FEET/SEC.) = 6.57  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13522.00 = 18614.76 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	688.52	58.84	0.791	0.30( 0.28)	0.95	1509.5	13510.00
2	640.29	69.13	0.734	0.30( 0.28)	0.94	1579.8	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 688.52    Tc(MIN.) = 58.84  
 AREA-AVERAGED Fm(INCH/HR) = 0.28    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.95    EFFECTIVE AREA(ACRES) = 1509.47

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1579.8    TC(MIN.) = 58.84  
 EFFECTIVE AREA(ACRES) = 1509.47    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.947  
 PEAK FLOW RATE(CFS) = 688.52

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	688.52	58.84	0.791	0.30( 0.28)	0.95	1509.5	13510.00
2	640.29	69.13	0.734	0.30( 0.28)	0.94	1579.8	13500.00

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2011 Advanced Engineering Software (aes)  
Ver. 18.0 Release Date: 07/01/2011 License ID 1264

Analysis prepared by:

RBF Consulting

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 25-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P25EVAA.DAT  
TIME/DATE OF STUDY: 16:41 11/13/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.766
- 2) 10.00; 3.118
- 3) 15.00; 2.394
- 4) 20.00; 1.986
- 5) 25.00; 1.734
- 6) 30.00; 1.526
- 7) 40.00; 1.325
- 8) 50.00; 1.173
- 9) 60.00; 1.046
- 10) 90.00; 0.877
- 11) 120.00; 0.765
- 12) 180.00; 0.636
- 13) 360.00; 0.466
- 14) 1200.00; 0.203

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 571.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.305  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.006  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56	7.31

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 2.84  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 2.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.006  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.170  
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 11.75  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 14.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.006  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 2.60 0.30 0.200 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 9.23  
EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.06  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19  
TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 23.82

\*\*\*\*\*

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 571.00 DOWNSTREAM ELEVATION(FEET) = 530.50  
STREET LENGTH(FEET) = 1215.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 28.68

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.46  
HALFSTREET FLOOD WIDTH(FEET) = 16.84  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.26  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.44  
STREET FLOW TRAVEL TIME(MIN.) = 3.85 Tc(MIN.) = 11.15

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.951

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.20	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	2.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.135  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 9.69  
EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 27.15

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.45  
FLOW VELOCITY(FEET/SEC.) = 5.20 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.37  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1542.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 11.15  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.951  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.119  
SUBAREA AREA(ACRES) = 22.60 SUBAREA RUNOFF(CFS) = 59.29  
EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.04  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.13  
TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 86.45

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 11.15  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.951  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198  
SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 16.39  
EFFECTIVE AREA(ACRES) = 39.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
TOTAL AREA(ACRES) = 39.3 PEAK FLOW RATE(CFS) = 102.84

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.50 DOWNSTREAM(FEET) = 522.00  
FLOW LENGTH(FEET) = 837.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.83  
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 102.84  
PIPE TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 12.33  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2379.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 12.33  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.780  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 15.30 0.30 0.100 56  
 PUBLIC PARK B 0.70 0.30 0.850 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.133  
 SUBAREA AREA(ACRES) = 16.00 SUBAREA RUNOFF(CFS) = 39.46  
 EFFECTIVE AREA(ACRES) = 55.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA(ACRES) = 55.3 PEAK FLOW RATE(CFS) = 136.26

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 522.00 DOWNSTREAM(FEET) = 473.00  
 FLOW LENGTH(FEET) = 568.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 28.16  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 136.26  
 PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 12.67  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2947.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.67  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.732  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	2.10	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
COMMERCIAL	B	0.50	0.30	0.100	56
PUBLIC PARK	B	13.00	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.820  
 SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 35.57  
 EFFECTIVE AREA(ACRES) = 71.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 71.2 PEAK FLOW RATE(CFS) = 169.41

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 127.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 435.00  
 FLOW LENGTH(FEET) = 588.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.95

ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 169.41  
 PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 13.03  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 100.00 TO NODE 121.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 574.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.633  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56	8.44

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 1.93  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.93

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 574.00 DOWNSTREAM ELEVATION(FEET) = 557.00  
 STREET LENGTH(FEET) = 221.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.70  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.39  
 HALFSTREET FLOOD WIDTH(FEET) = 13.01  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.95  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.74



STREET FLOW TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 8.97  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.458  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 7.90 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.10 0.30 0.400 56  
 APARTMENTS B 2.20 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.257  
 SUBAREA AREA(ACRES) = 14.30 SUBAREA RUNOFF(CFS) = 43.51  
 EFFECTIVE AREA(ACRES) = 14.90 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.26  
 TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 45.35

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 17.07  
 FLOW VELOCITY(FEET/SEC.) = 8.11 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.79  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 551.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 557.00 DOWNSTREAM ELEVATION(FEET) = 527.00  
 STREET LENGTH(FEET) = 317.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 58.60  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.49  
 HALFSTREET FLOOD WIDTH(FEET) = 18.24  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.26  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.52  
 STREET FLOW TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 9.54  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.270  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.50 0.30 0.400 56  
 APARTMENTS B 0.70 0.30 0.200 56

COMMERCIAL B 0.40 0.30 0.100 56  
 CONDOMINIUMS B 3.50 0.30 0.350 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.352  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 26.49  
 EFFECTIVE AREA(ACRES) = 24.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 24.2 PEAK FLOW RATE(CFS) = 69.31

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.51 HALFSTREET FLOOD WIDTH(FEET) = 19.49  
 FLOW VELOCITY(FEET/SEC.) = 9.66 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.93  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 123.00 = 868.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 527.00 DOWNSTREAM ELEVATION(FEET) = 496.00  
 STREET LENGTH(FEET) = 315.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 84.68

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.54  
 HALFSTREET FLOOD WIDTH(FEET) = 20.90  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.34  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 5.54  
 STREET FLOW TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 10.05

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.111  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 2.90 0.30 0.400 56  
 CONDOMINIUMS B 1.40 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.00 0.30 0.400 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 CONDOMINIUMS B 2.70 0.30 0.350 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387  
 SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 30.73  
 EFFECTIVE AREA(ACRES) = 35.60 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32

TOTAL AREA (ACRES) = 35.6 PEAK FLOW RATE (CFS) = 96.58

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.56 HALFSTREET FLOOD WIDTH (FEET) = 22.07
FLOW VELOCITY (FEET/SEC.) = 10.63 DEPTH\*VELOCITY (FT\*FT/SEC.) = 5.92
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 124.00 = 1183.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 10.05
RAINFALL INTENSITY (INCH/HR) = 3.11
AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA (ACRES) = 35.60
TOTAL STREAM AREA (ACRES) = 35.60
PEAK FLOW RATE (CFS) AT CONFLUENCE = 96.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 317.00
ELEVATION DATA: UPSTREAM (FEET) = 699.00 DOWNSTREAM (FEET) = 610.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.111

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.411

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER
"OPEN BRUSH" B 1.50 0.30 1.000 66 9.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 4.20

TOTAL AREA (ACRES) = 1.50 PEAK FLOW RATE (CFS) = 4.20

\*\*\*\*\*

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 610.00 DOWNSTREAM (FEET) = 575.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 206.00 CHANNEL SLOPE = 0.1699

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.245

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 2.80 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.91

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.80

AVERAGE FLOW DEPTH (FEET) = 0.62 TRAVEL TIME (MIN.) = 0.50

Tc (MIN.) = 9.62

SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 7.42

EFFECTIVE AREA (ACRES) = 4.30 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 4.3 PEAK FLOW RATE (CFS) = 11.40

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.71 FLOW VELOCITY (FEET/SEC.) = 7.44

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 523.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 575.00 DOWNSTREAM (FEET) = 548.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.1350

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.109

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 3.30 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.57

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.42

AVERAGE FLOW DEPTH (FEET) = 0.84 TRAVEL TIME (MIN.) = 0.45

Tc (MIN.) = 10.07

SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 8.34

EFFECTIVE AREA (ACRES) = 7.60 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 7.6 PEAK FLOW RATE (CFS) = 19.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.91 FLOW VELOCITY (FEET/SEC.) = 7.82

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 723.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 548.00 DOWNSTREAM (FEET) = 524.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 318.00 CHANNEL SLOPE = 0.0755

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.990  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	2.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 22.00  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.46  
 AVERAGE FLOW DEPTH (FEET) = 1.07 TRAVEL TIME (MIN.) = 0.82  
 Tc (MIN.) = 10.89  
 SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 5.57  
 EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 23.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.10 FLOW VELOCITY (FEET/SEC.) = 6.58  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 1041.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 524.00 DOWNSTREAM (FEET) = 515.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 94.00 CHANNEL SLOPE = 0.0957  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.960  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	3.70	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 28.39  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.56  
 AVERAGE FLOW DEPTH (FEET) = 1.12 TRAVEL TIME (MIN.) = 0.21  
 Tc (MIN.) = 11.09  
 SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 8.86  
 EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 32.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.18 FLOW VELOCITY (FEET/SEC.) = 7.80  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 1135.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 507.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 207.00 CHANNEL SLOPE = 0.0386  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.876  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	8.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 42.18  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.94  
 AVERAGE FLOW DEPTH (FEET) = 1.54 TRAVEL TIME (MIN.) = 0.58  
 Tc (MIN.) = 11.67  
 SUBAREA AREA (ACRES) = 8.30 SUBAREA RUNOFF (CFS) = 19.24  
 EFFECTIVE AREA (ACRES) = 21.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 21.9 PEAK FLOW RATE (CFS) = 50.77

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.65 FLOW VELOCITY (FEET/SEC.) = 6.21  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 1342.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 507.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 338.00 CHANNEL SLOPE = 0.0207  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.720  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	0.60	0.30	1.000	66
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
NATURAL FAIR COVER "OPEN BRUSH"	B	13.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 66.15  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.25  
 AVERAGE FLOW DEPTH (FEET) = 2.05 TRAVEL TIME (MIN.) = 1.07  
 Tc (MIN.) = 12.75  
 SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 30.76  
 EFFECTIVE AREA (ACRES) = 36.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 36.0 PEAK FLOW RATE (CFS) = 78.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.18 FLOW VELOCITY(FEET/SEC.) = 5.48  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 1680.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 137.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 496.00  
FLOW LENGTH(FEET) = 726.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.75  
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 78.47  
PIPE TRAVEL TIME(MIN.) = 1.38 Tc(MIN.) = 14.13  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.13  
RAINFALL INTENSITY(INCH/HR) = 2.52  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 36.00  
TOTAL STREAM AREA(ACRES) = 36.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 78.47

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	96.58	10.05	3.111	0.30( 0.10)	0.32	35.6	100.00
2	78.47	14.13	2.520	0.30( 0.30)	1.00	36.0	130.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	167.22	10.05	3.111	0.30( 0.18)	0.60	61.2	100.00
2	156.11	14.13	2.520	0.30( 0.20)	0.66	71.6	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 167.22 Tc(MIN.) = 10.05  
EFFECTIVE AREA(ACRES) = 61.20 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 71.6  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 444.00  
FLOW LENGTH(FEET) = 888.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.79  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 167.22  
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 10.62  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 125.00 = 3294.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.62  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.028  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCs SOIL AREA Fp Ap SCs  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 7.50 0.30 0.400 56  
NATURAL FAIR COVER  
"OPEN BRUSH" B 0.10 0.30 1.000 66  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.407  
SUBAREA AREA(ACRES) = 8.60 SUBAREA RUNOFF(CFS) = 22.49  
EFFECTIVE AREA(ACRES) = 69.80 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 179.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 444.00 DOWNSTREAM(FEET) = 438.00  
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.07  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 179.30  
PIPE TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 11.46  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.46

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.906  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	4.30	0.30	0.200	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.70	0.30	0.400	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.20	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 7.10 SUBAREA RUNOFF (CFS) = 18.14  
 EFFECTIVE AREA (ACRES) = 76.90 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 87.3 PEAK FLOW RATE (CFS) = 189.78

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.46  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.906  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.51  
 EFFECTIVE AREA (ACRES) = 77.10 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 87.5 PEAK FLOW RATE (CFS) = 190.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 11.46  
 RAINFALL INTENSITY (INCH/HR) = 2.91  
 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.55  
 EFFECTIVE STREAM AREA (ACRES) = 77.10  
 TOTAL STREAM AREA (ACRES) = 87.50  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 190.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====  
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 557.00 DOWNSTREAM (FEET) = 546.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.105  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.402  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.50	0.30	0.100	56	6.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 1.97  
 TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 1.97

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<<<<

=====

UPSTREAM ELEVATION (FEET) = 546.00 DOWNSTREAM ELEVATION (FEET) = 488.00  
 STREET LENGTH (FEET) = 671.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.86

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.32  
 HALfstREET FLOOD WIDTH (FEET) = 8.78  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.15  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.97  
 STREET FLOW TRAVEL TIME (MIN.) = 1.82 Tc (MIN.) = 7.92

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.803  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.50	0.30	0.200	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	3.90	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293  
 SUBAREA AREA (ACRES) = 5.30 SUBAREA RUNOFF (CFS) = 17.72  
 EFFECTIVE AREA (ACRES) = 5.80 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA (ACRES) = 5.8 PEAK FLOW RATE (CFS) = 19.42

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 11.60  
 FLOW VELOCITY(FEET/SEC.) = 6.96 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.57  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1001.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 7.92  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.803  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	14.60	0.30	0.200	56
COMMERCIAL	B	1.10	0.30	0.100	56
CONDOMINIUMS	B	4.30	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.227  
 SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 67.22  
 EFFECTIVE AREA(ACRES) = 25.80 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 25.8 PEAK FLOW RATE(CFS) = 86.64

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

-----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 488.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
 STREET LENGTH(FEET) = 371.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 108.44  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.60  
 HALFSTREET FLOOD WIDTH(FEET) = 24.34  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.89  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 5.91  
 STREET FLOW TRAVEL TIME(MIN.) = 0.63 Tc(MIN.) = 8.55

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.597  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.50	0.30	0.200	56

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 10.00 0.30 0.200 56  
 APARTMENTS B 1.70 0.30 0.200 56  
 COMMERCIAL B 0.50 0.30 0.100 56  
 CONDOMINIUMS B 1.00 0.30 0.350 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.207  
 SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 43.58  
 EFFECTIVE AREA(ACRES) = 39.50 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA(ACRES) = 39.5 PEAK FLOW RATE(CFS) = 125.44

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 25.74  
 FLOW VELOCITY(FEET/SEC.) = 10.26 DEPTH\*VELOCITY(FT\*FT/SEC.) = 6.39  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1372.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 113.00 TO NODE 126.00 IS CODE = 31

-----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 438.00  
 FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 21.36  
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 125.44  
 PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 8.94  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 1872.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 8.94  
 RAINFALL INTENSITY(INCH/HR) = 3.47  
 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.23  
 EFFECTIVE STREAM AREA(ACRES) = 39.50  
 TOTAL STREAM AREA(ACRES) = 39.50  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 125.44

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	190.29	11.46	2.906	0.30( 0.16)	0.55	77.1	100.00
1	170.66	15.58	2.347	0.30( 0.18)	0.60	87.5	130.00
2	125.44	8.94	3.468	0.30( 0.07)	0.23	39.5	110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	304.22	8.94	3.468	0.30 ( 0.13)	0.42	99.6	110.00
2	295.00	11.46	2.906	0.30 ( 0.13)	0.44	116.6	100.00
3	254.73	15.58	2.347	0.30 ( 0.15)	0.48	127.0	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 304.22 Tc(MIN.) = 8.94  
EFFECTIVE AREA(ACRES) = 99.62 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 127.0  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 435.00  
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 66.0 INCH PIPE IS 51.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.36  
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 304.22  
PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 9.26  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.26  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.362  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	5.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.366  
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 22.83  
EFFECTIVE AREA(ACRES) = 107.42 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 134.8 PEAK FLOW RATE(CFS) = 312.99

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.26  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.362  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	1.50	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 14.14  
EFFECTIVE AREA(ACRES) = 112.32 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 139.7 PEAK FLOW RATE(CFS) = 327.13

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	327.13	9.26	3.362	0.30 ( 0.13)	0.42	112.3	110.00
2	317.52	11.78	2.860	0.30 ( 0.13)	0.44	129.3	100.00
3	273.61	15.91	2.320	0.30 ( 0.14)	0.48	139.7	130.00

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	169.41	13.03	2.679	0.30 ( 0.09)	0.29	71.2	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	479.23	9.26	3.362	0.30 ( 0.11)	0.38	162.9	110.00
2	481.39	11.78	2.860	0.30 ( 0.12)	0.39	193.7	100.00
3	473.65	13.03	2.679	0.30 ( 0.12)	0.39	203.6	100.00
4	419.54	15.91	2.320	0.30 ( 0.12)	0.42	210.9	130.00

TOTAL AREA(ACRES) = 210.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 481.39 Tc(MIN.) = 11.784  
EFFECTIVE AREA(ACRES) = 193.68 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
TOTAL AREA(ACRES) = 210.9  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.10 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 500.20 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 44.56
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 481.39
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 11.97
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.10 = 4750.20 FEET.

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*****
FLOW PROCESS FROM NODE 127.10 TO NODE 127.20 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 353.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 595.30 CHANNEL SLOPE = 0.0218
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.650
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         3.50   0.30  0.100  56
COMMERCIAL          B         0.10   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 485.63
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.88
AVERAGE FLOW DEPTH(FEET) = 1.18 TRAVEL TIME(MIN.) = 1.26
Tc(MIN.) = 13.23
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 8.49
EFFECTIVE AREA(ACRES) = 197.28 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 214.5 PEAK FLOW RATE(CFS) = 481.39
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.17 FLOW VELOCITY(FEET/SEC.) = 7.85
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.20 = 5345.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.20 TO NODE 127.30 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 340.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 476.00 CHANNEL SLOPE = 0.0273
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.514
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS

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LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         3.10   0.30  0.100  56
COMMERCIAL          B         0.10   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 484.97
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.43
AVERAGE FLOW DEPTH(FEET) = 1.10 TRAVEL TIME(MIN.) = 0.94
Tc(MIN.) = 14.17
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 7.15
EFFECTIVE AREA(ACRES) = 200.48 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 217.7 PEAK FLOW RATE(CFS) = 481.39
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.10 FLOW VELOCITY(FEET/SEC.) = 8.42
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.30 = 5821.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.30 TO NODE 13569.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 338.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 506.00 CHANNEL SLOPE = 0.0040
CHANNEL BASE(FEET) = 150.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.242
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         2.80   0.30  0.100  56
COMMERCIAL          B         0.60   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 484.77
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.13
AVERAGE FLOW DEPTH(FEET) = 1.02 TRAVEL TIME(MIN.) = 2.70
Tc(MIN.) = 16.87
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 6.77
EFFECTIVE AREA(ACRES) = 203.88 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 221.1 PEAK FLOW RATE(CFS) = 481.39
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.02 FLOW VELOCITY(FEET/SEC.) = 3.11
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 13569.00 = 6327.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 12
-----

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>>>>CLEAR MEMORY BANK # 1 <<<<
=====
END OF STUDY SUMMARY:

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TOTAL AREA (ACRES) = 221.1 TC (MIN.) = 16.87  
 EFFECTIVE AREA (ACRES) = 203.88 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.375  
 PEAK FLOW RATE (CFS) = 481.39

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	479.23	14.36	2.487	0.30 ( 0.11)	0.36	173.1	110.00
2	481.39	16.87	2.242	0.30 ( 0.11)	0.37	203.9	100.00
3	473.65	18.15	2.137	0.30 ( 0.11)	0.38	213.8	100.00
4	419.54	21.27	1.922	0.30 ( 0.12)	0.40	221.1	130.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2012 Advanced Engineering Software (aes)  
Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 25-YR ULTIMATE EV DECEMBER 2013 MCHANDOO/TMULI \*  
\*\*\*\*\*

FILE NAME: 2P25EVBB.DAT  
TIME/DATE OF STUDY: 16:37 12/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.808
- 2) 10.00; 3.143
- 3) 15.00; 2.408
- 4) 20.00; 1.996
- 5) 25.00; 1.742
- 6) 30.00; 1.531
- 7) 40.00; 1.331
- 8) 50.00; 1.178
- 9) 60.00; 1.052
- 10) 90.00; 0.883
- 11) 120.00; 0.772
- 12) 180.00; 0.643
- 13) 360.00; 0.472
- 14) 1200.00; 0.207

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00  
ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 543.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.596  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.944  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.80	0.30	0.100	56	7.60

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 2.82  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 2.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 543.00 DOWNSTREAM ELEVATION(FEET) = 523.00  
STREET LENGTH(FEET) = 502.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.40  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.30  
HALFSTREET FLOOD WIDTH(FEET) = 6.95  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.01  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.19  
STREET FLOW TRAVEL TIME(MIN.) = 2.09 Tc(MIN.) = 9.68  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.249

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.20	0.30	0.200	56
COMMERCIAL	B	1.30	0.30	0.100	56

NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.261  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.14  
 EFFECTIVE AREA(ACRES) = 2.60 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 7.45

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 8.24  
 FLOW VELOCITY(FEET/SEC.) = 4.29 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.39  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 810.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.68  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.249  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 1.40 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 4.06  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 11.51

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 2 USED)<<<<

UPSTREAM ELEVATION(FEET) = 523.00 DOWNSTREAM ELEVATION(FEET) = 468.00  
 STREET LENGTH(FEET) = 987.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.52  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.38  
 HALFSTREET FLOOD WIDTH(FEET) = 11.11  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.80  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.21  
 STREET FLOW TRAVEL TIME(MIN.) = 2.84 Tc(MIN.) = 12.52  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.773  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56  
 COMMERCIAL B 2.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.426  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 10.00  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 19.79

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 12.05  
 FLOW VELOCITY(FEET/SEC.) = 6.03 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.41  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 1797.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 468.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.04  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.41  
 HALFSTREET FLOOD WIDTH(FEET) = 13.63  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.22  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.52  
 STREET FLOW TRAVEL TIME(MIN.) = 2.62 Tc(MIN.) = 15.14  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.397  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.10 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 COMMERCIAL B 1.90 0.30 0.100 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 6.49  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 23.51

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 13.71  
 FLOW VELOCITY(FEET/SEC.) = 6.28 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.56  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2774.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
 MAINLINE Tc(MIN.) = 15.14  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.397  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.30 0.30 1.000 66  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 2.45  
 EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
 TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 25.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 204.00 TO NODE 218.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

-----  
 UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 343.00  
 STREET LENGTH(FEET) = 1228.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.56  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.44  
 HALFSTREET FLOOD WIDTH(FEET) = 15.43  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.37  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.79  
 STREET FLOW TRAVEL TIME(MIN.) = 3.21 Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 COMMERCIAL B 0.50 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.40 0.30 1.000 66  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.70 0.30 0.500 56  
 COMMERCIAL B 1.50 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.80 0.30 1.000 66  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 7.19  
 EFFECTIVE AREA(ACRES) = 16.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 16.6 PEAK FLOW RATE(CFS) = 30.15

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 15.51  
 FLOW VELOCITY(FEET/SEC.) = 6.44 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.83  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
 MAINLINE Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 1.20 0.30 0.500 56  
 COMMERCIAL B 0.10 0.30 0.100 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
 COMMERCIAL B 0.10 0.30 0.100 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450  
 SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 2.88  
 EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 33.03

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

-----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 18.35  
 RAINFALL INTENSITY(INCH/HR) = 2.13  
 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.39  
 EFFECTIVE STREAM AREA (ACRES) = 18.20  
 TOTAL STREAM AREA (ACRES) = 18.20  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 33.03

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 268.00  
 ELEVATION DATA: UPSTREAM (FEET) = 514.00 DOWNSTREAM (FEET) = 511.50

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.724  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.901

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	B	2.30	0.30	0.500	56	9.27
APARTMENTS	B	0.40	0.30	0.200	56	7.72

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456

SUBAREA RUNOFF (CFS) = 9.15

TOTAL AREA (ACRES) = 2.70 PEAK FLOW RATE (CFS) = 9.15

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION (FEET) = 511.50 DOWNSTREAM ELEVATION (FEET) = 503.00  
 STREET LENGTH (FEET) = 503.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.93  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.45  
 HALFSTREET FLOOD WIDTH (FEET) = 16.29  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.69  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.67  
 STREET FLOW TRAVEL TIME (MIN.) = 2.27 Tc (MIN.) = 9.99

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.145

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.20	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.475  
 SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 19.46  
 EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.14  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47  
 TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 26.77

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.50 HALFSTREET FLOOD WIDTH (FEET) = 18.79  
 FLOW VELOCITY (FEET/SEC.) = 4.00 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.99  
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 771.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.99

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.145

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.281

SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 3.58

EFFECTIVE AREA (ACRES) = 11.20 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45

TOTAL AREA (ACRES) = 11.2 PEAK FLOW RATE (CFS) = 30.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION (FEET) = 503.00 DOWNSTREAM ELEVATION (FEET) = 476.00  
 STREET LENGTH (FEET) = 423.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.89  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.44  
HALFSTREET FLOOD WIDTH(FEET) = 15.35  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.94  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.03  
STREET FLOW TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 11.01  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.995

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 1.00 0.30 0.500 56  
COMMERCIAL B 0.10 0.30 0.100 56  
CONDOMINIUMS B 0.10 0.30 0.350 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.454  
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 3.09  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 31.92

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 15.35  
FLOW VELOCITY(FEET/SEC.) = 6.94 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.03  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 11.01  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.995  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.50 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
COMMERCIAL B 0.30 0.30 0.100 56  
CONDOMINIUMS B 3.30 0.30 0.350 56  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.332  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 12.77  
EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 44.69

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 11.01  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.995  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 3.40 0.30 0.100 56  
CONDOMINIUMS B 8.10 0.30 0.350 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.276  
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 30.14  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 74.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 476.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
STREET LENGTH(FEET) = 789.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 74.82  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.65  
HALFSTREET FLOOD WIDTH(FEET) = 27.23  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.49  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.56  
STREET FLOW TRAVEL TIME(MIN.) = 2.39 Tc(MIN.) = 13.40  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.642  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 74.82  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.65 HALFSTREET FLOOD WIDTH(FEET) = 27.23  
FLOW VELOCITY(FEET/SEC.) = 5.49 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.56  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1983.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.40  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.642  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	8.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.40	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 32.30  
 EFFECTIVE AREA(ACRES) = 43.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
 TOTAL AREA(ACRES) = 43.2 PEAK FLOW RATE(CFS) = 98.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 460.00 DOWNSTREAM ELEVATION(FEET) = 419.00  
STREET LENGTH(FEET) = 529.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 102.25  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.58  
 HALFSTREET FLOOD WIDTH(FEET) = 23.63  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.87  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 5.77  
 STREET FLOW TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 14.30  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.511  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 8.50  
 EFFECTIVE AREA(ACRES) = 47.20 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 47.2 PEAK FLOW RATE(CFS) = 101.39

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 23.55  
FLOW VELOCITY(FEET/SEC.) = 9.85 DEPTH\*VELOCITY(FT\*FT/SEC.) = 5.74  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 2512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.30  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.511  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.70	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 11.90  
 EFFECTIVE AREA(ACRES) = 52.80 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
 TOTAL AREA(ACRES) = 52.8 PEAK FLOW RATE(CFS) = 113.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.30  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.511  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.90	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.50	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 15.94  
 EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 129.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 419.00 DOWNSTREAM ELEVATION(FEET) = 405.00  
STREET LENGTH(FEET) = 174.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 129.23  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.62  
HALFSTREET FLOOD WIDTH(FEET) = 25.74  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.57  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.58  
STREET FLOW TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 14.57  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.471  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 129.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 25.74  
FLOW VELOCITY(FEET/SEC.) = 10.57 DEPTH\*VELOCITY(FT\*FT/SEC.) = 6.58  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 2686.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 372.00  
FLOW LENGTH(FEET) = 395.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.60  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 129.23  
PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 14.81  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 3081.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 14.81  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.436  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500					
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 4.53					
EFFECTIVE AREA(ACRES) = 62.50 AREA-AVERAGED Fm(INCH/HR) = 0.13					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44					
TOTAL AREA(ACRES) = 62.5 PEAK FLOW RATE(CFS) = 129.66					

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 14.81  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.436  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 3.50 0.30 0.500 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 6.90 0.30 0.500 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 21.81  
EFFECTIVE AREA(ACRES) = 73.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 73.1 PEAK FLOW RATE(CFS) = 151.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 343.00  
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.30  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 151.47  
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 15.25  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 3688.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 15.25



\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.388  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.443  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.42  
 EFFECTIVE AREA (ACRES) = 73.80 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 73.8 PEAK FLOW RATE (CFS) = 151.47  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
 -----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 15.25  
 RAINFALL INTENSITY (INCH/HR) = 2.39  
 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.44  
 EFFECTIVE STREAM AREA (ACRES) = 73.80  
 TOTAL STREAM AREA (ACRES) = 73.80  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 151.47

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	33.03	18.35	2.132	0.30 ( 0.12)	0.39	18.2	200.00
2	151.47	15.25	2.388	0.30 ( 0.13)	0.44	73.8	210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	182.39	15.25	2.388	0.30 ( 0.13)	0.43	88.9	210.00
2	167.32	18.35	2.132	0.30 ( 0.13)	0.43	92.0	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 182.39 Tc (MIN.) = 15.25  
 EFFECTIVE AREA (ACRES) = 88.92 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA (ACRES) = 92.0  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 343.00 DOWNSTREAM (FEET) = 326.50  
 FLOW LENGTH (FEET) = 734.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 35.4 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 18.38  
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 182.39  
 PIPE TRAVEL TIME (MIN.) = 0.67 Tc (MIN.) = 15.91  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 219.00 = 4736.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 15.91  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.333  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56  
 COMMERCIAL  
 B 0.60 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.70 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.90 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 5.66  
 EFFECTIVE AREA (ACRES) = 91.82 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 94.9 PEAK FLOW RATE (CFS) = 182.39  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 15.91  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.333  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL  
 B 0.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 1.19  
 EFFECTIVE AREA (ACRES) = 92.42 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA (ACRES) = 95.5 PEAK FLOW RATE (CFS) = 183.12

\*\*\*\*\*

FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 326.50 DOWNSTREAM (FEET) = 325.00  
FLOW LENGTH (FEET) = 161.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.5 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.24  
ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 183.12  
PIPE TRAVEL TIME (MIN.) = 0.20 Tc (MIN.) = 16.11  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 220.00 = 4897.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.11  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.316  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.90	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.60	0.30	0.400	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	18.40	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	4.30	0.30	0.400	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.50	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	6.90	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462  
SUBAREA AREA (ACRES) = 38.60 SUBAREA RUNOFF (CFS) = 75.66  
EFFECTIVE AREA (ACRES) = 131.02 AREA-AVERAGED Fm (INCH/HR) = 0.13  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA (ACRES) = 134.1 PEAK FLOW RATE (CFS) = 257.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 245.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 325.00 DOWNSTREAM (FEET) = 315.00  
FLOW LENGTH (FEET) = 1019.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 14.62  
ESTIMATED PIPE DIAMETER (INCH) = 63.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 257.39  
PIPE TRAVEL TIME (MIN.) = 1.16 Tc (MIN.) = 17.28  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.28  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.221  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.30	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.00	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379  
SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 5.50  
EFFECTIVE AREA (ACRES) = 133.92 AREA-AVERAGED Fm (INCH/HR) = 0.13  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA (ACRES) = 137.0 PEAK FLOW RATE (CFS) = 257.39  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.28  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.221  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.264  
SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.12  
EFFECTIVE AREA (ACRES) = 135.02 AREA-AVERAGED Fm (INCH/HR) = 0.13  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA (ACRES) = 138.1 PEAK FLOW RATE (CFS) = 257.39  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.28  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.221  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.40	0.30	0.400	56

  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.434  
 SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 6.02  
 EFFECTIVE AREA(ACRES) = 138.22 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA(ACRES) = 141.3 PEAK FLOW RATE(CFS) = 259.74

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3<<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 220.50 TO NODE 221.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 251.00  
 ELEVATION DATA: UPSTREAM(FEET) = 551.00 DOWNSTREAM(FEET) = 547.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.785  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.215  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"1 DWELLING/ACRE"	B	3.10	0.30	0.800	56	9.79
RESIDENTIAL						
"1 DWELLING/ACRE"	B	3.10	0.30	0.800	56	9.79

  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA RUNOFF(CFS) = 16.60  
 TOTAL AREA(ACRES) = 6.20 PEAK FLOW RATE(CFS) = 16.60

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 542.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0130  
 CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.006  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56

  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.163  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.85  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.61  
 AVERAGE FLOW DEPTH(FEET) = 0.38 TRAVEL TIME(MIN.) = 1.15  
 Tc(MIN.) = 10.93  
 SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 12.51  
 EFFECTIVE AREA(ACRES) = 10.90 AREA-AVERAGED Fm(INCH/HR) = 0.16  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA(ACRES) = 10.9 PEAK FLOW RATE(CFS) = 27.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.43 FLOW VELOCITY(FEET/SEC.) = 5.98  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 222.00 = 637.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 542.00 DOWNSTREAM ELEVATION(FEET) = 531.00  
 STREET LENGTH(FEET) = 1146.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018  
  
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.78  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.63  
 HALFSTREET FLOOD WIDTH(FEET) = 25.98  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.68  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.31  
 STREET FLOW TRAVEL TIME(MIN.) = 5.19 Tc(MIN.) = 16.12  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.316

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					

"11+ DWELLINGS/ACRE" B 11.50 0.30 0.200 56  
 APARTMENTS B 2.90 0.30 0.200 56  
 COMMERCIAL B 0.70 0.30 0.100 56  
 PUBLIC PARK B 2.60 0.30 0.850 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.292  
 SUBAREA AREA(ACRES) = 17.70 SUBAREA RUNOFF(CFS) = 35.49  
 EFFECTIVE AREA(ACRES) = 28.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 28.6 PEAK FLOW RATE(CFS) = 56.66

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.67 HALFSTREET FLOOD WIDTH(FEET) = 28.26  
 FLOW VELOCITY(FEET/SEC.) = 3.87 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.58  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 223.00 = 1783.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 -----

UPSTREAM ELEVATION(FEET) = 531.00 DOWNSTREAM ELEVATION(FEET) = 520.00  
 STREET LENGTH(FEET) = 702.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 67.82  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.65  
 HALFSTREET FLOOD WIDTH(FEET) = 27.54  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.87  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.19  
 STREET FLOW TRAVEL TIME(MIN.) = 2.40 Tc(MIN.) = 18.53

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.118

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.40	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
CONDOMINIUMS	B	0.70	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175  
 SUBAREA AREA(ACRES) = 12.00 SUBAREA RUNOFF(CFS) = 22.30  
 EFFECTIVE AREA(ACRES) = 40.60 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32

TOTAL AREA(ACRES) = 40.6 PEAK FLOW RATE(CFS) = 73.87

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.67 HALFSTREET FLOOD WIDTH(FEET) = 28.70  
 FLOW VELOCITY(FEET/SEC.) = 4.97 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.33  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 224.00 = 2485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----

ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 463.00  
 FLOW LENGTH(FEET) = 1760.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.96  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 73.87  
 PIPE TRAVEL TIME(MIN.) = 1.73 Tc(MIN.) = 20.26  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 225.00 = 4245.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----

MAINLINE Tc(MIN.) = 20.26  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.983  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.20	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	0.30	0.30	0.350	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	2.00	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.235  
 SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 19.79  
 EFFECTIVE AREA(ACRES) = 52.10 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 52.1 PEAK FLOW RATE(CFS) = 88.75

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----

MAINLINE Tc(MIN.) = 20.26  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.983  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.20	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	0.30	0.30	0.350	56

```

LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      6.40    0.30     0.500    56
CONDOMINIUMS          B      0.90    0.30     0.350    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      5.20    0.30     0.500    56
CONDOMINIUMS          B      0.80    0.30     0.350    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.481
SUBAREA AREA(ACRES) = 13.30      SUBAREA RUNOFF(CFS) = 22.01
EFFECTIVE AREA(ACRES) = 65.40    AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 65.4        PEAK FLOW RATE(CFS) = 110.76

```

```

*****
FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 31
-----

```

```
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 425.00
FLOW LENGTH(FEET) = 639.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.33
ESTIMATED PIPE DIAMETER(INCH) = 33.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 110.76
PIPE TRAVEL TIME(MIN.) = 0.46    Tc(MIN.) = 20.71
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 226.00 = 4884.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 226.00 TO NODE 226.00 IS CODE = 81
-----

```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
MAINLINE Tc(MIN.) = 20.71
```

```
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.960
```

```
SUBAREA LOSS RATE DATA(AMC II):
```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.90	0.30	0.500	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.30	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.00	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 30.23  
EFFECTIVE AREA(ACRES) = 83.50 AREA-AVERAGED Fm(INCH/HR) = 0.10  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34  
TOTAL AREA(ACRES) = 83.5 PEAK FLOW RATE(CFS) = 139.62

```

*****
FLOW PROCESS FROM NODE 226.00 TO NODE 243.00 IS CODE = 31
-----

```

```
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 653.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 26.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.95
ESTIMATED PIPE DIAMETER(INCH) = 39.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 139.62
PIPE TRAVEL TIME(MIN.) = 0.47    Tc(MIN.) = 21.19
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 243.00 = 5537.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81
-----

```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
MAINLINE Tc(MIN.) = 21.19
```

```
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.936
```

```
SUBAREA LOSS RATE DATA(AMC II):
```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.60	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 7.47  
EFFECTIVE AREA(ACRES) = 88.00 AREA-AVERAGED Fm(INCH/HR) = 0.10  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34  
TOTAL AREA(ACRES) = 88.0 PEAK FLOW RATE(CFS) = 145.28

```

*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1
-----

```

```
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
TOTAL NUMBER OF STREAMS = 2
```

```
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
```

```
TIME OF CONCENTRATION(MIN.) = 21.19
```

```
RAINFALL INTENSITY(INCH/HR) = 1.94
```

```
AREA-AVERAGED Fm(INCH/HR) = 0.10
```

```
AREA-AVERAGED Fp(INCH/HR) = 0.30
```

```
AREA-AVERAGED Ap = 0.34
```

```
EFFECTIVE STREAM AREA(ACRES) = 88.00
```

```
TOTAL STREAM AREA(ACRES) = 88.00
```

```
PEAK FLOW RATE(CFS) AT CONFLUENCE = 145.28
```

```

*****
FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21
-----

```

```
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
```

```
ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 547.50
```

```
Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
```

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.751  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.559  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 APARTMENTS B 0.60 0.30 0.200 56 8.75  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 1.89  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.89

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 547.50 DOWNSTREAM(FEET) = 541.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 802.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 3.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.946  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 APARTMENTS B 0.20 0.30 0.200 56  
 COMMERCIAL B 5.90 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.93  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.16  
 AVERAGE FLOW DEPTH(FEET) = 0.98 TRAVEL TIME(MIN.) = 2.59  
 Tc(MIN.) = 11.34  
 SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 16.00  
 EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 17.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.22 FLOW VELOCITY(FEET/SEC.) = 5.94  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1132.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 541.00 DOWNSTREAM(FEET) = 533.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 849.00 CHANNEL SLOPE = 0.0094  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.667  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 14.90 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 35.26  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.47  
 AVERAGE FLOW DEPTH(FEET) = 1.54 TRAVEL TIME(MIN.) = 1.89  
 Tc(MIN.) = 13.24  
 SUBAREA AREA(ACRES) = 14.90 SUBAREA RUNOFF(CFS) = 35.36  
 EFFECTIVE AREA(ACRES) = 21.60 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 21.6 PEAK FLOW RATE(CFS) = 51.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.77 FLOW VELOCITY(FEET/SEC.) = 8.22  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1981.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.24  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.667  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 APARTMENTS B 0.20 0.30 0.200 56  
 COMMERCIAL B 1.80 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124  
 SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 4.97  
 EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 56.21

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.24  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.667  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.40 0.30 0.100 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 COMMERCIAL B 1.30 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.117  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.26  
 EFFECTIVE AREA(ACRES) = 25.50 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 25.5 PEAK FLOW RATE(CFS) = 60.48

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31

```

=====
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 537.00 DOWNSTREAM(FEET) = 510.00
FLOW LENGTH(FEET) = 513.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.18
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 60.48
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 13.68
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2494.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.68
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.601
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B        9.40    0.30    0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 20.99
EFFECTIVE AREA(ACRES) = 34.90 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 34.9 PEAK FLOW RATE(CFS) = 79.97

```

```

*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.68
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.601
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        0.70    0.30    0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B        2.50    0.30    0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 7.18
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 87.15

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 478.00
FLOW LENGTH(FEET) = 474.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.17
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 87.15
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 14.02
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 2968.00 FEET.

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FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.02
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.551
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        1.70    0.30    0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B        1.60    0.30    0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 7.31
EFFECTIVE AREA(ACRES) = 41.40 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21
TOTAL AREA(ACRES) = 41.4 PEAK FLOW RATE(CFS) = 92.74

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*****
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 478.00 DOWNSTREAM(FEET) = 471.00
FLOW LENGTH(FEET) = 473.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.09
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 92.74
PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 14.63
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 3441.00 FEET.

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FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.63
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.463
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        1.40    0.30    0.200    56

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RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 7.10 0.30 0.400 56  
 APARTMENTS B 2.70 0.30 0.200 56  
 COMMERCIAL B 1.10 0.30 0.100 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.307  
 SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 26.25  
 EFFECTIVE AREA(ACRES) = 53.70 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA(ACRES) = 53.7 PEAK FLOW RATE(CFS) = 115.69

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.63  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.463  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.90 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 5.40 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
 COMMERCIAL B 0.60 0.30 0.100 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.378  
 SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 20.93  
 EFFECTIVE AREA(ACRES) = 63.60 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 63.6 PEAK FLOW RATE(CFS) = 136.62

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 471.00 DOWNSTREAM(FEET) = 468.00  
 FLOW LENGTH(FEET) = 283.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.72  
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 136.62  
 PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 15.00  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 237.00 = 3724.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.408  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 6.10 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.60 0.30 0.400 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.218  
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 14.13  
 EFFECTIVE AREA(ACRES) = 70.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 70.3 PEAK FLOW RATE(CFS) = 147.63

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 468.00 DOWNSTREAM(FEET) = 461.00  
 FLOW LENGTH(FEET) = 698.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.83  
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 147.63  
 PIPE TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 15.90  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 238.00 = 4422.00 FEET.

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 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.90  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.333  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 8.40 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.220  
 SUBAREA AREA(ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 18.37  
 EFFECTIVE AREA(ACRES) = 79.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 79.3 PEAK FLOW RATE(CFS) = 161.26

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.90  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.333  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS



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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      2.10      0.30      0.200      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 2.10      SUBAREA RUNOFF (CFS) = 4.30
EFFECTIVE AREA (ACRES) = 81.40      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.25
TOTAL AREA (ACRES) = 81.4      PEAK FLOW RATE (CFS) = 165.56

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FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 461.00 DOWNSTREAM(FEET) = 440.00
FLOW LENGTH( FEET) = 582.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 21.36
ESTIMATED PIPE DIAMETER (INCH) = 42.00      NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 165.56
PIPE TRAVEL TIME (MIN.) = 0.45      Tc (MIN.) = 16.36
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 5004.00 FEET.

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FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.36
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.296
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      5.00      0.30      0.200      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 5.00      SUBAREA RUNOFF (CFS) = 10.06
EFFECTIVE AREA (ACRES) = 86.40      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 86.4      PEAK FLOW RATE (CFS) = 172.88

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FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM( FEET) = 440.00 DOWNSTREAM( FEET) = 418.00
FLOW LENGTH( FEET) = 650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 20.80
ESTIMATED PIPE DIAMETER (INCH) = 42.00      NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 172.88
PIPE TRAVEL TIME (MIN.) = 0.52      Tc (MIN.) = 16.88
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 5654.00 FEET.

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*****
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.88
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.253
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      5.30      0.30      0.200      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 5.30      SUBAREA RUNOFF (CFS) = 10.46
EFFECTIVE AREA (ACRES) = 91.70      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 91.7      PEAK FLOW RATE (CFS) = 180.01

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FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.88
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.253
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      1.20      0.30      0.200      56
COMMERCIAL              B      0.20      0.30      0.100      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186
SUBAREA AREA (ACRES) = 1.40      SUBAREA RUNOFF (CFS) = 2.77
EFFECTIVE AREA (ACRES) = 93.10      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 93.1      PEAK FLOW RATE (CFS) = 182.78

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*****
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.88
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.253
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      1.20      0.30      0.200      56
SCHOOL                  B      0.70      0.30      0.600      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA (ACRES) = 1.90      SUBAREA RUNOFF (CFS) = 3.67
EFFECTIVE AREA (ACRES) = 95.00      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24

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TOTAL AREA (ACRES) = 95.0 PEAK FLOW RATE (CFS) = 186.45

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FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 418.00 DOWNSTREAM(FEET) = 404.00
FLOW LENGTH(FEET) = 1279.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 42.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.97
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 186.45
PIPE TRAVEL TIME(MIN.) = 1.53 Tc(MIN.) = 18.41
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 241.00 = 6933.00 FEET.

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FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.41
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.127
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.10 0.30 0.200 56
COMMERCIAL B 1.20 0.30 0.100 56
PUBLIC PARK B 6.30 0.30 0.850 56
SCHOOL B 4.60 0.30 0.600 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.60 0.30 0.200 56
COMMERCIAL B 4.00 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 18.80 SUBAREA RUNOFF(CFS) = 33.52
EFFECTIVE AREA(ACRES) = 113.80 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 113.8 PEAK FLOW RATE(CFS) = 209.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.41
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.127
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK B 3.90 0.30 0.850 56
SCHOOL B 10.80 0.30 0.600 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.666
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 25.50
EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 234.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 403.00
FLOW LENGTH(FEET) = 66.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.90
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 234.72
PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 18.47
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 6999.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.47
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.122
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.40 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 16.40 0.30 0.200 56
COMMERCIAL B 1.30 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.193
SUBAREA AREA(ACRES) = 19.10 SUBAREA RUNOFF(CFS) = 35.48
EFFECTIVE AREA(ACRES) = 147.60 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 147.6 PEAK FLOW RATE(CFS) = 269.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 1270.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 50.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.14
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 269.58
PIPE TRAVEL TIME(MIN.) = 1.61 Tc(MIN.) = 20.08
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 20.08  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.992  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.00	0.30	0.200	56
PUBLIC PARK	B	2.00	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.80	0.30	0.200	56
COMMERCIAL	B	1.50	0.30	0.100	56
CONDOMINIUMS	B	0.10	0.30	0.350	56
PUBLIC PARK	B	1.10	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.421  
 SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 14.27  
 EFFECTIVE AREA(ACRES) = 156.10 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32  
 TOTAL AREA(ACRES) = 156.1 PEAK FLOW RATE(CFS) = 269.58  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

-----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 20.08  
 RAINFALL INTENSITY(INCH/HR) = 1.99  
 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.32  
 EFFECTIVE STREAM AREA(ACRES) = 156.10  
 TOTAL STREAM AREA(ACRES) = 156.10  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 269.58

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	145.28	21.19	1.936	0.30( 0.10)	0.34	88.0	220.50
2	269.58	20.08	1.992	0.30( 0.09)	0.32	156.1	230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	411.49	20.08	1.992	0.30( 0.10)	0.32	239.5	230.00
2	406.88	21.19	1.936	0.30( 0.10)	0.32	244.1	220.50

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 411.49 Tc(MIN.) = 20.08  
 EFFECTIVE AREA(ACRES) = 239.51 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32  
 TOTAL AREA(ACRES) = 244.1  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 244.00 IS CODE = 31

-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 394.00 DOWNSTREAM(FEET) = 340.00  
 FLOW LENGTH(FEET) = 849.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 33.35  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 411.49  
 PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 20.50  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 244.00 = 9118.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 244.00 TO NODE 244.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 20.50  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.970  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.70	0.30	0.500	56
PUBLIC PARK	B	0.30	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
PUBLIC PARK	B	0.10	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.537  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 4.89  
 EFFECTIVE AREA(ACRES) = 242.51 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33  
 TOTAL AREA(ACRES) = 247.1 PEAK FLOW RATE(CFS) = 411.49  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 244.00 TO NODE 245.00 IS CODE = 31

-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 315.00  
 FLOW LENGTH(FEET) = 777.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 60.0 INCH PIPE IS 45.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 25.63  
 ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 411.49  
 PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 21.01

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.01

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.945

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56

PUBLIC PARK B 0.20 0.30 0.850 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56

PUBLIC PARK B 0.10 0.30 0.850 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631

SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 1.26

EFFECTIVE AREA(ACRES) = 243.31 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33

TOTAL AREA(ACRES) = 247.9 PEAK FLOW RATE(CFS) = 411.49

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	411.49	21.01	1.945	0.30( 0.10)	0.33	243.3	230.00
2	406.88	22.12	1.888	0.30( 0.10)	0.33	247.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	259.74	17.28	2.221	0.30( 0.13)	0.44	138.2	210.00
2	234.15	20.44	1.973	0.30( 0.13)	0.44	141.3	200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	648.62	17.28	2.221	0.30( 0.11)	0.37	338.3	210.00
2	640.79	20.44	1.973	0.30( 0.11)	0.37	378.1	200.00
3	641.99	21.01	1.945	0.30( 0.11)	0.37	384.6	230.00
4	630.22	22.12	1.888	0.30( 0.11)	0.37	389.2	220.50

TOTAL AREA(ACRES) = 389.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 648.62 Tc(MIN.) = 17.275

EFFECTIVE AREA(ACRES) = 338.28 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 389.2

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 3 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 246.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 306.00

FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 81.0 INCH PIPE IS 64.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.12

ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 648.62

PIPE TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 17.76

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 246.00 = 10514.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.76

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.180

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.90 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.50 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56

CONDOMINIUMS B 9.10 0.30 0.350 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.80 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.410

SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 30.18

EFFECTIVE AREA(ACRES) = 354.58 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38

TOTAL AREA(ACRES) = 405.5 PEAK FLOW RATE(CFS) = 659.82

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.76  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.180  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.60	0.30	0.400	56
CONDOMINIUMS	B	7.40	0.30	0.350	56
PUBLIC PARK	B	0.30	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.375  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 17.31  
 EFFECTIVE AREA(ACRES) = 363.88 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 414.8 PEAK FLOW RATE(CFS) = 677.13

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 246.00 TO NODE 247.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 306.00 DOWNSTREAM(FEET) = 300.00  
 FLOW LENGTH(FEET) = 185.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 55.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 29.08  
 ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 677.13  
 PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 17.87  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 247.00 = 10699.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.87  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.172  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.30	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.413  
 SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 3.69  
 EFFECTIVE AREA(ACRES) = 365.88 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 416.8 PEAK FLOW RATE(CFS) = 677.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.87  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.172  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.40	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.80	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.365  
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 4.82  
 EFFECTIVE AREA(ACRES) = 368.48 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 419.4 PEAK FLOW RATE(CFS) = 682.78

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 271.00  
 FLOW LENGTH(FEET) = 859.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 29.64  
 ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 682.78  
 PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 18.35  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.60	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.60	0.30	0.400	56
COMMERCIAL	B	1.00	0.30	0.100	56

NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356  
 SUBAREA AREA(ACRES) = 4.80 SUBAREA RUNOFF(CFS) = 8.75  
 EFFECTIVE AREA(ACRES) = 373.28 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 424.2 PEAK FLOW RATE(CFS) = 682.78  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

\*\*\*\*\*  
 MAINLINE Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.50 0.30 0.400 56  
 COMMERCIAL B 0.30 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367  
 SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.64  
 EFFECTIVE AREA(ACRES) = 374.18 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 425.1 PEAK FLOW RATE(CFS) = 682.78  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

\*\*\*\*\*  
 MAINLINE Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 2.20 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.80 0.30 0.400 56  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 3.20 0.30 0.500 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.466  
 SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 14.70  
 EFFECTIVE AREA(ACRES) = 382.38 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 433.3 PEAK FLOW RATE(CFS) = 694.67

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

\*\*\*\*\*  
 MAINLINE Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 5.70 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 10.32  
 EFFECTIVE AREA(ACRES) = 388.08 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 439.0 PEAK FLOW RATE(CFS) = 704.99

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

\*\*\*\*\*  
 MAINLINE Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 6.40 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.40 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.60 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 8.40 SUBAREA RUNOFF(CFS) = 13.85  
 EFFECTIVE AREA(ACRES) = 396.48 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA(ACRES) = 447.4 PEAK FLOW RATE(CFS) = 718.84

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 \*\*\*\*\*  
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00

ELEVATION DATA: UPSTREAM(FEET) = 413.04 DOWNSTREAM(FEET) = 405.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.928  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.166

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
CONDOMINIUMS RESIDENTIAL	B	0.20	0.30	0.350	56	7.70
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56	6.93
CONDOMINIUMS	B	0.10	0.30	0.350	56	7.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.312  
SUBAREA RUNOFF(CFS) = 1.47  
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 405.00 DOWNSTREAM ELEVATION(FEET) = 385.00  
STREET LENGTH(FEET) = 587.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.40  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.30  
HALFSTREET FLOOD WIDTH(FEET) = 7.78  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.68  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.11  
STREET FLOW TRAVEL TIME(MIN.) = 2.66 Tc(MIN.) = 9.59  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.281

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.20	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.224  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 7.81  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.07

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 8.96

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 10.04  
FLOW VELOCITY(FEET/SEC.) = 4.09 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.40  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 917.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 385.00 DOWNSTREAM(FEET) = 378.50  
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.99  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 8.96  
PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 9.83  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1079.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 9.83  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.199  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/  
LAND USE

SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	
COMMERCIAL	B	1.10	0.30	0.100	56
COMMERCIAL	B	1.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 6.84  
EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 15.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 378.50 DOWNSTREAM(FEET) = 348.50  
FLOW LENGTH(FEET) = 637.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.32  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 15.57  
PIPE TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 10.63  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 1716.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.63

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.050

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.60	0.30	0.500	56
COMMERCIAL	B	1.70	0.30	0.100	56
CONDOMINIUMS	B	1.00	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
COMMERCIAL	B	0.70	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.240					
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 12.06					
EFFECTIVE AREA(ACRES) = 10.00 AREA-AVERAGED Fm(INCH/HR) = 0.06					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21					
TOTAL AREA(ACRES) = 10.0 PEAK FLOW RATE(CFS) = 26.90					

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 348.50 DOWNSTREAM(FEET) = 306.00  
 FLOW LENGTH(FEET) = 944.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.87  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 26.90  
 PIPE TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 11.69  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.69

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.895

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.20	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.50	0.30	0.500	56
RESIDENTIAL					

"8-10 DWELLINGS/ACRE" B 1.90 0.30 0.400 56  
 COMMERCIAL B 2.00 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
 SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 18.33  
 EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.27  
 TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 43.83

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.69

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.895

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	4.40	0.30	0.200	56
COMMERCIAL	B	0.10	0.30	0.100	56
APARTMENTS	B	6.70	0.30	0.200	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.199					
SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 28.58					
EFFECTIVE AREA(ACRES) = 28.50 AREA-AVERAGED Fm(INCH/HR) = 0.07					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24					
TOTAL AREA(ACRES) = 28.5 PEAK FLOW RATE(CFS) = 72.41					

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.69

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.895

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.10	0.30	1.000	66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 7.24					
EFFECTIVE AREA(ACRES) = 31.60 AREA-AVERAGED Fm(INCH/HR) = 0.09					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31					
TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 79.65					

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 11.69  
 RAINFALL INTENSITY(INCH/HR) = 2.89  
 AREA-AVERAGED Fm(INCH/HR) = 0.09



AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.31  
 EFFECTIVE STREAM AREA (ACRES) = 31.60  
 TOTAL STREAM AREA (ACRES) = 31.60  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 79.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 400.00 TO NODE 420.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 300.40  
 ELEVATION DATA: UPSTREAM (FEET) = 312.80 DOWNSTREAM (FEET) = 310.80

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.115  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.771  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.50	0.30	0.100	56	8.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 1.68  
 TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 1.68

\*\*\*\*\*

FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<

UPSTREAM ELEVATION (FEET) = 310.80 DOWNSTREAM ELEVATION (FEET) = 307.00  
 STREET LENGTH (FEET) = 266.50 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 67.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 62.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.54  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.33  
 HALFSTREET FLOOD WIDTH (FEET) = 9.75  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.53  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.83  
 STREET FLOW TRAVEL TIME (MIN.) = 1.76 Tc (MIN.) = 9.87  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.185

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.60	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 1.70  
 EFFECTIVE AREA (ACRES) = 1.10 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 3.12

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.35 HALFSTREET FLOOD WIDTH (FEET) = 10.78  
 FLOW VELOCITY (FEET/SEC.) = 2.64 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.92  
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.00 = 566.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 307.00 DOWNSTREAM (FEET) = 305.50  
 FLOW LENGTH (FEET) = 105.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.68  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 3.12  
 PIPE TRAVEL TIME (MIN.) = 0.31 Tc (MIN.) = 10.18  
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.10 = 671.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 10.18  
 RAINFALL INTENSITY (INCH/HR) = 3.12  
 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.10  
 EFFECTIVE STREAM AREA (ACRES) = 1.10  
 TOTAL STREAM AREA (ACRES) = 1.10  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 3.12

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	79.65	11.69	2.895	0.30 ( 0.09)	0.31	31.6	300.00
2	3.12	10.18	3.116	0.30 ( 0.03)	0.10	1.1	400.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	77.99	10.18	3.116	0.30 ( 0.09)	0.31	28.6	400.00

2 82.55 11.69 2.895 0.30( 0.09) 0.31 32.7 300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 82.55 Tc(MIN.) = 11.69
EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.7
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 426.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 305.50 DOWNSTREAM(FEET) = 301.00
FLOW LENGTH(FEET) = 261.40 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 29.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.39
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 82.55
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 12.01
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.10 = 2921.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.01
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.847
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.49
EFFECTIVE AREA(ACRES) = 32.90 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.9 PEAK FLOW RATE(CFS) = 82.55
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.20 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 289.00
FLOW LENGTH(FEET) = 448.56 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.26
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 82.55
PIPE TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 12.47
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.20 = 3369.96 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.20 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.47
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.779
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.20
EFFECTIVE AREA(ACRES) = 33.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 33.4 PEAK FLOW RATE(CFS) = 82.55
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.30 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 289.00 DOWNSTREAM(FEET) = 282.00
FLOW LENGTH(FEET) = 260.45 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.29
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 82.55
PIPE TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 12.74
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.30 = 3630.41 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.30 TO NODE 426.30 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.74
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.740
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.80 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 2.59
EFFECTIVE AREA(ACRES) = 34.50 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 34.5 PEAK FLOW RATE(CFS) = 82.55

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 426.30 TO NODE 248.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 271.00
FLOW LENGTH(FEET) = 411.44 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.25
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 82.55
PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 13.16
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.
*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.16
RAINFALL INTENSITY(INCH/HR) = 2.68
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 34.50
TOTAL STREAM AREA(ACRES) = 34.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 82.55
*****
FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----
INITIAL SUBAREA FLOW-LENGTH(FEET) = 233.60
ELEVATION DATA: UPSTREAM(FEET) = 306.50 DOWNSTREAM(FEET) = 301.80

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.882
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.514
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.20 0.30 0.100 56 5.88
COMMERCIAL B 0.20 0.30 0.100 56 5.88
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 1.61
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.61
*****
FLOW PROCESS FROM NODE 426.00 TO NODE 427.00 IS CODE = 61
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 301.80 DOWNSTREAM ELEVATION(FEET) = 294.00
STREET LENGTH(FEET) = 478.70 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.73
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.33
HALFSTREET FLOOD WIDTH(FEET) = 9.73
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.73
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.90
STREET FLOW TRAVEL TIME(MIN.) = 2.93 Tc(MIN.) = 8.81
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.539
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.20 0.30 0.100 56
COMMERCIAL B 0.50 0.30 0.100 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 2.21
EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 3.47

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.93
FLOW VELOCITY(FEET/SEC.) = 2.87 DEPTH*VELOCITY(FT*FT/SEC.) = 1.00
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 427.00 = 712.30 FEET.
*****
FLOW PROCESS FROM NODE 427.00 TO NODE 428.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 294.00 DOWNSTREAM ELEVATION(FEET) = 286.00
STREET LENGTH(FEET) = 300.80 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

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Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.17  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 10.64  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.60  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.24

STREET FLOW TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 10.20  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.113

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.39  
EFFECTIVE AREA(ACRES) = 1.60 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 4.44

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.96  
FLOW VELOCITY(FEET/SEC.) = 3.65 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.28  
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 428.00 = 1013.10 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 428.00 TO NODE 429.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 286.00 DOWNSTREAM ELEVATION(FEET) = 276.00  
STREET LENGTH(FEET) = 242.40 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.97  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 10.42  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.44  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.52  
STREET FLOW TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 11.11

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.980

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.06  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 5.31

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.75  
FLOW VELOCITY(FEET/SEC.) = 4.51 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.56  
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 429.00 = 1255.50 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 429.00 TO NODE 429.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.11

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.980

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.50	0.30	0.400	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.50	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 5.15  
EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.08  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 10.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 429.00 TO NODE 248.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 273.00  
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.23  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 10.46  
PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 11.27  
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 248.00 = 1355.50 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 11.27

RAINFALL INTENSITY(INCH/HR) = 2.96  
 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.25  
 EFFECTIVE STREAM AREA(ACRES) = 4.00  
 TOTAL STREAM AREA(ACRES) = 4.00  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 10.46

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	78.44	11.69	2.894	0.30( 0.09)	0.31	30.4	400.00
1	82.55	13.16	2.678	0.30( 0.09)	0.31	34.5	300.00
2	10.46	11.27	2.956	0.30( 0.08)	0.25	4.0	425.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	87.75	11.27	2.956	0.30( 0.09)	0.30	33.3	425.00
2	88.67	11.69	2.894	0.30( 0.09)	0.30	34.4	400.00
3	92.00	13.16	2.678	0.30( 0.09)	0.31	38.5	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 92.00 Tc(MIN.) = 13.16  
 EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 38.5  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	87.75	11.27	2.956	0.30( 0.09)	0.30	33.3	425.00
2	88.67	11.69	2.894	0.30( 0.09)	0.30	34.4	400.00
3	92.00	13.16	2.678	0.30( 0.09)	0.31	38.5	300.00

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	718.84	18.35	2.132	0.30( 0.12)	0.39	396.5	210.00
2	707.92	21.52	1.919	0.30( 0.12)	0.39	436.3	200.00
3	707.21	22.09	1.890	0.30( 0.12)	0.38	442.8	230.00
4	691.92	23.20	1.834	0.30( 0.12)	0.38	447.4	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	709.95	11.27	2.956	0.30( 0.11)	0.38	276.9	425.00
2	720.02	11.69	2.894	0.30( 0.11)	0.38	287.1	400.00
3	747.36	13.16	2.678	0.30( 0.11)	0.38	322.8	300.00
4	791.40	18.35	2.132	0.30( 0.11)	0.38	435.0	210.00
5	772.91	21.52	1.919	0.30( 0.11)	0.38	474.8	200.00
6	771.17	22.09	1.890	0.30( 0.11)	0.38	481.3	230.00
7	753.88	23.20	1.834	0.30( 0.11)	0.38	485.9	220.50

TOTAL AREA(ACRES) = 485.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 791.40 Tc(MIN.) = 18.353  
 EFFECTIVE AREA(ACRES) = 434.98 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 485.9  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 249.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 261.00  
 FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 78.0 INCH PIPE IS 59.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 29.00  
 ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 791.40  
 PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 18.55  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 429.00 TO NODE 430.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 262.70

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.459  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.322  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

COMMERCIAL B 0.20 0.30 0.100 56 6.46  
COMMERCIAL B 0.40 0.30 0.100 56 6.46  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 2.32  
TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 2.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 262.70 DOWNSTREAM ELEVATION(FEET) = 258.98  
STREET LENGTH(FEET) = 345.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.26

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 11.72  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.39  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.87  
STREET FLOW TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 8.87  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.521

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.89  
EFFECTIVE AREA(ACRES) = 1.20 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 3.77

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.52  
FLOW VELOCITY(FEET/SEC.) = 2.47 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.93  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.00 = 675.60 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.00 TO NODE 431.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 258.98 DOWNSTREAM(FEET) = 258.00

FLOW LENGTH(FEET) = 91.03 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.39  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 3.77  
PIPE TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 9.15  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.10 = 766.63 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 9.15  
RAINFALL INTENSITY(INCH/HR) = 3.43  
AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 1.20  
TOTAL STREAM AREA(ACRES) = 1.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 410.00 TO NODE 440.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 299.70  
ELEVATION DATA: UPSTREAM(FEET) = 312.69 DOWNSTREAM(FEET) = 310.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.196

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.744

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.40	0.30	0.100	56	8.20

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF(CFS) = 1.34

TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.34

\*\*\*\*\*  
FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 306.50  
STREET LENGTH(FEET) = 299.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017  
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.89  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 8.38  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.38  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.73  
STREET FLOW TRAVEL TIME(MIN.) = 2.09 Tc(MIN.) = 10.29

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.101  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.10 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.11  
EFFECTIVE AREA(ACRES) = 0.80 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 2.21

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 9.03  
FLOW VELOCITY(FEET/SEC.) = 2.49 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.79  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 441.00 = 598.70 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 306.50 DOWNSTREAM ELEVATION(FEET) = 299.00  
STREET LENGTH(FEET) = 341.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.97  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 9.43  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.12  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.01  
STREET FLOW TRAVEL TIME(MIN.) = 1.83 Tc(MIN.) = 12.11

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.833  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.20 0.30 0.100 56  
COMMERCIAL B 0.40 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.51  
EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 3.53

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 10.33  
FLOW VELOCITY(FEET/SEC.) = 3.20 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.09  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 442.00 = 940.30 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 299.00 DOWNSTREAM ELEVATION(FEET) = 288.50  
STREET LENGTH(FEET) = 390.10 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.22  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 10.63  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.65  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.26  
STREET FLOW TRAVEL TIME(MIN.) = 1.78 Tc(MIN.) = 13.89

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.571  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.30 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.37  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 4.57

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 11.13  
FLOW VELOCITY(FEET/SEC.) = 3.67 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.30  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 443.00 = 1330.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 443.00 TO NODE 444.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 288.50 DOWNSTREAM ELEVATION(FEET) = 281.00  
STREET LENGTH(FEET) = 272.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.00

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 11.52  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.78  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.36  
STREET FLOW TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 15.10  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.400  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.85  
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 5.12

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.62  
FLOW VELOCITY(FEET/SEC.) = 3.81 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.38  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 444.00 = 1603.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 444.00 TO NODE 445.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 281.00 DOWNSTREAM ELEVATION(FEET) = 268.10  
STREET LENGTH(FEET) = 462.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.82

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 12.32  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.91  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.46  
STREET FLOW TRAVEL TIME(MIN.) = 1.97 Tc(MIN.) = 17.07  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.238  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.70	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.39  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 6.16

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.62  
FLOW VELOCITY(FEET/SEC.) = 3.98 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.51  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 445.00 = 2065.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 445.00 TO NODE 446.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 268.10 DOWNSTREAM ELEVATION(FEET) = 257.00  
STREET LENGTH(FEET) = 532.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.06

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.41  
HALFSTREET FLOOD WIDTH(FEET) = 14.29  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.66  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.49  
STREET FLOW TRAVEL TIME(MIN.) = 2.43 Tc(MIN.) = 19.50



\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.038  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.10 0.30 0.100 56  
 COMMERCIAL B 0.60 0.30 0.100 56  
 COMMERCIAL B 0.30 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA (ACRES) = 1.00 SUBAREA RUNOFF (CFS) = 1.81  
 EFFECTIVE AREA (ACRES) = 4.10 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 4.1 PEAK FLOW RATE (CFS) = 7.41

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.41 HALFSTREET FLOOD WIDTH (FEET) = 14.51  
 FLOW VELOCITY (FEET/SEC.) = 3.73 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.53  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 446.00 = 2598.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 446.00 TO NODE 431.10 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 257.00 DOWNSTREAM (FEET) = 256.50  
 FLOW LENGTH (FEET) = 100.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.9 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.78  
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 7.41  
 PIPE TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 19.85  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 19.85  
 RAINFALL INTENSITY (INCH/HR) = 2.01  
 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.10  
 EFFECTIVE STREAM AREA (ACRES) = 4.10  
 TOTAL STREAM AREA (ACRES) = 4.10  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 7.41

\*\* CONFLUENCE DATA \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3.77	9.15	3.427	0.30 ( 0.03)	0.10	1.2	429.00
2	7.41	19.85	2.009	0.30 ( 0.03)	0.10	4.1	410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.63	9.15	3.427	0.30 ( 0.03)	0.10	3.1	429.00
2	9.60	19.85	2.009	0.30 ( 0.03)	0.10	5.3	410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 9.63 Tc (MIN.) = 9.15  
 EFFECTIVE AREA (ACRES) = 3.09 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 5.3  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 249.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 258.00 DOWNSTREAM (FEET) = 257.00  
 FLOW LENGTH (FEET) = 230.42 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.69  
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 9.63  
 PIPE TRAVEL TIME (MIN.) = 0.82 Tc (MIN.) = 9.97  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<<  
 =====

\*\* MAIN STREAM CONFLUENCE DATA \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.63	9.97	3.155	0.30 ( 0.03)	0.10	3.1	429.00
2	9.60	20.66	1.962	0.30 ( 0.03)	0.10	5.3	410.00

 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	709.95	11.48	2.926	0.30 ( 0.11)	0.38	276.9	425.00
2	720.02	11.90	2.864	0.30 ( 0.11)	0.38	287.1	400.00
3	747.36	13.36	2.648	0.30 ( 0.11)	0.38	322.8	300.00
4	791.40	18.55	2.115	0.30 ( 0.11)	0.38	435.0	210.00
5	772.91	21.72	1.909	0.30 ( 0.11)	0.38	474.8	200.00
6	771.17	22.29	1.880	0.30 ( 0.11)	0.38	481.3	230.00
7	753.88	23.40	1.823	0.30 ( 0.11)	0.38	485.9	220.50

 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
---------------	---------	-----------	---------------------	-------------------	----	------------	----------------

1	676.18	9.97	3.155	0.30	( 0.11)	0.38	243.5	429.00
2	719.57	11.48	2.926	0.30	( 0.11)	0.38	280.3	425.00
3	729.64	11.90	2.864	0.30	( 0.11)	0.38	290.5	400.00
4	756.99	13.36	2.648	0.30	( 0.11)	0.38	326.6	300.00
5	801.01	18.55	2.115	0.30	( 0.11)	0.38	439.8	210.00
6	788.68	20.66	1.962	0.30	( 0.11)	0.38	466.8	410.00
7	782.25	21.72	1.909	0.30	( 0.11)	0.38	480.1	200.00
8	780.36	22.29	1.880	0.30	( 0.11)	0.38	486.6	230.00
9	762.79	23.40	1.823	0.30	( 0.11)	0.37	491.2	220.50

TOTAL AREA (ACRES) = 491.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 801.01 Tc (MIN.) = 18.551  
EFFECTIVE AREA (ACRES) = 439.84 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA (ACRES) = 491.2  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<<

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 491.2 TC (MIN.) = 18.55  
EFFECTIVE AREA (ACRES) = 439.84 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.380  
PEAK FLOW RATE (CFS) = 801.01

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	676.18	9.97	3.155	0.30 ( 0.11)	0.38	243.5	429.00
2	719.57	11.48	2.926	0.30 ( 0.11)	0.38	280.3	425.00
3	729.64	11.90	2.864	0.30 ( 0.11)	0.38	290.5	400.00
4	756.99	13.36	2.648	0.30 ( 0.11)	0.38	326.6	300.00
5	801.01	18.55	2.115	0.30 ( 0.11)	0.38	439.8	210.00
6	788.68	20.66	1.962	0.30 ( 0.11)	0.38	466.8	410.00
7	782.25	21.72	1.909	0.30 ( 0.11)	0.38	480.1	200.00
8	780.36	22.29	1.880	0.30 ( 0.11)	0.38	486.6	230.00
9	762.79	23.40	1.823	0.30 ( 0.11)	0.37	491.2	220.50

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506101D.DAT  
TIME/DATE OF STUDY: 12:41 04/15/2013  
=====

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:  
=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.060
- 2) 6.00; 3.660
- 3) 7.00; 3.350
- 4) 8.00; 3.100
- 5) 9.00; 2.900
- 6) 10.00; 2.730
- 7) 11.00; 2.580
- 8) 12.00; 2.460
- 9) 13.00; 2.350
- 10) 14.00; 2.250
- 11) 15.00; 2.160
- 12) 20.00; 1.830
- 13) 25.00; 1.610
- 14) 30.00; 1.450
- 15) 40.00; 1.230
- 16) 50.00; 1.090
- 17) 60.00; 0.980
- 18) 90.00; 0.770
- 19) 120.00; 0.660
- 20) 180.00; 0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10100.00 TO NODE 10101.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 820.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.606  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.797  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.10	0.30	1.000	98	9.61
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.30	1.000	98	9.61

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.90  
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 0.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 10101.00 TO NODE 10102.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 790.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 152.00 CHANNEL SLOPE = 0.1974  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.90  
FLOW VELOCITY(FEET/SEC.) = 4.11 FLOW DEPTH(FEET) = 0.27  
TRAVEL TIME(MIN.) = 0.62  $T_c$ (MIN.) = 10.22  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10102.00 = 479.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10102.00 TO NODE 10102.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 10.22  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.697  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL	AREA	Fp	Ap	SCS
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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.50      0.30      1.000      -
USER-DEFINED  -        0.30      0.30      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.80 SUBAREA RUNOFF (CFS) = 1.73
EFFECTIVE AREA (ACRES) = 1.20 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.2 PEAK FLOW RATE (CFS) = 2.59

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*****
FLOW PROCESS FROM NODE 10102.00 TO NODE 10103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 762.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.1400
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.59
FLOW VELOCITY(FEET/SEC.) = 4.79 FLOW DEPTH(FEET) = 0.42
TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 10.92
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10103.00 = 679.00 FEET.

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 10.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.592
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -        0.40    0.30    1.000  -
USER-DEFINED       -        0.80    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 2.48
EFFECTIVE AREA (ACRES) = 2.40 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 2.4 PEAK FLOW RATE (CFS) = 4.95

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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ELEVATION DATA: UPSTREAM(FEET) = 762.00 DOWNSTREAM(FEET) = 754.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 124.00 CHANNEL SLOPE = 0.0645
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.95
FLOW VELOCITY(FEET/SEC.) = 4.18 FLOW DEPTH(FEET) = 0.63
TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 11.41
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10104.00 = 803.00 FEET.

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.41
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.531
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -        0.70    0.30    1.000  -
USER-DEFINED       -        1.10    0.30    1.000  -
USER-DEFINED       -        0.10    0.30    1.000  -
USER-DEFINED       -        0.40    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 4.62
EFFECTIVE AREA (ACRES) = 4.70 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.7 PEAK FLOW RATE (CFS) = 9.44

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 754.00 DOWNSTREAM(FEET) = 740.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00 CHANNEL SLOPE = 0.0255
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 9.44
FLOW VELOCITY(FEET/SEC.) = 3.48 FLOW DEPTH(FEET) = 0.95
TRAVEL TIME(MIN.) = 2.63 Tc(MIN.) = 14.05
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10105.00 = 1353.00 FEET.

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.05
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.246
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -        3.40    0.30    1.000  -
USER-DEFINED       -        0.60    0.30    1.000  -
USER-DEFINED       -        6.00    0.30    1.000  -
USER-DEFINED       -        0.60    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 10.60 SUBAREA RUNOFF (CFS) = 18.56
EFFECTIVE AREA (ACRES) = 15.30 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 15.3 PEAK FLOW RATE (CFS) = 26.79

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10106.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 740.00 DOWNSTREAM(FEET) = 623.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 929.00 CHANNEL SLOPE = 0.1259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 26.79
FLOW VELOCITY(FEET/SEC.) = 8.25 FLOW DEPTH(FEET) = 1.04
TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 15.92
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10106.00 = 2282.00 FEET.
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10106.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.099
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 10.40 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 4.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 25.10
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 49.87
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 592.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 417.00 CHANNEL SLOPE = 0.0743
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 49.87
FLOW VELOCITY(FEET/SEC.) = 7.88 FLOW DEPTH(FEET) = 1.45
TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 16.81
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10107.00 = 2699.00 FEET.
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10107.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.81

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* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.041
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 5.10 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 2.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 14.89
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 63.14
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 592.00 DOWNSTREAM(FEET) = 590.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0333
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.000
CHANNEL FLOW THRU SUBAREA(CFS) = 63.14
FLOW VELOCITY(FEET/SEC.) = 6.19 FLOW DEPTH(FEET) = 1.84
TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 16.97
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10108.00 = 2759.00 FEET.
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.97
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.030
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 7.00 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 7.50 0.30 1.000 -
USER-DEFINED - 1.80 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 28.19
EFFECTIVE AREA(ACRES) = 58.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.4 PEAK FLOW RATE(CFS) = 90.94
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 16.97
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.030
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -        0.20     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20     SUBAREA RUNOFF(CFS) = 0.31
EFFECTIVE AREA(ACRES) = 58.60   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.6     PEAK FLOW RATE(CFS) = 91.26

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*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10109.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 526.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 973.00 CHANNEL SLOPE = 0.0658
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 91.26
FLOW VELOCITY(FEET/SEC.) = 8.75 FLOW DEPTH(FEET) = 1.86
TRAVEL TIME(MIN.) = 1.85 Tc(MIN.) = 18.82
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10109.00 = 3732.00 FEET.

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*****
FLOW PROCESS FROM NODE 10109.00 TO NODE 10109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 18.82
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.908
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -        16.40   0.30     1.000     -
USER-DEFINED        -         0.60   0.30     1.000     -
USER-DEFINED        -         3.00   0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.00     SUBAREA RUNOFF(CFS) = 28.94
EFFECTIVE AREA(ACRES) = 78.60   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.6     PEAK FLOW RATE(CFS) = 113.75

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*****
FLOW PROCESS FROM NODE 10109.00 TO NODE 10110.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 526.00 DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1045.00 CHANNEL SLOPE = 0.0679

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CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 113.75
FLOW VELOCITY(FEET/SEC.) = 9.37 FLOW DEPTH(FEET) = 2.01
TRAVEL TIME(MIN.) = 1.86 Tc(MIN.) = 20.68
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10110.00 = 4777.00 FEET.

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*****
FLOW PROCESS FROM NODE 10110.00 TO NODE 10110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 20.68
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.800
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         1.00   0.30     1.000     -
USER-DEFINED        -         0.50   0.30     1.000     -
USER-DEFINED        -        31.60   0.30     1.000     -
USER-DEFINED        -         1.60   0.30     1.000     -
USER-DEFINED        -         0.40   0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.10     SUBAREA RUNOFF(CFS) = 47.39
EFFECTIVE AREA(ACRES) = 113.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.7     PEAK FLOW RATE(CFS) = 153.52

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*****
FLOW PROCESS FROM NODE 10110.00 TO NODE 10111.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 675.00 CHANNEL SLOPE = 0.0667
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 153.52
FLOW VELOCITY(FEET/SEC.) = 10.06 FLOW DEPTH(FEET) = 2.26
TRAVEL TIME(MIN.) = 1.12 Tc(MIN.) = 21.80
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10111.00 = 5452.00 FEET.

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*****
FLOW PROCESS FROM NODE 10111.00 TO NODE 10111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 21.80
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.751
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         7.40   0.30     1.000     -
USER-DEFINED        -         6.00   0.30     1.000     -
USER-DEFINED        -        24.80   0.30     1.000     -
USER-DEFINED        -         0.90   0.30     1.000     -

```

USER-DEFINED - 4.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 43.20 SUBAREA RUNOFF (CFS) = 56.42  
EFFECTIVE AREA (ACRES) = 156.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 156.9 PEAK FLOW RATE (CFS) = 204.90

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10111.00 TO NODE 10112.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	410.00	DOWNSTREAM (FEET) =	405.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	143.00	CHANNEL SLOPE =	0.0350
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	4.00
CHANNEL FLOW THRU SUBAREA (CFS) =	204.90		
FLOW VELOCITY (FEET/SEC.) =	8.46	FLOW DEPTH (FEET) =	2.84
TRAVEL TIME (MIN.) =	0.28	Tc (MIN.) =	22.08
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10112.00 =	5595.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 22.08

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.739

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	7.90	0.30	1.000	-
USER-DEFINED	-	25.90	0.30	1.000	-
USER-DEFINED	-	19.30	0.30	1.000	-
USER-DEFINED	-	2.10	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 56.20 SUBAREA RUNOFF (CFS) = 72.77  
EFFECTIVE AREA (ACRES) = 213.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 213.1 PEAK FLOW RATE (CFS) = 275.92

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10113.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	405.00	DOWNSTREAM (FEET) =	363.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	1642.00	CHANNEL SLOPE =	0.0256
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	275.92		
FLOW VELOCITY (FEET/SEC.) =	8.11	FLOW DEPTH (FEET) =	3.37

TRAVEL TIME (MIN.) = 3.37 Tc (MIN.) = 25.45  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10113.00 = 7237.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 25.45

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.596

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	33.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 35.40 SUBAREA RUNOFF (CFS) = 41.28  
EFFECTIVE AREA (ACRES) = 248.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 248.5 PEAK FLOW RATE (CFS) = 289.76

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10114.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	363.00	DOWNSTREAM (FEET) =	340.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	918.00	CHANNEL SLOPE =	0.0251
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	289.76		
FLOW VELOCITY (FEET/SEC.) =	8.14	FLOW DEPTH (FEET) =	3.44
TRAVEL TIME (MIN.) =	1.88	Tc (MIN.) =	27.33
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10114.00 =	8155.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 27.33

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.535

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	10.10	0.30	1.000	-
USER-DEFINED	-	17.70	0.30	1.000	-
USER-DEFINED	-	52.90	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 83.10 SUBAREA RUNOFF (CFS) = 92.40

EFFECTIVE AREA(ACRES) = 331.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 331.6 PEAK FLOW RATE(CFS) = 368.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 27.33  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.535  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 1.67  
EFFECTIVE AREA(ACRES) = 333.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 333.1 PEAK FLOW RATE(CFS) = 370.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 10114.00 TO NODE 10115.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 301.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1467.00 CHANNEL SLOPE = 0.0266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 370.39  
FLOW VELOCITY(FEET/SEC.) = 8.86 FLOW DEPTH(FEET) = 3.73  
TRAVEL TIME(MIN.) = 2.76 Tc(MIN.) = 30.09  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10115.00 = 9622.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10115.00 TO NODE 10115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 30.09  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.448  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.60 0.30 1.000 -  
USER-DEFINED - 24.30 0.30 1.000 -  
USER-DEFINED - 47.70 0.30 1.000 -  
USER-DEFINED - 9.80 0.30 1.000 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 94.00 SUBAREA RUNOFF(CFS) = 97.13  
EFFECTIVE AREA(ACRES) = 427.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 427.1 PEAK FLOW RATE(CFS) = 441.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 10115.00 TO NODE 10116.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 272.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1696.00 CHANNEL SLOPE = 0.0171  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 441.30  
FLOW VELOCITY(FEET/SEC.) = 7.85 FLOW DEPTH(FEET) = 4.33  
TRAVEL TIME(MIN.) = 3.60 Tc(MIN.) = 33.69  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10116.00 = 11318.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 33.69  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.369  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.90 0.30 1.000 -  
USER-DEFINED - 4.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 32.00 0.30 1.000 -  
USER-DEFINED - 3.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 45.60 SUBAREA RUNOFF(CFS) = 43.87  
EFFECTIVE AREA(ACRES) = 472.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 472.7 PEAK FLOW RATE(CFS) = 454.72

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FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 33.69  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.369  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 1.000 -  
USER-DEFINED - 7.70 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.70 SUBAREA RUNOFF(CFS) = 9.33  
EFFECTIVE AREA(ACRES) = 482.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 482.4 PEAK FLOW RATE(CFS) = 464.05



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*****
FLOW PROCESS FROM NODE 10116.00 TO NODE 10117.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 272.00 DOWNSTREAM(FEET) = 252.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 878.00 CHANNEL SLOPE = 0.0228
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 464.05
FLOW VELOCITY(FEET/SEC.) = 8.86 FLOW DEPTH(FEET) = 4.18
TRAVEL TIME(MIN.) = 1.65 Tc(MIN.) = 35.34
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10117.00 = 12196.00 FEET.
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 35.34
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.332
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 8.20 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 11.45
EFFECTIVE AREA(ACRES) = 494.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 494.7 PEAK FLOW RATE(CFS) = 464.05
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 35.34
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.332
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 14.60 0.30 1.000 -
USER-DEFINED - 6.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 3.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996
SUBAREA AREA(ACRES) = 25.00 SUBAREA RUNOFF(CFS) = 23.26
EFFECTIVE AREA(ACRES) = 519.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

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AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 519.7 PEAK FLOW RATE(CFS) = 482.99
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10118.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 252.00 DOWNSTREAM(FEET) = 249.00
FLOW LENGTH(FEET) = 280.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 78.0 INCH PIPE IS 60.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.64
ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 482.99
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 35.61
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10118.00 = 12476.00 FEET.
*****
FLOW PROCESS FROM NODE 10118.00 TO NODE 10119.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 249.00 DOWNSTREAM(FEET) = 240.00
FLOW LENGTH(FEET) = 892.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 78.0 INCH PIPE IS 61.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.15
ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 482.99
PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 36.47
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10119.00 = 13368.00 FEET.
*****
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 36.47
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.308
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.100 -
USER-DEFINED - 1.00 0.30 0.600 -
USER-DEFINED - 0.80 0.30 0.850 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.706
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 3.55
EFFECTIVE AREA(ACRES) = 523.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 523.3 PEAK FLOW RATE(CFS) = 482.99
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****

```

FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.47  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.308  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	9.60	0.30	0.600	-
USER-DEFINED	-	1.00	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.627  
 SUBAREA AREA (ACRES) = 13.60 SUBAREA RUNOFF (CFS) = 13.70  
 EFFECTIVE AREA (ACRES) = 536.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 536.9 PEAK FLOW RATE (CFS) = 488.60

FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.47  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.308  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.09  
 EFFECTIVE AREA (ACRES) = 537.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 537.0 PEAK FLOW RATE (CFS) = 488.69

FLOW PROCESS FROM NODE 10119.00 TO NODE 10120.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 240.00 DOWNSTREAM(FEET) = 239.00  
 FLOW LENGTH(FEET) = 120.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 81.0 INCH PIPE IS 64.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.99  
 ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 488.69  
 PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 36.60  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10120.00 = 13488.00 FEET.

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.60  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.305  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.657  
 SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 5.58  
 EFFECTIVE AREA (ACRES) = 542.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA (ACRES) = 542.6 PEAK FLOW RATE (CFS) = 492.94

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.60  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.305  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.717  
 SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 5.00  
 EFFECTIVE AREA (ACRES) = 547.70 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA (ACRES) = 547.7 PEAK FLOW RATE (CFS) = 497.95

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.60  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.305  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	2.70	0.30	1.000	-
USER-DEFINED	-	11.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 14.29  
EFFECTIVE AREA(ACRES) = 563.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 563.5 PEAK FLOW RATE(CFS) = 512.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10121.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 239.00 DOWNSTREAM(FEET) = 213.00  
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 36.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 46.59  
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 512.23  
PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 36.67  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10121.00 = 13682.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10121.00 TO NODE 10122.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 213.00 DOWNSTREAM(FEET) = 176.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 995.00 CHANNEL SLOPE = 0.0372  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 512.23  
FLOW VELOCITY(FEET/SEC.) = 10.91 FLOW DEPTH(FEET) = 3.96  
TRAVEL TIME(MIN.) = 1.52 Tc(MIN.) = 38.19  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10122.00 = 14677.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 38.19  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.270  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.80 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 6.37  
EFFECTIVE AREA(ACRES) = 570.80 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98

TOTAL AREA(ACRES) = 570.8 PEAK FLOW RATE(CFS) = 512.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 38.19  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.270  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 3.30 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 3.00 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 9.17  
EFFECTIVE AREA(ACRES) = 581.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 581.3 PEAK FLOW RATE(CFS) = 512.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 38.19  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.270  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 3.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 3.50 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 6.90  
EFFECTIVE AREA(ACRES) = 589.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 589.2 PEAK FLOW RATE(CFS) = 516.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 38.19  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.270  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 1.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$  (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 1.57  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.98  
TOTAL AREA (ACRES) = 591.0 PEAK FLOW RATE (CFS) = 518.50

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 591.0 TC (MIN.) = 38.19  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.984  
PEAK FLOW RATE (CFS) = 518.50

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2007 Advanced Engineering Software (aes)  
Ver. 13.4 Release Date: 01/25/2007 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506102D.DAT  
TIME/DATE OF STUDY: 13:56 01/08/2009  
=====

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.080
- 2) 10.00; 2.729
- 3) 15.00; 2.163
- 4) 20.00; 1.834
- 5) 25.00; 1.614
- 6) 30.00; 1.440
- 7) 40.00; 1.233
- 8) 50.00; 1.085
- 9) 60.00; 0.950
- 10) 90.00; 0.775
- 11) 120.00; 0.657
- 12) 180.00; 0.530
- 13) 360.00; 0.367
- 14) 1440.00; 0.153

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10200.00 TO NODE 10201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 293.00  
ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 617.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.991

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.732

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	-	0.73	0.30	0.600	0	9.99
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600						
SUBAREA RUNOFF(CFS) = 1.68						
TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 1.68						

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10201.00 TO NODE 10202.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 617.00 DOWNSTREAM ELEVATION(FEET) = 613.00  
STREET LENGTH(FEET) = 323.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.60

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 9.19  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.51  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.86  
STREET FLOW TRAVEL TIME(MIN.) = 2.14 Tc(MIN.) = 12.13  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.488

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.88	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 1.84  
EFFECTIVE AREA(ACRES) = 1.62 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 3.36

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.39  
FLOW VELOCITY(FEET/SEC.) = 2.64 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.97  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10202.00 = 616.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10202.00 TO NODE 10203.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 613.00 DOWNSTREAM ELEVATION(FEET) = 594.00  
STREET LENGTH(FEET) = 613.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.02

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 10.12  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.13  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.49  
STREET FLOW TRAVEL TIME(MIN.) = 2.47 Tc(MIN.) = 14.60

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.208

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.82	0.30	0.614	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.614

SUBAREA AREA(ACRES) = 1.82 SUBAREA RUNOFF(CFS) = 3.32

EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61

TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 6.27

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 11.21  
FLOW VELOCITY(FEET/SEC.) = 4.33 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.66  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10203.00 = 1229.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10203.00 TO NODE 10204.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 594.00 DOWNSTREAM ELEVATION(FEET) = 578.00  
STREET LENGTH(FEET) = 433.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.30

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.54  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.79  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.87  
STREET FLOW TRAVEL TIME(MIN.) = 1.51 Tc(MIN.) = 16.11  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.090

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.21	0.30	0.655	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.655

SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 2.06

EFFECTIVE AREA(ACRES) = 4.64 AREA-AVERAGED Fm(INCH/HR) = 0.19

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62

TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 7.96

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 11.98

FLOW VELOCITY(FEET/SEC.) = 4.90 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.95

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10204.00 = 1662.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 578.00 DOWNSTREAM(FEET) = 575.00

FLOW LENGTH(FEET) = 147.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 8.28

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 7.96

PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 16.41

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10205.00 = 1809.00 FEET.

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*****
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.41
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.071
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.61    0.30    0.917    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917
SUBAREA AREA(ACRES) = 3.61      SUBAREA RUNOFF(CFS) = 5.83
EFFECTIVE AREA(ACRES) = 8.25   AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75
TOTAL AREA(ACRES) = 8.3       PEAK FLOW RATE(CFS) = 13.71

*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 563.00
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.35
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.71
PIPE TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 17.41
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10206.00 = 2374.00 FEET.

*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.41
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.004
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         4.75    0.30    0.669    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.669
SUBAREA AREA(ACRES) = 4.75      SUBAREA RUNOFF(CFS) = 7.71
EFFECTIVE AREA(ACRES) = 13.00   AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 13.0       PEAK FLOW RATE(CFS) = 20.92

*****
FLOW PROCESS FROM NODE 10206.00 TO NODE 10207.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 563.00 DOWNSTREAM(FEET) = 547.00

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FLOW LENGTH(FEET) = 599.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.47
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.92
PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 18.28
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10207.00 = 2973.00 FEET.

*****
FLOW PROCESS FROM NODE 10206.10 TO NODE 10207.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.28
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.947
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         4.59    0.30    0.664    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.664
SUBAREA AREA(ACRES) = 4.59      SUBAREA RUNOFF(CFS) = 7.21
EFFECTIVE AREA(ACRES) = 17.58   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 17.6       PEAK FLOW RATE(CFS) = 27.46

*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 516.00
FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.79
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 27.46
PIPE TRAVEL TIME(MIN.) = 0.63 Tc(MIN.) = 18.92
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10208.00 = 3573.00 FEET.

*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.92
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.905
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.60    0.30    0.697    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.697
SUBAREA AREA(ACRES) = 3.60      SUBAREA RUNOFF(CFS) = 5.50
EFFECTIVE AREA(ACRES) = 21.18   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 21.2       PEAK FLOW RATE(CFS) = 32.30

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*****
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 516.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 604.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.21
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 32.30
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 19.50
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10209.00 = 4177.00 FEET.

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*****
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.50
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.867
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 8.21 0.30 0.645 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645
SUBAREA AREA(ACRES) = 8.21 SUBAREA RUNOFF(CFS) = 12.37
EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 43.93

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*****
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 678.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.98
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 43.93
PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 20.10
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10210.00 = 4855.00 FEET.

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*****
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.10
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.830
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 10.49 0.30 0.986 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 10.49 SUBAREA RUNOFF(CFS) = 14.49
EFFECTIVE AREA(ACRES) = 39.89 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 39.9 PEAK FLOW RATE(CFS) = 57.44

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*****
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 280.00
FLOW LENGTH(FEET) = 2662.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.01
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 57.44
PIPE TRAVEL TIME(MIN.) = 2.22 Tc(MIN.) = 22.31
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10211.00 = 7517.00 FEET.

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*****
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.31
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.732
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 10.00 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 12.89
EFFECTIVE AREA(ACRES) = 49.89 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 49.9 PEAK FLOW RATE(CFS) = 66.83

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*****
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 280.00 DOWNSTREAM(FEET) = 176.00
FLOW LENGTH(FEET) = 935.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.89
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 66.83
PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 22.92
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10212.00 = 8452.00 FEET.

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FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.92
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.706
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 18.37 0.30 0.926 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.926
SUBAREA AREA(ACRES) = 18.37 SUBAREA RUNOFF(CFS) = 23.61
EFFECTIVE AREA(ACRES) = 68.26 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 68.3 PEAK FLOW RATE(CFS) = 89.25

\*\*\*\*\*
FLOW PROCESS FROM NODE 10212.00 TO NODE 10242.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM( FEET) = 176.00 DOWNSTREAM( FEET) = 169.00
CHANNEL LENGTH THRU SUBAREA( FEET) = 332.00 CHANNEL SLOPE = 0.0211
CHANNEL BASE( FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH( FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY( INCH/HR) = 1.663
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.97 0.30 0.970 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 90.47
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 5.70
AVERAGE FLOW DEPTH( FEET) = 2.30 TRAVEL TIME( MIN.) = 0.97
Tc( MIN.) = 23.89
SUBAREA AREA( ACRES) = 1.97 SUBAREA RUNOFF( CFS) = 2.43
EFFECTIVE AREA( ACRES) = 70.23 AREA-AVERAGED Fm( INCH/HR) = 0.25
AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA( ACRES) = 70.2 PEAK FLOW RATE( CFS) = 89.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH( FEET) = 2.29 FLOW VELOCITY( FEET/SEC.) = 5.69
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<

\*\*\*\*\*
FLOW PROCESS FROM NODE 10220.00 TO NODE 10221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH( FEET) = 330.00
ELEVATION DATA: UPSTREAM( FEET) = 308.00 DOWNSTREAM( FEET) = 300.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc( MIN.) = 15.111
\* 100 YEAR RAINFALL INTENSITY( INCH/HR) = 2.156
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN ( MIN.)
NATURAL FAIR COVER
"GRASS" - 1.03 0.30 1.000 0 15.11
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF( CFS) = 1.72
TOTAL AREA( ACRES) = 1.03 PEAK FLOW RATE( CFS) = 1.72

\*\*\*\*\*
FLOW PROCESS FROM NODE 10221.10 TO NODE 10222.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION( FEET) = 300.00 DOWNSTREAM ELEVATION( FEET) = 261.00
STREET LENGTH( FEET) = 434.00 CURB HEIGHT( INCHES) = 8.0
STREET HALFWIDTH( FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK( FEET) = 15.00
INSIDE STREET CROSSFALL( DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL( DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL( DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section( curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH( FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW( CFS) = 3.03

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH( FEET) = 0.21
HALFSTREET FLOOD WIDTH( FEET) = 2.43
AVERAGE FLOW VELOCITY( FEET/SEC.) = 6.10
PRODUCT OF DEPTH&VELOCITY( FT\*FT/SEC.) = 1.26
STREET FLOW TRAVEL TIME( MIN.) = 1.19 Tc( MIN.) = 16.30
\* 100 YEAR RAINFALL INTENSITY( INCH/HR) = 2.078

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.64 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA( ACRES) = 1.64 SUBAREA RUNOFF( CFS) = 2.62
EFFECTIVE AREA( ACRES) = 2.67 AREA-AVERAGED Fm( INCH/HR) = 0.30
AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA( ACRES) = 2.7 PEAK FLOW RATE( CFS) = 4.27

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.25 HALFSTREET FLOOD WIDTH(FEET) = 4.36  
FLOW VELOCITY(FEET/SEC.) = 5.62 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.38  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10222.00 = 764.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10221.20 TO NODE 10222.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.30  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.078  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.12 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.12 SUBAREA RUNOFF(CFS) = 4.98  
EFFECTIVE AREA(ACRES) = 5.78 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 9.25

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.10 TO NODE 10223.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 261.00 DOWNSTREAM ELEVATION(FEET) = 208.00  
STREET LENGTH(FEET) = 622.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.57

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 8.12  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.23  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.00  
STREET FLOW TRAVEL TIME(MIN.) = 1.66 Tc(MIN.) = 17.96  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.968

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.75 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 2.63  
EFFECTIVE AREA(ACRES) = 7.54 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.5 PEAK FLOW RATE(CFS) = 11.32

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.42  
FLOW VELOCITY(FEET/SEC.) = 6.29 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.06  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10223.00 = 1386.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.20 TO NODE 10223.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.96  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.968  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.91 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.91 SUBAREA RUNOFF(CFS) = 11.88  
EFFECTIVE AREA(ACRES) = 15.45 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 23.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 10223.10 TO NODE 10224.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 208.00 DOWNSTREAM ELEVATION(FEET) = 204.00  
STREET LENGTH(FEET) = 758.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.18

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.60  
HALFSTREET FLOOD WIDTH(FEET) = 21.88  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.63  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.57  
STREET FLOW TRAVEL TIME(MIN.) = 4.80 Tc(MIN.) = 22.77  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.712

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.70 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 5.97  
EFFECTIVE AREA(ACRES) = 20.15 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.1 PEAK FLOW RATE(CFS) = 25.61

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 21.71  
FLOW VELOCITY(FEET/SEC.) = 2.61 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.55  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10224.00 = 2144.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.20 TO NODE 10224.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 22.77  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.712  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.21	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 1.54  
EFFECTIVE AREA(ACRES) = 21.35 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 27.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 204.00 DOWNSTREAM(FEET) = 201.00  
FLOW LENGTH(FEET) = 422.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.47  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 27.14  
PIPE TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 23.71  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10225.00 = 2566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 23.71  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.671  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.81	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 4.81 SUBAREA RUNOFF(CFS) = 5.94  
EFFECTIVE AREA(ACRES) = 26.17 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 26.2 PEAK FLOW RATE(CFS) = 32.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 201.00 DOWNSTREAM(FEET) = 197.00  
FLOW LENGTH(FEET) = 799.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.77  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 32.29  
PIPE TRAVEL TIME(MIN.) = 1.97 Tc(MIN.) = 25.68  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10238.00 = 3365.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 25.68  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.590  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.24	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.24 SUBAREA RUNOFF(CFS) = 4.92  
EFFECTIVE AREA(ACRES) = 30.41 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.4 PEAK FLOW RATE(CFS) = 35.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 25.68  
RAINFALL INTENSITY(INCH/HR) = 1.59  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 30.41  
TOTAL STREAM AREA(ACRES) = 30.41  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 35.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10230.00 TO NODE 10231.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 276.00  
ELEVATION DATA: UPSTREAM (FEET) = 503.00 DOWNSTREAM (FEET) = 390.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM  $T_c$  (MIN.) = 5.944

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.825

SUBAREA  $T_c$  AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
AGRICULTURAL POOR COVER "FALLOW"	-	0.95	0.30	1.000	0	5.94

AGRICULTURAL POOR COVER

"FALLOW"

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 3.02

TOTAL AREA (ACRES) = 0.95 PEAK FLOW RATE (CFS) = 3.02

\*\*\*\*\*

FLOW PROCESS FROM NODE 10231.10 TO NODE 10232.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 390.00 DOWNSTREAM (FEET) = 301.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 394.00 CHANNEL SLOPE = 0.2259

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.619

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.68	0.30	1.000	-

USER-DEFINED

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.53

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.62

AVERAGE FLOW DEPTH (FEET) = 0.46 TRAVEL TIME (MIN.) = 0.76

$T_c$  (MIN.) = 6.71

SUBAREA AREA (ACRES) = 1.68 SUBAREA RUNOFF (CFS) = 5.03

EFFECTIVE AREA (ACRES) = 2.63 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 2.6 PEAK FLOW RATE (CFS) = 7.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.53 FLOW VELOCITY (FEET/SEC.) = 9.37

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10232.00 = 670.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10231.20 TO NODE 10232.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE  $T_c$  (MIN.) = 6.71

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.619

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED - 6.38 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 6.38 SUBAREA RUNOFF (CFS) = 19.05  
 EFFECTIVE AREA (ACRES) = 9.01 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.0 PEAK FLOW RATE (CFS) = 26.92

\*\*\*\*\*

FLOW PROCESS FROM NODE 10232.00 TO NODE 10233.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION (FEET) = 301.00 DOWNSTREAM ELEVATION (FEET) = 277.00

STREET LENGTH (FEET) = 341.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.61

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.83

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.44

HALFSTREET FLOOD WIDTH (FEET) = 14.01

AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.39

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.24

STREET FLOW TRAVEL TIME (MIN.) = 0.77  $T_c$  (MIN.) = 7.47

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.411

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.30	1.000	-

USER-DEFINED

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 3.50 SUBAREA RUNOFF (CFS) = 9.81

EFFECTIVE AREA (ACRES) = 12.52 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 12.5 PEAK FLOW RATE (CFS) = 35.05

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.45 HALFSTREET FLOOD WIDTH (FEET) = 14.62

FLOW VELOCITY (FEET/SEC.) = 7.53 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.39

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10233.00 = 1011.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10233.10 TO NODE 10234.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 277.00 DOWNSTREAM ELEVATION(FEET) = 226.00  
STREET LENGTH(FEET) = 682.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 40.29

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.46  
HALFSTREET FLOOD WIDTH(FEET) = 15.26  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.00  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.71  
STREET FLOW TRAVEL TIME(MIN.) = 1.42 Tc(MIN.) = 8.90

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.027

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.27	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 4.27 SUBAREA RUNOFF(CFS) = 10.48					
EFFECTIVE AREA(ACRES) = 16.78 AREA-AVERAGED Fm(INCH/HR) = 0.30					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 41.20					

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 15.44  
FLOW VELOCITY(FEET/SEC.) = 8.01 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.74  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10234.00 = 1693.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10233.20 TO NODE 10234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.90

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.027

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.60	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 38.29					
EFFECTIVE AREA(ACRES) = 32.38 AREA-AVERAGED Fm(INCH/HR) = 0.30					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 79.49					

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.10 TO NODE 10235.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 3 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 226.00 DOWNSTREAM ELEVATION(FEET) = 205.00  
STREET LENGTH(FEET) = 759.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 84.48

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.66  
HALFSTREET FLOOD WIDTH(FEET) = 25.04  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.54  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.31  
STREET FLOW TRAVEL TIME(MIN.) = 1.93 Tc(MIN.) = 10.83

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.635

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.74	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 9.97					
EFFECTIVE AREA(ACRES) = 37.13 AREA-AVERAGED Fm(INCH/HR) = 0.30					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 79.49					

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.65 HALFSTREET FLOOD WIDTH(FEET) = 24.41  
FLOW VELOCITY(FEET/SEC.) = 6.46 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.18  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10235.00 = 2452.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.20 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.83

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.635

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.02	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 8.02 SUBAREA RUNOFF(CFS) = 16.85					
EFFECTIVE AREA(ACRES) = 45.15 AREA-AVERAGED Fm(INCH/HR) = 0.30					

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.1 PEAK FLOW RATE (CFS) = 94.88

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.30 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.83  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.635  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.62 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.62 SUBAREA RUNOFF (CFS) = 5.50  
EFFECTIVE AREA (ACRES) = 47.76 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 100.37

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.00 TO NODE 10236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 205.00 DOWNSTREAM (FEET) = 201.00  
FLOW LENGTH (FEET) = 489.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.6 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.70  
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 100.37  
PIPE TRAVEL TIME (MIN.) = 0.76 Tc (MIN.) = 11.59  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10236.00 = 2941.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.10 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.59  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.549  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.89 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.89 SUBAREA RUNOFF (CFS) = 5.85  
EFFECTIVE AREA (ACRES) = 50.65 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 50.7 PEAK FLOW RATE (CFS) = 102.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.20 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 11.59  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.549  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.84 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.84 SUBAREA RUNOFF (CFS) = 9.79  
EFFECTIVE AREA (ACRES) = 55.49 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 112.31

\*\*\*\*\*

FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 201.00 DOWNSTREAM (FEET) = 199.00  
FLOW LENGTH (FEET) = 278.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.48  
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 112.31  
PIPE TRAVEL TIME (MIN.) = 0.44 Tc (MIN.) = 12.03  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10237.00 = 3219.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 12.03  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.499  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.62 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.62 SUBAREA RUNOFF (CFS) = 3.21  
EFFECTIVE AREA (ACRES) = 57.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 57.1 PEAK FLOW RATE (CFS) = 113.02

\*\*\*\*\*

FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 199.00 DOWNSTREAM (FEET) = 197.00  
FLOW LENGTH (FEET) = 345.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.76  
ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 113.02  
 PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 12.62  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.62  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.432  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.38 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.38 SUBAREA RUNOFF(CFS) = 2.65  
 EFFECTIVE AREA(ACRES) = 58.49 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 113.02  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 12.62  
 RAINFALL INTENSITY(INCH/HR) = 2.43  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 58.49  
 TOTAL STREAM AREA(ACRES) = 58.49  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 113.02

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	35.32	25.68	1.590	0.30( 0.30)	1.00	30.4	10220.00
2	113.02	12.62	2.432	0.30( 0.30)	1.00	58.5	10230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	141.71	12.62	2.432	0.30( 0.30)	1.00	73.4	10230.00
2	103.73	25.68	1.590	0.30( 0.30)	1.00	88.9	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 141.71 Tc(MIN.) = 12.62  
 EFFECTIVE AREA(ACRES) = 73.44 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 88.9  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.00 TO NODE 10239.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 197.00 DOWNSTREAM(FEET) = 193.00  
 FLOW LENGTH(FEET) = 753.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 42.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.03  
 ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 141.71  
 PIPE TRAVEL TIME(MIN.) = 1.25 Tc(MIN.) = 13.87  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10239.00 = 4317.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.10 TO NODE 10239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.87  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.290  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.72 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.72 SUBAREA RUNOFF(CFS) = 4.87  
 EFFECTIVE AREA(ACRES) = 76.16 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 91.6 PEAK FLOW RATE(CFS) = 141.71  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.20 TO NODE 10239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.87  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.290  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 34.37 0.30 0.991 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991  
 SUBAREA AREA(ACRES) = 34.37 SUBAREA RUNOFF(CFS) = 61.65  
 EFFECTIVE AREA(ACRES) = 110.53 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 126.0 PEAK FLOW RATE(CFS) = 198.09

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FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 193.00 DOWNSTREAM(FEET) = 191.00
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 48.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.69
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 198.09
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 14.30
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10240.00 = 4618.00 FEET.

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*****
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.30
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.242
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.22     0.30    0.916   -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.916
SUBAREA AREA(ACRES) = 2.22 SUBAREA RUNOFF(CFS) = 3.94
EFFECTIVE AREA(ACRES) = 112.75 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 128.2 PEAK FLOW RATE(CFS) = 198.09
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10240.00 TO NODE 10241.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 191.00 DOWNSTREAM(FEET) = 180.00
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.05
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 198.09
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 14.39
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10241.00 = 4768.00 FEET.

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*****
FLOW PROCESS FROM NODE 10241.00 TO NODE 10242.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 169.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 267.00 CHANNEL SLOPE = 0.0412
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.187

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.16     0.30    0.958   -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.958
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 199.94
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.09
AVERAGE FLOW DEPTH(FEET) = 2.45 TRAVEL TIME(MIN.) = 0.40
Tc(MIN.) = 14.79
SUBAREA AREA(ACRES) = 2.16 SUBAREA RUNOFF(CFS) = 3.69
EFFECTIVE AREA(ACRES) = 114.91 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 130.4 PEAK FLOW RATE(CFS) = 198.09
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.44 FLOW VELOCITY(FEET/SEC.) = 11.10
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

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*****
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 11
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>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<
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** MAIN STREAM CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap      Ae      HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES)  NODE
1           198.09 14.79  2.187  0.30( 0.30) 0.99  114.9  10230.00
2           142.03 28.02  1.509  0.30( 0.30) 1.00  130.4  10220.00
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

```

```

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap      Ae      HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES)  NODE
1           89.25 23.89  1.663  0.30( 0.25) 0.85  70.2  10200.00
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

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** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap      Ae      HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES)  NODE
1           273.90 14.79  2.187  0.30( 0.29) 0.95  158.4  10230.00
2           248.79 23.89  1.663  0.30( 0.28) 0.94  195.8  10200.00
3           221.53 28.02  1.509  0.30( 0.28) 0.94  200.6  10220.00
TOTAL AREA(ACRES) = 200.6

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```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 273.90 Tc(MIN.) = 14.791
EFFECTIVE AREA(ACRES) = 158.40 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 200.6
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

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*****
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 12
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>>>>CLEAR MEMORY BANK # 1 <<<<

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*****
FLOW PROCESS FROM NODE 10242.00 TO NODE 10256.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 169.00 DOWNSTREAM(FEET) = 163.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 315.00 CHANNEL SLOPE = 0.0190
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.139
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 9.10 0.30 0.995 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 281.44
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.07
AVERAGE FLOW DEPTH(FEET) = 3.22 TRAVEL TIME(MIN.) = 0.58
Tc(MIN.) = 15.37
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 15.08
EFFECTIVE AREA(ACRES) = 167.51 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 209.7 PEAK FLOW RATE(CFS) = 279.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 3.21 FLOW VELOCITY(FEET/SEC.) = 9.05
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

*****
FLOW PROCESS FROM NODE 10243.00 TO NODE 10256.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 15.37
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.139
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.01 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.01 SUBAREA RUNOFF(CFS) = 11.59
EFFECTIVE AREA(ACRES) = 174.51 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 216.7 PEAK FLOW RATE(CFS) = 290.76

*****
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 15.37

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RAINFALL INTENSITY(INCH/HR) = 2.14
AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 174.51
TOTAL STREAM AREA(ACRES) = 216.71
PEAK FLOW RATE(CFS) AT CONFLUENCE = 290.76

*****
FLOW PROCESS FROM NODE 10250.00 TO NODE 10251.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----
INITIAL SUBAREA FLOW-LENGTH(FEET) = 284.00
ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 243.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.802
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.044
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"WOODLAND,GRASS" - 1.04 0.30 1.000 0 16.80
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.63
TOTAL AREA(ACRES) = 1.04 PEAK FLOW RATE(CFS) = 1.63

*****
FLOW PROCESS FROM NODE 10251.00 TO NODE 10252.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 243.00 DOWNSTREAM ELEVATION(FEET) = 240.00
STREET LENGTH(FEET) = 301.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.68
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.30
HALFSTREET FLOOD WIDTH(FEET) = 6.91
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.01
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.60
STREET FLOW TRAVEL TIME(MIN.) = 2.49 Tc(MIN.) = 19.30
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.880

```

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.47	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 2.09  
EFFECTIVE AREA(ACRES) = 2.51 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 3.57

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 8.09  
FLOW VELOCITY(FEET/SEC.) = 2.11 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.68  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10252.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10252.00 TO NODE 10253.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 240.00 DOWNSTREAM ELEVATION(FEET) = 234.00  
STREET LENGTH(FEET) = 544.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.49

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 10.51  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.51  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.92

STREET FLOW TRAVEL TIME(MIN.) = 3.61 Tc(MIN.) = 22.91  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.706

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.60 SUBAREA RUNOFF(CFS) = 5.83  
EFFECTIVE AREA(ACRES) = 7.12 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 9.00

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 12.15  
FLOW VELOCITY(FEET/SEC.) = 2.70 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.08

LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10253.00 = 1129.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 234.00 DOWNSTREAM(FEET) = 219.00  
FLOW LENGTH(FEET) = 362.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.14  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 9.00  
PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 23.45  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10254.00 = 1491.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.45  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.682  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.55	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 10.63  
EFFECTIVE AREA(ACRES) = 15.66 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.7 PEAK FLOW RATE(CFS) = 19.48

\*\*\*\*\*

FLOW PROCESS FROM NODE 10254.00 TO NODE 10255.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 219.00 DOWNSTREAM(FEET) = 182.00  
FLOW LENGTH(FEET) = 716.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.42  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 19.48  
PIPE TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 24.28  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10255.00 = 2207.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10255.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 182.00 DOWNSTREAM(FEET) = 163.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 228.00 CHANNEL SLOPE = 0.0833  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.627  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	13.88	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.77  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.81  
 AVERAGE FLOW DEPTH (FEET) = 1.03 TRAVEL TIME (MIN.) = 0.43  
 Tc (MIN.) = 24.71  
 SUBAREA AREA (ACRES) = 13.88 SUBAREA RUNOFF (CFS) = 16.57  
 EFFECTIVE AREA (ACRES) = 29.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 29.5 PEAK FLOW RATE (CFS) = 35.28

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.12 FLOW VELOCITY (FEET/SEC.) = 9.40  
 LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10256.00 = 2435.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 24.71  
 RAINFALL INTENSITY (INCH/HR) = 1.63  
 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 29.54  
 TOTAL STREAM AREA (ACRES) = 29.54  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 35.28

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	290.76	15.37	2.139	0.30 ( 0.29)	0.96	174.5	10230.00
1	258.03	24.48	1.637	0.30 ( 0.28)	0.95	211.9	10200.00
1	234.75	28.63	1.488	0.30 ( 0.28)	0.95	216.7	10220.00
2	35.28	24.71	1.627	0.30 ( 0.30)	1.00	29.5	10250.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	321.17	15.37	2.139	0.30 ( 0.29)	0.96	192.9	10230.00
2	293.25	24.48	1.637	0.30 ( 0.29)	0.95	241.2	10200.00
3	292.00	24.71	1.627	0.30 ( 0.29)	0.95	241.7	10250.00
4	266.33	28.63	1.488	0.30 ( 0.29)	0.95	246.3	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 321.17 Tc (MIN.) = 15.37  
 EFFECTIVE AREA (ACRES) = 192.89 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 246.3  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 246.3 TC (MIN.) = 15.37  
 EFFECTIVE AREA (ACRES) = 192.89 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 PEAK FLOW RATE (CFS) = 321.17

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	321.17	15.37	2.139	0.30 ( 0.29)	0.96	192.9	10230.00
2	293.25	24.48	1.637	0.30 ( 0.29)	0.95	241.2	10200.00
3	292.00	24.71	1.627	0.30 ( 0.29)	0.95	241.7	10250.00
4	266.33	28.63	1.488	0.30 ( 0.29)	0.95	246.3	10220.00

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506103D.DAT  
TIME/DATE OF STUDY: 12:44 04/15/2013  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.060
- 2) 6.00; 3.660
- 3) 7.00; 3.350
- 4) 8.00; 3.100
- 5) 9.00; 2.900
- 6) 10.00; 2.730
- 7) 11.00; 2.580
- 8) 12.00; 2.460
- 9) 13.00; 2.350
- 10) 14.00; 2.250
- 11) 15.00; 2.160
- 12) 20.00; 1.830
- 13) 25.00; 1.610
- 14) 30.00; 1.450
- 15) 40.00; 1.230
- 16) 50.00; 1.090
- 17) 60.00; 0.980
- 18) 90.00; 0.770
- 19) 120.00; 0.660
- 20) 180.00; 0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH	LIP	HIKE	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10300.00 TO NODE 10301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 627.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 5.147  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.001  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "5-7 DWELLINGS/ACRE"	-	1.20	0.30	0.500	95	5.15

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.500  
 SUBAREA RUNOFF(CFS) = 4.16  
 TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 4.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 10301.00 TO NODE 10302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 510.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.2609  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.16  
 FLOW VELOCITY(FEET/SEC.) = 6.76 FLOW DEPTH(FEET) = 0.45  
 TRAVEL TIME(MIN.) = 0.28  $T_c$ (MIN.) = 5.43  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10302.00 = 443.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10302.00 TO NODE 10302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 5.43  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.888  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 5.05  
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 9.08

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10302.00 TO NODE 10303.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 467.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.2575  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.08  
FLOW VELOCITY(FEET/SEC.) = 8.20 FLOW DEPTH(FEET) = 0.61  
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 5.77  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10303.00 = 610.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10303.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.77  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.752  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 7.13  
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 15.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10304.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 467.00 DOWNSTREAM(FEET) = 446.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 15.88  
FLOW VELOCITY(FEET/SEC.) = 8.31 FLOW DEPTH(FEET) = 0.80  
TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 6.00  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10304.00 = 725.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10304.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.660  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.500 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 7.53  
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 23.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10305.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 446.00 DOWNSTREAM(FEET) = 366.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 423.00 CHANNEL SLOPE = 0.1891  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 23.01  
FLOW VELOCITY(FEET/SEC.) = 9.24 FLOW DEPTH(FEET) = 0.91  
TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 6.76  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10305.00 = 1148.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10305.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.76  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.423  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.912  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 9.64  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.65  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 31.09

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10306.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 300.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 574.00 CHANNEL SLOPE = 0.1150  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.09  
FLOW VELOCITY (FEET/SEC.) = 8.28 FLOW DEPTH (FEET) = 1.12  
TRAVEL TIME (MIN.) = 1.16 Tc (MIN.) = 7.92  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10306.00 = 1722.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10306.00 TO NODE 10306.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 7.92  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.120  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 9.15  
EFFECTIVE AREA (ACRES) = 14.30 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA (ACRES) = 14.3 PEAK FLOW RATE (CFS) = 37.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10306.00 TO NODE 10307.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 300.00 DOWNSTREAM (FEET) = 293.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0350  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 37.32  
FLOW VELOCITY (FEET/SEC.) = 5.54 FLOW DEPTH (FEET) = 1.50  
TRAVEL TIME (MIN.) = 0.60 Tc (MIN.) = 8.52  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10307.00 = 1922.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10307.00 TO NODE 10307.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 8.52  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.996  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.70  
EFFECTIVE AREA (ACRES) = 15.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 15.0 PEAK FLOW RATE (CFS) = 37.42

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10307.00 TO NODE 10308.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 293.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0850  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 37.42  
FLOW VELOCITY (FEET/SEC.) = 9.57 FLOW DEPTH (FEET) = 1.14  
TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 8.87  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10308.00 = 2122.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10308.00 TO NODE 10308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 8.87  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.926  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	8.50	0.30	0.500	-
USER-DEFINED	-	3.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.696  
SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 34.24  
EFFECTIVE AREA (ACRES) = 29.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA (ACRES) = 29.0 PEAK FLOW RATE (CFS) = 70.72

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10308.00 TO NODE 10309.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 250.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 600.00 CHANNEL SLOPE = 0.0433  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 70.72  
FLOW VELOCITY (FEET/SEC.) = 8.73 FLOW DEPTH (FEET) = 1.64  
TRAVEL TIME (MIN.) = 1.15 Tc (MIN.) = 10.01  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10309.00 = 2722.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.01  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.728  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.00	0.30	0.600	-
USER-DEFINED	-	1.80	0.30	0.850	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	0.500	-
USER-DEFINED	-	2.10	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.662  
 SUBAREA AREA(ACRES) = 15.40 SUBAREA RUNOFF(CFS) = 35.06  
 EFFECTIVE AREA(ACRES) = 44.40 AREA-AVERAGED Fm(INCH/HR) = 0.21  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
 TOTAL AREA(ACRES) = 44.4 PEAK FLOW RATE(CFS) = 100.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.01  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.728  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.30	0.850	-
USER-DEFINED	-	8.80	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.967  
 SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 34.67  
 EFFECTIVE AREA(ACRES) = 60.20 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA(ACRES) = 60.2 PEAK FLOW RATE(CFS) = 135.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10309.00 TO NODE 10310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 250.00 DOWNSTREAM(FEET) = 208.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1021.00 CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 135.27  
 FLOW VELOCITY(FEET/SEC.) = 10.07 FLOW DEPTH(FEET) = 2.12  
 TRAVEL TIME(MIN.) = 1.69 Tc(MIN.) = 11.70  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10310.00 = 3743.00 FEET.

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.70  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.496  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	1.80	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.668  
 SUBAREA AREA(ACRES) = 6.60 SUBAREA RUNOFF(CFS) = 13.63  
 EFFECTIVE AREA(ACRES) = 66.80 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA(ACRES) = 66.8 PEAK FLOW RATE(CFS) = 136.31

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.70  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.496  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	8.00	0.30	0.600	-
USER-DEFINED	-	7.10	0.30	0.850	-
USER-DEFINED	-	8.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814  
 SUBAREA AREA(ACRES) = 23.50 SUBAREA RUNOFF(CFS) = 47.62  
 EFFECTIVE AREA(ACRES) = 90.30 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA(ACRES) = 90.3 PEAK FLOW RATE(CFS) = 183.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10310.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 208.00 DOWNSTREAM(FEET) = 189.00  
 FLOW LENGTH(FEET) = 1595.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.49  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 183.93  
 PIPE TRAVEL TIME(MIN.) = 1.83 Tc(MIN.) = 13.54  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10335.00 = 5338.00 FEET.



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*****
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.54
RAINFALL INTENSITY(INCH/HR) = 2.30
AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.77
EFFECTIVE STREAM AREA(ACRES) = 90.30
TOTAL STREAM AREA(ACRES) = 90.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 183.93

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*****
FLOW PROCESS FROM NODE 10320.00 TO NODE 10321.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 671.00 DOWNSTREAM(FEET) = 622.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.795
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.742
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.00 0.30 0.500 95 5.79
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 3.23
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 3.23

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*****
FLOW PROCESS FROM NODE 10321.00 TO NODE 10322.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 622.00 DOWNSTREAM(FEET) = 599.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 227.00 CHANNEL SLOPE = 0.1013
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.23
FLOW VELOCITY(FEET/SEC.) = 5.58 FLOW DEPTH(FEET) = 0.44
TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 6.47
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10322.00 = 557.00 FEET.

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*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10322.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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MAINLINE Tc(MIN.) = 6.47
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.513
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.30 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 4.24
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 7.26

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*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10323.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 599.00 DOWNSTREAM(FEET) = 539.00
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.13
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.26
PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 6.59
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10323.00 = 719.00 FEET.

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*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10323.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 6.59
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.477
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.30 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.50
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 8.68

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*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10324.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 539.00 DOWNSTREAM(FEET) = 530.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 97.00 CHANNEL SLOPE = 0.0928
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 8.68

```

FLOW VELOCITY(FEET/SEC.) = 5.55 FLOW DEPTH(FEET) = 0.72  
TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 6.88  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10324.00 = 816.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10324.00 TO NODE 10324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.88  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.387

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.24  
EFFECTIVE AREA(ACRES) = 4.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.7 PEAK FLOW RATE(CFS) = 13.69

\*\*\*\*\*

FLOW PROCESS FROM NODE 10324.00 TO NODE 10325.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 210.00 CHANNEL SLOPE = 0.1429  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 13.69  
FLOW VELOCITY(FEET/SEC.) = 7.30 FLOW DEPTH(FEET) = 0.79  
TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 7.36  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10325.00 = 1026.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.36  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 4.76  
EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 17.91

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10326.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 460.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 345.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 17.91  
FLOW VELOCITY(FEET/SEC.) = 7.20 FLOW DEPTH(FEET) = 0.91  
TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 8.16  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10326.00 = 1371.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10326.00 TO NODE 10326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.16  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.068

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 4.99  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 21.80

\*\*\*\*\*

FLOW PROCESS FROM NODE 10326.00 TO NODE 10327.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 430.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 263.00 CHANNEL SLOPE = 0.1141  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 21.80  
FLOW VELOCITY(FEET/SEC.) = 7.55 FLOW DEPTH(FEET) = 0.98  
TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 8.74  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10327.00 = 1634.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10327.00 TO NODE 10327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.74  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.952

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.10	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500

SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 10.34  
EFFECTIVE AREA (ACRES) = 12.40 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 12.4 PEAK FLOW RATE (CFS) = 31.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10328.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 430.00 DOWNSTREAM (FEET) = 375.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 437.00 CHANNEL SLOPE = 0.1259  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.27  
FLOW VELOCITY (FEET/SEC.) = 10.66 FLOW DEPTH (FEET) = 0.99  
TRAVEL TIME (MIN.) = 0.68 Tc (MIN.) = 9.42  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10328.00 = 2071.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10328.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 9.42  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.828  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.500 -  
USER-DEFINED - 1.20 0.30 0.850 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.772  
SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 7.48  
EFFECTIVE AREA (ACRES) = 15.60 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 15.6 PEAK FLOW RATE (CFS) = 37.37

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10329.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 375.00 DOWNSTREAM (FEET) = 372.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 224.00 CHANNEL SLOPE = 0.0134  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 37.37  
FLOW VELOCITY (FEET/SEC.) = 4.79 FLOW DEPTH (FEET) = 1.61  
TRAVEL TIME (MIN.) = 0.78 Tc (MIN.) = 10.20  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10329.00 = 2295.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10329.00 TO NODE 10329.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 10.20  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.700  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.20 0.30 0.500 -  
USER-DEFINED - 1.40 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.571  
SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 25.49  
EFFECTIVE AREA (ACRES) = 26.80 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 26.8 PEAK FLOW RATE (CFS) = 61.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10329.00 TO NODE 10330.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 372.00 DOWNSTREAM (FEET) = 300.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 452.00 CHANNEL SLOPE = 0.1593  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 61.05  
FLOW VELOCITY (FEET/SEC.) = 13.72 FLOW DEPTH (FEET) = 1.22  
TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 10.75  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10330.00 = 2747.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10330.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 10.75  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.617  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 4.20 0.30 0.500 -  
USER-DEFINED - 2.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.673  
SUBAREA AREA (ACRES) = 7.80 SUBAREA RUNOFF (CFS) = 16.96  
EFFECTIVE AREA (ACRES) = 34.60 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 34.6 PEAK FLOW RATE (CFS) = 76.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10331.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 295.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 182.00 CHANNEL SLOPE = 0.0275  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 76.02  
FLOW VELOCITY(FEET/SEC.) = 7.47 FLOW DEPTH(FEET) = 1.84  
TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 11.16  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10331.00 = 2929.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10331.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 11.16  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.561  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 11.30 0.30 0.500 -  
USER-DEFINED - 0.20 0.30 0.600 -  
USER-DEFINED - 4.20 0.30 0.850 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.652  
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 40.45  
EFFECTIVE AREA(ACRES) = 53.60 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 53.6 PEAK FLOW RATE(CFS) = 114.72

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10332.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 295.00 DOWNSTREAM(FEET) = 245.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.00 CHANNEL SLOPE = 0.0542  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 114.72  
FLOW VELOCITY(FEET/SEC.) = 10.71 FLOW DEPTH(FEET) = 1.89  
TRAVEL TIME(MIN.) = 1.43 Tc(MIN.) = 12.59  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10332.00 = 3851.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10332.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 12.59  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.395  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.850 -

USER-DEFINED - 1.40 0.30 0.500 -  
USER-DEFINED - 15.40 0.30 0.850 -  
USER-DEFINED - 8.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.881  
SUBAREA AREA(ACRES) = 25.60 SUBAREA RUNOFF(CFS) = 49.09  
EFFECTIVE AREA(ACRES) = 79.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 79.2 PEAK FLOW RATE(CFS) = 155.79

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10333.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 199.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 564.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 155.79  
FLOW VELOCITY(FEET/SEC.) = 13.47 FLOW DEPTH(FEET) = 1.96  
TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 13.29  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10333.00 = 4415.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10333.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 13.29  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.321  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 0.500 -  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 5.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.761  
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 15.63  
EFFECTIVE AREA(ACRES) = 87.50 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 87.5 PEAK FLOW RATE(CFS) = 166.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10334.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 195.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 454.00 CHANNEL SLOPE = 0.0088  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 166.16  
FLOW VELOCITY(FEET/SEC.) = 5.96 FLOW DEPTH(FEET) = 3.05

TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 14.56  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10334.00 = 4869.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10334.00 TO NODE 10334.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.56

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.200

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.800	-
USER-DEFINED	-	2.60	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835

SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 6.49

EFFECTIVE AREA(ACRES) = 91.20 AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71

TOTAL AREA(ACRES) = 91.2 PEAK FLOW RATE(CFS) = 166.16

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10334.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 195.00 DOWNSTREAM(FEET) = 189.00

FLOW LENGTH(FEET) = 1291.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 60.0 INCH PIPE IS 48.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 9.78

ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 166.16

PIPE TRAVEL TIME(MIN.) = 2.20 Tc(MIN.) = 16.76

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 16.76

RAINFALL INTENSITY(INCH/HR) = 2.04

AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.71

EFFECTIVE STREAM AREA(ACRES) = 91.20

TOTAL STREAM AREA(ACRES) = 91.20

PEAK FLOW RATE(CFS) AT CONFLUENCE = 166.16

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	183.93	13.54	2.296	0.30( 0.23)	0.77	90.3	10300.00
2	166.16	16.76	2.044	0.30( 0.21)	0.71	91.2	10320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	336.64	13.54	2.296	0.30( 0.22)	0.75	164.0	10300.00
2	327.59	16.76	2.044	0.30( 0.22)	0.74	181.5	10320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 336.64 Tc(MIN.) = 13.54

EFFECTIVE AREA(ACRES) = 163.96 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75

TOTAL AREA(ACRES) = 181.5

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10336.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 189.00 DOWNSTREAM(FEET) = 188.00

FLOW LENGTH(FEET) = 103.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 69.0 INCH PIPE IS 53.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.49

ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 336.64

PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 13.65

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10336.00 = 6263.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10336.00 TO NODE 10337.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 180.00

FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 54.0 INCH PIPE IS 41.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 25.88

ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 336.64

PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 13.78

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10337.00 = 6475.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10337.00 TO NODE 10338.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 161.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0218

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 336.64  
FLOW VELOCITY (FEET/SEC.) = 9.97 FLOW DEPTH (FEET) = 3.35  
TRAVEL TIME (MIN.) = 1.46 Tc (MIN.) = 15.24  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10338.00 = 7347.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.24  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.144  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.850 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.943  
SUBAREA AREA (ACRES) = 4.20 SUBAREA RUNOFF (CFS) = 7.04  
EFFECTIVE AREA (ACRES) = 168.16 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 185.7 PEAK FLOW RATE (CFS) = 336.64  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.24  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.144  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 8.30  
EFFECTIVE AREA (ACRES) = 173.16 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 190.7 PEAK FLOW RATE (CFS) = 336.64  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10339.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 161.00 DOWNSTREAM (FEET) = 159.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 328.00 CHANNEL SLOPE = 0.0061

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 336.64  
FLOW VELOCITY (FEET/SEC.) = 6.18 FLOW DEPTH (FEET) = 4.26  
TRAVEL TIME (MIN.) = 0.88 Tc (MIN.) = 16.13  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10339.00 = 7675.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 16.13  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.086  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 2.30 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.767  
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 11.52  
EFFECTIVE AREA (ACRES) = 180.06 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 336.64  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 16.13  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.086  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 6.30 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 2.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.876  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 15.10  
EFFECTIVE AREA (ACRES) = 189.26 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 206.8 PEAK FLOW RATE (CFS) = 336.64  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10390.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

```
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 159.00 DOWNSTREAM(FEET) = 155.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 782.00 CHANNEL SLOPE = 0.0051
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 336.64
FLOW VELOCITY(FEET/SEC.) = 5.78 FLOW DEPTH(FEET) = 4.41
TRAVEL TIME(MIN.) = 2.25 Tc(MIN.) = 18.38
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.
```

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
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```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
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```
MAINLINE Tc(MIN.) = 18.38
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.937
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 0.800 -
USER-DEFINED - 3.70 0.30 0.850 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 2.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.901
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 9.30
EFFECTIVE AREA(ACRES) = 195.46 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 213.0 PEAK FLOW RATE(CFS) = 336.64
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

```
*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10
-----
```

```
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====
```

```
*****
FLOW PROCESS FROM NODE 10340.00 TO NODE 10341.00 IS CODE = 21
-----
```

```
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
```

```
INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 585.00
```

```
Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.581
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.643
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE" - 0.10 0.30 0.800 95 10.58
PUBLIC PARK - 0.50 0.30 0.850 95 10.90
AGRICULTURAL GOOD COVER
```

```
"ROW CROPS, STRAIGHT ROW" - 0.40 0.30 1.000 95 21.09
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA RUNOFF(CFS) = 2.13
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.13
```

```
*****
FLOW PROCESS FROM NODE 10341.00 TO NODE 10342.00 IS CODE = 63
-----
```

```
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====
```

```
UPSTREAM ELEVATION(FEET) = 585.00 DOWNSTREAM ELEVATION(FEET) = 570.00
STREET LENGTH(FEET) = 250.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00
```

```
DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020
```

```
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64
```

```
**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.25
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.26
HALFSTREET FLOOD WIDTH(FEET) = 5.17
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.65
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.22
STREET FLOW TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 11.48
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.523
```

```
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.70 0.30 0.800 -
USER-DEFINED - 1.40 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 4.24
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 6.27
```

```
END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 6.70
FLOW VELOCITY(FEET/SEC.) = 4.91 DEPTH*VELOCITY(FT*FT/SEC.) = 1.43
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10342.00 = 558.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
-----
```

```
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====
```

```
UPSTREAM ELEVATION(FEET) = 570.00 DOWNSTREAM ELEVATION(FEET) = 560.00
```

STREET LENGTH(FEET) = 415.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.49  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.36  
 HALfstREET FLOOD WIDTH(FEET) = 9.95  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.60  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.29  
 STREET FLOW TRAVEL TIME(MIN.) = 1.92 Tc(MIN.) = 13.40  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.310  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.800	-
USER-DEFINED	-	1.20	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.825  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.46  
 EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
 TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 10.13

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.37 HALfstREET FLOOD WIDTH(FEET) = 10.76  
 FLOW VELOCITY(FEET/SEC.) = 3.76 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.40  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10343.00 = 973.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10343.00 TO NODE 10344.00 IS CODE = 63  
 -----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 4 USED)<<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 560.00 DOWNSTREAM ELEVATION(FEET) = 550.00  
 STREET LENGTH(FEET) = 616.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.51  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.42  
 HALfstREET FLOOD WIDTH(FEET) = 12.89  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.38  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.41  
 STREET FLOW TRAVEL TIME(MIN.) = 3.04 Tc(MIN.) = 16.44  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.065  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.30	0.800	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814  
 SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 4.75  
 EFFECTIVE AREA(ACRES) = 8.40 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 13.67

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.43 HALfstREET FLOOD WIDTH(FEET) = 13.40  
 FLOW VELOCITY(FEET/SEC.) = 3.44 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.47  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10344.00 = 1589.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10344.00 TO NODE 10345.00 IS CODE = 63  
 -----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 4 USED)<<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 550.00 DOWNSTREAM ELEVATION(FEET) = 510.00  
 STREET LENGTH(FEET) = 474.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.03  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.36  
 HALfstREET FLOOD WIDTH(FEET) = 9.95  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.80  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.43  
 STREET FLOW TRAVEL TIME(MIN.) = 1.16 Tc(MIN.) = 17.60  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.989  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.80	0.30	0.800	-
USER-DEFINED	-	0.20	0.30	0.850	-



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 4.72  
EFFECTIVE AREA(ACRES) = 11.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 11.4 PEAK FLOW RATE(CFS) = 17.81

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.46  
FLOW VELOCITY(FEET/SEC.) = 6.94 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.55  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10345.00 = 2063.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10345.00 TO NODE 10346.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 510.00 DOWNSTREAM ELEVATION(FEET) = 484.00  
STREET LENGTH(FEET) = 231.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.54

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.66  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 10.25  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.92  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.88  
STREET FLOW TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 18.08  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.956

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.40 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 3.71  
EFFECTIVE AREA(ACRES) = 13.80 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 13.8 PEAK FLOW RATE(CFS) = 21.19

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.61  
FLOW VELOCITY(FEET/SEC.) = 8.06 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.98  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10346.00 = 2294.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10346.00 TO NODE 10347.00 IS CODE = 63

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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 484.00 DOWNSTREAM ELEVATION(FEET) = 378.00  
STREET LENGTH(FEET) = 995.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.55

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.11  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.37  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.13  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.14  
STREET FLOW TRAVEL TIME(MIN.) = 2.04 Tc(MIN.) = 20.12  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.825

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 5.85  
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 25.39

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.62  
FLOW VELOCITY(FEET/SEC.) = 8.24 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.22  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10347.00 = 3289.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10347.00 TO NODE 10348.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 378.00 DOWNSTREAM ELEVATION(FEET) = 303.00  
STREET LENGTH(FEET) = 751.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH( FEET) = 0.56

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.00  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH( FEET) = 0.42  
HALFSTREET FLOOD WIDTH( FEET) = 12.89  
AVERAGE FLOW VELOCITY( FEET/SEC.) = 8.37  
PRODUCT OF DEPTH&VELOCITY( FT\*FT/SEC.) = 3.48  
STREET FLOW TRAVEL TIME( MIN.) = 1.50 Tc( MIN.) = 21.62  
\* 25 YEAR RAINFALL INTENSITY( INCH/HR) = 1.759

SUBAREA LOSS RATE DATA( AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.20 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp( INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA( ACRES) = 8.20 SUBAREA RUNOFF( CFS) = 11.21  
EFFECTIVE AREA( ACRES) = 26.10 AREA-AVERAGED Fm( INCH/HR) = 0.25  
AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA( ACRES) = 26.1 PEAK FLOW RATE( CFS) = 35.54

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH( FEET) = 0.43 HALFSTREET FLOOD WIDTH( FEET) = 13.65  
FLOW VELOCITY( FEET/SEC.) = 8.65 DEPTH\*VELOCITY( FT\*FT/SEC.) = 3.73  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10348.00 = 4040.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10348.00 TO NODE 10349.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION( FEET) = 303.00 DOWNSTREAM ELEVATION( FEET) = 252.00  
STREET LENGTH( FEET) = 607.00 CURB HEIGHT( INCHES) = 8.0  
STREET HALFWIDTH( FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK( FEET) = 15.00  
INSIDE STREET CROSSFALL( DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL( DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL( DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH( FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.32  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH( FEET) = 0.46  
HALFSTREET FLOOD WIDTH( FEET) = 15.21  
AVERAGE FLOW VELOCITY( FEET/SEC.) = 8.46  
PRODUCT OF DEPTH&VELOCITY( FT\*FT/SEC.) = 3.91  
STREET FLOW TRAVEL TIME( MIN.) = 1.20 Tc( MIN.) = 22.81  
\* 25 YEAR RAINFALL INTENSITY( INCH/HR) = 1.706  
SUBAREA LOSS RATE DATA( AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.30 0.30 0.800 -  
USER-DEFINED - 3.00 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp( INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.815  
SUBAREA AREA( ACRES) = 10.30 SUBAREA RUNOFF( CFS) = 13.55  
EFFECTIVE AREA( ACRES) = 36.40 AREA-AVERAGED Fm( INCH/HR) = 0.25  
AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA( ACRES) = 36.4 PEAK FLOW RATE( CFS) = 47.86

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH( FEET) = 0.48 HALFSTREET FLOOD WIDTH( FEET) = 16.03  
FLOW VELOCITY( FEET/SEC.) = 8.68 DEPTH\*VELOCITY( FT\*FT/SEC.) = 4.15  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10349.00 = 4647.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10349.00 TO NODE 10350.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION( FEET) = 252.00 DOWNSTREAM ELEVATION( FEET) = 246.00  
STREET LENGTH( FEET) = 224.00 CURB HEIGHT( INCHES) = 8.0  
STREET HALFWIDTH( FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK( FEET) = 15.00  
INSIDE STREET CROSSFALL( DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL( DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL( DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH( FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 56.33  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH( FEET) = 0.59  
HALFSTREET FLOOD WIDTH( FEET) = 21.47  
AVERAGE FLOW VELOCITY( FEET/SEC.) = 5.87  
PRODUCT OF DEPTH&VELOCITY( FT\*FT/SEC.) = 3.45  
STREET FLOW TRAVEL TIME( MIN.) = 0.64 Tc( MIN.) = 23.45  
\* 25 YEAR RAINFALL INTENSITY( INCH/HR) = 1.678  
SUBAREA LOSS RATE DATA( AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 12.60 0.30 0.800 -  
USER-DEFINED - 0.50 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp( INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.802  
SUBAREA AREA( ACRES) = 13.10 SUBAREA RUNOFF( CFS) = 16.95  
EFFECTIVE AREA( ACRES) = 49.50 AREA-AVERAGED Fm( INCH/HR) = 0.24  
AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA( ACRES) = 49.5 PEAK FLOW RATE( CFS) = 63.89

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH( FEET) = 0.61 HALFSTREET FLOOD WIDTH( FEET) = 22.59  
FLOW VELOCITY( FEET/SEC.) = 6.04 DEPTH\*VELOCITY( FT\*FT/SEC.) = 3.68

LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10350.00 = 4871.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10350.00 TO NODE 10351.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 237.00  
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.67  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 63.89  
PIPE TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 24.13  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10351.00 = 5390.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10351.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.13  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.648  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 5.60 0.30 0.800 -  
USER-DEFINED - 0.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.784  
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 8.27  
EFFECTIVE AREA(ACRES) = 56.00 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 56.0 PEAK FLOW RATE(CFS) = 70.82

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10352.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 237.00 DOWNSTREAM(FEET) = 230.00  
FLOW LENGTH(FEET) = 675.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.86  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 70.82  
PIPE TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 25.17  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10352.00 = 6065.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 25.17

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.605

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.300  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.91  
EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 70.82  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 25.17  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.605  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 0.100 -  
USER-DEFINED - 9.40 0.30 0.800 -  
USER-DEFINED - 1.10 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755  
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 14.01  
EFFECTIVE AREA(ACRES) = 68.70 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
TOTAL AREA(ACRES) = 68.7 PEAK FLOW RATE(CFS) = 84.55

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10353.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 230.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 19.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 31.72  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 84.55  
PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 25.33  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10353.00 = 6366.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10353.00 TO NODE 10353.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 25.33  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.600  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 6.00 0.30 0.800 -  
 USER-DEFINED - 1.30 0.30 0.850 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.799  
 SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 9.06  
 EFFECTIVE AREA(ACRES) = 76.10 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 76.1 PEAK FLOW RATE(CFS) = 93.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10353.00 TO NODE 10354.00 IS CODE = 31  
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 172.00  
 FLOW LENGTH(FEET) = 458.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.12  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 93.29  
 PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 25.87  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10354.00 = 6824.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10354.00 TO NODE 10390.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 172.00 DOWNSTREAM(FEET) = 155.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00 CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 93.29  
 FLOW VELOCITY(FEET/SEC.) = 9.17 FLOW DEPTH(FEET) = 1.84  
 TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 26.62  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 26.62  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.558  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 0.100 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.100 -  
 USER-DEFINED - 0.90 0.30 0.850 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 2.52  
 EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
 TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 93.29  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 26.62  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.558  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 2.10 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.964  
 SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 4.34  
 EFFECTIVE AREA(ACRES) = 81.90 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 81.9 PEAK FLOW RATE(CFS) = 97.32

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 26.62  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.558  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.50 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 2.83  
 EFFECTIVE AREA(ACRES) = 84.40 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 84.4 PEAK FLOW RATE(CFS) = 100.15

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

=====

\*\* MAIN STREAM CONFLUENCE DATA \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 100.15 26.62 1.558 0.30( 0.24) 0.80 84.4 10340.00  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	336.64	18.38	1.937	0.30 ( 0.23)	0.77	195.5	10300.00
2	327.59	21.63	1.758	0.30 ( 0.23)	0.76	213.0	10320.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	425.65	18.38	1.937	0.30 ( 0.23)	0.77	253.7	10300.00
2	421.33	21.63	1.758	0.30 ( 0.23)	0.77	281.6	10320.00
3	384.92	26.62	1.558	0.30 ( 0.23)	0.77	297.4	10340.00

TOTAL AREA (ACRES) = 297.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 425.65 Tc (MIN.) = 18.380  
EFFECTIVE AREA (ACRES) = 253.74 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
TOTAL AREA (ACRES) = 297.4  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10360.00 TO NODE 10361.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
ELEVATION DATA: UPSTREAM (FEET) = 337.00 DOWNSTREAM (FEET) = 292.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.697

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.625

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.30	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"GRASS"	-	0.50	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.10	0.30	1.000	95	10.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 1.88  
TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 1.88

\*\*\*\*\*

FLOW PROCESS FROM NODE 10361.00 TO NODE 10362.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 292.00 DOWNSTREAM (FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 199.00 CHANNEL SLOPE = 0.0101  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 1.88  
FLOW VELOCITY (FEET/SEC.) = 2.05 FLOW DEPTH (FEET) = 0.55  
TRAVEL TIME (MIN.) = 1.62 Tc (MIN.) = 12.32  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10362.00 = 529.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.32

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.425

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.11  
EFFECTIVE AREA (ACRES) = 2.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 3.83

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10363.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 290.00 DOWNSTREAM (FEET) = 288.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 3.83  
FLOW VELOCITY (FEET/SEC.) = 2.73 FLOW DEPTH (FEET) = 0.68  
TRAVEL TIME (MIN.) = 0.90 Tc (MIN.) = 13.22  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10363.00 = 676.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10363.00 TO NODE 10363.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.22  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.328  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.40 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 0.850 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.39  
 EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 8.04

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10363.00 TO NODE 10364.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 288.00 DOWNSTREAM(FEET) = 286.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.04  
 FLOW VELOCITY(FEET/SEC.) = 3.29 FLOW DEPTH(FEET) = 0.90  
 TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 13.96  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10364.00 = 823.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10364.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.96  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.254  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.40 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
 SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 3.35  
 EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 11.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10365.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 286.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 11.10  
 FLOW VELOCITY(FEET/SEC.) = 2.93 FLOW DEPTH(FEET) = 1.12  
 TRAVEL TIME(MIN.) = 1.41 Tc(MIN.) = 15.37  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10365.00 = 1071.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10365.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.37  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.135  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.90 0.30 1.000 -  
 USER-DEFINED - 1.80 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.850 -  
 USER-DEFINED - 0.50 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 5.79  
 EFFECTIVE AREA(ACRES) = 9.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 16.22

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10366.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 16.22  
 FLOW VELOCITY(FEET/SEC.) = 3.23 FLOW DEPTH(FEET) = 1.29  
 TRAVEL TIME(MIN.) = 1.28 Tc(MIN.) = 16.65  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10366.00 = 1319.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10366.00 TO NODE 10366.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.65  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.051  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.20 0.30 1.000 -  
 USER-DEFINED - 2.30 0.30 1.000 -

USER-DEFINED - 0.20 0.30 0.850 -  
 USER-DEFINED - 2.70 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995  
 SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 13.41  
 EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 28.88

\*\*\*\*\*

FLOW PROCESS FROM NODE 10366.00 TO NODE 10367.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 279.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 292.00 CHANNEL SLOPE = 0.0103  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 28.88  
 FLOW VELOCITY (FEET/SEC.) = 4.07 FLOW DEPTH (FEET) = 1.54  
 TRAVEL TIME (MIN.) = 1.20 Tc (MIN.) = 17.85  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10367.00 = 1611.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10367.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.85  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.972  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972  
 SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 2.42  
 EFFECTIVE AREA (ACRES) = 19.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 19.9 PEAK FLOW RATE (CFS) = 30.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10368.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 279.00 DOWNSTREAM (FEET) = 276.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 378.00 CHANNEL SLOPE = 0.0079  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 30.00  
 FLOW VELOCITY (FEET/SEC.) = 3.73 FLOW DEPTH (FEET) = 1.64

TRAVEL TIME (MIN.) = 1.69 Tc (MIN.) = 19.54  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10368.00 = 1989.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10368.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 19.54  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.860  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.973  
 SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 3.11  
 EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 31.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10369.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 247.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 229.00 CHANNEL SLOPE = 0.1266  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 31.11  
 FLOW VELOCITY (FEET/SEC.) = 10.64 FLOW DEPTH (FEET) = 0.99  
 TRAVEL TIME (MIN.) = 0.36 Tc (MIN.) = 19.90  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10369.00 = 2218.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10369.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 19.90  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.837  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	9.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996  
 SUBAREA AREA (ACRES) = 11.60 SUBAREA RUNOFF (CFS) = 16.06  
 EFFECTIVE AREA (ACRES) = 33.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 33.7 PEAK FLOW RATE (CFS) = 46.70

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10370.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 247.00 DOWNSTREAM(FEET) = 226.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 179.00 CHANNEL SLOPE = 0.1173
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 46.70
FLOW VELOCITY(FEET/SEC.) = 11.48 FLOW DEPTH(FEET) = 1.16
TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 20.16
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10370.00 = 2397.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10370.00 TO NODE 10370.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.16

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.823

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 0.850 -
USER-DEFINED - 3.60 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 5.60 0.30 1.000 -
USER-DEFINED - 1.50 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997

SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 15.22

EFFECTIVE AREA(ACRES) = 44.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 44.8 PEAK FLOW RATE(CFS) = 61.50

\*\*\*\*\*

FLOW PROCESS FROM NODE 10370.00 TO NODE 10371.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 226.00 DOWNSTREAM(FEET) = 188.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 434.00 CHANNEL SLOPE = 0.0876
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 61.50
FLOW VELOCITY(FEET/SEC.) = 10.95 FLOW DEPTH(FEET) = 1.37
TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 20.82
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10371.00 = 2831.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10371.00 TO NODE 10371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.82

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.794

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 0.100 -
USER-DEFINED - 1.20 0.30 0.850 -
USER-DEFINED - 1.60 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 0.20 0.30 0.100 -
USER-DEFINED - 7.20 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958

SUBAREA AREA(ACRES) = 10.70 SUBAREA RUNOFF(CFS) = 14.51

EFFECTIVE AREA(ACRES) = 55.50 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 55.5 PEAK FLOW RATE(CFS) = 74.84

\*\*\*\*\*

FLOW PROCESS FROM NODE 10371.00 TO NODE 10389.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 157.00
FLOW LENGTH(FEET) = 1918.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.93
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 74.84
PIPE TRAVEL TIME(MIN.) = 2.47 Tc(MIN.) = 23.29
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 23.29

RAINFALL INTENSITY(INCH/HR) = 1.69

AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.99

EFFECTIVE STREAM AREA(ACRES) = 55.50

TOTAL STREAM AREA(ACRES) = 55.50

PEAK FLOW RATE(CFS) AT CONFLUENCE = 74.84

\*\*\*\*\*

FLOW PROCESS FROM NODE 10380.00 TO NODE 10381.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 241.00

ELEVATION DATA: UPSTREAM(FEET) = 275.00 DOWNSTREAM(FEET) = 273.00



Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.110  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.322  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.30	0.100	95	7.11
PUBLIC PARK	-	1.10	0.30	0.850	95	11.30

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.735  
 SUBAREA RUNOFF(CFS) = 3.63  
 TOTAL AREA(ACRES) = 1.30 PEAK FLOW RATE(CFS) = 3.63

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10381.00 TO NODE 10382.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 273.00 DOWNSTREAM ELEVATION(FEET) = 271.00  
 STREET LENGTH(FEET) = 238.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.70  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.37  
 HALFSTREET FLOOD WIDTH(FEET) = 10.51  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.20  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.81  
 STREET FLOW TRAVEL TIME(MIN.) = 1.80 Tc(MIN.) = 8.91  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.918

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	1.40	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.718  
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 4.13  
 EFFECTIVE AREA(ACRES) = 3.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 7.29

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.76  
 FLOW VELOCITY(FEET/SEC.) = 2.32 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.91  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10382.00 = 479.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10382.00 TO NODE 10383.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 271.00 DOWNSTREAM ELEVATION(FEET) = 268.00  
 STREET LENGTH(FEET) = 357.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.55  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.43  
 HALFSTREET FLOOD WIDTH(FEET) = 13.79  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.52  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.09  
 STREET FLOW TRAVEL TIME(MIN.) = 2.36 Tc(MIN.) = 11.27  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.548

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	1.30	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.452  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 6.51  
 EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 12.80

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 14.96  
 FLOW VELOCITY(FEET/SEC.) = 2.64 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.21  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10383.00 = 836.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10383.00 TO NODE 10384.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 268.00 DOWNSTREAM ELEVATION(FEET) = 264.00  
 STREET LENGTH(FEET) = 473.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.83  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.49  
 HALFSTREET FLOOD WIDTH(FEET) = 16.68  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.83  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.39  
 STREET FLOW TRAVEL TIME(MIN.) = 2.78 Tc(MIN.) = 14.05  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.245

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.60	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 8.05  
 EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.57  
 TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 19.22

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.51 HALFSTREET FLOOD WIDTH(FEET) = 17.62  
 FLOW VELOCITY(FEET/SEC.) = 2.92 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.49  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10384.00 = 1309.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10384.00 TO NODE 10385.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 264.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
 STREET LENGTH(FEET) = 463.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.55  
 \*\*\*STREET FLOWING FULL\*\*\*

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.57  
 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.82  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.60  
 STREET FLOW TRAVEL TIME(MIN.) = 2.73 Tc(MIN.) = 16.79  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.042

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.600	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.650  
 SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 10.64  
 EFFECTIVE AREA(ACRES) = 16.70 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.7 PEAK FLOW RATE(CFS) = 27.98

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
 FLOW VELOCITY(FEET/SEC.) = 2.98 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.74  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10385.00 = 1772.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10385.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 16.79  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.042  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.34  
 EFFECTIVE AREA(ACRES) = 16.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.9 PEAK FLOW RATE(CFS) = 28.32

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10386.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 261.00 DOWNSTREAM(FEET) = 200.00  
 FLOW LENGTH(FEET) = 712.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 18.81  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 28.32

PIPE TRAVEL TIME(MIN.) = 0.63 Tc(MIN.) = 17.42  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10386.00 = 2484.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 0.100 -  
USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 0.100 -  
USER-DEFINED - 0.30 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.561  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.31  
EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 30.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 0.100 -  
USER-DEFINED - 0.10 0.30 0.600 -  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.30 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.544  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 6.78  
EFFECTIVE AREA(ACRES) = 22.40 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 22.4 PEAK FLOW RATE(CFS) = 36.78

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.100 -  
USER-DEFINED - 0.20 0.30 0.500 -  
USER-DEFINED - 0.10 0.30 0.600 -  
USER-DEFINED - 0.30 0.30 0.850 -  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 0.10 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 6.09  
EFFECTIVE AREA(ACRES) = 25.90 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54  
TOTAL AREA(ACRES) = 25.9 PEAK FLOW RATE(CFS) = 42.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.70 0.30 0.100 -  
USER-DEFINED - 0.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.228  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 3.48  
EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52  
TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 46.34

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 2.10 0.30 0.100 -  
USER-DEFINED - 0.20 0.30 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.225  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.22  
EFFECTIVE AREA(ACRES) = 30.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49  
TOTAL AREA(ACRES) = 30.9 PEAK FLOW RATE(CFS) = 51.56

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.100 -  
USER-DEFINED - 1.50 0.30 0.600 -  
USER-DEFINED - 1.70 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.204  
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 12.57  
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 64.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10387.00 IS CODE = 31  
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 200.00 DOWNSTREAM(FEET) = 163.00  
FLOW LENGTH(FEET) = 1145.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.16  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 64.13  
PIPE TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 18.60  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10387.00 = 3629.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.60  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.922  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.100 -  
USER-DEFINED - 23.80 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 0.100 -  
USER-DEFINED - 6.90 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.830  
SUBAREA AREA(ACRES) = 32.90 SUBAREA RUNOFF(CFS) = 49.55  
EFFECTIVE AREA(ACRES) = 71.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 71.0 PEAK FLOW RATE(CFS) = 111.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81  
=====

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.60  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.922  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 1.20 0.30 0.100 -  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.641  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 5.92  
EFFECTIVE AREA(ACRES) = 74.80 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 74.8 PEAK FLOW RATE(CFS) = 116.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10388.00 IS CODE = 31  
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 163.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 26.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.23  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 116.93  
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 18.73  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10388.00 = 3779.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.73  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.914  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.80 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.400 -  
USER-DEFINED - 0.60 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 10.14  
EFFECTIVE AREA(ACRES) = 80.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 80.9 PEAK FLOW RATE(CFS) = 126.49

```

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.73
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.914
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.30     0.100    -
USER-DEFINED        -        10.70     0.30     0.400    -
USER-DEFINED        -         2.30     0.30     0.850    -
USER-DEFINED        -         0.50     0.30     1.000    -
USER-DEFINED        -         0.30     0.30     1.000    -
USER-DEFINED        -         0.70     0.30     0.400    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.502
SUBAREA AREA(ACRES) = 14.60   SUBAREA RUNOFF(CFS) = 23.17
EFFECTIVE AREA(ACRES) = 95.50   AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 95.5     PEAK FLOW RATE(CFS) = 149.66

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.73
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.914
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70     0.30     0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.70   SUBAREA RUNOFF(CFS) = 1.05
EFFECTIVE AREA(ACRES) = 96.20   AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 96.2     PEAK FLOW RATE(CFS) = 150.71

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10389.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 158.00   DOWNSTREAM(FEET) = 157.00
FLOW LENGTH(FEET) = 51.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.53
ESTIMATED PIPE DIAMETER(INCH) = 45.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 150.71
PIPE TRAVEL TIME(MIN.) = 0.05   Tc(MIN.) = 18.78
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10389.00 = 3830.00 FEET.

*****

```

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FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 18.78
RAINFALL INTENSITY(INCH/HR) = 1.91
AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.58
EFFECTIVE STREAM AREA(ACRES) = 96.20
TOTAL STREAM AREA(ACRES) = 96.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 150.71

** CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER     (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1          74.84 23.29 1.685 0.30( 0.30) 0.99 55.5 10360.00
2         150.71 18.78 1.911 0.30( 0.17) 0.58 96.2 10380.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER     (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1          220.84 18.78 1.911 0.30( 0.21) 0.71 140.9 10380.00
2          206.00 23.29 1.685 0.30( 0.22) 0.73 151.7 10360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 220.84   Tc(MIN.) = 18.78
EFFECTIVE AREA(ACRES) = 140.95   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 151.7
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

*****
FLOW PROCESS FROM NODE 10389.00 TO NODE 10390.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 157.00   DOWNSTREAM(FEET) = 155.00
FLOW LENGTH(FEET) = 312.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 50.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.86
ESTIMATED PIPE DIAMETER(INCH) = 63.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 220.84
PIPE TRAVEL TIME(MIN.) = 0.44   Tc(MIN.) = 19.22
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

MAINLINE Tc(MIN.) = 19.22  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.882  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 5.70 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 13.53  
 EFFECTIVE AREA(ACRES) = 150.45 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 161.2 PEAK FLOW RATE(CFS) = 225.31

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.22  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.882  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 3.13  
 EFFECTIVE AREA(ACRES) = 152.65 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 163.4 PEAK FLOW RATE(CFS) = 228.45

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	228.45	19.22	1.882	0.30( 0.22)	0.73	152.6	10380.00
2	212.05	23.73	1.666	0.30( 0.22)	0.75	163.4	10360.00

LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	425.65	18.38	1.937	0.30( 0.23)	0.77	253.7	10300.00
2	421.33	21.63	1.758	0.30( 0.23)	0.77	281.6	10320.00
3	384.92	26.62	1.558	0.30( 0.23)	0.77	297.4	10340.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	651.40	18.38	1.937	0.30( 0.23)	0.76	399.7	10300.00
2	652.99	19.22	1.882	0.30( 0.23)	0.76	413.6	10380.00
3	641.00	21.63	1.758	0.30( 0.23)	0.76	440.0	10320.00
4	618.06	23.73	1.666	0.30( 0.23)	0.76	451.6	10360.00
5	581.15	26.62	1.558	0.30( 0.23)	0.76	460.8	10340.00

TOTAL AREA(ACRES) = 460.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 652.99 Tc(MIN.) = 19.219  
 EFFECTIVE AREA(ACRES) = 413.56 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA(ACRES) = 460.8  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12  
 -----

>>>>CLEAR MEMORY BANK # 1 <<<<<

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 460.8 TC(MIN.) = 19.22  
 EFFECTIVE AREA(ACRES) = 413.56 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.758  
 PEAK FLOW RATE(CFS) = 652.99

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	651.40	18.38	1.937	0.30( 0.23)	0.76	399.7	10300.00
2	652.99	19.22	1.882	0.30( 0.23)	0.76	413.6	10380.00
3	641.00	21.63	1.758	0.30( 0.23)	0.76	440.0	10320.00
4	618.06	23.73	1.666	0.30( 0.23)	0.76	451.6	10360.00
5	581.15	26.62	1.558	0.30( 0.23)	0.76	460.8	10340.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506104D.DAT  
TIME/DATE OF STUDY: 12:47 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.060
- 2) 6.00; 3.660
- 3) 7.00; 3.350
- 4) 8.00; 3.100
- 5) 9.00; 2.900
- 6) 10.00; 2.730
- 7) 11.00; 2.580
- 8) 12.00; 2.460
- 9) 13.00; 2.350
- 10) 14.00; 2.250
- 11) 15.00; 2.160
- 12) 20.00; 1.830
- 13) 25.00; 1.610
- 14) 30.00; 1.450
- 15) 40.00; 1.230
- 16) 50.00; 1.090
- 17) 60.00; 0.980
- 18) 90.00; 0.770
- 19) 120.00; 0.660
- 20) 180.00; 0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH	LIP	HIKE	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10400.00 TO NODE 10401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00  
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.434  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.526  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
PUBLIC PARK	-	0.50	0.30	0.850	95	6.43

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.850  
 SUBAREA RUNOFF(CFS) = 1.47  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 10401.00 TO NODE 10402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.3419  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.47  
 FLOW VELOCITY(FEET/SEC.) = 5.72 FLOW DEPTH(FEET) = 0.29  
 TRAVEL TIME(MIN.) = 0.34  $T_c$ (MIN.) = 6.77  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10402.00 = 424.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 6.77  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.420  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.940  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.41  
EFFECTIVE AREA(ACRES) = 1.00 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 2.84

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10403.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.2439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.84  
FLOW VELOCITY(FEET/SEC.) = 6.09 FLOW DEPTH(FEET) = 0.39  
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 7.11  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10403.00 = 547.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10403.00 TO NODE 10403.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.11  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.322  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 2.47  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 5.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 10403.00 TO NODE 10404.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 420.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 266.00 CHANNEL SLOPE = 0.1880  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 5.22  
FLOW VELOCITY(FEET/SEC.) = 6.34 FLOW DEPTH(FEET) = 0.52  
TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 7.81  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10404.00 = 813.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10404.00 TO NODE 10404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.81  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.148  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.863  
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 5.98  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 10.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 10404.00 TO NODE 10405.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 370.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 289.00 CHANNEL SLOPE = 0.1730  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.90  
FLOW VELOCITY(FEET/SEC.) = 7.43 FLOW DEPTH(FEET) = 0.70  
TRAVEL TIME(MIN.) = 0.65 Tc(MIN.) = 8.46  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10405.00 = 1102.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10405.00 TO NODE 10405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.46  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.008  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 9.91  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 20.28

\*\*\*\*\*

FLOW PROCESS FROM NODE 10405.00 TO NODE 10406.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 367.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 23.00 CHANNEL SLOPE = 0.1304

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 20.28  
 FLOW VELOCITY (FEET/SEC.) = 7.76 FLOW DEPTH (FEET) = 0.93  
 TRAVEL TIME (MIN.) = 0.05 Tc (MIN.) = 8.51  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10406.00 = 1125.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10406.00 TO NODE 10406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.51  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.999  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 5.19  
 EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 25.40

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10406.00 TO NODE 10407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 367.00 DOWNSTREAM (FEET) = 344.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 214.00 CHANNEL SLOPE = 0.1075  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 25.40  
 FLOW VELOCITY (FEET/SEC.) = 7.68 FLOW DEPTH (FEET) = 1.05  
 TRAVEL TIME (MIN.) = 0.46 Tc (MIN.) = 8.97  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10407.00 = 1339.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10407.00 TO NODE 10407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.97  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.906  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.00	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
 SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 4.77  
 EFFECTIVE AREA (ACRES) = 12.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 29.31

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10407.00 TO NODE 10408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 344.00 DOWNSTREAM (FEET) = 327.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 919.00 CHANNEL SLOPE = 0.0185  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 29.31  
 FLOW VELOCITY (FEET/SEC.) = 5.09 FLOW DEPTH (FEET) = 1.39  
 TRAVEL TIME (MIN.) = 3.01 Tc (MIN.) = 11.98  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10408.00 = 2258.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10408.00 TO NODE 10408.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.98  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.462  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.800	-
USER-DEFINED	-	7.90	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.849  
 SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 15.89  
 EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 40.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10408.00 TO NODE 10409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 327.00 DOWNSTREAM (FEET) = 314.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 807.00 CHANNEL SLOPE = 0.0161  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 40.29  
 FLOW VELOCITY (FEET/SEC.) = 5.25 FLOW DEPTH (FEET) = 1.60  
 TRAVEL TIME (MIN.) = 2.56 Tc (MIN.) = 14.54  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10409.00 = 3065.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10409.00 TO NODE 10409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 14.54  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.201  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.800	-
USER-DEFINED	-	7.90	0.30	0.850	-

```

LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        6.90     0.30      0.800     -
USER-DEFINED  -        5.70     0.30      0.850     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.823
SUBAREA AREA (ACRES) = 12.60  SUBAREA RUNOFF(CFS) = 22.16
EFFECTIVE AREA (ACRES) = 32.90  AREA-AVERAGED Fm (INCH/HR) = 0.25
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.84
TOTAL AREA (ACRES) = 32.9  PEAK FLOW RATE (CFS) = 57.68

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*****
FLOW PROCESS FROM NODE 10409.00 TO NODE 10410.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 314.00  DOWNSTREAM(FEET) = 266.00
FLOW LENGTH(FEET) = 213.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 33.02
ESTIMATED PIPE DIAMETER(INCH) = 21.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 57.68
PIPE TRAVEL TIME(MIN.) = 0.11  Tc(MIN.) = 14.65
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10410.00 = 3278.00 FEET.

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*****
FLOW PROCESS FROM NODE 10410.00 TO NODE 10411.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 266.00  DOWNSTREAM(FEET) = 170.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1470.00  CHANNEL SLOPE = 0.0653
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 57.68
FLOW VELOCITY(FEET/SEC.) = 9.69  FLOW DEPTH(FEET) = 1.41
TRAVEL TIME(MIN.) = 2.53  Tc(MIN.) = 17.18
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10411.00 = 4748.00 FEET.

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*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10411.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 17.18
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.016
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.60     0.30     0.100  -
USER-DEFINED  -        0.10     0.30     0.850  -
USER-DEFINED  -        0.40     0.30     0.100  -
USER-DEFINED  -        6.60     0.30     0.800  -
USER-DEFINED  -        0.80     0.30     0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.723
SUBAREA AREA (ACRES) = 8.50  SUBAREA RUNOFF(CFS) = 13.76

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EFFECTIVE AREA(ACRES) = 41.40  AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.82
TOTAL AREA(ACRES) = 41.4  PEAK FLOW RATE(CFS) = 65.97

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*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10412.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 170.00  DOWNSTREAM(FEET) = 161.00
FLOW LENGTH(FEET) = 1129.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 30.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.59
ESTIMATED PIPE DIAMETER(INCH) = 39.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 65.97
PIPE TRAVEL TIME(MIN.) = 1.96  Tc(MIN.) = 19.14
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10412.00 = 5877.00 FEET.

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*****
FLOW PROCESS FROM NODE 10412.00 TO NODE 10413.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 161.00  DOWNSTREAM(FEET) = 141.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 360.00  CHANNEL SLOPE = 0.0556
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 65.97
FLOW VELOCITY(FEET/SEC.) = 9.41  FLOW DEPTH(FEET) = 1.53
TRAVEL TIME(MIN.) = 0.64  Tc(MIN.) = 19.78
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10413.00 = 6237.00 FEET.

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*****
FLOW PROCESS FROM NODE 10413.00 TO NODE 10413.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 19.78
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.845
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        1.20     0.30     0.100  -
USER-DEFINED  -        0.40     0.30     0.850  -
USER-DEFINED  -        0.30     0.30     0.100  -
USER-DEFINED  -        0.10     0.30     0.850  -
USER-DEFINED  -        0.90     0.30     1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.509
SUBAREA AREA (ACRES) = 2.90  SUBAREA RUNOFF(CFS) = 4.42
EFFECTIVE AREA(ACRES) = 44.30  AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 44.3  PEAK FLOW RATE(CFS) = 65.97
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF STUDY SUMMARY:

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TOTAL AREA (ACRES) = 44.3 TC (MIN.) = 19.78  
EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.24  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.798  
PEAK FLOW RATE (CFS) = 65.97

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=====

END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

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FILE NAME: 0506105K.DAT  
TIME/DATE OF STUDY: 12:50 04/15/2013  
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--\*TIME-OF-CONCENTRATION MODEL\*--  
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5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

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FLOW PROCESS FROM NODE 10500.00 TO NODE 10501.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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INITIAL SUBAREA FLOW-LENGTH (FEET) = 326.00

ELEVATION DATA: UPSTREAM (FEET) = 1123.00 DOWNSTREAM (FEET) = 1085.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.984

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.582

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER

"GRASS" - 0.20 0.30 1.000 95 10.98

NATURAL FAIR COVER

"GRASS" - 0.30 0.30 1.000 95 10.98

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 1.03

TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 1.03

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FLOW PROCESS FROM NODE 10501.00 TO NODE 10502.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 1085.00 DOWNSTREAM (FEET) = 1050.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 181.00 CHANNEL SLOPE = 0.1934

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00

CHANNEL FLOW THRU SUBAREA (CFS) = 1.03

FLOW VELOCITY (FEET/SEC.) = 4.21 FLOW DEPTH (FEET) = 0.29

TRAVEL TIME (MIN.) = 0.72 Tc (MIN.) = 11.70

LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10502.00 = 507.00 FEET.

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FLOW PROCESS FROM NODE 10502.00 TO NODE 10502.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc (MIN.) = 11.70

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.496

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.10     0.30      1.000     -
USER-DEFINED  -        0.80     0.30      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 1.78
EFFECTIVE AREA (ACRES) = 1.40  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.4    PEAK FLOW RATE (CFS) = 2.77

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*****
FLOW PROCESS FROM NODE 10502.00 TO NODE 10503.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1025.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 193.00  CHANNEL SLOPE = 0.1295
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.77
FLOW VELOCITY(FEET/SEC.) = 4.77  FLOW DEPTH(FEET) = 0.44
TRAVEL TIME(MIN.) = 0.67  Tc(MIN.) = 12.38
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10503.00 = 700.00 FEET.

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10503.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.38
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.419
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.50   0.30  1.000  -
USER-DEFINED      -        1.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 4.39
EFFECTIVE AREA (ACRES) = 3.70  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 3.7    PEAK FLOW RATE (CFS) = 7.06

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10504.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1025.00  DOWNSTREAM(FEET) = 1020.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00  CHANNEL SLOPE = 0.0151
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.06
FLOW VELOCITY(FEET/SEC.) = 3.30  FLOW DEPTH(FEET) = 0.84
TRAVEL TIME(MIN.) = 1.68  Tc(MIN.) = 14.05
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10504.00 = 1032.00 FEET.

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10504.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.05
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.245
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.10   0.30  1.000  -
USER-DEFINED      -        0.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 1.58
EFFECTIVE AREA (ACRES) = 4.60  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.6    PEAK FLOW RATE (CFS) = 8.05

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10505.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1020.00  DOWNSTREAM(FEET) = 975.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 397.00  CHANNEL SLOPE = 0.1134
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 8.05
FLOW VELOCITY(FEET/SEC.) = 7.27  FLOW DEPTH(FEET) = 0.61
TRAVEL TIME(MIN.) = 0.91  Tc(MIN.) = 14.96
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10505.00 = 1429.00 FEET.

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10505.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.96
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.164
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.20   0.30  1.000  -
USER-DEFINED      -        1.20   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.40  SUBAREA RUNOFF (CFS) = 2.35
EFFECTIVE AREA (ACRES) = 6.00  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.0    PEAK FLOW RATE (CFS) = 10.06

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10506.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 905.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 334.00 CHANNEL SLOPE = 0.2096
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.06
FLOW VELOCITY(FEET/SEC.) = 9.63 FLOW DEPTH(FEET) = 0.59
TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 15.54
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10506.00 = 1763.00 FEET.

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10506.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.54
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.124
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        6.10   0.30   1.000  -
USER-DEFINED        -        3.70   0.30   1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 16.09
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 25.94

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10507.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 790.00 CHANNEL SLOPE = 0.0380
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 25.94
FLOW VELOCITY(FEET/SEC.) = 5.23 FLOW DEPTH(FEET) = 1.29
TRAVEL TIME(MIN.) = 2.52 Tc(MIN.) = 18.06
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10507.00 = 2553.00 FEET.

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FLOW PROCESS FROM NODE 10507.00 TO NODE 10507.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.06
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.958
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        2.70   0.30   1.000  -
USER-DEFINED        -        6.30   0.30   1.000  -
USER-DEFINED        -        0.30   0.30   1.000  -

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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 13.88
EFFECTIVE AREA(ACRES) = 25.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 37.46

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FLOW PROCESS FROM NODE 10507.00 TO NODE 10508.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 755.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 37.46
FLOW VELOCITY(FEET/SEC.) = 8.42 FLOW DEPTH(FEET) = 1.22
TRAVEL TIME(MIN.) = 2.22 Tc(MIN.) = 20.28
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10508.00 = 3673.00 FEET.

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10508.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.28
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.818
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.80   0.30   1.000  -
USER-DEFINED        -       11.10   0.30   1.000  -
USER-DEFINED        -        3.10   0.30   1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 20.49
EFFECTIVE AREA(ACRES) = 40.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 54.78

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10509.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 755.00 DOWNSTREAM(FEET) = 533.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1578.00 CHANNEL SLOPE = 0.1407
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 54.78
FLOW VELOCITY(FEET/SEC.) = 10.29 FLOW DEPTH(FEET) = 1.33
TRAVEL TIME(MIN.) = 2.56 Tc(MIN.) = 22.83
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10509.00 = 5251.00 FEET.

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FLOW PROCESS FROM NODE 10509.00 TO NODE 10509.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.83

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.705

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.80	0.30	1.000	-
USER-DEFINED	-	11.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	8.30	0.30	1.000	-
USER-DEFINED	-	38.10	0.30	1.000	-
USER-DEFINED	-	8.70	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 77.40 SUBAREA RUNOFF (CFS) = 97.90

EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 148.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 10509.00 TO NODE 10510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 415.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1236.00 CHANNEL SLOPE = 0.0955  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 148.63  
 FLOW VELOCITY (FEET/SEC.) = 11.39 FLOW DEPTH (FEET) = 2.09  
 TRAVEL TIME (MIN.) = 1.81 Tc (MIN.) = 24.64  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10510.00 = 6487.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 24.64

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.626

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	30.10	0.30	1.000	-
USER-DEFINED	-	15.30	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	11.30	0.30	1.000	-
USER-DEFINED	-	5.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 64.90 SUBAREA RUNOFF (CFS) = 77.44

EFFECTIVE AREA (ACRES) = 182.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 182.4 PEAK FLOW RATE (CFS) = 217.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10511.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1161.00 CHANNEL SLOPE = 0.0973  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 217.65  
 FLOW VELOCITY (FEET/SEC.) = 12.61 FLOW DEPTH (FEET) = 2.40  
 TRAVEL TIME (MIN.) = 1.53 Tc (MIN.) = 26.18  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10511.00 = 7648.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10511.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 26.18

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.572

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.50	0.30	1.000	-
USER-DEFINED	-	10.80	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	22.10	0.30	1.000	-
USER-DEFINED	-	4.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 54.80 SUBAREA RUNOFF (CFS) = 62.76

EFFECTIVE AREA (ACRES) = 237.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 237.2 PEAK FLOW RATE (CFS) = 271.64

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 302.00 DOWNSTREAM (FEET) = 190.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1644.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 271.64  
 FLOW VELOCITY (FEET/SEC.) = 11.65 FLOW DEPTH (FEET) = 2.79  
 TRAVEL TIME (MIN.) = 2.35 Tc (MIN.) = 28.53  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10512.00 = 9292.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10512.00 TO NODE 10512.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<



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=====
MAINLINE Tc(MIN.) = 28.53
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.497
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap      SCS
    LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED            -         0.50     0.30     1.000    -
USER-DEFINED            -         0.20     0.30     1.000    -
USER-DEFINED            -         1.70     0.30     1.000    -
USER-DEFINED            -         0.10     0.30     1.000    -
USER-DEFINED            -        14.20     0.30     1.000    -
USER-DEFINED            -         2.80     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 19.50      SUBAREA RUNOFF(CFS) = 21.01
EFFECTIVE AREA(ACRES) = 256.70   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 256.7        PEAK FLOW RATE(CFS) = 276.59

*****
FLOW PROCESS FROM NODE 10512.00 TO NODE 10513.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 190.00 DOWNSTREAM(FEET) = 183.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 86.00 CHANNEL SLOPE = 0.0814
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00
CHANNEL FLOW THRU SUBAREA(CFS) = 276.59
FLOW VELOCITY(FEET/SEC.) = 12.54 FLOW DEPTH(FEET) = 2.71
TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 28.64
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10513.00 = 9378.00 FEET.

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 28.64
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.493
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap      SCS
    LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED            -         0.10     0.30     0.100    -
USER-DEFINED            -         1.30     0.30     1.000    -
USER-DEFINED            -        29.90     0.30     1.000    -
USER-DEFINED            -        11.90     0.30     1.000    -
USER-DEFINED            -         1.70     0.30     1.000    -
USER-DEFINED            -         0.60     0.30     0.100    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 45.50      SUBAREA RUNOFF(CFS) = 49.05
EFFECTIVE AREA(ACRES) = 302.20   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 302.2        PEAK FLOW RATE(CFS) = 324.79

*****

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FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 28.64
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.493
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap      SCS
    LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED            -         9.30     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30      SUBAREA RUNOFF(CFS) = 9.99
EFFECTIVE AREA(ACRES) = 311.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 311.5        PEAK FLOW RATE(CFS) = 334.78

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10514.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 171.00
FLOW LENGTH(FEET) = 1209.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 53.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.64
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 334.78
PIPE TRAVEL TIME(MIN.) = 1.29 Tc(MIN.) = 29.93
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10514.00 = 10587.00 FEET.

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10514.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 29.93
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.452
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap      SCS
    LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED            -         0.20     0.30     0.100    -
USER-DEFINED            -         0.40     0.30     1.000    -
USER-DEFINED            -         1.70     0.30     0.100    -
USER-DEFINED            -        31.30     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 33.60      SUBAREA RUNOFF(CFS) = 35.31
EFFECTIVE AREA(ACRES) = 345.10   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 345.1        PEAK FLOW RATE(CFS) = 358.53

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10515.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

ELEVATION DATA: UPSTREAM(FEET) = 171.00 DOWNSTREAM(FEET) = 165.00  
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.22  
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 358.53  
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 30.51  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10515.00 = 11152.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10515.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 30.51  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.439  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 1.30 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 15.30 0.30 0.100 -  
USER-DEFINED - 1.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.202  
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 23.81  
EFFECTIVE AREA(ACRES) = 364.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 364.3 PEAK FLOW RATE(CFS) = 378.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10525.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 709.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 72.0 INCH PIPE IS 55.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.06  
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 378.16  
PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 31.25  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 31.25  
RAINFALL INTENSITY(INCH/HR) = 1.42  
AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.95  
EFFECTIVE STREAM AREA(ACRES) = 364.30  
TOTAL STREAM AREA(ACRES) = 364.30  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 378.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10520.00 TO NODE 10521.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 289.00  
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 180.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.311  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.272  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL - 0.30 0.30 0.100 95 7.31  
PUBLIC PARK - 1.20 0.30 0.850 95 11.62  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.700  
SUBAREA RUNOFF(CFS) = 4.13  
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 4.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10521.00 TO NODE 10522.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 180.00 DOWNSTREAM ELEVATION(FEET) = 176.00  
STREET LENGTH(FEET) = 408.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.02  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 11.21  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.43  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.93  
STREET FLOW TRAVEL TIME(MIN.) = 2.80 Tc(MIN.) = 10.11  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.713

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.60	0.30	0.100	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520  
 SUBAREA AREA (ACRES) = 2.50 SUBAREA RUNOFF (CFS) = 5.75  
 EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 9.13

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.41 HALFSTREET FLOOD WIDTH (FEET) = 12.54  
 FLOW VELOCITY (FEET/SEC.) = 2.59 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.06  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10522.00 = 697.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10522.00 TO NODE 10523.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 176.00 DOWNSTREAM ELEVATION (FEET) = 173.00  
 STREET LENGTH (FEET) = 333.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.01  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.47  
 HALFSTREET FLOOD WIDTH (FEET) = 15.74  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.81  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.33  
 STREET FLOW TRAVEL TIME (MIN.) = 1.97 Tc (MIN.) = 12.09  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.451

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	4.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.109  
 SUBAREA AREA (ACRES) = 5.40 SUBAREA RUNOFF (CFS) = 11.75  
 EFFECTIVE AREA (ACRES) = 9.40 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA (ACRES) = 9.4 PEAK FLOW RATE (CFS) = 19.94

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.51 HALFSTREET FLOOD WIDTH (FEET) = 17.62  
 FLOW VELOCITY (FEET/SEC.) = 3.03 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.55  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10523.00 = 1030.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10523.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.09  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.451  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.90	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	0.100	-
USER-DEFINED	-	4.80	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	4.90	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.785  
 SUBAREA AREA (ACRES) = 12.70 SUBAREA RUNOFF (CFS) = 25.32  
 EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 45.26

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10524.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 173.00 DOWNSTREAM (FEET) = 165.00  
 FLOW LENGTH (FEET) = 736.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.91  
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 45.26  
 PIPE TRAVEL TIME (MIN.) = 1.24 Tc (MIN.) = 13.32  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10524.00 = 1766.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10524.00 TO NODE 10524.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.32  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.318  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.308  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 3.60  
EFFECTIVE AREA(ACRES) = 23.90 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 23.9 PEAK FLOW RATE(CFS) = 46.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10524.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 623.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.08  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 46.22  
PIPE TRAVEL TIME(MIN.) = 1.03 Tc(MIN.) = 14.35  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10525.00 = 2389.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.35  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.218  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	6.80	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 16.07  
EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64  
TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 60.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.35  
RAINFALL INTENSITY(INCH/HR) = 2.22  
AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.64  
EFFECTIVE STREAM AREA(ACRES) = 33.00

TOTAL STREAM AREA(ACRES) = 33.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 60.15

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	378.16	31.25	1.423	0.30( 0.29)	0.95	364.3	10500.00
2	60.15	14.35	2.218	0.30( 0.19)	0.64	33.0	10520.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	355.40	14.35	2.218	0.30( 0.27)	0.90	200.4	10520.00
2	414.68	31.25	1.423	0.30( 0.28)	0.93	397.3	10500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 414.68 Tc(MIN.) = 31.25  
EFFECTIVE AREA(ACRES) = 397.30 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
TOTAL AREA(ACRES) = 397.3  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10526.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 158.00 DOWNSTREAM(FEET) = 148.00  
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 61.83  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 414.68  
PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 31.25  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10526.00 = 11891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10526.00 TO NODE 10527.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 148.00 DOWNSTREAM(FEET) = 135.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 296.00 CHANNEL SLOPE = 0.0439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 414.68  
FLOW VELOCITY(FEET/SEC.) = 13.68 FLOW DEPTH(FEET) = 3.18  
TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 31.61  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10527.00 = 12187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 31.61  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.414  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.40  
 EFFECTIVE AREA(ACRES) = 398.70 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 398.7 PEAK FLOW RATE(CFS) = 414.68  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 31.61  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.414  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
 SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 4.94  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 403.6 PEAK FLOW RATE(CFS) = 414.68  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 403.6 TC(MIN.) = 31.61  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.927  
 PEAK FLOW RATE(CFS) = 414.68

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	355.73	14.74	2.184	0.30( 0.27)	0.90	206.7	10520.00
2	414.68	31.61	1.414	0.30( 0.28)	0.93	403.6	10500.00

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506106D.DAT  
TIME/DATE OF STUDY: 12:51 04/15/2013  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.060
- 2) 6.00; 3.660
- 3) 7.00; 3.350
- 4) 8.00; 3.100
- 5) 9.00; 2.900
- 6) 10.00; 2.730
- 7) 11.00; 2.580
- 8) 12.00; 2.460
- 9) 13.00; 2.350
- 10) 14.00; 2.250
- 11) 15.00; 2.160
- 12) 20.00; 1.830
- 13) 25.00; 1.610
- 14) 30.00; 1.450
- 15) 40.00; 1.230
- 16) 50.00; 1.090
- 17) 60.00; 0.980
- 18) 90.00; 0.770
- 19) 120.00; 0.660
- 20) 180.00; 0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10600.00 TO NODE 10601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 311.00  
ELEVATION DATA: UPSTREAM(FEET) = 166.00 DOWNSTREAM(FEET) = 164.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.602  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.640  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  $T_c$   
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" - 0.50 0.30 0.500 95 10.60  
PUBLIC PARK - 0.60 0.30 0.850 95 13.16  
SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 0.691  
SUBAREA RUNOFF(CFS) = 2.41  
TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 2.41

\*\*\*\*\*

FLOW PROCESS FROM NODE 10601.00 TO NODE 10602.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 164.00 DOWNSTREAM ELEVATION(FEET) = 162.00  
STREET LENGTH(FEET) = 220.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.56  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 9.34  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.14

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.74  
STREET FLOW TRAVEL TIME (MIN.) = 1.71 Tc (MIN.) = 12.31  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.426  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.517  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 4.29  
EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 6.49

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.38 HALFSTREET FLOOD WIDTH (FEET) = 10.98  
FLOW VELOCITY (FEET/SEC.) = 2.33 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.88  
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10602.00 = 531.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10602.00 TO NODE 10603.00 IS CODE = 63  
-----  
>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
>>>> (STREET TABLE SECTION # 5 USED) <<<<<<  
-----  
UPSTREAM ELEVATION (FEET) = 162.00 DOWNSTREAM ELEVATION (FEET) = 159.00  
STREET LENGTH (FEET) = 328.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.09  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.42  
HALFSTREET FLOOD WIDTH (FEET) = 13.32  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.57  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.09  
STREET FLOW TRAVEL TIME (MIN.) = 2.13 Tc (MIN.) = 14.44  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.210  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.500	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	2.40	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.527  
SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 7.20

EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.16  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 13.07

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.45 HALFSTREET FLOOD WIDTH (FEET) = 14.80  
FLOW VELOCITY (FEET/SEC.) = 2.74 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.25  
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10603.00 = 859.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10603.00 TO NODE 10604.00 IS CODE = 63  
-----  
>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
>>>> (STREET TABLE SECTION # 5 USED) <<<<<<  
-----  
UPSTREAM ELEVATION (FEET) = 159.00 DOWNSTREAM ELEVATION (FEET) = 155.00  
STREET LENGTH (FEET) = 465.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 19.38  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.51  
HALFSTREET FLOOD WIDTH (FEET) = 17.62  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.94  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.50  
STREET FLOW TRAVEL TIME (MIN.) = 2.63 Tc (MIN.) = 17.07  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.023  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.30	0.500	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.513  
SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 12.62  
EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.16  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 24.49

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.54 HALFSTREET FLOOD WIDTH (FEET) = 19.34  
FLOW VELOCITY (FEET/SEC.) = 3.12 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.70  
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10604.00 = 1324.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10604.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.07
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.023
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.30     0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.10     SUBAREA RUNOFF(CFS) = 0.16
EFFECTIVE AREA(ACRES) = 14.70   AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 14.7       PEAK FLOW RATE(CFS) = 24.65

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10605.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 155.00 DOWNSTREAM(FEET) = 140.00
FLOW LENGTH(FEET) = 214.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.96
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 24.65
PIPE TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 17.28
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10605.00 = 1538.00 FEET.

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10605.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.28
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.009
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20     0.30     0.100    -
USER-DEFINED        -         1.70     0.30     0.100    -
USER-DEFINED        -        10.20     0.30     0.800    -
USER-DEFINED        -         2.90     0.30     0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.682
SUBAREA AREA(ACRES) = 16.00     SUBAREA RUNOFF(CFS) = 25.99
EFFECTIVE AREA(ACRES) = 30.70   AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 30.7       PEAK FLOW RATE(CFS) = 50.46

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10606.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 140.00 DOWNSTREAM(FEET) = 133.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00 CHANNEL SLOPE = 0.0400
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 50.46
FLOW VELOCITY(FEET/SEC.) = 7.79 FLOW DEPTH(FEET) = 1.47
TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 17.66
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10606.00 = 1713.00 FEET.

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.66
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.985
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     0.500    -
USER-DEFINED        -         0.30     0.30     0.850    -
USER-DEFINED        -         0.10     0.30     1.000    -
USER-DEFINED        -         1.10     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 1.80     SUBAREA RUNOFF(CFS) = 2.77
EFFECTIVE AREA(ACRES) = 32.50   AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 32.5       PEAK FLOW RATE(CFS) = 52.54

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.66
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.985
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40     0.30     0.850    -
USER-DEFINED        -         1.20     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     1.000    -
USER-DEFINED        -         1.80     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     0.850    -
USER-DEFINED        -         0.20     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980
SUBAREA AREA(ACRES) = 3.80     SUBAREA RUNOFF(CFS) = 5.78
EFFECTIVE AREA(ACRES) = 36.30   AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.66
TOTAL AREA(ACRES) = 36.3       PEAK FLOW RATE(CFS) = 58.32

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81

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-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.66  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.985  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.91  
EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.67  
TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 59.23  
=====

END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 36.9 TC(MIN.) = 17.66  
EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR)= 0.20  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.670  
PEAK FLOW RATE(CFS) = 59.23  
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END OF RATIONAL METHOD ANALYSIS

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 25 Yr \*  
\* From Node: 50100 To Node: 50167 \*  
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FILE NAME: 0610501W.DAT  
TIME/DATE OF STUDY: 09:47 01/21/2013

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.955
- 2) 10.00; 3.226
- 3) 15.00; 2.458
- 4) 20.00; 2.028
- 5) 25.00; 1.767
- 6) 30.00; 1.549
- 7) 40.00; 1.350
- 8) 50.00; 1.197
- 9) 60.00; 1.073
- 10) 90.00; 0.905
- 11) 120.00; 0.795
- 12) 180.00; 0.665
- 13) 360.00; 0.494
- 14) 1440.00; 0.217

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
- \*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

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FLOW PROCESS FROM NODE 50100.00 TO NODE 50101.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00  
ELEVATION DATA: UPSTREAM(FEET) = 1072.00 DOWNSTREAM(FEET) = 1063.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.598  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.520  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.30	1.000	0	14.60

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.21  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.21

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FLOW PROCESS FROM NODE 50101.00 TO NODE 50102.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 1063.00 DOWNSTREAM(FEET) = 975.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 273.00 CHANNEL SLOPE = 0.3223  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.424  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.29	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.49  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.71  
AVERAGE FLOW DEPTH(FEET) = 0.29 TRAVEL TIME(MIN.) = 0.80  
Tc(MIN.) = 15.39  
SUBAREA AREA(ACRES) = 0.29 SUBAREA RUNOFF(CFS) = 0.56  
EFFECTIVE AREA(ACRES) = 0.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 1.72

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 FLOW VELOCITY(FEET/SEC.) = 5.96  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50102.00 = 597.00 FEET.

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FLOW PROCESS FROM NODE 50102.00 TO NODE 50103.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 948.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 111.00 CHANNEL SLOPE = 0.2432  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.395

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.22	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.93

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.54

AVERAGE FLOW DEPTH(FEET) = 0.34 TRAVEL TIME(MIN.) = 0.33

Tc(MIN.) = 15.73

SUBAREA AREA(ACRES) = 0.22 SUBAREA RUNOFF(CFS) = 0.42

EFFECTIVE AREA(ACRES) = 1.12 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 2.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 FLOW VELOCITY(FEET/SEC.) = 5.56

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50103.00 = 708.00 FEET.

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FLOW PROCESS FROM NODE 50103.00 TO NODE 50104.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 948.00 DOWNSTREAM(FEET) = 914.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 136.00 CHANNEL SLOPE = 0.2500  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.363

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.66

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.01

AVERAGE FLOW DEPTH(FEET) = 0.38 TRAVEL TIME(MIN.) = 0.38

Tc(MIN.) = 16.11

SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 1.10

EFFECTIVE AREA(ACRES) = 1.71 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 3.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 FLOW VELOCITY(FEET/SEC.) = 6.33

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50104.00 = 844.00 FEET.

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FLOW PROCESS FROM NODE 50104.00 TO NODE 50105.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 914.00 DOWNSTREAM(FEET) = 895.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 52.00 CHANNEL SLOPE = 0.3654  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.354

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.73	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.78

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.96

AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.11

Tc(MIN.) = 16.21

SUBAREA AREA(ACRES) = 1.73 SUBAREA RUNOFF(CFS) = 3.19

EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 6.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.50 FLOW VELOCITY(FEET/SEC.) = 8.52

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50105.00 = 896.00 FEET.

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FLOW PROCESS FROM NODE 50105.00 TO NODE 50106.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 835.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00 CHANNEL SLOPE = 0.2143  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.302

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.79

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.83

AVERAGE FLOW DEPTH(FEET) = 0.65 TRAVEL TIME(MIN.) = 0.60

Tc(MIN.) = 16.81

SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 6.86

EFFECTIVE AREA(ACRES) = 7.24 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 7.2 PEAK FLOW RATE (CFS) = 13.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.72 FLOW VELOCITY (FEET/SEC.) = 8.40  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50106.00 = 1176.00 FEET.

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FLOW PROCESS FROM NODE 50106.00 TO NODE 50107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 835.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 413.00 CHANNEL SLOPE = 0.2179  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.237

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.53	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.01  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.07  
AVERAGE FLOW DEPTH (FEET) = 0.79 TRAVEL TIME (MIN.) = 0.76  
Tc (MIN.) = 17.57

SUBAREA AREA (ACRES) = 4.53 SUBAREA RUNOFF (CFS) = 7.90  
EFFECTIVE AREA (ACRES) = 11.77 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.8 PEAK FLOW RATE (CFS) = 20.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.85 FLOW VELOCITY (FEET/SEC.) = 9.48  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50107.00 = 1589.00 FEET.

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FLOW PROCESS FROM NODE 50107.00 TO NODE 50108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 302.00 CHANNEL SLOPE = 0.2318  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.195

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.76	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 25.45  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.23  
AVERAGE FLOW DEPTH (FEET) = 0.91 TRAVEL TIME (MIN.) = 0.49  
Tc (MIN.) = 18.06

SUBAREA AREA (ACRES) = 5.76 SUBAREA RUNOFF (CFS) = 9.83  
EFFECTIVE AREA (ACRES) = 17.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.5 PEAK FLOW RATE (CFS) = 29.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.97 FLOW VELOCITY (FEET/SEC.) = 10.68  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50108.00 = 1891.00 FEET.

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FLOW PROCESS FROM NODE 50108.00 TO NODE 50109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 655.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 81.00 CHANNEL SLOPE = 0.2469  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.185

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.77	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 43.29  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.89  
AVERAGE FLOW DEPTH (FEET) = 1.10 TRAVEL TIME (MIN.) = 0.11  
Tc (MIN.) = 18.17

SUBAREA AREA (ACRES) = 15.77 SUBAREA RUNOFF (CFS) = 26.76  
EFFECTIVE AREA (ACRES) = 33.31 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 33.3 PEAK FLOW RATE (CFS) = 56.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.22 FLOW VELOCITY (FEET/SEC.) = 12.74  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50109.00 = 1972.00 FEET.

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FLOW PROCESS FROM NODE 50109.00 TO NODE 50110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 655.00 DOWNSTREAM (FEET) = 590.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 379.00 CHANNEL SLOPE = 0.1715  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.138

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.53	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 66.06  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.60

AVERAGE FLOW DEPTH (FEET) = 1.38 TRAVEL TIME (MIN.) = 0.54  
Tc (MIN.) = 18.72  
SUBAREA AREA (ACRES) = 11.53 SUBAREA RUNOFF (CFS) = 19.09  
EFFECTIVE AREA (ACRES) = 44.84 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 44.8 PEAK FLOW RATE (CFS) = 74.20

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.44 FLOW VELOCITY (FEET/SEC.) = 11.94  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50110.00 = 2351.00 FEET.

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FLOW PROCESS FROM NODE 50110.00 TO NODE 50111.00 IS CODE = 51

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 590.00 DOWNSTREAM (FEET) = 570.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 340.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.081  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	27.15	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 95.96  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.54  
AVERAGE FLOW DEPTH (FEET) = 1.94 TRAVEL TIME (MIN.) = 0.66  
Tc (MIN.) = 19.38  
SUBAREA AREA (ACRES) = 27.15 SUBAREA RUNOFF (CFS) = 43.53  
EFFECTIVE AREA (ACRES) = 71.99 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 72.0 PEAK FLOW RATE (CFS) = 115.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.08 FLOW VELOCITY (FEET/SEC.) = 8.91  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50111.00 = 2691.00 FEET.

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FLOW PROCESS FROM NODE 50111.00 TO NODE 50112.00 IS CODE = 51

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 570.00 DOWNSTREAM (FEET) = 567.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 403.00 CHANNEL SLOPE = 0.0074  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.983  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	66.68	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 165.94  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.50  
AVERAGE FLOW DEPTH (FEET) = 3.51 TRAVEL TIME (MIN.) = 1.49  
Tc (MIN.) = 20.88  
SUBAREA AREA (ACRES) = 66.68 SUBAREA RUNOFF (CFS) = 100.99  
EFFECTIVE AREA (ACRES) = 138.68 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 138.7 PEAK FLOW RATE (CFS) = 210.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 3.83 FLOW VELOCITY (FEET/SEC.) = 4.77  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50112.00 = 3094.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50112.00 TO NODE 50140.00 IS CODE = 1

>>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 20.88  
RAINFALL INTENSITY (INCH/HR) = 1.98  
AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA (ACRES) = 138.68  
TOTAL STREAM AREA (ACRES) = 138.68  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 210.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50120.00 TO NODE 50121.00 IS CODE = 21

>>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>> USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 324.00  
ELEVATION DATA: UPSTREAM (FEET) = 1068.00 DOWNSTREAM (FEET) = 968.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.018  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.566  
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	-	0.29	0.30	1.000	0	9.02

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF (CFS) = 0.85  
TOTAL AREA (ACRES) = 0.29 PEAK FLOW RATE (CFS) = 0.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50121.00 TO NODE 50122.00 IS CODE = 51

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 968.00 DOWNSTREAM (FEET) = 916.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 242.00 CHANNEL SLOPE = 0.2149  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.286  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.55	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.58  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.99  
 AVERAGE FLOW DEPTH (FEET) = 0.33 TRAVEL TIME (MIN.) = 0.81  
 Tc (MIN.) = 9.83  
 SUBAREA AREA (ACRES) = 0.55 SUBAREA RUNOFF (CFS) = 1.47  
 EFFECTIVE AREA (ACRES) = 0.83 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 0.8 PEAK FLOW RATE (CFS) = 2.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.37 FLOW VELOCITY (FEET/SEC.) = 5.43  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50122.00 = 566.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50122.00 TO NODE 50123.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 916.00 DOWNSTREAM (FEET) = 906.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 111.00 CHANNEL SLOPE = 0.0901  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.186  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.68	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.12  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.28  
 AVERAGE FLOW DEPTH (FEET) = 0.49 TRAVEL TIME (MIN.) = 0.43  
 Tc (MIN.) = 10.26  
 SUBAREA AREA (ACRES) = 0.68 SUBAREA RUNOFF (CFS) = 1.76  
 EFFECTIVE AREA (ACRES) = 1.51 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.5 PEAK FLOW RATE (CFS) = 3.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.54 FLOW VELOCITY (FEET/SEC.) = 4.51  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50123.00 = 677.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50123.00 TO NODE 50124.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 906.00 DOWNSTREAM (FEET) = 903.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 60.00 CHANNEL SLOPE = 0.0500  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.146  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.68  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.77  
 AVERAGE FLOW DEPTH (FEET) = 0.64 TRAVEL TIME (MIN.) = 0.27  
 Tc (MIN.) = 10.52  
 SUBAREA AREA (ACRES) = 0.59 SUBAREA RUNOFF (CFS) = 1.51  
 EFFECTIVE AREA (ACRES) = 2.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.1 PEAK FLOW RATE (CFS) = 5.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.68 FLOW VELOCITY (FEET/SEC.) = 3.92  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50124.00 = 737.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50124.00 TO NODE 50125.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 903.00 DOWNSTREAM (FEET) = 901.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 29.00 CHANNEL SLOPE = 0.0690  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.130  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.44	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.21  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.74  
 AVERAGE FLOW DEPTH (FEET) = 0.71 TRAVEL TIME (MIN.) = 0.10  
 Tc (MIN.) = 10.63  
 SUBAREA AREA (ACRES) = 1.44 SUBAREA RUNOFF (CFS) = 3.67  
 EFFECTIVE AREA (ACRES) = 3.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.5 PEAK FLOW RATE (CFS) = 9.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.78 FLOW VELOCITY (FEET/SEC.) = 5.00  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50125.00 = 766.00 FEET.

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FLOW PROCESS FROM NODE 50125.00 TO NODE 50126.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 901.00 DOWNSTREAM(FEET) = 889.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 130.00 CHANNEL SLOPE = 0.0923
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.075
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.69 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.38
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.04
AVERAGE FLOW DEPTH(FEET) = 0.83 TRAVEL TIME(MIN.) = 0.36
Tc(MIN.) = 10.99
SUBAREA AREA(ACRES) = 2.69 SUBAREA RUNOFF(CFS) = 6.73
EFFECTIVE AREA(ACRES) = 6.23 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.2 PEAK FLOW RATE(CFS) = 15.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.90 FLOW VELOCITY(FEET/SEC.) = 6.36
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50126.00 = 896.00 FEET.

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FLOW PROCESS FROM NODE 50126.00 TO NODE 50127.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 889.00 DOWNSTREAM(FEET) = 855.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 231.00 CHANNEL SLOPE = 0.1472
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.000
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.18 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.22
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.94
AVERAGE FLOW DEPTH(FEET) = 0.87 TRAVEL TIME(MIN.) = 0.48
Tc(MIN.) = 11.47
SUBAREA AREA(ACRES) = 2.18 SUBAREA RUNOFF(CFS) = 5.30
EFFECTIVE AREA(ACRES) = 8.41 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 20.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.91 FLOW VELOCITY(FEET/SEC.) = 8.18
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50127.00 = 1127.00 FEET.

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FLOW PROCESS FROM NODE 50127.00 TO NODE 50128.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 855.00 DOWNSTREAM(FEET) = 793.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 211.00 CHANNEL SLOPE = 0.2938
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.953
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 5.70 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.25
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.33
AVERAGE FLOW DEPTH(FEET) = 0.90 TRAVEL TIME(MIN.) = 0.31
Tc(MIN.) = 11.78
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 13.60
EFFECTIVE AREA(ACRES) = 14.11 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.1 PEAK FLOW RATE(CFS) = 33.69

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.97 FLOW VELOCITY(FEET/SEC.) = 12.03
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50128.00 = 1338.00 FEET.

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FLOW PROCESS FROM NODE 50128.00 TO NODE 50129.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 793.00 DOWNSTREAM(FEET) = 708.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 353.00 CHANNEL SLOPE = 0.2408
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.877
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 9.99 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.27
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.94
AVERAGE FLOW DEPTH(FEET) = 1.12 TRAVEL TIME(MIN.) = 0.49
Tc(MIN.) = 12.27
SUBAREA AREA(ACRES) = 9.99 SUBAREA RUNOFF(CFS) = 23.17
EFFECTIVE AREA(ACRES) = 24.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 55.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.22 FLOW VELOCITY(FEET/SEC.) = 12.60
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50129.00 = 1691.00 FEET.

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FLOW PROCESS FROM NODE 50129.00 TO NODE 50130.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 708.00 DOWNSTREAM(FEET) = 571.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 735.00 CHANNEL SLOPE = 0.1864

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.722

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 13.71 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 70.85

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.16

AVERAGE FLOW DEPTH(FEET) = 1.39 TRAVEL TIME(MIN.) = 1.01

Tc(MIN.) = 13.28

SUBAREA AREA(ACRES) = 13.71 SUBAREA RUNOFF(CFS) = 29.89

EFFECTIVE AREA(ACRES) = 37.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 82.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.48 FLOW VELOCITY(FEET/SEC.) = 12.62

LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50130.00 = 2426.00 FEET.

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FLOW PROCESS FROM NODE 50130.00 TO NODE 50131.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 571.00 DOWNSTREAM(FEET) = 566.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 709.00 CHANNEL SLOPE = 0.0071

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.345

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 20.71 0.30 0.986 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.986

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 101.55

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.90

AVERAGE FLOW DEPTH(FEET) = 2.95 TRAVEL TIME(MIN.) = 3.03

Tc(MIN.) = 16.31

SUBAREA AREA(ACRES) = 20.71 SUBAREA RUNOFF(CFS) = 38.19

EFFECTIVE AREA(ACRES) = 58.52 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 107.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.01 FLOW VELOCITY(FEET/SEC.) = 3.96

LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50131.00 = 3135.00 FEET.

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FLOW PROCESS FROM NODE 50132.00 TO NODE 50131.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.31

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.345

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 154.02 0.30 0.949 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.949

SUBAREA AREA(ACRES) = 154.02 SUBAREA RUNOFF(CFS) = 285.61

EFFECTIVE AREA(ACRES) = 212.54 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96

TOTAL AREA(ACRES) = 212.5 PEAK FLOW RATE(CFS) = 393.40

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FLOW PROCESS FROM NODE 50131.00 TO NODE 50140.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 16.31

RAINFALL INTENSITY(INCH/HR) = 2.35

AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.96

EFFECTIVE STREAM AREA(ACRES) = 212.54

TOTAL STREAM AREA(ACRES) = 212.54

PEAK FLOW RATE(CFS) AT CONFLUENCE = 393.40

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	210.02	20.88	1.983	0.30( 0.30)	1.00	138.7	50100.00
2	393.40	16.31	2.345	0.30( 0.29)	0.96	212.5	50120.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	592.88	16.31	2.345	0.30( 0.29)	0.97	320.9	50120.00
2	534.10	20.88	1.983	0.30( 0.29)	0.98	351.2	50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 592.88 Tc(MIN.) = 16.31

EFFECTIVE AREA(ACRES) = 320.92 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97

TOTAL AREA(ACRES) = 351.2



LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50140.00 = 3135.00 FEET.

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FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 566.00 DOWNSTREAM(FEET) = 416.00
FLOW LENGTH(FEET) = 376.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 71.42
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 592.88
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 16.40
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50141.00 = 3511.00 FEET.

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FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.40
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.337
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 48.73 0.30 0.922 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.922
SUBAREA AREA(ACRES) = 48.73 SUBAREA RUNOFF(CFS) = 90.39
EFFECTIVE AREA(ACRES) = 369.65 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 400.0 PEAK FLOW RATE(CFS) = 681.09

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FLOW PROCESS FROM NODE 50141.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 416.00 DOWNSTREAM(FEET) = 404.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 972.00 CHANNEL SLOPE = 0.0123
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.158
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.56 0.30 0.610 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.610
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 687.81
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.76
AVERAGE FLOW DEPTH(FEET) = 5.43 TRAVEL TIME(MIN.) = 2.09
Tc(MIN.) = 18.49
SUBAREA AREA(ACRES) = 7.56 SUBAREA RUNOFF(CFS) = 13.44
EFFECTIVE AREA(ACRES) = 377.21 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 407.5 PEAK FLOW RATE(CFS) = 681.09
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 5.41 FLOW VELOCITY(FEET/SEC.) = 7.75
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50162.00 = 4483.00 FEET.

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FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 18.49
RAINFALL INTENSITY(INCH/HR) = 2.16
AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 377.21
TOTAL STREAM AREA(ACRES) = 407.52
PEAK FLOW RATE(CFS) AT CONFLUENCE = 681.09

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FLOW PROCESS FROM NODE 50150.00 TO NODE 50151.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00
ELEVATION DATA: UPSTREAM(FEET) = 1076.00 DOWNSTREAM(FEET) = 988.00

Tc = K \* [(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.235
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.491
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" - 0.46 0.30 1.000 0 9.23
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.31
TOTAL AREA(ACRES) = 0.46 PEAK FLOW RATE(CFS) = 1.31

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FLOW PROCESS FROM NODE 50151.00 TO NODE 50152.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 988.00 DOWNSTREAM(FEET) = 938.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 220.00 CHANNEL SLOPE = 0.2273
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.261
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.09  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.51  
 AVERAGE FLOW DEPTH (FEET) = 0.36 TRAVEL TIME (MIN.) = 0.67  
 Tc (MIN.) = 9.90  
 SUBAREA AREA (ACRES) = 0.59 SUBAREA RUNOFF (CFS) = 1.57  
 EFFECTIVE AREA (ACRES) = 1.04 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.0 PEAK FLOW RATE (CFS) = 2.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.40 FLOW VELOCITY (FEET/SEC.) = 5.81  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50152.00 = 543.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50152.00 TO NODE 50153.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 938.00 DOWNSTREAM (FEET) = 904.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 218.00 CHANNEL SLOPE = 0.1560  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.142  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.13	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.23  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.63  
 AVERAGE FLOW DEPTH (FEET) = 0.50 TRAVEL TIME (MIN.) = 0.65  
 Tc (MIN.) = 10.55  
 SUBAREA AREA (ACRES) = 1.13 SUBAREA RUNOFF (CFS) = 2.90  
 EFFECTIVE AREA (ACRES) = 2.18 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.2 PEAK FLOW RATE (CFS) = 5.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.55 FLOW VELOCITY (FEET/SEC.) = 6.05  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50153.00 = 761.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50153.00 TO NODE 50154.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 904.00 DOWNSTREAM (FEET) = 881.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 212.00 CHANNEL SLOPE = 0.1085  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.051

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.28  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.97  
 AVERAGE FLOW DEPTH (FEET) = 0.72 TRAVEL TIME (MIN.) = 0.59  
 Tc (MIN.) = 11.14  
 SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 7.43  
 EFFECTIVE AREA (ACRES) = 5.18 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.2 PEAK FLOW RATE (CFS) = 12.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.81 FLOW VELOCITY (FEET/SEC.) = 6.49  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50154.00 = 973.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50154.00 TO NODE 50155.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 881.00 DOWNSTREAM (FEET) = 877.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 158.00 CHANNEL SLOPE = 0.0253  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.952  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.37  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.05  
 AVERAGE FLOW DEPTH (FEET) = 1.19 TRAVEL TIME (MIN.) = 0.65  
 Tc (MIN.) = 11.79  
 SUBAREA AREA (ACRES) = 3.81 SUBAREA RUNOFF (CFS) = 9.10  
 EFFECTIVE AREA (ACRES) = 8.99 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.0 PEAK FLOW RATE (CFS) = 21.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.29 FLOW VELOCITY (FEET/SEC.) = 4.27  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50155.00 = 1131.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50155.00 TO NODE 50156.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 877.00 DOWNSTREAM (FEET) = 875.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 195.00 CHANNEL SLOPE = 0.0103

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.794  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.32 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 25.18  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.17  
AVERAGE FLOW DEPTH (FEET) = 1.63 TRAVEL TIME (MIN.) = 1.03  
Tc (MIN.) = 12.81  
SUBAREA AREA (ACRES) = 3.32 SUBAREA RUNOFF (CFS) = 7.45  
EFFECTIVE AREA (ACRES) = 12.31 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 27.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.68 FLOW VELOCITY (FEET/SEC.) = 3.25  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50156.00 = 1326.00 FEET.

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FLOW PROCESS FROM NODE 50156.00 TO NODE 50157.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 875.00 DOWNSTREAM (FEET) = 850.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 424.00 CHANNEL SLOPE = 0.0590  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.626  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.78 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.59  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.46  
AVERAGE FLOW DEPTH (FEET) = 1.28 TRAVEL TIME (MIN.) = 1.09  
Tc (MIN.) = 13.91  
SUBAREA AREA (ACRES) = 3.78 SUBAREA RUNOFF (CFS) = 7.91  
EFFECTIVE AREA (ACRES) = 16.09 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 16.1 PEAK FLOW RATE (CFS) = 33.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.31 FLOW VELOCITY (FEET/SEC.) = 6.57  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50157.00 = 1750.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50157.00 TO NODE 50158.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 850.00 DOWNSTREAM (FEET) = 835.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 158.00 CHANNEL SLOPE = 0.0949  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.578  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 11.22 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 45.18  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.41  
AVERAGE FLOW DEPTH (FEET) = 1.34 TRAVEL TIME (MIN.) = 0.31  
Tc (MIN.) = 14.22  
SUBAREA AREA (ACRES) = 11.22 SUBAREA RUNOFF (CFS) = 22.99  
EFFECTIVE AREA (ACRES) = 27.31 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 27.3 PEAK FLOW RATE (CFS) = 55.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.45 FLOW VELOCITY (FEET/SEC.) = 8.91  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50158.00 = 1908.00 FEET.

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FLOW PROCESS FROM NODE 50158.00 TO NODE 50159.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 835.00 DOWNSTREAM (FEET) = 680.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 721.00 CHANNEL SLOPE = 0.2150  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.446  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 20.87 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 76.14  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.07  
AVERAGE FLOW DEPTH (FEET) = 1.39 TRAVEL TIME (MIN.) = 0.92  
Tc (MIN.) = 15.14  
SUBAREA AREA (ACRES) = 20.87 SUBAREA RUNOFF (CFS) = 40.31  
EFFECTIVE AREA (ACRES) = 48.18 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 48.2 PEAK FLOW RATE (CFS) = 93.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.50 FLOW VELOCITY (FEET/SEC.) = 13.78  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50159.00 = 2629.00 FEET.

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FLOW PROCESS FROM NODE 50159.00 TO NODE 50160.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 680.00 DOWNSTREAM(FEET) = 558.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 874.00 CHANNEL SLOPE = 0.1396
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.346

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 32.02 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 122.54
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.53
AVERAGE FLOW DEPTH(FEET) = 1.81 TRAVEL TIME(MIN.) = 1.16
Tc(MIN.) = 16.30
SUBAREA AREA(ACRES) = 32.02 SUBAREA RUNOFF(CFS) = 58.96
EFFECTIVE AREA(ACRES) = 80.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 147.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.94 FLOW VELOCITY(FEET/SEC.) = 13.15
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50160.00 = 3503.00 FEET.

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FLOW PROCESS FROM NODE 50160.00 TO NODE 50161.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 558.00 DOWNSTREAM(FEET) = 463.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1013.00 CHANNEL SLOPE = 0.0938
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.220

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 13.52 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 159.37
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.53
AVERAGE FLOW DEPTH(FEET) = 2.15 TRAVEL TIME(MIN.) = 1.46
Tc(MIN.) = 17.77
SUBAREA AREA(ACRES) = 13.52 SUBAREA RUNOFF(CFS) = 23.38
EFFECTIVE AREA(ACRES) = 93.72 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 93.7 PEAK FLOW RATE(CFS) = 161.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.16 FLOW VELOCITY(FEET/SEC.) = 11.55
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50161.00 = 4516.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 50161.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 404.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1126.00 CHANNEL SLOPE = 0.0524
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.051

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 19.35 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 177.22
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.51
AVERAGE FLOW DEPTH(FEET) = 2.49 TRAVEL TIME(MIN.) = 1.97
Tc(MIN.) = 19.74
SUBAREA AREA(ACRES) = 19.35 SUBAREA RUNOFF(CFS) = 30.48
EFFECTIVE AREA(ACRES) = 113.07 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.1 PEAK FLOW RATE(CFS) = 178.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.50 FLOW VELOCITY(FEET/SEC.) = 9.52
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 19.74
RAINFALL INTENSITY(INCH/HR) = 2.05
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 113.07
TOTAL STREAM AREA(ACRES) = 113.07
PEAK FLOW RATE(CFS) AT CONFLUENCE = 178.16

\*\* CONFLUENCE DATA \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 681.09 18.49 2.158 0.30( 0.29) 0.96 377.2 50120.00
1 607.26 23.11 1.866 0.30( 0.29) 0.96 407.5 50100.00
2 178.16 19.74 2.051 0.30( 0.30) 1.00 113.1 50150.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE

1 858.21 18.49 2.158 0.30( 0.29) 0.97 483.1 50120.00  
2 839.30 19.74 2.051 0.30( 0.29) 0.97 498.5 50150.00  
3 766.60 23.11 1.866 0.30( 0.29) 0.97 520.6 50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 858.21 Tc(MIN.) = 18.49  
EFFECTIVE AREA(ACRES) = 483.12 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 520.6  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50162.00 TO NODE 50163.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 378.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1158.00 CHANNEL SLOPE = 0.0225  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.012  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 151.93 0.30 0.990 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 975.51  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.61  
AVERAGE FLOW DEPTH(FEET) = 5.54 TRAVEL TIME(MIN.) = 1.82  
Tc(MIN.) = 20.31  
SUBAREA AREA(ACRES) = 151.93 SUBAREA RUNOFF(CFS) = 234.54  
EFFECTIVE AREA(ACRES) = 635.04 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 672.5 PEAK FLOW RATE(CFS) = 983.10

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 5.56 FLOW VELOCITY(FEET/SEC.) = 10.61  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50163.00 = 6800.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50163.00 TO NODE 50164.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 378.00 DOWNSTREAM(FEET) = 356.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 886.00 CHANNEL SLOPE = 0.0248  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.945  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 177.01 0.30 0.989 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.989

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1114.36  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.39  
AVERAGE FLOW DEPTH(FEET) = 5.71 TRAVEL TIME(MIN.) = 1.30  
Tc(MIN.) = 21.61  
SUBAREA AREA(ACRES) = 177.01 SUBAREA RUNOFF(CFS) = 262.53  
EFFECTIVE AREA(ACRES) = 812.05 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 849.5 PEAK FLOW RATE(CFS) = 1206.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 5.89 FLOW VELOCITY(FEET/SEC.) = 11.61  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50164.00 = 7686.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50164.00 TO NODE 50165.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 356.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1762.00 CHANNEL SLOPE = 0.0233  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.812  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 155.27 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1312.58  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.56  
AVERAGE FLOW DEPTH(FEET) = 6.15 TRAVEL TIME(MIN.) = 2.54  
Tc(MIN.) = 24.15  
SUBAREA AREA(ACRES) = 155.27 SUBAREA RUNOFF(CFS) = 211.29  
EFFECTIVE AREA(ACRES) = 967.33 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 1004.8 PEAK FLOW RATE(CFS) = 1321.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 6.17 FLOW VELOCITY(FEET/SEC.) = 11.58  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50165.00 = 9448.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50165.00 TO NODE 50166.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 284.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 893.00 CHANNEL SLOPE = 0.0347  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.757  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 50.24 0.30 0.997 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1354.20  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.55  
 AVERAGE FLOW DEPTH(FEET) = 5.77 TRAVEL TIME(MIN.) = 1.10  
 Tc(MIN.) = 25.24  
 SUBAREA AREA(ACRES) = 50.24 SUBAREA RUNOFF(CFS) = 65.90  
 EFFECTIVE AREA(ACRES) = 1017.56 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1055.0 PEAK FLOW RATE(CFS) = 1339.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 5.75 FLOW VELOCITY(FEET/SEC.) = 13.51  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50166.00 = 10341.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50166.00 TO NODE 50167.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 240.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00 CHANNEL SLOPE = 0.0437  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.707  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 8.36 0.30 0.892 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.892  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1344.45  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 14.74  
 AVERAGE FLOW DEPTH(FEET) = 5.51 TRAVEL TIME(MIN.) = 1.14  
 Tc(MIN.) = 26.38  
 SUBAREA AREA(ACRES) = 8.36 SUBAREA RUNOFF(CFS) = 10.83  
 EFFECTIVE AREA(ACRES) = 1025.92 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1063.4 PEAK FLOW RATE(CFS) = 1339.03  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 5.51 FLOW VELOCITY(FEET/SEC.) = 14.73  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50167.00 = 11349.00 FEET.

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1063.4 TC(MIN.) = 26.38  
 EFFECTIVE AREA(ACRES) = 1025.92 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.981  
 PEAK FLOW RATE(CFS) = 1339.03

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1339.03	26.38	1.707	0.30( 0.29)	0.98	1025.9	50120.00
2	1307.01	27.68	1.651	0.30( 0.29)	0.98	1041.3	50150.00
3	1190.23	31.24	1.525	0.30( 0.29)	0.98	1063.4	50100.00

=====  
 END OF RATIONAL METHOD ANALYSIS  
 =====



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 25 Yr \*  
\* From Node: 50500 To Node: 50513 \*  
\*\*\*\*\*

FILE NAME: 0610505W.DAT  
TIME/DATE OF STUDY: 09:49 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.811
- 2) 10.00; 3.144
- 3) 15.00; 2.409
- 4) 20.00; 1.996
- 5) 25.00; 1.742
- 6) 30.00; 1.531
- 7) 40.00; 1.331
- 8) 50.00; 1.178
- 9) 60.00; 1.053
- 10) 90.00; 0.883
- 11) 120.00; 0.772
- 12) 180.00; 0.643
- 13) 360.00; 0.473
- 14) 1440.00; 0.207

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50500.00 TO NODE 50501.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 1122.00 DOWNSTREAM(FEET) = 980.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.501  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.644  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.67	0.30	1.000	0	8.50

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.01  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 2.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50501.00 TO NODE 50502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 832.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 500.00 CHANNEL SLOPE = 0.2960  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.228  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.83	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.11  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.69  
AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 1.25  
Tc(MIN.) = 9.75  
SUBAREA AREA(ACRES) = 0.83 SUBAREA RUNOFF(CFS) = 2.20  
EFFECTIVE AREA(ACRES) = 1.50 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.5 PEAK FLOW RATE(CFS) = 3.96

END OF SUBAREA CHANNEL FLOW HYDRAULICS:



DEPTH(FEET) = 0.43 FLOW VELOCITY(FEET/SEC.) = 7.07  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50502.00 = 830.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50502.00 TO NODE 50503.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 832.00 DOWNSTREAM(FEET) = 779.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 255.00 CHANNEL SLOPE = 0.2078  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.098  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.76	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.69  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.52  
AVERAGE FLOW DEPTH(FEET) = 0.62 TRAVEL TIME(MIN.) = 0.57  
Tc(MIN.) = 10.31  
SUBAREA AREA(ACRES) = 3.76 SUBAREA RUNOFF(CFS) = 9.46  
EFFECTIVE AREA(ACRES) = 5.26 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.3 PEAK FLOW RATE(CFS) = 13.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.73 FLOW VELOCITY(FEET/SEC.) = 8.34  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50503.00 = 1085.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50503.00 TO NODE 50504.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 779.00 DOWNSTREAM(FEET) = 765.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 382.00 CHANNEL SLOPE = 0.0366  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.901  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.56	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.58  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.75  
AVERAGE FLOW DEPTH(FEET) = 1.14 TRAVEL TIME(MIN.) = 1.34  
Tc(MIN.) = 11.65  
SUBAREA AREA(ACRES) = 4.56 SUBAREA RUNOFF(CFS) = 10.67  
EFFECTIVE AREA(ACRES) = 9.82 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 22.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.24 FLOW VELOCITY(FEET/SEC.) = 4.99  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50504.00 = 1467.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50504.00 TO NODE 50505.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 355.00 CHANNEL SLOPE = 0.0423  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.743  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.79	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.15  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.49  
AVERAGE FLOW DEPTH(FEET) = 1.28 TRAVEL TIME(MIN.) = 1.08  
Tc(MIN.) = 12.73  
SUBAREA AREA(ACRES) = 3.79 SUBAREA RUNOFF(CFS) = 8.33  
EFFECTIVE AREA(ACRES) = 13.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 13.6 PEAK FLOW RATE(CFS) = 29.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.33 FLOW VELOCITY(FEET/SEC.) = 5.62  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50505.00 = 1822.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50505.00 TO NODE 50506.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 712.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 261.00 CHANNEL SLOPE = 0.1456  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.675  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.43	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 36.79  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.41  
AVERAGE FLOW DEPTH(FEET) = 1.14 TRAVEL TIME(MIN.) = 0.46  
Tc(MIN.) = 13.19  
SUBAREA AREA(ACRES) = 6.43 SUBAREA RUNOFF(CFS) = 13.74  
EFFECTIVE AREA(ACRES) = 20.03 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.0 PEAK FLOW RATE (CFS) = 42.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.21 FLOW VELOCITY (FEET/SEC.) = 9.78  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50506.00 = 2083.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50506.00 TO NODE 50507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 464.00 CHANNEL SLOPE = 0.2414  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.580

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.57	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 45.46  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.99  
AVERAGE FLOW DEPTH (FEET) = 1.12 TRAVEL TIME (MIN.) = 0.65  
Tc (MIN.) = 13.84  
SUBAREA AREA (ACRES) = 2.57 SUBAREA RUNOFF (CFS) = 5.27  
EFFECTIVE AREA (ACRES) = 22.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.6 PEAK FLOW RATE (CFS) = 46.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.13 FLOW VELOCITY (FEET/SEC.) = 12.07  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50507.00 = 2547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50507.00 TO NODE 50508.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 535.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 310.00 CHANNEL SLOPE = 0.2097  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.516

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.09	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 52.46  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.79  
AVERAGE FLOW DEPTH (FEET) = 1.22 TRAVEL TIME (MIN.) = 0.44  
Tc (MIN.) = 14.28

SUBAREA AREA (ACRES) = 6.09 SUBAREA RUNOFF (CFS) = 12.15  
EFFECTIVE AREA (ACRES) = 28.69 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 28.7 PEAK FLOW RATE (CFS) = 57.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.26 FLOW VELOCITY (FEET/SEC.) = 12.09  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50508.00 = 2857.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50508.00 TO NODE 50509.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 405.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.2658  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.428

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 66.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.66  
AVERAGE FLOW DEPTH (FEET) = 1.28 TRAVEL TIME (MIN.) = 0.60  
Tc (MIN.) = 14.87  
SUBAREA AREA (ACRES) = 10.02 SUBAREA RUNOFF (CFS) = 19.20  
EFFECTIVE AREA (ACRES) = 38.72 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.7 PEAK FLOW RATE (CFS) = 74.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.32 FLOW VELOCITY (FEET/SEC.) = 14.09  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50509.00 = 3346.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50509.00 TO NODE 50510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 285.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 706.00 CHANNEL SLOPE = 0.1700  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.340

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 80.21  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.13

AVERAGE FLOW DEPTH (FEET) = 1.48 TRAVEL TIME (MIN.) = 0.97  
Tc (MIN.) = 15.84  
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 12.11  
EFFECTIVE AREA (ACRES) = 45.32 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 83.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.51 FLOW VELOCITY (FEET/SEC.) = 12.23  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50510.00 = 4052.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50510.00 TO NODE 50511.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 285.00 DOWNSTREAM (FEET) = 238.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1169.00 CHANNEL SLOPE = 0.0402  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.167

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 22.45 0.30 0.991 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 102.08  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.31  
AVERAGE FLOW DEPTH (FEET) = 1.91 TRAVEL TIME (MIN.) = 2.09  
Tc (MIN.) = 17.94  
SUBAREA AREA (ACRES) = 22.45 SUBAREA RUNOFF (CFS) = 37.77  
EFFECTIVE AREA (ACRES) = 67.77 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 67.8 PEAK FLOW RATE (CFS) = 113.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.99 FLOW VELOCITY (FEET/SEC.) = 9.55  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50511.00 = 5221.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50511.00 TO NODE 50512.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 238.00 DOWNSTREAM (FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.0102  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.056

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 39.83 0.30 0.990 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 145.45  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.10  
AVERAGE FLOW DEPTH (FEET) = 2.82 TRAVEL TIME (MIN.) = 1.34  
Tc (MIN.) = 19.27  
SUBAREA AREA (ACRES) = 39.83 SUBAREA RUNOFF (CFS) = 63.06  
EFFECTIVE AREA (ACRES) = 107.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 107.6 PEAK FLOW RATE (CFS) = 170.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.99 FLOW VELOCITY (FEET/SEC.) = 6.33  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50512.00 = 5710.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50512.00 TO NODE 50513.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 233.00 DOWNSTREAM (FEET) = 209.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 537.00 CHANNEL SLOPE = 0.0447  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.992

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.40 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 175.87  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.09  
AVERAGE FLOW DEPTH (FEET) = 2.30 TRAVEL TIME (MIN.) = 0.81  
Tc (MIN.) = 20.08  
SUBAREA AREA (ACRES) = 7.40 SUBAREA RUNOFF (CFS) = 11.27  
EFFECTIVE AREA (ACRES) = 114.99 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 115.0 PEAK FLOW RATE (CFS) = 175.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.29 FLOW VELOCITY (FEET/SEC.) = 11.11  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50513.00 = 6247.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50513.00 TO NODE 50513.00 IS CODE = 81

-----  
>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 20.08  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.992  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.19 0.30 0.961 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.961  
SUBAREA AREA (ACRES) = 38.19 SUBAREA RUNOFF (CFS) = 58.57  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.99  
TOTAL AREA (ACRES) = 153.2 PEAK FLOW RATE (CFS) = 233.86

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 153.2 TC (MIN.) = 20.08  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.986  
PEAK FLOW RATE (CFS) = 233.86  
=====

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 25 Yr \*  
\* From Node: 50600 To Node: 50610 \*  
\*\*\*\*\*

FILE NAME: 0610506W.DAT  
TIME/DATE OF STUDY: 11:51 04/03/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.811
- 2) 10.00; 3.144
- 3) 15.00; 2.409
- 4) 20.00; 1.996
- 5) 25.00; 1.742
- 6) 30.00; 1.531
- 7) 40.00; 1.331
- 8) 50.00; 1.178
- 9) 60.00; 1.053
- 10) 90.00; 0.883
- 11) 120.00; 0.772
- 12) 180.00; 0.643
- 13) 360.00; 0.473
- 14) 1440.00; 0.207

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0312 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0312 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0312 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0312 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0312 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50600.00 TO NODE 50601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00  
ELEVATION DATA: UPSTREAM(FEET) = 780.00 DOWNSTREAM(FEET) = 730.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.166  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.120  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	1.44	0.30	1.000	0	10.17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 3.65  
TOTAL AREA(ACRES) = 1.44 PEAK FLOW RATE(CFS) = 3.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50601.00 TO NODE 50602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.1541  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.972  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.27	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.17  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.94  
AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 1.00  
Tc(MIN.) = 11.17  
SUBAREA AREA(ACRES) = 1.27 SUBAREA RUNOFF(CFS) = 3.06  
EFFECTIVE AREA(ACRES) = 2.71 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 6.51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 FLOW VELOCITY(FEET/SEC.) = 6.23  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50602.00 = 671.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50602.00 TO NODE 50603.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 258.00 CHANNEL SLOPE = 0.2907  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.897

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.31	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.05

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.33

AVERAGE FLOW DEPTH(FEET) = 0.57 TRAVEL TIME(MIN.) = 0.52

Tc(MIN.) = 11.68

SUBAREA AREA(ACRES) = 1.31 SUBAREA RUNOFF(CFS) = 3.06

EFFECTIVE AREA(ACRES) = 4.02 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 9.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.60 FLOW VELOCITY(FEET/SEC.) = 8.70

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50603.00 = 929.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50603.00 TO NODE 50604.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 585.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.1293  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.854

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.58	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.21

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.74

AVERAGE FLOW DEPTH(FEET) = 0.74 TRAVEL TIME(MIN.) = 0.29

Tc(MIN.) = 11.97

SUBAREA AREA(ACRES) = 1.58 SUBAREA RUNOFF(CFS) = 3.64

EFFECTIVE AREA(ACRES) = 5.60 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.6 PEAK FLOW RATE(CFS) = 12.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.79 FLOW VELOCITY(FEET/SEC.) = 6.90

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50604.00 = 1045.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50604.00 TO NODE 50605.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 584.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 16.00 CHANNEL SLOPE = 0.0625  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.848

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.98	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.59

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.79

AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 0.05

Tc(MIN.) = 12.02

SUBAREA AREA(ACRES) = 4.98 SUBAREA RUNOFF(CFS) = 11.42

EFFECTIVE AREA(ACRES) = 10.58 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 10.6 PEAK FLOW RATE(CFS) = 24.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.14 FLOW VELOCITY(FEET/SEC.) = 6.21

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50605.00 = 1061.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50605.00 TO NODE 50606.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 584.00 DOWNSTREAM(FEET) = 579.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 122.00 CHANNEL SLOPE = 0.0410  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.794

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.18	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.08

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.58

AVERAGE FLOW DEPTH(FEET) = 1.34 TRAVEL TIME(MIN.) = 0.36

Tc(MIN.) = 12.38

SUBAREA AREA(ACRES) = 5.18 SUBAREA RUNOFF(CFS) = 11.63

EFFECTIVE AREA(ACRES) = 15.76 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 15.8 PEAK FLOW RATE (CFS) = 35.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.42 FLOW VELOCITY (FEET/SEC.) = 5.82  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50606.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50606.00 TO NODE 50607.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 579.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 637.00 CHANNEL SLOPE = 0.0801  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.595

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.34	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 42.97  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.82  
AVERAGE FLOW DEPTH (FEET) = 1.35 TRAVEL TIME (MIN.) = 1.36  
Tc (MIN.) = 13.74  
SUBAREA AREA (ACRES) = 7.34 SUBAREA RUNOFF (CFS) = 15.16  
EFFECTIVE AREA (ACRES) = 23.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 23.1 PEAK FLOW RATE (CFS) = 47.72

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.41 FLOW VELOCITY (FEET/SEC.) = 8.04  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50607.00 = 1820.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50607.00 TO NODE 50608.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 422.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 529.00 CHANNEL SLOPE = 0.2004  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.482

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.99	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 50.65  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.53  
AVERAGE FLOW DEPTH (FEET) = 1.21 TRAVEL TIME (MIN.) = 0.76  
Tc (MIN.) = 14.50

SUBAREA AREA (ACRES) = 2.99 SUBAREA RUNOFF (CFS) = 5.87  
EFFECTIVE AREA (ACRES) = 26.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.1 PEAK FLOW RATE (CFS) = 51.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.22 FLOW VELOCITY (FEET/SEC.) = 11.52  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50608.00 = 2349.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50608.00 TO NODE 50609.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 422.00 DOWNSTREAM (FEET) = 297.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 708.00 CHANNEL SLOPE = 0.1766  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.366

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.94	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 62.36  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.58  
AVERAGE FLOW DEPTH (FEET) = 1.34 TRAVEL TIME (MIN.) = 1.02  
Tc (MIN.) = 15.52  
SUBAREA AREA (ACRES) = 11.94 SUBAREA RUNOFF (CFS) = 22.21  
EFFECTIVE AREA (ACRES) = 38.04 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.0 PEAK FLOW RATE (CFS) = 70.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.41 FLOW VELOCITY (FEET/SEC.) = 11.92  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50609.00 = 3057.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50609.00 TO NODE 50610.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 297.00 DOWNSTREAM (FEET) = 207.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1321.00 CHANNEL SLOPE = 0.0681  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.196

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.38	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 79.59  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.68

AVERAGE FLOW DEPTH (FEET) = 1.58 TRAVEL TIME (MIN.) = 2.06  
Tc (MIN.) = 17.59  
SUBAREA AREA (ACRES) = 10.38 SUBAREA RUNOFF (CFS) = 17.71  
EFFECTIVE AREA (ACRES) = 48.42 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 82.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.60 FLOW VELOCITY (FEET/SEC.) = 10.77  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50610.00 = 4378.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 17.59  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.196  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.17 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.17 SUBAREA RUNOFF (CFS) = 2.00  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 49.6 PEAK FLOW RATE (CFS) = 84.62

=====

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 49.6 TC (MIN.) = 17.59  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.000  
PEAK FLOW RATE (CFS) = 84.62

=====

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END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 25 Yr \*  
\* From Node: 50700 To Node: 50716 \*  
\*\*\*\*\*

FILE NAME: 0610507W.DAT  
TIME/DATE OF STUDY: 09:49 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.811
- 2) 10.00; 3.144
- 3) 15.00; 2.409
- 4) 20.00; 1.996
- 5) 25.00; 1.742
- 6) 30.00; 1.531
- 7) 40.00; 1.331
- 8) 50.00; 1.178
- 9) 60.00; 1.053
- 10) 90.00; 0.883
- 11) 120.00; 0.772
- 12) 180.00; 0.643
- 13) 360.00; 0.473
- 14) 1440.00; 0.207

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50700.00 TO NODE 50701.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00  
ELEVATION DATA: UPSTREAM(FEET) = 1121.00 DOWNSTREAM(FEET) = 870.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 7.572  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.953  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.18	0.30	1.000	0	7.57

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.61  
TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 0.61

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50701.00 TO NODE 50702.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 827.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.3386  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.826  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.27  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.52  
AVERAGE FLOW DEPTH(FEET) = 0.28 TRAVEL TIME(MIN.) = 0.38  
 $T_c$ (MIN.) = 7.96  
SUBAREA AREA(ACRES) = 0.42 SUBAREA RUNOFF(CFS) = 1.34  
EFFECTIVE AREA(ACRES) = 0.61 AREA-AVERAGED  $F_m$ (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$ (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 1.00  
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 1.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 6.13  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50702.00 = 456.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50703.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	827.00	DOWNSTREAM(FEET) =	815.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	94.00	CHANNEL SLOPE =	0.1277
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	3.711		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.34	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.44

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.56

AVERAGE FLOW DEPTH(FEET) = 0.42 TRAVEL TIME(MIN.) = 0.34

Tc(MIN.) = 8.30

SUBAREA AREA(ACRES) = 0.34 SUBAREA RUNOFF(CFS) = 1.04

EFFECTIVE AREA(ACRES) = 0.94 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 2.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 4.71

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50703.00 = 550.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50704.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	815.00	DOWNSTREAM(FEET) =	800.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	169.00	CHANNEL SLOPE =	0.0888
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	3.518		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.72	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.39

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.87

AVERAGE FLOW DEPTH(FEET) = 0.61 TRAVEL TIME(MIN.) = 0.58

Tc(MIN.) = 8.88

SUBAREA AREA(ACRES) = 1.72 SUBAREA RUNOFF(CFS) = 4.99

EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 7.72

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.70 FLOW VELOCITY(FEET/SEC.) = 5.30

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50704.00 = 719.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50705.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	800.00	DOWNSTREAM(FEET) =	785.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	128.00	CHANNEL SLOPE =	0.1172
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	3.406		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.12	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.69

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.33

AVERAGE FLOW DEPTH(FEET) = 0.75 TRAVEL TIME(MIN.) = 0.34

Tc(MIN.) = 9.21

SUBAREA AREA(ACRES) = 2.12 SUBAREA RUNOFF(CFS) = 5.93

EFFECTIVE AREA(ACRES) = 4.79 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 13.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.81 FLOW VELOCITY(FEET/SEC.) = 6.74

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50705.00 = 847.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50705.00 TO NODE 50706.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	785.00	DOWNSTREAM(FEET) =	775.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	170.00	CHANNEL SLOPE =	0.0588
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	3.237		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.64	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.19

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.60

AVERAGE FLOW DEPTH(FEET) = 1.04 TRAVEL TIME(MIN.) = 0.51

Tc(MIN.) = 9.72

SUBAREA AREA(ACRES) = 3.64 SUBAREA RUNOFF(CFS) = 9.61

EFFECTIVE AREA(ACRES) = 8.42 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.4 PEAK FLOW RATE (CFS) = 22.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.12 FLOW VELOCITY (FEET/SEC.) = 5.93  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50706.00 = 1017.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50706.00 TO NODE 50707.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 775.00 DOWNSTREAM (FEET) = 772.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 162.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.087

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.65	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 28.10  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.05  
AVERAGE FLOW DEPTH (FEET) = 1.52 TRAVEL TIME (MIN.) = 0.67  
Tc (MIN.) = 10.39  
SUBAREA AREA (ACRES) = 4.65 SUBAREA RUNOFF (CFS) = 11.66  
EFFECTIVE AREA (ACRES) = 13.07 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 13.1 PEAK FLOW RATE (CFS) = 32.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.61 FLOW VELOCITY (FEET/SEC.) = 4.23  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50707.00 = 1179.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50707.00 TO NODE 50708.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 772.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 357.00 CHANNEL SLOPE = 0.0756  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.969

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.55	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 37.06  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.38  
AVERAGE FLOW DEPTH (FEET) = 1.29 TRAVEL TIME (MIN.) = 0.81  
Tc (MIN.) = 11.19

SUBAREA AREA (ACRES) = 3.55 SUBAREA RUNOFF (CFS) = 8.53  
EFFECTIVE AREA (ACRES) = 16.62 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 16.6 PEAK FLOW RATE (CFS) = 39.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.33 FLOW VELOCITY (FEET/SEC.) = 7.52  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50708.00 = 1536.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50708.00 TO NODE 50709.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 733.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 444.00 CHANNEL SLOPE = 0.0270  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.763

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.58	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 46.11  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.29  
AVERAGE FLOW DEPTH (FEET) = 1.70 TRAVEL TIME (MIN.) = 1.40  
Tc (MIN.) = 12.59  
SUBAREA AREA (ACRES) = 5.58 SUBAREA RUNOFF (CFS) = 12.37  
EFFECTIVE AREA (ACRES) = 22.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.2 PEAK FLOW RATE (CFS) = 49.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.74 FLOW VELOCITY (FEET/SEC.) = 5.39  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50709.00 = 1980.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50709.00 TO NODE 50710.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 733.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 467.00 CHANNEL SLOPE = 0.1242  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.646

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.17	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 53.63  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.73

AVERAGE FLOW DEPTH (FEET) = 1.36 TRAVEL TIME (MIN.) = 0.80  
Tc (MIN.) = 13.39  
SUBAREA AREA (ACRES) = 4.17 SUBAREA RUNOFF (CFS) = 8.81  
EFFECTIVE AREA (ACRES) = 26.38 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.4 PEAK FLOW RATE (CFS) = 55.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.38 FLOW VELOCITY (FEET/SEC.) = 9.80  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50710.00 = 2447.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50710.00 TO NODE 50711.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 619.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 516.00 CHANNEL SLOPE = 0.1085  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.521  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 21.41 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 77.09  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.14  
AVERAGE FLOW DEPTH (FEET) = 1.59 TRAVEL TIME (MIN.) = 0.85  
Tc (MIN.) = 14.24  
SUBAREA AREA (ACRES) = 21.41 SUBAREA RUNOFF (CFS) = 42.80  
EFFECTIVE AREA (ACRES) = 47.78 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 95.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.73 FLOW VELOCITY (FEET/SEC.) = 10.67  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50711.00 = 2963.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50711.00 TO NODE 50712.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 619.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 650.00 CHANNEL SLOPE = 0.0292  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.364  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.43 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 102.42  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.27  
AVERAGE FLOW DEPTH (FEET) = 2.03 TRAVEL TIME (MIN.) = 1.31  
Tc (MIN.) = 15.55  
SUBAREA AREA (ACRES) = 7.43 SUBAREA RUNOFF (CFS) = 13.79  
EFFECTIVE AREA (ACRES) = 55.21 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.2 PEAK FLOW RATE (CFS) = 102.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.03 FLOW VELOCITY (FEET/SEC.) = 8.26  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50712.00 = 3613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50713.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 794.00 CHANNEL SLOPE = 0.0907  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.283  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 36.47 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 135.11  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.50  
AVERAGE FLOW DEPTH (FEET) = 1.83 TRAVEL TIME (MIN.) = 0.98  
Tc (MIN.) = 16.53  
SUBAREA AREA (ACRES) = 36.47 SUBAREA RUNOFF (CFS) = 65.10  
EFFECTIVE AREA (ACRES) = 91.68 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 163.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.96 FLOW VELOCITY (FEET/SEC.) = 14.23  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50713.00 = 4407.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50713.00 TO NODE 50714.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 423.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1215.00 CHANNEL SLOPE = 0.0864  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.166  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.52 0.30 0.998 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.998  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 179.19  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 14.25  
 AVERAGE FLOW DEPTH(FEET) = 2.05 TRAVEL TIME(MIN.) = 1.42  
 Tc(MIN.) = 17.95  
 SUBAREA AREA(ACRES) = 18.52 SUBAREA RUNOFF(CFS) = 31.11  
 EFFECTIVE AREA(ACRES) = 110.22 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 110.2 PEAK FLOW RATE(CFS) = 185.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.07 FLOW VELOCITY(FEET/SEC.) = 14.39  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50714.00 = 5622.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50714.00 TO NODE 50715.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 319.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 768.00 CHANNEL SLOPE = 0.1354  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.104  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.31 0.30 0.993 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 189.37  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 17.13  
 AVERAGE FLOW DEPTH(FEET) = 1.92 TRAVEL TIME(MIN.) = 0.75  
 Tc(MIN.) = 18.70  
 SUBAREA AREA(ACRES) = 5.31 SUBAREA RUNOFF(CFS) = 8.64  
 EFFECTIVE AREA(ACRES) = 115.52 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 115.5 PEAK FLOW RATE(CFS) = 187.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.91 FLOW VELOCITY(FEET/SEC.) = 17.10  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50715.00 = 6390.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50715.00 TO NODE 50716.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 319.00 DOWNSTREAM(FEET) = 182.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1513.00 CHANNEL SLOPE = 0.0905  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.981  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 79.09 0.30 0.979 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 247.64  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 15.72  
 AVERAGE FLOW DEPTH(FEET) = 2.29 TRAVEL TIME(MIN.) = 1.60  
 Tc(MIN.) = 20.30  
 SUBAREA AREA(ACRES) = 79.09 SUBAREA RUNOFF(CFS) = 120.10  
 EFFECTIVE AREA(ACRES) = 194.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 194.6 PEAK FLOW RATE(CFS) = 294.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.44 FLOW VELOCITY(FEET/SEC.) = 16.45  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50716.00 = 7903.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50716.00 TO NODE 50716.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.30  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.981  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 42.18 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 42.18 SUBAREA RUNOFF(CFS) = 63.81  
 EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 236.8 PEAK FLOW RATE(CFS) = 358.70

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 236.8 TC(MIN.) = 20.30  
 EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.993  
 PEAK FLOW RATE(CFS) = 358.70

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 25 Yr \*  
\* From Node: 50800 To Node: 50811 \*  
\*\*\*\*\*

FILE NAME: 0610508W.DAT  
TIME/DATE OF STUDY: 09:49 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.811
- 2) 10.00; 3.144
- 3) 15.00; 2.409
- 4) 20.00; 1.996
- 5) 25.00; 1.742
- 6) 30.00; 1.531
- 7) 40.00; 1.331
- 8) 50.00; 1.178
- 9) 60.00; 1.053
- 10) 90.00; 0.883
- 11) 120.00; 0.772
- 12) 180.00; 0.643
- 13) 360.00; 0.473
- 14) 1440.00; 0.207

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50800.00 TO NODE 50801.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00  
ELEVATION DATA: UPSTREAM(FEET) = 795.00 DOWNSTREAM(FEET) = 745.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.302  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.100  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.60	0.30	1.000	0	10.30

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.50  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.50

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50801.00 TO NODE 50802.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 725.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 245.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.973  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.35	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.53  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.76  
AVERAGE FLOW DEPTH(FEET) = 0.62 TRAVEL TIME(MIN.) = 0.86  
Tc(MIN.) = 11.16  
SUBAREA AREA(ACRES) = 3.35 SUBAREA RUNOFF(CFS) = 8.06  
EFFECTIVE AREA(ACRES) = 3.94 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 3.9 PEAK FLOW RATE(CFS) = 9.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.77 FLOW VELOCITY(FEET/SEC.) = 5.40  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50802.00 = 566.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50802.00 TO NODE 50803.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 725.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 325.00 CHANNEL SLOPE = 0.0769  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.828

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.52	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.23

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.47

AVERAGE FLOW DEPTH(FEET) = 0.83 TRAVEL TIME(MIN.) = 0.99

Tc(MIN.) = 12.15

SUBAREA AREA(ACRES) = 1.52 SUBAREA RUNOFF(CFS) = 3.47

EFFECTIVE AREA(ACRES) = 5.47 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 12.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.86 FLOW VELOCITY(FEET/SEC.) = 5.64

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50803.00 = 891.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50803.00 TO NODE 50804.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 652.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 594.00 CHANNEL SLOPE = 0.0808  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.601

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.12	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.79

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.40

AVERAGE FLOW DEPTH(FEET) = 0.99 TRAVEL TIME(MIN.) = 1.55

Tc(MIN.) = 13.70

SUBAREA AREA(ACRES) = 6.12 SUBAREA RUNOFF(CFS) = 12.68

EFFECTIVE AREA(ACRES) = 11.59 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 11.6 PEAK FLOW RATE(CFS) = 24.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.09 FLOW VELOCITY(FEET/SEC.) = 6.78

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50804.00 = 1485.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50804.00 TO NODE 50805.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 652.00 DOWNSTREAM(FEET) = 542.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 499.00 CHANNEL SLOPE = 0.2204  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.483

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.17	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.09

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.39

AVERAGE FLOW DEPTH(FEET) = 0.97 TRAVEL TIME(MIN.) = 0.80

Tc(MIN.) = 14.50

SUBAREA AREA(ACRES) = 5.17 SUBAREA RUNOFF(CFS) = 10.16

EFFECTIVE AREA(ACRES) = 16.76 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 32.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.01 FLOW VELOCITY(FEET/SEC.) = 10.72

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50805.00 = 1984.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50805.00 TO NODE 50806.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 542.00 DOWNSTREAM(FEET) = 450.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 650.00 CHANNEL SLOPE = 0.1415  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.356

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.22	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.77

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.41

AVERAGE FLOW DEPTH(FEET) = 1.16 TRAVEL TIME(MIN.) = 1.15

Tc(MIN.) = 15.65

SUBAREA AREA(ACRES) = 5.22 SUBAREA RUNOFF(CFS) = 9.66

EFFECTIVE AREA(ACRES) = 21.99 AREA-AVERAGED Fm(INCH/HR) = 0.30



AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 40.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.19 FLOW VELOCITY (FEET/SEC.) = 9.53  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50806.00 = 2634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50806.00 TO NODE 50807.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 450.00 DOWNSTREAM (FEET) = 400.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 639.00 CHANNEL SLOPE = 0.0782  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.249

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.83	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 54.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.25  
AVERAGE FLOW DEPTH (FEET) = 1.48 TRAVEL TIME (MIN.) = 1.29  
Tc (MIN.) = 16.94  
SUBAREA AREA (ACRES) = 15.83 SUBAREA RUNOFF (CFS) = 27.78  
EFFECTIVE AREA (ACRES) = 37.82 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 37.8 PEAK FLOW RATE (CFS) = 66.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.60 FLOW VELOCITY (FEET/SEC.) = 8.65  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50807.00 = 3273.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50807.00 TO NODE 50808.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 400.00 DOWNSTREAM (FEET) = 350.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 448.00 CHANNEL SLOPE = 0.1116  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.188

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 72.68  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.14  
AVERAGE FLOW DEPTH (FEET) = 1.55 TRAVEL TIME (MIN.) = 0.74  
Tc (MIN.) = 17.68

SUBAREA AREA (ACRES) = 7.46 SUBAREA RUNOFF (CFS) = 12.67  
EFFECTIVE AREA (ACRES) = 45.28 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 76.95

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.58 FLOW VELOCITY (FEET/SEC.) = 10.25  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50808.00 = 3721.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50808.00 TO NODE 50809.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 350.00 DOWNSTREAM (FEET) = 283.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 438.00 CHANNEL SLOPE = 0.1530  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.137

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.20	0.30	0.972	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 82.93  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.71  
AVERAGE FLOW DEPTH (FEET) = 1.54 TRAVEL TIME (MIN.) = 0.62  
Tc (MIN.) = 18.30  
SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 11.96  
EFFECTIVE AREA (ACRES) = 52.48 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 52.5 PEAK FLOW RATE (CFS) = 86.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.56 FLOW VELOCITY (FEET/SEC.) = 11.90  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50809.00 = 4159.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50809.00 TO NODE 50810.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 283.00 DOWNSTREAM (FEET) = 243.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 665.00 CHANNEL SLOPE = 0.0602  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.058

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	63.52	0.30	0.983	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.983  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 137.22  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.66

AVERAGE FLOW DEPTH (FEET) = 1.98 TRAVEL TIME (MIN.) = 0.95  
Tc (MIN.) = 19.25  
SUBAREA AREA (ACRES) = 63.52 SUBAREA RUNOFF (CFS) = 100.81  
EFFECTIVE AREA (ACRES) = 116.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 116.0 PEAK FLOW RATE (CFS) = 183.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.21 FLOW VELOCITY (FEET/SEC.) = 12.56  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50810.00 = 4824.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50810.00 TO NODE 50811.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
-----

ELEVATION DATA: UPSTREAM (FEET) = 243.00 DOWNSTREAM (FEET) = 173.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1122.00 CHANNEL SLOPE = 0.0624  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.943

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 11.57 0.30 0.980 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 192.50  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.35  
AVERAGE FLOW DEPTH (FEET) = 2.49 TRAVEL TIME (MIN.) = 1.81  
Tc (MIN.) = 21.06  
SUBAREA AREA (ACRES) = 11.57 SUBAREA RUNOFF (CFS) = 17.17  
EFFECTIVE AREA (ACRES) = 127.57 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 127.6 PEAK FLOW RATE (CFS) = 189.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.47 FLOW VELOCITY (FEET/SEC.) = 10.33  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50811.00 = 5946.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81

-----  
>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 21.06  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.943  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 5.47  
EFFECTIVE AREA (ACRES) = 131.27 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 131.3 PEAK FLOW RATE (CFS) = 194.47

=====

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 131.3 TC (MIN.) = 21.06  
EFFECTIVE AREA (ACRES) = 131.27 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.988  
PEAK FLOW RATE (CFS) = 194.47

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 2 \*  
\* HYDROLOGIC ANALYSIS - 25-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E502XX25.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.060
2)	6.000;	3.660
3)	7.000;	3.350
4)	8.000;	3.100
5)	9.000;	2.900
6)	10.000;	2.730
7)	11.000;	2.580
8)	12.000;	2.460
9)	13.000;	2.350
10)	14.000;	2.250
11)	15.000;	2.160
12)	20.000;	1.830
13)	25.000;	1.610
14)	30.000;	1.450
15)	40.000;	1.230
16)	50.000;	1.090
17)	60.000;	0.980
18)	90.000;	0.770
19)	120.000;	0.660
20)	180.000;	0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50200.00 TO NODE 50201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 497.00 DOWNSTREAM(FEET) = 365.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.563  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.987  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.30	1.000	95	8.56
NATURAL FAIR COVER "OPEN BRUSH"	-	0.60	0.30	1.000	95	8.56
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.20	0.30	1.000	95	8.56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 3.39  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 3.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50201.00 TO NODE 50202.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 365.00 DOWNSTREAM(FEET) = 335.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 259.00 CHANNEL SLOPE = 0.1158  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.39  
FLOW VELOCITY(FEET/SEC.) = 4.79 FLOW DEPTH(FEET) = 0.49  
TRAVEL TIME(MIN.) = 0.90  $T_c$ (MIN.) = 9.46  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50202.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50202.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.46  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.821  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 6.13  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 9.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50203.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 335.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.1020  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.30  
FLOW VELOCITY(FEET/SEC.) = 5.86 FLOW DEPTH(FEET) = 0.73  
TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 10.02  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50203.00 = 781.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50203.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.02  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.727  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 9.17  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 18.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50204.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 304.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0696  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 18.13  
FLOW VELOCITY(FEET/SEC.) = 5.99 FLOW DEPTH(FEET) = 1.00  
TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 10.46  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50204.00 = 939.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50204.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.46  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.661  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 9.31  
EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 26.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50205.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 304.00 DOWNSTREAM(FEET) = 234.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 487.00 CHANNEL SLOPE = 0.1437  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 26.94  
FLOW VELOCITY(FEET/SEC.) = 10.78 FLOW DEPTH(FEET) = 0.91  
TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 11.21  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50205.00 = 1426.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 11.21  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.554  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.100 -

USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.90 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 7.23  
 EFFECTIVE AREA(ACRES) = 16.10 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 32.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN) = 11.21  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.554  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	4.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.850	-
USER-DEFINED	-	3.70	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.882  
 SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 25.97  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
 TOTAL AREA(ACRES) = 28.7 PEAK FLOW RATE(CFS) = 58.93

=====  
 END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 28.7 TC(MIN.) = 11.21  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.910  
 PEAK FLOW RATE(CFS) = 58.93  
 =====

-----  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 3 \*  
\* HYDROLOGIC ANALYSIS - 25-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E503XX25.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.060
2)	6.000;	3.660
3)	7.000;	3.350
4)	8.000;	3.100
5)	9.000;	2.900
6)	10.000;	2.730
7)	11.000;	2.580
8)	12.000;	2.460
9)	13.000;	2.350
10)	14.000;	2.250
11)	15.000;	2.160
12)	20.000;	1.830
13)	25.000;	1.610
14)	30.000;	1.450
15)	40.000;	1.230
16)	50.000;	1.090
17)	60.000;	0.980
18)	90.000;	0.770
19)	120.000;	0.660
20)	180.000;	0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50300.00 TO NODE 50301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00  
ELEVATION DATA: UPSTREAM(FEET) = 1110.00 DOWNSTREAM(FEET) = 1035.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.517  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.812  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.60	0.30	1.000	95	9.52
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.52

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 2.03  
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 2.03

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50301.00 TO NODE 50302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 960.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 225.00 CHANNEL SLOPE = 0.3333  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.03  
FLOW VELOCITY(FEET/SEC.) = 6.19 FLOW DEPTH(FEET) = 0.33  
TRAVEL TIME(MIN.) = 0.61  $T_c$ (MIN.) = 10.12  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50302.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50302.00 TO NODE 50302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN) = 10.12
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.712
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.30    1.000   -
USER-DEFINED        -         1.00    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.10   SUBAREA RUNOFF(CFS) = 2.39
EFFECTIVE AREA(ACRES) = 2.00   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.0     PEAK FLOW RATE(CFS) = 4.34

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*****
FLOW PROCESS FROM NODE 50302.00 TO NODE 50303.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 84.00 CHANNEL SLOPE = 0.1190
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.34
FLOW VELOCITY(FEET/SEC.) = 5.13 FLOW DEPTH(FEET) = 0.53
TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 10.40
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50303.00 = 631.00 FEET.

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*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50303.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.40
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.671
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.30    1.000   -
USER-DEFINED        -         0.30    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.70   SUBAREA RUNOFF(CFS) = 1.49
EFFECTIVE AREA(ACRES) = 2.70   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.7     PEAK FLOW RATE(CFS) = 5.76

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*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50304.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 940.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 72.00 CHANNEL SLOPE = 0.1389
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

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MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.76
FLOW VELOCITY(FEET/SEC.) = 5.81 FLOW DEPTH(FEET) = 0.58
TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 10.60
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50304.00 = 703.00 FEET.

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*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50304.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.60
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.640
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.30    0.30    1.000   -
USER-DEFINED        -         0.90    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.20   SUBAREA RUNOFF(CFS) = 4.63
EFFECTIVE AREA(ACRES) = 4.90   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.9     PEAK FLOW RATE(CFS) = 10.32

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*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50305.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 940.00 DOWNSTREAM(FEET) = 890.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.2941
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.32
FLOW VELOCITY(FEET/SEC.) = 8.92 FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 10.92
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50305.00 = 873.00 FEET.

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*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.592
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00    0.30    1.000   -
USER-DEFINED        -         0.80    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.80   SUBAREA RUNOFF(CFS) = 5.78
EFFECTIVE AREA(ACRES) = 7.70   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 7.7     PEAK FLOW RATE(CFS) = 15.88

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*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50306.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 890.00 DOWNSTREAM(FEET) = 785.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 439.00 CHANNEL SLOPE = 0.2392
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 15.88
FLOW VELOCITY(FEET/SEC.) = 9.21 FLOW DEPTH(FEET) = 0.76
TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 11.71
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50306.00 = 1312.00 FEET.

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*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 11.71
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.494
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.80   0.30  1.000  -
USER-DEFINED        -         3.30   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 14.02
EFFECTIVE AREA(ACRES) = 14.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.8 PEAK FLOW RATE(CFS) = 29.23

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*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50307.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 737.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 213.00 CHANNEL SLOPE = 0.2254
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 29.23
FLOW VELOCITY(FEET/SEC.) = 10.48 FLOW DEPTH(FEET) = 0.96
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 12.05
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50307.00 = 1525.00 FEET.

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*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.05
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.454
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00   0.30  1.000  -
USER-DEFINED        -         0.90   0.30  1.000  -
USER-DEFINED        -         0.20   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 6.01
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 34.71

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*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50308.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 737.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 527.00 CHANNEL SLOPE = 0.2600
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 34.71
FLOW VELOCITY(FEET/SEC.) = 11.52 FLOW DEPTH(FEET) = 1.00
TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 12.82
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50308.00 = 2052.00 FEET.

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*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.82
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.370
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         5.70   0.30  1.000  -
USER-DEFINED        -         1.00   0.30  1.000  -
USER-DEFINED        -         3.30   0.30  1.000  -
USER-DEFINED        -         0.40   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 19.38
EFFECTIVE AREA(ACRES) = 28.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 28.3 PEAK FLOW RATE(CFS) = 52.73

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*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50309.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 555.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 561.00 CHANNEL SLOPE = 0.0802
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00

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CHANNEL FLOW THRU SUBAREA(CFS) = 52.73  
FLOW VELOCITY(FEET/SEC.) = 8.25 FLOW DEPTH(FEET) = 1.46  
TRAVEL TIME(MIN.) = 1.13 Tc(MIN.) = 13.95  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 2613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 13.95  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.255  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 5.45  
EFFECTIVE AREA(ACRES) = 31.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.4 PEAK FLOW RATE(CFS) = 55.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50310.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 555.00 DOWNSTREAM(FEET) = 509.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 401.00 CHANNEL SLOPE = 0.1147  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 55.25  
FLOW VELOCITY(FEET/SEC.) = 9.51 FLOW DEPTH(FEET) = 1.39  
TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 14.65  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50310.00 = 3014.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 14.65  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.191  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	7.60	0.30	1.000	-
USER-DEFINED	-	6.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 29.45

EFFECTIVE AREA(ACRES) = 48.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 48.7 PEAK FLOW RATE(CFS) = 82.90

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50311.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 509.00 DOWNSTREAM(FEET) = 395.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 685.00 CHANNEL SLOPE = 0.1664  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 82.90  
FLOW VELOCITY(FEET/SEC.) = 12.16 FLOW DEPTH(FEET) = 1.51  
TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 15.59  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50311.00 = 3699.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50311.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 15.59  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.121  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 15.41  
EFFECTIVE AREA(ACRES) = 58.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 58.1 PEAK FLOW RATE(CFS) = 95.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50312.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 383.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 216.00 CHANNEL SLOPE = 0.0556  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 95.22  
FLOW VELOCITY(FEET/SEC.) = 8.35 FLOW DEPTH(FEET) = 1.95  
TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 16.02  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50312.00 = 3915.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.02

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.092

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	18.40	0.30	1.000	-
USER-DEFINED	-	11.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 37.70 SUBAREA RUNOFF(CFS) = 60.82

EFFECTIVE AREA(ACRES) = 95.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 95.8 PEAK FLOW RATE(CFS) = 154.56

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.02

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.092

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 5.49  
EFFECTIVE AREA(ACRES) = 99.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 99.2 PEAK FLOW RATE(CFS) = 160.04

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50313.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 383.00 DOWNSTREAM(FEET) = 350.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 762.00 CHANNEL SLOPE = 0.0433  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 160.04  
FLOW VELOCITY(FEET/SEC.) = 8.64 FLOW DEPTH(FEET) = 2.48  
TRAVEL TIME(MIN.) = 1.47 Tc(MIN.) = 17.49  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50313.00 = 4677.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.49

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.996

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 9.61

EFFECTIVE AREA(ACRES) = 105.50 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 105.5 PEAK FLOW RATE(CFS) = 161.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.49

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.996

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 10.90 SUBAREA RUNOFF(CFS) = 16.63  
EFFECTIVE AREA(ACRES) = 116.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 116.4 PEAK FLOW RATE(CFS) = 177.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50314.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 318.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 957.00 CHANNEL SLOPE = 0.0334  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 177.63  
FLOW VELOCITY(FEET/SEC.) = 8.04 FLOW DEPTH(FEET) = 2.71  
TRAVEL TIME(MIN.) = 1.98 Tc(MIN.) = 19.48  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50314.00 = 5634.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.48  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.865  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	3.70	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	10.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 21.80 SUBAREA RUNOFF(CFS) = 30.70  
 EFFECTIVE AREA(ACRES) = 138.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 138.2 PEAK FLOW RATE(CFS) = 194.62

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.48  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.865  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.80	0.30	1.000	-
USER-DEFINED	-	15.20	0.30	1.000	-
USER-DEFINED	-	5.90	0.30	1.000	-
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 34.70 SUBAREA RUNOFF(CFS) = 48.87  
 EFFECTIVE AREA(ACRES) = 172.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 172.9 PEAK FLOW RATE(CFS) = 243.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.48  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.865  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 1.13  
 EFFECTIVE AREA(ACRES) = 173.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 173.7 PEAK FLOW RATE(CFS) = 244.61

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50315.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

=====

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 318.00 DOWNSTREAM(FEET) = 313.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00 CHANNEL SLOPE = 0.0179  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 244.61  
 FLOW VELOCITY(FEET/SEC.) = 6.88 FLOW DEPTH(FEET) = 3.44  
 TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 20.15  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50315.00 = 5914.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50315.00 TO NODE 50315.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 20.15  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.823  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	2.40	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 9.19  
 EFFECTIVE AREA(ACRES) = 180.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 180.4 PEAK FLOW RATE(CFS) = 247.32

\*\*\*\*\*

FLOW PROCESS FROM NODE 50315.00 TO NODE 50316.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

=====

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 313.00 DOWNSTREAM(FEET) = 285.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 642.00 CHANNEL SLOPE = 0.0436  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 247.32  
 FLOW VELOCITY(FEET/SEC.) = 9.64 FLOW DEPTH(FEET) = 2.92  
 TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 21.26  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50316.00 = 6556.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 21.26  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.774  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 9.69  
EFFECTIVE AREA(ACRES) = 187.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 187.7 PEAK FLOW RATE(CFS) = 249.08

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 21.26  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.774  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 2.92  
EFFECTIVE AREA(ACRES) = 189.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 189.9 PEAK FLOW RATE(CFS) = 252.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50316.00 TO NODE 50317.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 282.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 448.00 CHANNEL SLOPE = 0.0067  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 252.00  
FLOW VELOCITY(FEET/SEC.) = 4.80 FLOW DEPTH(FEET) = 4.18  
TRAVEL TIME(MIN.) = 1.56 Tc(MIN.) = 22.82  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50317.00 = 7004.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.82  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.706  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	2.60	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	10.20	0.30	1.000	-
USER-DEFINED	-	42.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.997  
SUBAREA AREA(ACRES) = 59.70 SUBAREA RUNOFF(CFS) = 75.59  
EFFECTIVE AREA(ACRES) = 249.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 249.6 PEAK FLOW RATE(CFS) = 315.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.82  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.706  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.30	1.000	-
USER-DEFINED	-	17.50	0.30	1.000	-
USER-DEFINED	-	22.00	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 65.80 SUBAREA RUNOFF(CFS) = 83.26  
EFFECTIVE AREA(ACRES) = 315.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 315.4 PEAK FLOW RATE(CFS) = 399.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50317.00 TO NODE 50318.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 600.00 CHANNEL SLOPE = 0.0817  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 399.15  
FLOW VELOCITY(FEET/SEC.) = 13.76 FLOW DEPTH(FEET) = 3.11  
TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 23.55  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50318.00 = 7604.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81  
-----

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.55

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.674

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	0.100	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.839

SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 8.58

EFFECTIVE AREA(ACRES) = 322.10 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 322.1 PEAK FLOW RATE(CFS) = 399.15

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.55

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.674

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	5.00	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.935

SUBAREA AREA(ACRES) = 7.60 SUBAREA RUNOFF(CFS) = 9.53

EFFECTIVE AREA(ACRES) = 329.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 329.7 PEAK FLOW RATE(CFS) = 408.18

\*\*\*\*\*

FLOW PROCESS FROM NODE 50318.00 TO NODE 50319.00 IS CODE = 51

=====  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 233.00 DOWNSTREAM(FEET) = 228.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 201.00 CHANNEL SLOPE = 0.0249

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00

CHANNEL FLOW THRU SUBAREA(CFS) = 408.18

FLOW VELOCITY(FEET/SEC.) = 10.98 FLOW DEPTH(FEET) = 3.52

TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 23.85

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50319.00 = 7805.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.85

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.661

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 8.03

EFFECTIVE AREA(ACRES) = 336.00 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 336.0 PEAK FLOW RATE(CFS) = 412.23

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.85

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.661

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.994

SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 9.56

EFFECTIVE AREA(ACRES) = 343.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 343.8 PEAK FLOW RATE(CFS) = 421.79

\*\*\*\*\*

FLOW PROCESS FROM NODE 50319.00 TO NODE 50320.00 IS CODE = 51

=====  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 228.00 DOWNSTREAM(FEET) = 214.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 809.00 CHANNEL SLOPE = 0.0173

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00

CHANNEL FLOW THRU SUBAREA(CFS) = 421.79

FLOW VELOCITY (FEET/SEC.) = 9.68 FLOW DEPTH (FEET) = 3.81  
TRAVEL TIME (MIN.) = 1.39 Tc (MIN.) = 25.25  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50320.00 = 8614.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 25.25

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.602

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	4.80	0.30	0.850	-
USER-DEFINED	-	5.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.929

SUBAREA AREA (ACRES) = 11.40 SUBAREA RUNOFF (CFS) = 13.58

EFFECTIVE AREA (ACRES) = 355.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 355.2 PEAK FLOW RATE (CFS) = 421.79

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 25.25

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.602

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.90	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.854

SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 13.57

EFFECTIVE AREA (ACRES) = 366.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 366.4 PEAK FLOW RATE (CFS) = 430.88

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 366.4 TC (MIN.) = 25.25

EFFECTIVE AREA (ACRES) = 366.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.985

PEAK FLOW RATE (CFS) = 430.88

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 4 \*  
\* HYDROLOGIC ANALYSIS - 25-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E504XX25.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.000; 4.060
- 2) 6.000; 3.660
- 3) 7.000; 3.350
- 4) 8.000; 3.100
- 5) 9.000; 2.900
- 6) 10.000; 2.730
- 7) 11.000; 2.580
- 8) 12.000; 2.460
- 9) 13.000; 2.350
- 10) 14.000; 2.250
- 11) 15.000; 2.160
- 12) 20.000; 1.830
- 13) 25.000; 1.610
- 14) 30.000; 1.450
- 15) 40.000; 1.230
- 16) 50.000; 1.090
- 17) 60.000; 0.980
- 18) 90.000; 0.770
- 19) 120.000; 0.660
- 20) 180.000; 0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.482  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.658  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.50	0.30	1.000	95	10.48

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.06  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.06

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.06  
FLOW VELOCITY(FEET/SEC.) = 4.79 FLOW DEPTH(FEET) = 0.27  
TRAVEL TIME(MIN.) = 0.91  $T_c$ (MIN.) = 11.39  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.39



\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.533  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.80  
 EFFECTIVE AREA (ACRES) = 0.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 1.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 239.00 CHANNEL SLOPE = 0.4184  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1.81  
 FLOW VELOCITY (FEET/SEC.) = 6.60 FLOW DEPTH (FEET) = 0.30  
 TRAVEL TIME (MIN.) = 0.60 Tc (MIN.) = 12.00  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50403.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.460  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.78  
 EFFECTIVE AREA (ACRES) = 1.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.3 PEAK FLOW RATE (CFS) = 2.53

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00 CHANNEL SLOPE = 0.7042  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 2.53

FLOW VELOCITY (FEET/SEC.) = 8.77 FLOW DEPTH (FEET) = 0.31  
 TRAVEL TIME (MIN.) = 0.13 Tc (MIN.) = 12.13  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50404.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.13  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.445  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 2.32  
 EFFECTIVE AREA (ACRES) = 2.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.5 PEAK FLOW RATE (CFS) = 4.83

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 145.00 CHANNEL SLOPE = 0.3448  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 4.83  
 FLOW VELOCITY (FEET/SEC.) = 7.84 FLOW DEPTH (FEET) = 0.45  
 TRAVEL TIME (MIN.) = 0.31 Tc (MIN.) = 12.44  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50405.00 TO NODE 50405.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.44  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.411  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.09  
 EFFECTIVE AREA (ACRES) = 3.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.6 PEAK FLOW RATE (CFS) = 6.84

```

*****
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 6.84
FLOW VELOCITY(FEET/SEC.) = 8.32 FLOW DEPTH(FEET) = 0.52
TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 12.76
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50406.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.76
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.377
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.30    1.000  -
USER-DEFINED        -         0.20    0.30    1.000  -
USER-DEFINED        -         0.80    0.30    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 2.24
EFFECTIVE AREA(ACRES) = 4.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 8.97

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.2193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 8.97
FLOW VELOCITY(FEET/SEC.) = 7.71 FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 13.25
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50407.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 13.25
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.325
SUBAREA LOSS RATE DATA(AMC II):

```

```

DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.50    0.30    1.000  -
USER-DEFINED        -         1.20    0.30    1.000  -
USER-DEFINED        -         1.70    0.30    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 11.66
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 20.41

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 325.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 490.00 CHANNEL SLOPE = 0.1531
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 20.41
FLOW VELOCITY(FEET/SEC.) = 8.31 FLOW DEPTH(FEET) = 0.91
TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 14.23
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.23
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.229
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.30    1.000  -
USER-DEFINED        -         0.10    0.30    1.000  -
USER-DEFINED        -         0.60    0.30    1.000  -
USER-DEFINED        -         1.30    0.30    1.000  -
USER-DEFINED        -         0.50    0.30    1.000  -
USER-DEFINED        -         1.20    0.30    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 6.60
EFFECTIVE AREA(ACRES) = 15.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.0 PEAK FLOW RATE(CFS) = 26.04

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.23
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.229
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.56  
EFFECTIVE AREA(ACRES) = 15.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.9 PEAK FLOW RATE(CFS) = 27.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 27.60  
FLOW VELOCITY(FEET/SEC.) = 6.61 FLOW DEPTH(FEET) = 1.18  
TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 14.42  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.212  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	6.40	0.30	1.000	-
USER-DEFINED	-	6.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 14.80 SUBAREA RUNOFF(CFS) = 25.47  
EFFECTIVE AREA(ACRES) = 30.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.7 PEAK FLOW RATE(CFS) = 52.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.212  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.03  
EFFECTIVE AREA(ACRES) = 31.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.3 PEAK FLOW RATE(CFS) = 53.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 53.88  
FLOW VELOCITY(FEET/SEC.) = 8.23 FLOW DEPTH(FEET) = 1.48  
TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 14.62  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.62  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.194  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 10.91  
EFFECTIVE AREA(ACRES) = 37.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 37.7 PEAK FLOW RATE(CFS) = 64.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.62  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.194  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 1.02  
 EFFECTIVE AREA (ACRES) = 38.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 38.3 PEAK FLOW RATE (CFS) = 65.28

\*\*\*\*\*

FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 312.00 DOWNSTREAM (FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 566.00 CHANNEL SLOPE = 0.0530  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 65.28  
 FLOW VELOCITY (FEET/SEC.) = 7.43 FLOW DEPTH (FEET) = 1.71  
 TRAVEL TIME (MIN.) = 1.27 Tc (MIN.) = 15.89  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 15.89  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.101  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658  
 SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 8.57  
 EFFECTIVE AREA (ACRES) = 43.30 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 43.3 PEAK FLOW RATE (CFS) = 70.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 15.89  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.101  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

USER-DEFINED - 5.80 0.30 1.000 -  
 USER-DEFINED - 0.50 0.30 1.000 -  
 USER-DEFINED - 3.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 10.50 SUBAREA RUNOFF (CFS) = 17.02  
 EFFECTIVE AREA (ACRES) = 53.80 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 53.8 PEAK FLOW RATE (CFS) = 87.67

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 216.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 954.00 CHANNEL SLOPE = 0.0692  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 87.67  
 FLOW VELOCITY (FEET/SEC.) = 11.00 FLOW DEPTH (FEET) = 1.63  
 TRAVEL TIME (MIN.) = 1.45 Tc (MIN.) = 17.34  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 17.34  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.006  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875  
 SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 5.65  
 EFFECTIVE AREA (ACRES) = 57.40 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 57.4 PEAK FLOW RATE (CFS) = 88.70

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 17.34  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.006  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.30 0.30 1.000 -  
 USER-DEFINED - 9.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 16.28  
 EFFECTIVE AREA(ACRES) = 68.00 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 68.0 PEAK FLOW RATE(CFS) = 104.97

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.34  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.006  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.934  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 3.88  
 EFFECTIVE AREA(ACRES) = 70.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 70.5 PEAK FLOW RATE(CFS) = 108.86

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 70.5 TC(MIN.) = 17.34  
 EFFECTIVE AREA(ACRES) = 70.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.967  
 PEAK FLOW RATE(CFS) = 108.86

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 2 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 25-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P201XX25.DAT  
TIME/DATE OF STUDY: 10:20 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.000; 4.060  
2) 6.000; 3.660  
3) 7.000; 3.350  
4) 8.000; 3.100  
5) 9.000; 2.900  
6) 10.000; 2.730  
7) 11.000; 2.580  
8) 12.000; 2.460  
9) 13.000; 2.350  
10) 14.000; 2.250  
11) 15.000; 2.160  
12) 20.000; 1.830  
13) 25.000; 1.610  
14) 30.000; 1.450  
15) 40.000; 1.230  
16) 50.000; 1.090  
17) 60.000; 0.980  
18) 90.000; 0.770  
19) 120.000; 0.660  
20) 180.000; 0.520  
\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20100.00 TO NODE 20101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 830.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.230  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.861  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.30	1.000	95	9.23
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.23

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.38  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20101.00 TO NODE 20102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 276.00 CHANNEL SLOPE = 0.2899  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.38  
FLOW VELOCITY(FEET/SEC.) = 5.38 FLOW DEPTH(FEET) = 0.29  
TRAVEL TIME(MIN.) = 0.86  $T_c$ (MIN.) = 10.09  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20102.00 = 595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20102.00 TO NODE 20102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN) = 10.09
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.717
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.80     0.30     1.000    -
USER-DEFINED        -         0.20     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.00    SUBAREA RUNOFF(CFS) = 2.18
EFFECTIVE AREA(ACRES) = 1.60    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6        PEAK FLOW RATE(CFS) = 3.48

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*****
FLOW PROCESS FROM NODE 20102.00 TO NODE 20103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.1863
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.48
FLOW VELOCITY(FEET/SEC.) = 5.80 FLOW DEPTH(FEET) = 0.45
TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 10.55
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20103.00 = 756.00 FEET.

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20103.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.55
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.648
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     1.000    -
USER-DEFINED        -         0.30     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90    SUBAREA RUNOFF(CFS) = 1.90
EFFECTIVE AREA(ACRES) = 2.50    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.5        PEAK FLOW RATE(CFS) = 5.28

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20104.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 690.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 64.00 CHANNEL SLOPE = 0.4688

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CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.28
FLOW VELOCITY(FEET/SEC.) = 8.88 FLOW DEPTH(FEET) = 0.45
TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 10.67
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20104.00 = 820.00 FEET.

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.67
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.630
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40     0.30     1.000    -
USER-DEFINED        -         3.30     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 7.97
EFFECTIVE AREA(ACRES) = 6.30    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.3        PEAK FLOW RATE(CFS) = 13.21

```

```

*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20105.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 690.00 DOWNSTREAM(FEET) = 670.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 159.00 CHANNEL SLOPE = 0.1258
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 13.21
FLOW VELOCITY(FEET/SEC.) = 6.91 FLOW DEPTH(FEET) = 0.80
TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 11.05
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20105.00 = 979.00 FEET.

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*****
FLOW PROCESS FROM NODE 20105.00 TO NODE 20105.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.05
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.574
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     1.000    -
USER-DEFINED        -         1.50     0.30     1.000    -
USER-DEFINED        -         2.20     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90    SUBAREA RUNOFF(CFS) = 7.98

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EFFECTIVE AREA(ACRES) = 10.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 10.2 PEAK FLOW RATE(CFS) = 20.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 20105.00 TO NODE 20106.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 670.00 DOWNSTREAM(FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 192.00 CHANNEL SLOPE = 0.1042  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 20.87  
FLOW VELOCITY(FEET/SEC.) = 7.23 FLOW DEPTH(FEET) = 0.98  
TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 11.49  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20106.00 = 1171.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 11.49  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.521  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.10 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 7.59  
EFFECTIVE AREA(ACRES) = 14.00 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 27.98

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 650.00 DOWNSTREAM(FEET) = 640.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 156.00 CHANNEL SLOPE = 0.0641  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 27.98  
FLOW VELOCITY(FEET/SEC.) = 6.47 FLOW DEPTH(FEET) = 1.20  
TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 11.90  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20107.00 = 1327.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 11.90  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.472

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.20 0.30 1.000 -  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 7.82  
EFFECTIVE AREA(ACRES) = 18.00 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 18.0 PEAK FLOW RATE(CFS) = 35.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 640.00 DOWNSTREAM(FEET) = 609.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 512.00 CHANNEL SLOPE = 0.0605  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 35.19  
FLOW VELOCITY(FEET/SEC.) = 6.71 FLOW DEPTH(FEET) = 1.32  
TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 13.17  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20108.00 = 1839.00 FEET.

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 13.17  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.333  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.200 -  
USER-DEFINED - 1.50 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 4.96  
EFFECTIVE AREA(ACRES) = 20.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.7 PEAK FLOW RATE(CFS) = 37.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<



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=====
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 600.00
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.42
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 37.90
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 13.37
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20109.00 = 2033.00 FEET.

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*****
FLOW PROCESS FROM NODE 20109.00 TO NODE 20109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 13.37
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.313
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.70    0.30    0.200  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.42
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 38.95

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*****
FLOW PROCESS FROM NODE 20109.00 TO NODE 20110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 594.00
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.30
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 38.95
PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 13.90
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20110.00 = 2393.00 FEET.

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*****
FLOW PROCESS FROM NODE 20110.00 TO NODE 20110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 13.90
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.260
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.30    0.30    0.100  -
USER-DEFINED         -        3.50    0.30    0.200  -
USER-DEFINED         -        2.70    0.30    1.000  -
USER-DEFINED         -        0.20    0.30    1.000  -
USER-DEFINED         -        1.20    0.30    1.000  -

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USER-DEFINED         -        0.30    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 15.30
EFFECTIVE AREA(ACRES) = 29.60 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 29.6 PEAK FLOW RATE(CFS) = 53.23

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*****
FLOW PROCESS FROM NODE 20110.00 TO NODE 20111.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 594.00 DOWNSTREAM(FEET) = 590.00
FLOW LENGTH(FEET) = 246.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.05
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 53.23
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 14.24
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20111.00 = 2639.00 FEET.

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*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 14.24
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.229
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN

```

```

USER-DEFINED         -        0.70    0.30    0.100  -
USER-DEFINED         -        2.10    0.30    0.200  -
USER-DEFINED         -        2.10    0.30    1.000  -
USER-DEFINED         -        0.60    0.30    1.000  -
USER-DEFINED         -        4.70    0.30    1.000  -
USER-DEFINED         -        0.90    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.792
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 19.89
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 72.28

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*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20112.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 580.00
FLOW LENGTH(FEET) = 628.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.79
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 72.28

```

PIPE TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 15.06  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20112.00 = 3267.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN) = 15.06  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.156  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.90 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.200 -  
USER-DEFINED - 4.40 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 7.50 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.797  
SUBAREA AREA(ACRES) = 15.20 SUBAREA RUNOFF(CFS) = 26.23  
EFFECTIVE AREA(ACRES) = 55.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 55.9 PEAK FLOW RATE(CFS) = 95.86

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN) = 15.06  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.156  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 0.100 -  
USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 0.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.04  
EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 99.90

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20112.00 TO NODE 20113.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 580.00 DOWNSTREAM(FEET) = 570.00  
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.87  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 99.90  
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 15.64  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20113.00 = 3786.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN) = 15.64  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.118  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.00 0.30 0.100 -  
USER-DEFINED - 4.30 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 1.80 0.30 1.000 -  
USER-DEFINED - 4.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.877  
SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 21.03  
EFFECTIVE AREA(ACRES) = 70.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 118.92

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN) = 15.64  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.118  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 1.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.787  
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 6.10  
EFFECTIVE AREA(ACRES) = 74.50 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 74.5 PEAK FLOW RATE(CFS) = 125.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20113.00 TO NODE 20114.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00  
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 36.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.52

ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 125.01  
PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 16.51  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20114.00 = 4393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.51  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.060  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.30 0.100 -  
USER-DEFINED - 4.00 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 0.50 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.747  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 13.05  
EFFECTIVE AREA(ACRES) = 82.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 82.4 PEAK FLOW RATE(CFS) = 134.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.51  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.060  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 1.000 -  
USER-DEFINED - 8.20 0.30 1.000 -  
USER-DEFINED - 3.20 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 3.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.932  
SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 28.04  
EFFECTIVE AREA(ACRES) = 99.90 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 99.9 PEAK FLOW RATE(CFS) = 162.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20115.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 560.00  
FLOW LENGTH(FEET) = 461.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.40  
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 162.22  
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 17.09  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20115.00 = 4854.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.09  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.022  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.60 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 0.100 -  
USER-DEFINED - 6.20 0.30 0.850 -  
USER-DEFINED - 2.20 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798  
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 20.54  
EFFECTIVE AREA(ACRES) = 112.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 112.7 PEAK FLOW RATE(CFS) = 179.36

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.09  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.022  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.09  
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 180.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20116.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 560.00 DOWNSTREAM(FEET) = 528.00  
FLOW LENGTH(FEET) = 219.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 36.71

ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 180.44  
 PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 17.19  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20116.00 = 5073.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20116.00 TO NODE 20117.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 489.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 174.00 CHANNEL SLOPE = 0.2241  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 180.44  
 FLOW VELOCITY(FEET/SEC.) = 20.48 FLOW DEPTH(FEET) = 1.71  
 TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 17.33  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20117.00 = 5247.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.33  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.006  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.910  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 3.90  
 EFFECTIVE AREA(ACRES) = 115.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 115.9 PEAK FLOW RATE(CFS) = 182.72

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.33  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.006  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.200	-
USER-DEFINED	-	3.30	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	6.50	0.30	1.000	-

USER-DEFINED - 0.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.855  
 SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 20.16  
 EFFECTIVE AREA(ACRES) = 128.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 128.7 PEAK FLOW RATE(CFS) = 202.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.33  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.006  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 7.86  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 133.8 PEAK FLOW RATE(CFS) = 210.74

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 133.8 TC(MIN.) = 17.33  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.854  
 PEAK FLOW RATE(CFS) = 210.74

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S31 \*  
\* Rational Method Hydrology Analysis - 25-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S31.DAT  
TIME/DATE OF STUDY: 16:09 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.080
- 2) 10.00; 2.729
- 3) 15.00; 2.163
- 4) 20.00; 1.834
- 5) 25.00; 1.614
- 6) 30.00; 1.440
- 7) 40.00; 1.233
- 8) 50.00; 1.085
- 9) 60.00; 0.950
- 10) 90.00; 0.775
- 11) 120.00; 0.657
- 12) 180.00; 0.530
- 13) 360.00; 0.367
- 14) 1440.00; 0.153

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13100.00 TO NODE 13101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.58  
ELEVATION DATA: UPSTREAM(FEET) = 1069.66 DOWNSTREAM(FEET) = 969.92

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.312  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.185  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.94	0.30	1.000	0	8.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.44  
TOTAL AREA(ACRES) = 0.94 PEAK FLOW RATE(CFS) = 2.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13101.00 TO NODE 13102.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 969.92 DOWNSTREAM(FEET) = 807.20  
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.89 CHANNEL SLOPE = 0.2444  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.25  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.639  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.67	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.47  
AVERAGE FLOW DEPTH(FEET) = 0.23 TRAVEL TIME(MIN.) = 2.48  
Tc(MIN.) = 10.79  
SUBAREA AREA(ACRES) = 7.67 SUBAREA RUNOFF(CFS) = 16.15  
EFFECTIVE AREA(ACRES) = 8.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 18.13  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.32

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 5.40  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13102.00 = 948.47 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13102.00 TO NODE 13103.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	807.20	DOWNSTREAM(FEET) =	769.94
CHANNEL LENGTH THRU SUBAREA(FEET) =	691.01	CHANNEL SLOPE =	0.0539
GIVEN CHANNEL BASE(FEET) =	10.00	CHANNEL FREEBOARD(FEET) =	0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.78  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.336

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	20.65	0.30	0.999	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.12  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.30  
AVERAGE FLOW DEPTH(FEET) = 0.75 TRAVEL TIME(MIN.) = 2.68  
Tc(MIN.) = 13.47

SUBAREA AREA(ACRES) =	20.65	SUBAREA RUNOFF(CFS) =	37.85
EFFECTIVE AREA(ACRES) =	29.26	AREA-AVERAGED Fm(INCH/HR) =	0.30
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	1.00
TOTAL AREA(ACRES) =	29.3	PEAK FLOW RATE(CFS) =	53.63

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.93 FLOW VELOCITY(FEET/SEC.) = 4.87  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13103.00 = 1639.48 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	769.94	DOWNSTREAM(FEET) =	693.88
FLOW LENGTH(FEET) =	1563.10	MANNING'S N =	0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO	36.000		
DEPTH OF FLOW IN 36.0 INCH PIPE IS	15.5 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	18.45		
ESTIMATED PIPE DIAMETER(INCH) =	36.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	53.63		
PIPE TRAVEL TIME(MIN.) =	1.41	Tc(MIN.) =	14.88
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13104.00 =	3202.58 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.88  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.176

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	28.00	0.30	0.750	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750  
SUBAREA AREA(ACRES) = 28.00 SUBAREA RUNOFF(CFS) = 49.18  
EFFECTIVE AREA(ACRES) = 57.26 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 57.3 PEAK FLOW RATE(CFS) = 98.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	693.88	DOWNSTREAM(FEET) =	645.69
FLOW LENGTH(FEET) =	1068.98	MANNING'S N =	0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO	36.000		
DEPTH OF FLOW IN 36.0 INCH PIPE IS	22.9 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	20.77		
ESTIMATED PIPE DIAMETER(INCH) =	36.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	98.59		
PIPE TRAVEL TIME(MIN.) =	0.86	Tc(MIN.) =	15.74
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13105.00 =	4271.56 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.74  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.114

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	35.28	0.30	0.867	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867  
SUBAREA AREA(ACRES) = 35.28 SUBAREA RUNOFF(CFS) = 58.88  
EFFECTIVE AREA(ACRES) = 92.54 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 154.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	645.69	DOWNSTREAM(FEET) =	608.48
FLOW LENGTH(FEET) =	1127.55	MANNING'S N =	0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS	30.9 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	20.36		
ESTIMATED PIPE DIAMETER(INCH) =	42.00	NUMBER OF PIPES =	1

PIPE-FLOW(CFS) = 154.28  
PIPE TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 16.66  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.66  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.054  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 37.68 0.30 0.889 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.889  
SUBAREA AREA(ACRES) = 37.68 SUBAREA RUNOFF(CFS) = 60.60  
EFFECTIVE AREA(ACRES) = 130.22 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 130.2 PEAK FLOW RATE(CFS) = 209.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 15.1

>>>>DEFINE MEMORY BANK # 2 <<<<<

PEAK FLOWRATE TABLE FILE NAME: S30.DNA  
MEMORY BANK # 2 DEFINED AS FOLLOWS:  
STREAM Q Tc Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (ACRES) NODE  
1 1841.40 38.39 0.30( 0.24) 0.81 1996.2 13000.00  
2 1786.54 40.48 0.30( 0.24) 0.81 2016.1 13010.00  
TOTAL AREA(ACRES) = 2016.1

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 14.0

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<<

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1841.40	38.39	0.30( 0.24)	0.81	1996.2	13000.00
2	1786.54	40.48	0.30( 0.24)	0.81	2016.1	13010.00
TOTAL AREA(ACRES) = 2016.1						

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13026.00 TO NODE 13106.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 662.66 DOWNSTREAM(FEET) = 608.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 3098.88 CHANNEL SLOPE = 0.0175  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.76  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.191

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	75.28	0.30	0.755	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1874.09  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.67  
AVERAGE FLOW DEPTH(FEET) = 2.76 TRAVEL TIME(MIN.) = 4.43  
Tc(MIN.) = 42.81  
SUBAREA AREA(ACRES) = 75.28 SUBAREA RUNOFF(CFS) = 65.38  
EFFECTIVE AREA(ACRES) = 2071.52 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 2091.4 PEAK FLOW RATE(CFS) = 1841.40

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.73 FLOW VELOCITY(FEET/SEC.) = 11.61

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1841.40	42.81	1.191	0.30( 0.24)	0.80	2071.5	13000.00
2	1786.54	44.94	1.160	0.30( 0.24)	0.80	2091.4	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1841.40 Tc(MIN.) = 42.81

AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA(ACRES) = 2071.52

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1841.40	42.81	1.191	0.30( 0.24)	0.80	2071.5	13000.00
2	1786.54	44.94	1.160	0.30( 0.24)	0.80	2091.4	13010.00

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	209.83	16.66	2.054	0.30( 0.26)	0.88	130.2	13100.00



LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1576.75	16.66	2.054	0.30 ( 0.24)	0.81	936.5	13100.00
2	1950.17	42.81	1.191	0.30 ( 0.24)	0.81	2201.7	13000.00
3	1891.62	44.94	1.160	0.30 ( 0.24)	0.81	2221.6	13010.00
TOTAL AREA (ACRES) =							2221.6

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1950.17 Tc(MIN.) = 42.814  
EFFECTIVE AREA(ACRES) = 2201.74 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 2221.6  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13106.00 TO NODE 13107.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 608.48 DOWNSTREAM(FEET) = 584.29  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1650.20 CHANNEL SLOPE = 0.0147  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.04  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.156

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	190.45	0.30	0.755	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.755

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2029.80

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.32

AVERAGE FLOW DEPTH(FEET) = 3.03 TRAVEL TIME(MIN.) = 2.43

Tc(MIN.) = 45.24

SUBAREA AREA(ACRES) = 190.45 SUBAREA RUNOFF(CFS) = 159.25

EFFECTIVE AREA(ACRES) = 2392.19 AREA-AVERAGED Fm(INCH/HR) = 0.24

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80

TOTAL AREA(ACRES) = 2412.1 PEAK FLOW RATE(CFS) = 1968.75

GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.98 FLOW VELOCITY(FEET/SEC.) = 11.21

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13107.00 = 20924.84 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1667.01	19.23	1.885	0.30 ( 0.24)	0.80	1126.9	13100.00
2	1968.75	45.24	1.156	0.30 ( 0.24)	0.80	2392.2	13000.00
3	1916.07	47.40	1.124	0.30 ( 0.24)	0.80	2412.1	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1968.75 Tc(MIN.) = 45.24  
AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA(ACRES) = 2392.19

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13107.00 TO NODE 13108.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 584.29 DOWNSTREAM(FEET) = 563.78  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1061.67 CHANNEL SLOPE = 0.0193  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.86

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.135

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	314.12	0.30	0.939	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.939

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2089.32

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.52

AVERAGE FLOW DEPTH(FEET) = 2.85 TRAVEL TIME(MIN.) = 1.41

Tc(MIN.) = 46.66

SUBAREA AREA(ACRES) = 314.12 SUBAREA RUNOFF(CFS) = 241.14

EFFECTIVE AREA(ACRES) = 2706.31 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82

TOTAL AREA(ACRES) = 2726.2 PEAK FLOW RATE(CFS) = 2164.85

GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.91 FLOW VELOCITY(FEET/SEC.) = 12.67

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13108.00 = 21986.51 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2015.05	20.70	1.804	0.30 ( 0.25)	0.83	1441.1	13100.00
2	2164.85	46.66	1.135	0.30 ( 0.25)	0.82	2706.3	13000.00
3	2102.29	48.83	1.102	0.30 ( 0.25)	0.82	2726.2	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 2164.85 Tc(MIN.) = 46.66

AREA-AVERAGED Fm(INCH/HR) = 0.25 AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA(ACRES) = 2706.31

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13108.00 TO NODE 13109.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 563.78 DOWNSTREAM(FEET) = 541.61  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1657.28 CHANNEL SLOPE = 0.0134  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.30  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.099  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 203.63 0.30 0.785 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2243.94  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.35  
 AVERAGE FLOW DEPTH(FEET) = 3.30 TRAVEL TIME(MIN.) = 2.43  
 Tc(MIN.) = 49.09  
 SUBAREA AREA(ACRES) = 203.63 SUBAREA RUNOFF(CFS) = 158.18  
 EFFECTIVE AREA(ACRES) = 2909.94 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA(ACRES) = 2929.8 PEAK FLOW RATE(CFS) = 2235.30  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.29 FLOW VELOCITY(FEET/SEC.) = 11.34  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13109.00 = 23643.79 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 2141.68 23.16 1.695 0.30( 0.25) 0.83 1644.7 13100.00  
 2 2235.30 49.09 1.099 0.30( 0.25) 0.82 2909.9 13000.00  
 3 2169.63 51.28 1.068 0.30( 0.24) 0.82 2929.8 13010.00  
 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 2235.30 Tc(MIN.) = 49.09  
 AREA-AVERAGED Fm(INCH/HR) = 0.25 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA(ACRES) = 2909.94

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13109.00 TO NODE 13110.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 541.61 DOWNSTREAM(FEET) = 509.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2016.96 CHANNEL SLOPE = 0.0157  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.23  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.060  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 283.06 0.30 0.791 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.791  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2340.10  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.14  
 AVERAGE FLOW DEPTH(FEET) = 3.23 TRAVEL TIME(MIN.) = 2.77  
 Tc(MIN.) = 51.86

SUBAREA AREA(ACRES) = 283.06 SUBAREA RUNOFF(CFS) = 209.59  
 EFFECTIVE AREA(ACRES) = 3193.00 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3212.9 PEAK FLOW RATE(CFS) = 2343.81  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.23 FLOW VELOCITY(FEET/SEC.) = 12.15  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13110.00 = 25660.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 2315.78 25.94 1.581 0.30( 0.25) 0.82 1927.8 13100.00  
 2 2343.81 51.86 1.060 0.30( 0.24) 0.81 3193.0 13000.00  
 3 2272.06 54.08 1.030 0.30( 0.24) 0.81 3212.9 13010.00  
 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 2343.81 Tc(MIN.) = 51.86  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3193.00

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13110.00 TO NODE 13111.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 509.94 DOWNSTREAM(FEET) = 461.07  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 3058.95 CHANNEL SLOPE = 0.0160  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.29  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.004  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 248.05 0.30 0.783 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2429.71  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.36  
 AVERAGE FLOW DEPTH(FEET) = 3.28 TRAVEL TIME(MIN.) = 4.12  
 Tc(MIN.) = 55.98  
 SUBAREA AREA(ACRES) = 248.05 SUBAREA RUNOFF(CFS) = 171.77  
 EFFECTIVE AREA(ACRES) = 3441.05 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3460.9 PEAK FLOW RATE(CFS) = 2355.48  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.22 FLOW VELOCITY(FEET/SEC.) = 12.24  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13111.00 = 28719.70 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2337.39	30.06	1.439	0.30( 0.25)	0.82	2175.8	13100.00
2	2355.48	55.98	1.004	0.30( 0.24)	0.81	3441.0	13000.00
3	2274.25	58.24	0.974	0.30( 0.24)	0.81	3460.9	13010.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 2355.48 Tc(MIN.) = 55.98  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3441.05

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13111.00 TO NODE 13112.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 461.07 DOWNSTREAM(FEET) = 452.77  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1781.78 CHANNEL SLOPE = 0.0047  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.64  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 0.955  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	179.91	0.30	0.694	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.694  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2415.95  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.14  
 AVERAGE FLOW DEPTH(FEET) = 4.64 TRAVEL TIME(MIN.) = 3.65  
 Tc(MIN.) = 59.63

SUBAREA AREA(ACRES) = 179.91 SUBAREA RUNOFF(CFS) = 120.93  
 EFFECTIVE AREA(ACRES) = 3620.96 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3640.9 PEAK FLOW RATE(CFS) = 2355.48  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 4.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 4.57 FLOW VELOCITY(FEET/SEC.) = 8.08  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13112.00 = 30501.48 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2377.04	33.69	1.364	0.30( 0.24)	0.81	2355.7	13100.00
2	2355.48	59.63	0.955	0.30( 0.24)	0.81	3621.0	13000.00
3	2283.49	61.93	0.939	0.30( 0.24)	0.81	3640.9	13010.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 2377.04 Tc(MIN.) = 33.69  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 2355.71

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13112.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 452.77 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1625.01 CHANNEL SLOPE = 0.0155  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.33  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.318

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	155.96	0.30	0.836	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.836  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2451.94  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.30  
 AVERAGE FLOW DEPTH(FEET) = 3.32 TRAVEL TIME(MIN.) = 2.20  
 Tc(MIN.) = 35.90

SUBAREA AREA(ACRES) = 155.96 SUBAREA RUNOFF(CFS) = 149.81  
 EFFECTIVE AREA(ACRES) = 2511.67 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3796.8 PEAK FLOW RATE(CFS) = 2430.28

GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.31 FLOW VELOCITY(FEET/SEC.) = 12.26  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13222.00 = 32126.49 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2430.28	35.90	1.318	0.30( 0.24)	0.81	2511.7	13100.00
2	2369.04	61.85	0.939	0.30( 0.24)	0.81	3776.9	13000.00
3	2335.36	64.17	0.926	0.30( 0.24)	0.81	3796.8	13010.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 2430.28 Tc(MIN.) = 35.90  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 2511.67

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 3796.8 TC(MIN.) = 35.90  
 EFFECTIVE AREA(ACRES) = 2511.67 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.810  
 PEAK FLOW RATE(CFS) = 2430.28

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2430.28	35.90	1.318	0.30( 0.24)	0.81	2511.7	13100.00
2	2369.04	61.85	0.939	0.30( 0.24)	0.81	3776.9	13000.00
3	2335.36	64.17	0.926	0.30( 0.24)	0.81	3796.8	13010.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S32 \*  
\* Rational Method Hydrology Analysis - 25-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S32.DAT  
TIME/DATE OF STUDY: 16:09 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.080
- 2) 10.00; 2.729
- 3) 15.00; 2.163
- 4) 20.00; 1.834
- 5) 25.00; 1.614
- 6) 30.00; 1.440
- 7) 40.00; 1.233
- 8) 50.00; 1.085
- 9) 60.00; 0.950
- 10) 90.00; 0.775
- 11) 120.00; 0.657
- 12) 180.00; 0.530
- 13) 360.00; 0.367
- 14) 1440.00; 0.153

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13200.00 TO NODE 13201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 298.57  
ELEVATION DATA: UPSTREAM(FEET) = 1069.04 DOWNSTREAM(FEET) = 1005.76

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.888  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.67	0.30	1.000	0	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.56  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 1.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13201.00 TO NODE 13202.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.76 DOWNSTREAM(FEET) = 896.98  
CHANNEL LENGTH THRU SUBAREA(FEET) = 747.55 CHANNEL SLOPE = 0.1455  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.26  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.396  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.62  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.52  
AVERAGE FLOW DEPTH(FEET) = 0.23 TRAVEL TIME(MIN.) = 3.53  
Tc(MIN.) = 12.94  
SUBAREA AREA(ACRES) = 7.42 SUBAREA RUNOFF(CFS) = 14.00  
EFFECTIVE AREA(ACRES) = 8.09 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.1 PEAK FLOW RATE(CFS) = 15.26  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.33 FLOW VELOCITY(FEET/SEC.) = 4.30  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13202.00 = 1046.12 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 896.98 DOWNSTREAM(FEET) = 840.27  
FLOW LENGTH(FEET) = 1789.59 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 9.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.13  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 15.26  
PIPE TRAVEL TIME(MIN.) = 2.68 Tc(MIN.) = 15.62  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13203.00 = 2835.71 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.62  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.122  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.89 0.30 0.731 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.731  
SUBAREA AREA(ACRES) = 38.89 SUBAREA RUNOFF(CFS) = 66.60  
EFFECTIVE AREA(ACRES) = 46.98 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
TOTAL AREA(ACRES) = 47.0 PEAK FLOW RATE(CFS) = 79.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 840.27 DOWNSTREAM(FEET) = 782.97  
FLOW LENGTH(FEET) = 992.54 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 18.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.77  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 79.87  
PIPE TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 16.38  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13204.00 = 3828.25 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.38  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.072  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 83.09 0.30 0.645 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645  
SUBAREA AREA(ACRES) = 83.09 SUBAREA RUNOFF(CFS) = 140.49  
EFFECTIVE AREA(ACRES) = 130.07 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 130.1 PEAK FLOW RATE(CFS) = 218.24

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 782.97 DOWNSTREAM(FEET) = 692.52  
FLOW LENGTH(FEET) = 2046.57 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.73  
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 218.24  
PIPE TRAVEL TIME(MIN.) = 1.38 Tc(MIN.) = 17.76  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13205.00 = 5874.82 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.76  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.981  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 88.51 0.30 0.679 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.679  
SUBAREA AREA(ACRES) = 88.51 SUBAREA RUNOFF(CFS) = 141.62  
EFFECTIVE AREA(ACRES) = 218.58 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 218.6 PEAK FLOW RATE(CFS) = 349.24

\*\*\*\*\*

FLOW PROCESS FROM NODE 13205.00 TO NODE 13206.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 692.52 DOWNSTREAM(FEET) = 605.24  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2704.69 CHANNEL SLOPE = 0.0323  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.89  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.742

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	163.73	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 458.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.41  
AVERAGE FLOW DEPTH(FEET) = 2.82 TRAVEL TIME(MIN.) = 4.33  
Tc(MIN.) = 22.09  
SUBAREA AREA(ACRES) = 163.73 SUBAREA RUNOFF(CFS) = 218.81  
EFFECTIVE AREA(ACRES) = 382.31 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 382.3 PEAK FLOW RATE(CFS) = 521.00  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.01 FLOW VELOCITY(FEET/SEC.) = 10.80  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13206.00 = 8579.51 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13206.00 TO NODE 13207.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 604.78  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.47  
AVERAGE FLOW DEPTH(FEET) = 3.68 TRAVEL TIME(MIN.) = 4.37  
Tc(MIN.) = 26.46  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 167.41  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 626.89  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.74

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 604.78  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.47  
AVERAGE FLOW DEPTH(FEET) = 3.68 TRAVEL TIME(MIN.) = 4.37  
Tc(MIN.) = 26.46  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 167.41  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 626.89  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.74 FLOW VELOCITY(FEET/SEC.) = 9.58  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13207.00 = 11058.66 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 694.52  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.20  
AVERAGE FLOW DEPTH(FEET) = 3.60 TRAVEL TIME(MIN.) = 2.58  
Tc(MIN.) = 29.04  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 135.24  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 719.57  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.67

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 694.52  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.20  
AVERAGE FLOW DEPTH(FEET) = 3.60 TRAVEL TIME(MIN.) = 2.58  
Tc(MIN.) = 29.04  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 135.24  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 719.57  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.67

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.67 FLOW VELOCITY(FEET/SEC.) = 11.32  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 29.04  
RAINFALL INTENSITY(INCH/HR) = 1.47  
AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.81  
EFFECTIVE STREAM AREA(ACRES) = 649.28  
TOTAL STREAM AREA(ACRES) = 649.28  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 719.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13210.00 TO NODE 13211.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.51  
ELEVATION DATA: UPSTREAM(FEET) = 949.80 DOWNSTREAM(FEET) = 828.64

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.525  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.127  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 NATURAL FAIR COVER  
 "OPEN BRUSH" - 1.96 0.30 1.000 0 8.53  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 4.99  
 TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 4.99

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13211.00 TO NODE 13212.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 828.64 DOWNSTREAM(FEET) = 767.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 652.49 CHANNEL SLOPE = 0.0930  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.45  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.582

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 11.95 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.35  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.92  
 AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 2.77  
 Tc(MIN.) = 11.30

SUBAREA AREA(ACRES) = 11.95 SUBAREA RUNOFF(CFS) = 24.54  
 EFFECTIVE AREA(ACRES) = 13.91 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 28.57  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.55 FLOW VELOCITY(FEET/SEC.) = 4.71  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13212.00 = 967.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13212.00 TO NODE 13213.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 767.94 DOWNSTREAM(FEET) = 706.43  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 967.91 CHANNEL SLOPE = 0.0635  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.91  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.223

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 27.07 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 52.11  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.08  
 AVERAGE FLOW DEPTH(FEET) = 0.87 TRAVEL TIME(MIN.) = 3.17  
 Tc(MIN.) = 14.47  
 SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 46.85  
 EFFECTIVE AREA(ACRES) = 40.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 41.0 PEAK FLOW RATE(CFS) = 70.92  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.04 FLOW VELOCITY(FEET/SEC.) = 5.64  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13213.00 = 1934.91 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13213.00 TO NODE 13214.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 706.43 DOWNSTREAM(FEET) = 659.31  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 948.11 CHANNEL SLOPE = 0.0497  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.25  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.009

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 18.09 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 84.84  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.49  
 AVERAGE FLOW DEPTH(FEET) = 1.24 TRAVEL TIME(MIN.) = 2.88  
 Tc(MIN.) = 17.35

SUBAREA AREA(ACRES) = 18.09 SUBAREA RUNOFF(CFS) = 27.82  
 EFFECTIVE AREA(ACRES) = 59.07 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 90.83  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.29 FLOW VELOCITY(FEET/SEC.) = 5.62  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13214.00 = 2883.02 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13214.00 TO NODE 13215.00 IS CODE = 56



-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 659.31 DOWNSTREAM(FEET) = 628.91  
CHANNEL LENGTH THRU SUBAREA(FEET) = 970.24 CHANNEL SLOPE = 0.0313  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.90

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.821

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	71.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 139.77

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.46

AVERAGE FLOW DEPTH(FEET) = 1.86 TRAVEL TIME(MIN.) = 2.96

Tc(MIN.) = 20.31

SUBAREA AREA(ACRES) = 71.42 SUBAREA RUNOFF(CFS) = 97.75

EFFECTIVE AREA(ACRES) = 130.49 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 130.5 PEAK FLOW RATE(CFS) = 178.59

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.13 FLOW VELOCITY(FEET/SEC.) = 5.87

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13215.00 = 3853.26 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13215.00 TO NODE 13216.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 628.91 DOWNSTREAM(FEET) = 598.39  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.63 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.25

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.712

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	36.33	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 201.67

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.22

AVERAGE FLOW DEPTH(FEET) = 2.24 TRAVEL TIME(MIN.) = 2.47

Tc(MIN.) = 22.79

SUBAREA AREA(ACRES) = 36.33 SUBAREA RUNOFF(CFS) = 46.16

EFFECTIVE AREA(ACRES) = 166.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 166.8 PEAK FLOW RATE(CFS) = 211.96

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.30 FLOW VELOCITY(FEET/SEC.) = 6.31

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13216.00 = 4775.89 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13216.00 TO NODE 13217.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 598.39 DOWNSTREAM(FEET) = 568.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.40 CHANNEL SLOPE = 0.0470  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.23

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.649

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	42.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 237.76

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.40

AVERAGE FLOW DEPTH(FEET) = 2.22 TRAVEL TIME(MIN.) = 1.43

Tc(MIN.) = 24.22

SUBAREA AREA(ACRES) = 42.51 SUBAREA RUNOFF(CFS) = 51.60

EFFECTIVE AREA(ACRES) = 209.33 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 209.3 PEAK FLOW RATE(CFS) = 254.07

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.31 FLOW VELOCITY(FEET/SEC.) = 7.53

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13217.00 = 5412.29 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 568.48 DOWNSTREAM(FEET) = 505.65  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1896.50 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.76

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.483

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	73.24	0.30	0.951	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.951  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 293.55  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 6.93  
 AVERAGE FLOW DEPTH( FEET) = 2.74 TRAVEL TIME( MIN.) = 4.56  
 Tc( MIN.) = 28.78  
 SUBAREA AREA( ACRES) = 73.24 SUBAREA RUNOFF( CFS) = 78.92  
 EFFECTIVE AREA( ACRES) = 282.57 AREA-AVERAGED Fm( INCH/HR) = 0.30  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA( ACRES) = 282.6 PEAK FLOW RATE( CFS) = 301.72  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 2.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 2.78 FLOW VELOCITY( FEET/SEC.) = 6.98  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13220.00 = 7308.79 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION( MIN.) = 28.78  
 RAINFALL INTENSITY( INCH/HR) = 1.48  
 AREA-AVERAGED Fm( INCH/HR) = 0.30  
 AREA-AVERAGED Fp( INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.99  
 EFFECTIVE STREAM AREA( ACRES) = 282.57  
 TOTAL STREAM AREA( ACRES) = 282.57  
 PEAK FLOW RATE( CFS) AT CONFLUENCE = 301.72

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	719.57	29.04	1.473	0.30( 0.24)	0.81	649.3	13200.00
2	301.72	28.78	1.483	0.30( 0.30)	0.99	282.6	13210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1020.09	28.78	1.483	0.30( 0.26)	0.86	926.0	13210.00
2	1018.98	29.04	1.473	0.30( 0.26)	0.86	931.8	13200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE( CFS) = 1020.09 Tc( MIN.) = 28.78  
 EFFECTIVE AREA( ACRES) = 926.04 AREA-AVERAGED Fm( INCH/HR) = 0.26  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA( ACRES) = 931.8  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13220.00 TO NODE 13221.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM( FEET) = 505.65 DOWNSTREAM( FEET) = 478.94  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 1949.14 CHANNEL SLOPE = 0.0137  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 4.69  
 \* 25 YEAR RAINFALL INTENSITY( INCH/HR) = 1.409

SUBAREA LOSS RATE DATA( AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 108.50 0.30 0.637 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp( INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.637  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW( CFS) = 1079.54  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 11.88  
 AVERAGE FLOW DEPTH( FEET) = 4.69 TRAVEL TIME( MIN.) = 2.73  
 Tc( MIN.) = 31.51

SUBAREA AREA( ACRES) = 108.50 SUBAREA RUNOFF( CFS) = 118.90  
 EFFECTIVE AREA( ACRES) = 1034.54 AREA-AVERAGED Fm( INCH/HR) = 0.25  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA( ACRES) = 1040.3 PEAK FLOW RATE( CFS) = 1077.44  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 4.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 4.68 FLOW VELOCITY( FEET/SEC.) = 11.89  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13221.00 = 14742.35 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1077.44	31.51	1.409	0.30( 0.25)	0.84	1034.5	13210.00
2	1078.47	31.78	1.403	0.30( 0.25)	0.84	1040.3	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE( CFS) = 1078.47 Tc( MIN.) = 31.78  
 AREA-AVERAGED Fm( INCH/HR) = 0.25 AREA-AVERAGED Fp( INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.84 EFFECTIVE AREA( ACRES) = 1040.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13221.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM( FEET) = 478.94 DOWNSTREAM( FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 2078.70 CHANNEL SLOPE = 0.0247  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 4.13  
 \* 25 YEAR RAINFALL INTENSITY( INCH/HR) = 1.355

SUBAREA LOSS RATE DATA( AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 87.26 0.30 0.699 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$  (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.699  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1123.45  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 14.93  
 AVERAGE FLOW DEPTH (FEET) = 4.12 TRAVEL TIME (MIN.) = 2.32  
 $T_c$  (MIN.) = 34.10  
 SUBAREA AREA (ACRES) = 87.26 SUBAREA RUNOFF (CFS) = 89.97  
 EFFECTIVE AREA (ACRES) = 1127.61 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.25  
 AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.83  
 TOTAL AREA (ACRES) = 1127.6 PEAK FLOW RATE (CFS) = 1123.47  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 4.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 4.12 FLOW VELOCITY (FEET/SEC.) = 14.93  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13222.00 = 16821.05 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	$T_c$ (MIN.)	Intensity (INCH/HR)	$F_p$ ( $F_m$ ) (INCH/HR)	$A_p$	$A_e$ (ACRES)	HEADWATER NODE
1	1123.08	33.84	1.361	0.30 (0.25)	0.83	1121.8	13210.00
2	1123.47	34.10	1.355	0.30 (0.25)	0.83	1127.6	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1123.47  $T_c$  (MIN.) = 34.10  
 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.25 AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30  
 AREA-AVERAGED  $A_p$  = 0.83 EFFECTIVE AREA (ACRES) = 1127.61

=====  
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1127.6  $T_c$  (MIN.) = 34.10  
 EFFECTIVE AREA (ACRES) = 1127.61 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.25  
 AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.828  
 PEAK FLOW RATE (CFS) = 1123.47

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	$T_c$ (MIN.)	Intensity (INCH/HR)	$F_p$ ( $F_m$ ) (INCH/HR)	$A_p$	$A_e$ (ACRES)	HEADWATER NODE
1	1123.08	33.84	1.361	0.30 (0.25)	0.83	1121.8	13210.00
2	1123.47	34.10	1.355	0.30 (0.25)	0.83	1127.6	13200.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S35 \*  
\* Rational Method Hydrology Analysis - 25-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S35.DAT  
TIME/DATE OF STUDY: 16:10 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.080
- 2) 10.00; 2.729
- 3) 15.00; 2.163
- 4) 20.00; 1.834
- 5) 25.00; 1.614
- 6) 30.00; 1.440
- 7) 40.00; 1.233
- 8) 50.00; 1.085
- 9) 60.00; 0.950
- 10) 90.00; 0.775
- 11) 120.00; 0.657
- 12) 180.00; 0.530
- 13) 360.00; 0.367
- 14) 1440.00; 0.153

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.00 TO NODE 13500.50 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 548.43  
ELEVATION DATA: UPSTREAM(FEET) = 1183.47 DOWNSTREAM(FEET) = 1065.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.508  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	5.11	0.30	1.000	0	11.96

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 10.15  
TOTAL AREA(ACRES) = 5.11 PEAK FLOW RATE(CFS) = 10.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.50 TO NODE 13501.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1033.15  
CHANNEL LENGTH THRU SUBAREA(FEET) = 431.71 CHANNEL SLOPE = 0.0738  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.46  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.288  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.87	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.10  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.71  
AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 1.94  
Tc(MIN.) = 13.89  
SUBAREA AREA(ACRES) = 8.87 SUBAREA RUNOFF(CFS) = 15.87  
EFFECTIVE AREA(ACRES) = 13.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 25.02  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.54 FLOW VELOCITY(FEET/SEC.) = 4.14  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13501.00 = 980.14 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13501.00 TO NODE 13502.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1033.15 DOWNSTREAM(FEET) = 990.26  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.63 CHANNEL SLOPE = 0.0452  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.83

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.981

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.82	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.78  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.08

AVERAGE FLOW DEPTH(FEET) = 0.80 TRAVEL TIME(MIN.) = 3.87  
Tc(MIN.) = 17.77

SUBAREA AREA(ACRES) = 16.82 SUBAREA RUNOFF(CFS) = 25.45  
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 46.61  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.90 FLOW VELOCITY(FEET/SEC.) = 4.37

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13502.00 = 1928.77 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13502.00 TO NODE 13503.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.26 DOWNSTREAM(FEET) = 956.06  
CHANNEL LENGTH THRU SUBAREA(FEET) = 940.98 CHANNEL SLOPE = 0.0363  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.32

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.789

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	46.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 77.48  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.80

AVERAGE FLOW DEPTH(FEET) = 1.28 TRAVEL TIME(MIN.) = 3.27

Tc(MIN.) = 21.03

SUBAREA AREA(ACRES) = 46.02 SUBAREA RUNOFF(CFS) = 61.67

EFFECTIVE AREA(ACRES) = 76.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 76.8 PEAK FLOW RATE(CFS) = 102.94

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.51 FLOW VELOCITY(FEET/SEC.) = 5.25

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13503.00 = 2869.75 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13503.00 TO NODE 13504.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 956.06 DOWNSTREAM(FEET) = 889.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2131.31 CHANNEL SLOPE = 0.0312  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.88

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.524

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	58.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 135.23

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.42

AVERAGE FLOW DEPTH(FEET) = 1.83 TRAVEL TIME(MIN.) = 6.56

Tc(MIN.) = 27.59

SUBAREA AREA(ACRES) = 58.46 SUBAREA RUNOFF(CFS) = 64.40

EFFECTIVE AREA(ACRES) = 135.28 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 135.3 PEAK FLOW RATE(CFS) = 149.02

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.93 FLOW VELOCITY(FEET/SEC.) = 5.58

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13504.00 = 5001.06 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13504.00 TO NODE 13505.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 889.48 DOWNSTREAM(FEET) = 848.10  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1661.97 CHANNEL SLOPE = 0.0249  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.25

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.383  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 49.30 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 173.07  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.38  
 AVERAGE FLOW DEPTH (FEET) = 2.22 TRAVEL TIME (MIN.) = 5.15  
 Tc (MIN.) = 32.74  
 SUBAREA AREA (ACRES) = 49.30 SUBAREA RUNOFF (CFS) = 48.07  
 EFFECTIVE AREA (ACRES) = 184.58 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 184.6 PEAK FLOW RATE (CFS) = 179.98  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.28  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.28 FLOW VELOCITY (FEET/SEC.) = 5.43  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.00 = 6663.03 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13505.00 TO NODE 13505.50 IS CODE = 56

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----

ELEVATION DATA: UPSTREAM (FEET) = 848.10 DOWNSTREAM (FEET) = 811.10  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1234.61 CHANNEL SLOPE = 0.0300  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.29  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.312  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 39.35 0.30 0.811 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.811  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 198.91  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.98  
 AVERAGE FLOW DEPTH (FEET) = 2.28 TRAVEL TIME (MIN.) = 3.44  
 Tc (MIN.) = 36.18  
 SUBAREA AREA (ACRES) = 39.35 SUBAREA RUNOFF (CFS) = 37.86  
 EFFECTIVE AREA (ACRES) = 223.93 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 223.9 PEAK FLOW RATE (CFS) = 206.01  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.33 FLOW VELOCITY (FEET/SEC.) = 6.03  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.50 = 7897.64 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13505.50 TO NODE 13506.00 IS CODE = 56

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----

ELEVATION DATA: UPSTREAM (FEET) = 811.10 DOWNSTREAM (FEET) = 781.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1415.98 CHANNEL SLOPE = 0.0213  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.71  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.226  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 54.33 0.30 0.738 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.738  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 230.58  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.51  
 AVERAGE FLOW DEPTH (FEET) = 2.71 TRAVEL TIME (MIN.) = 4.28  
 Tc (MIN.) = 40.46  
 SUBAREA AREA (ACRES) = 54.33 SUBAREA RUNOFF (CFS) = 49.14  
 EFFECTIVE AREA (ACRES) = 278.26 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
 TOTAL AREA (ACRES) = 278.3 PEAK FLOW RATE (CFS) = 237.85  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.76 FLOW VELOCITY (FEET/SEC.) = 5.56  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.00 = 9313.62 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13506.00 TO NODE 13506.50 IS CODE = 56

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----

ELEVATION DATA: UPSTREAM (FEET) = 781.00 DOWNSTREAM (FEET) = 743.17  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1542.62 CHANNEL SLOPE = 0.0245  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.80  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.163  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 61.33 0.30 0.783 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 263.47  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.02  
 AVERAGE FLOW DEPTH (FEET) = 2.80 TRAVEL TIME (MIN.) = 4.27  
 Tc (MIN.) = 44.73  
 SUBAREA AREA (ACRES) = 61.33 SUBAREA RUNOFF (CFS) = 51.24  
 EFFECTIVE AREA (ACRES) = 339.59 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90

TOTAL AREA (ACRES) = 339.6 PEAK FLOW RATE (CFS) = 273.26  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.86  
  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.86 FLOW VELOCITY (FEET/SEC.) = 6.09  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.50 = 10856.24 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.50 TO NODE 13520.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 743.17 DOWNSTREAM (FEET) = 717.04  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1370.93 CHANNEL SLOPE = 0.0191  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.14  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.103  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.86	0.30	0.848	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.848  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 288.49  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.65  
 AVERAGE FLOW DEPTH (FEET) = 3.14 TRAVEL TIME (MIN.) = 4.05  
 Tc (MIN.) = 48.77  
 SUBAREA AREA (ACRES) = 39.86 SUBAREA RUNOFF (CFS) = 30.45  
 EFFECTIVE AREA (ACRES) = 379.45 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
 TOTAL AREA (ACRES) = 379.5 PEAK FLOW RATE (CFS) = 285.42  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.12 FLOW VELOCITY (FEET/SEC.) = 5.64  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 48.77  
 RAINFALL INTENSITY (INCH/HR) = 1.10  
 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.89  
 EFFECTIVE STREAM AREA (ACRES) = 379.45  
 TOTAL STREAM AREA (ACRES) = 379.45  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 285.42

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13510.00 TO NODE 13511.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 903.68  
 ELEVATION DATA: UPSTREAM (FEET) = 1216.90 DOWNSTREAM (FEET) = 1022.78

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.615  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.207  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	6.66	0.30	1.000	0	14.62

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 11.43  
 TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 11.43

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13511.00 TO NODE 13512.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1022.78 DOWNSTREAM (FEET) = 954.27  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1027.63 CHANNEL SLOPE = 0.0667  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.66  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.927  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.30	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 30.12  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.30  
 AVERAGE FLOW DEPTH (FEET) = 0.62 TRAVEL TIME (MIN.) = 3.98  
 Tc (MIN.) = 18.60  
 SUBAREA AREA (ACRES) = 25.40 SUBAREA RUNOFF (CFS) = 37.19  
 EFFECTIVE AREA (ACRES) = 32.06 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 46.94  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.81 FLOW VELOCITY (FEET/SEC.) = 4.98  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13512.00 = 1931.31 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13512.00 TO NODE 13513.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 954.27 DOWNSTREAM(FEET) = 872.45
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.42 CHANNEL SLOPE = 0.0425
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.52
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.640

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 90.23 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 101.67
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.52
AVERAGE FLOW DEPTH(FEET) = 1.43 TRAVEL TIME(MIN.) = 5.81
Tc(MIN.) = 24.41

SUBAREA AREA(ACRES) = 90.23 SUBAREA RUNOFF(CFS) = 108.83
EFFECTIVE AREA(ACRES) = 122.29 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 122.3 PEAK FLOW RATE(CFS) = 147.50
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.77

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.77 FLOW VELOCITY(FEET/SEC.) = 6.18
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13513.00 = 3857.73 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13513.00 TO NODE 13514.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 872.45 DOWNSTREAM(FEET) = 813.12
CHANNEL LENGTH THRU SUBAREA(FEET) = 1895.66 CHANNEL SLOPE = 0.0313
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.44
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.458

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 135.65 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 218.36
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.23
AVERAGE FLOW DEPTH(FEET) = 2.38 TRAVEL TIME(MIN.) = 5.07
Tc(MIN.) = 29.48

SUBAREA AREA(ACRES) = 135.65 SUBAREA RUNOFF(CFS) = 141.38
EFFECTIVE AREA(ACRES) = 257.94 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 257.9 PEAK FLOW RATE(CFS) = 268.84
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.65

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.65 FLOW VELOCITY(FEET/SEC.) = 6.62
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13514.00 = 5753.39 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13514.00 TO NODE 13515.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 813.12 DOWNSTREAM(FEET) = 773.74
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.15 CHANNEL SLOPE = 0.0204
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.28
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.339

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 109.30 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 319.99
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.96
AVERAGE FLOW DEPTH(FEET) = 3.25 TRAVEL TIME(MIN.) = 5.39
Tc(MIN.) = 34.87

SUBAREA AREA(ACRES) = 109.30 SUBAREA RUNOFF(CFS) = 102.24
EFFECTIVE AREA(ACRES) = 367.24 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 367.2 PEAK FLOW RATE(CFS) = 343.51
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 3.38 FLOW VELOCITY(FEET/SEC.) = 6.08
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13515.00 = 7679.54 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 773.74 DOWNSTREAM(FEET) = 717.04
CHANNEL LENGTH THRU SUBAREA(FEET) = 2279.49 CHANNEL SLOPE = 0.0249
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.69
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.229

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN



USER-DEFINED - 231.44 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 440.30  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.99  
 AVERAGE FLOW DEPTH(FEET) = 3.64 TRAVEL TIME(MIN.) = 5.43  
 Tc(MIN.) = 40.30  
 SUBAREA AREA(ACRES) = 231.44 SUBAREA RUNOFF(CFS) = 193.45  
 EFFECTIVE AREA(ACRES) = 598.68 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 598.7 PEAK FLOW RATE(CFS) = 500.40  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.89 FLOW VELOCITY(FEET/SEC.) = 7.24  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13520.00 = 9959.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 40.30  
 RAINFALL INTENSITY(INCH/HR) = 1.23  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 598.68  
 TOTAL STREAM AREA(ACRES) = 598.68  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 500.40

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	285.42	48.77	1.103	0.30( 0.27)	0.89	379.5	13500.00
2	500.40	40.30	1.229	0.30( 0.30)	1.00	598.7	13510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	771.62	40.30	1.229	0.30( 0.29)	0.96	912.2	13510.00
2	718.25	48.77	1.103	0.30( 0.29)	0.96	978.1	13500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 771.62 Tc(MIN.) = 40.30  
 EFFECTIVE AREA(ACRES) = 912.21 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 978.1  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.00 TO NODE 13520.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 717.04 DOWNSTREAM(FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2019.22 CHANNEL SLOPE = 0.0084  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.31  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.151

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 846.61  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.43  
 AVERAGE FLOW DEPTH(FEET) = 3.30 TRAVEL TIME(MIN.) = 5.23  
 Tc(MIN.) = 45.53  
 SUBAREA AREA(ACRES) = 193.31 SUBAREA RUNOFF(CFS) = 149.93  
 EFFECTIVE AREA(ACRES) = 1105.52 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96

TOTAL AREA(ACRES) = 1171.4 PEAK FLOW RATE(CFS) = 857.99  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.32

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.32 FLOW VELOCITY(FEET/SEC.) = 6.46  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.50 = 14246.39 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	857.99	45.53	1.151	0.30( 0.29)	0.96	1105.5	13510.00
2	781.89	54.13	1.029	0.30( 0.29)	0.96	1171.4	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 857.99 Tc(MIN.) = 45.53  
 AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 1105.52

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.50 TO NODE 13521.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 661.95  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1622.36 CHANNEL SLOPE = 0.0235  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.58  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.108

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -        129.79      0.30        0.897       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 907.01  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.33  
 AVERAGE FLOW DEPTH(FEET) = 2.58    TRAVEL TIME(MIN.) = 2.90  
 Tc(MIN.) = 48.43  
 SUBAREA AREA(ACRES) = 129.79        SUBAREA RUNOFF(CFS) = 98.04  
 EFFECTIVE AREA(ACRES) = 1235.31    AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 1301.2        PEAK FLOW RATE(CFS) = 913.37  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.59    FLOW VELOCITY(FEET/SEC.) = 9.34  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13521.00 = 15868.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	913.37	48.43	1.108	0.30( 0.29)	0.96	1235.3	13510.00
2	823.44	57.12	0.989	0.30( 0.29)	0.95	1301.2	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 913.37    Tc(MIN.) = 48.43  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96    EFFECTIVE AREA(ACRES) = 1235.31

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13521.00 TO NODE 13522.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 661.95    DOWNSTREAM(FEET) = 632.19  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2746.01    CHANNEL SLOPE = 0.0108  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.41  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.023  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	278.60	0.30	0.905	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1007.59  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.40  
 AVERAGE FLOW DEPTH(FEET) = 3.39    TRAVEL TIME(MIN.) = 6.19  
 Tc(MIN.) = 54.62  
 SUBAREA AREA(ACRES) = 278.60        SUBAREA RUNOFF(CFS) = 188.38  
 EFFECTIVE AREA(ACRES) = 1513.91    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.95  
 TOTAL AREA(ACRES) = 1579.8        PEAK FLOW RATE(CFS) = 1006.57  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.39    FLOW VELOCITY(FEET/SEC.) = 7.39  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13522.00 = 18614.76 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1006.57	54.62	1.023	0.30( 0.28)	0.95	1513.9	13510.00
2	918.88	63.50	0.930	0.30( 0.28)	0.94	1579.8	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1006.57    Tc(MIN.) = 54.62  
 AREA-AVERAGED Fm(INCH/HR) = 0.28    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.95    EFFECTIVE AREA(ACRES) = 1513.91

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1579.8    TC(MIN.) = 54.62  
 EFFECTIVE AREA(ACRES) = 1513.91    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.947  
 PEAK FLOW RATE(CFS) = 1006.57

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1006.57	54.62	1.023	0.30( 0.28)	0.95	1513.9	13510.00
2	918.88	63.50	0.930	0.30( 0.28)	0.94	1579.8	13500.00

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2011 Advanced Engineering Software (aes)  
Ver. 18.0 Release Date: 07/01/2011 License ID 1264

Analysis prepared by:

RBF Consulting

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 50-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P50EVAA.DAT  
TIME/DATE OF STUDY: 15:21 11/13/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.254
- 2) 10.00; 3.396
- 3) 15.00; 2.615
- 4) 20.00; 2.190
- 5) 25.00; 1.899
- 6) 30.00; 1.707
- 7) 40.00; 1.447
- 8) 50.00; 1.285
- 9) 60.00; 1.174
- 10) 90.00; 0.972
- 11) 120.00; 0.842
- 12) 180.00; 0.717
- 13) 360.00; 0.527
- 14) 1200.00; 0.230

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / PARK- / WAY		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 571.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.305  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.397

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56	7.31

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 3.12  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 3.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.397

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.170  
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 12.91  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 16.03

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.397

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.60 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 10.15  
 EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19  
 TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 26.18

\*\*\*\*\*

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 571.00 DOWNSTREAM ELEVATION(FEET) = 530.50  
 STREET LENGTH(FEET) = 1215.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.50

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.47  
 HALFSTREET FLOOD WIDTH(FEET) = 17.46  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.40  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.56  
 STREET FLOW TRAVEL TIME(MIN.) = 3.75 Tc(MIN.) = 11.05

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.231

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.20	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	2.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.135  
 SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 10.63  
 EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 29.77

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 17.07  
 FLOW VELOCITY(FEET/SEC.) = 5.32 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.49  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1542.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.05  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.231  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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APARTMENTS B 4.40 0.30 0.200 56  
 COMMERCIAL B 18.20 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.119  
 SUBAREA AREA(ACRES) = 22.60 SUBAREA RUNOFF(CFS) = 64.99  
 EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.13  
 TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 94.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.05  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.231  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

APARTMENTS B 6.20 0.30 0.200 56  
 COMMERCIAL B 0.10 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198  
 SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 17.98  
 EFFECTIVE AREA(ACRES) = 39.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA(ACRES) = 39.3 PEAK FLOW RATE(CFS) = 112.75

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.50 DOWNSTREAM(FEET) = 522.00  
 FLOW LENGTH(FEET) = 837.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.93  
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 112.75  
 PIPE TRAVEL TIME(MIN.) = 1.17 Tc(MIN.) = 12.22  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2379.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.22  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.049  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	15.30	0.30	0.100	56
PUBLIC PARK	B	0.70	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.133  
SUBAREA AREA(ACRES) = 16.00 SUBAREA RUNOFF(CFS) = 43.33  
EFFECTIVE AREA(ACRES) = 55.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
TOTAL AREA(ACRES) = 55.3 PEAK FLOW RATE(CFS) = 149.62

\*\*\*\*\*  
FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 522.00 DOWNSTREAM(FEET) = 473.00  
FLOW LENGTH(FEET) = 568.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.24  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 149.62  
PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 12.55  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2947.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.55  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.998

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	2.10	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
COMMERCIAL	B	0.50	0.30	0.100	56
PUBLIC PARK	B	13.00	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.820  
SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 39.38  
EFFECTIVE AREA(ACRES) = 71.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
TOTAL AREA(ACRES) = 71.2 PEAK FLOW RATE(CFS) = 186.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 104.00 TO NODE 127.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 435.00  
FLOW LENGTH(FEET) = 588.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.28

ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 186.48  
PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 12.91  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 10  
-----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 121.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 574.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.977

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56	8.44

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 2.11  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 2.11

\*\*\*\*\*  
FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 574.00 DOWNSTREAM ELEVATION(FEET) = 557.00  
STREET LENGTH(FEET) = 221.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 25.97

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.40  
HALFSTREET FLOOD WIDTH(FEET) = 13.55  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.08  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.86

STREET FLOW TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 8.96  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.783  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 7.90 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.10 0.30 0.400 56  
 APARTMENTS B 2.20 0.30 0.200 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.257  
 SUBAREA AREA(ACRES) = 14.30 SUBAREA RUNOFF(CFS) = 47.70  
 EFFECTIVE AREA(ACRES) = 14.90 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.26  
 TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 49.71

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 17.77  
 FLOW VELOCITY(FEET/SEC.) = 8.24 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.96  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 551.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 557.00 DOWNSTREAM ELEVATION(FEET) = 527.00  
 STREET LENGTH(FEET) = 317.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 64.23  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.50  
 HALFSTREET FLOOD WIDTH(FEET) = 18.87  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.52  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.76  
 STREET FLOW TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 9.51  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.577

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.50 0.30 0.400 56  
 APARTMENTS B 0.70 0.30 0.200 56

COMMERCIAL B 0.40 0.30 0.100 56  
 CONDOMINIUMS B 3.50 0.30 0.350 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.352  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 29.06  
 EFFECTIVE AREA(ACRES) = 24.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 24.2 PEAK FLOW RATE(CFS) = 76.00

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 20.20  
 FLOW VELOCITY(FEET/SEC.) = 9.91 DEPTH\*VELOCITY(FT\*FT/SEC.) = 5.18  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 123.00 = 868.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62  
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 527.00 DOWNSTREAM ELEVATION(FEET) = 496.00  
 STREET LENGTH(FEET) = 315.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 92.81  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.55  
 HALFSTREET FLOOD WIDTH(FEET) = 21.68  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.57  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 5.81  
 STREET FLOW TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 10.01  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.394

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 2.90 0.30 0.400 56  
 CONDOMINIUMS B 1.40 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.00 0.30 0.400 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 CONDOMINIUMS B 2.70 0.30 0.350 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.387  
 SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 33.64  
 EFFECTIVE AREA(ACRES) = 35.60 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32

TOTAL AREA (ACRES) = 35.6 PEAK FLOW RATE (CFS) = 105.66

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.57 HALFSTREET FLOOD WIDTH (FEET) = 22.85
FLOW VELOCITY (FEET/SEC.) = 10.88 DEPTH\*VELOCITY (FT\*FT/SEC.) = 6.21
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 124.00 = 1183.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 10.01
RAINFALL INTENSITY (INCH/HR) = 3.39
AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA (ACRES) = 35.60
TOTAL STREAM AREA (ACRES) = 35.60
PEAK FLOW RATE (CFS) AT CONFLUENCE = 105.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 317.00
ELEVATION DATA: UPSTREAM (FEET) = 699.00 DOWNSTREAM (FEET) = 610.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.111

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.726

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER
"OPEN BRUSH" B 1.50 0.30 1.000 66 9.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 4.63

TOTAL AREA (ACRES) = 1.50 PEAK FLOW RATE (CFS) = 4.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 610.00 DOWNSTREAM (FEET) = 575.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 206.00 CHANNEL SLOPE = 0.1699

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.543

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 2.80 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.71

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.97

AVERAGE FLOW DEPTH (FEET) = 0.65 TRAVEL TIME (MIN.) = 0.49

Tc (MIN.) = 9.60

SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 8.17

EFFECTIVE AREA (ACRES) = 4.30 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 4.3 PEAK FLOW RATE (CFS) = 12.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.74 FLOW VELOCITY (FEET/SEC.) = 7.58

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 523.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 575.00 DOWNSTREAM (FEET) = 548.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.1350

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.389

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 3.30 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.14

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.60

AVERAGE FLOW DEPTH (FEET) = 0.87 TRAVEL TIME (MIN.) = 0.44

Tc (MIN.) = 10.04

SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 9.18

EFFECTIVE AREA (ACRES) = 7.60 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 7.6 PEAK FLOW RATE (CFS) = 21.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.94 FLOW VELOCITY (FEET/SEC.) = 7.95

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 723.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 548.00 DOWNSTREAM (FEET) = 524.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 318.00 CHANNEL SLOPE = 0.0755

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000



MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.264  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	2.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 24.20  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.63  
 AVERAGE FLOW DEPTH (FEET) = 1.10 TRAVEL TIME (MIN.) = 0.80  
 Tc (MIN.) = 10.84  
 SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 6.14  
 EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 26.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.14 FLOW VELOCITY (FEET/SEC.) = 6.78  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 1041.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	3.70	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.30  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.72  
 AVERAGE FLOW DEPTH (FEET) = 1.16 TRAVEL TIME (MIN.) = 0.20  
 Tc (MIN.) = 11.05  
 SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 9.77  
 EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 35.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.22 FLOW VELOCITY (FEET/SEC.) = 7.99  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 1135.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	8.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 46.52  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.08  
 AVERAGE FLOW DEPTH (FEET) = 1.60 TRAVEL TIME (MIN.) = 0.57  
 Tc (MIN.) = 11.61  
 SUBAREA AREA (ACRES) = 8.30 SUBAREA RUNOFF (CFS) = 21.25  
 EFFECTIVE AREA (ACRES) = 21.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 21.9 PEAK FLOW RATE (CFS) = 56.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.71 FLOW VELOCITY (FEET/SEC.) = 6.36  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 1342.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	0.60	0.30	1.000	66
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
NATURAL FAIR COVER "OPEN BRUSH"	B	13.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 73.09  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.39  
 AVERAGE FLOW DEPTH (FEET) = 2.13 TRAVEL TIME (MIN.) = 1.04  
 Tc (MIN.) = 12.66  
 SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 34.07  
 EFFECTIVE AREA (ACRES) = 36.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 36.0 PEAK FLOW RATE (CFS) = 86.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.27 FLOW VELOCITY(FEET/SEC.) = 5.62  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 1680.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 137.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 496.00  
FLOW LENGTH(FEET) = 726.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.05  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 86.91  
PIPE TRAVEL TIME(MIN.) = 1.34 Tc(MIN.) = 13.99  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 13.99  
RAINFALL INTENSITY(INCH/HR) = 2.77  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 36.00  
TOTAL STREAM AREA(ACRES) = 36.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 86.91

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	105.66	10.01	3.394	0.30( 0.10)	0.32	35.6	100.00
2	86.91	13.99	2.772	0.30( 0.30)	1.00	36.0	130.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	183.46	10.01	3.394	0.30( 0.18)	0.60	61.3	100.00
2	172.62	13.99	2.772	0.30( 0.20)	0.66	71.6	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 183.46 Tc(MIN.) = 10.01  
EFFECTIVE AREA(ACRES) = 61.35 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 71.6  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 444.00  
FLOW LENGTH(FEET) = 888.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 30.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.03  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 183.46  
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 10.58  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 125.00 = 3294.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.58  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.306  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCs SOIL AREA Fp Ap SCs  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 7.50 0.30 0.400 56  
NATURAL FAIR COVER  
"OPEN BRUSH" B 0.10 0.30 1.000 66  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.407  
SUBAREA AREA(ACRES) = 8.60 SUBAREA RUNOFF(CFS) = 24.64  
EFFECTIVE AREA(ACRES) = 69.95 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 197.14

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 444.00 DOWNSTREAM(FEET) = 438.00  
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 44.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.20  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 197.14  
PIPE TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 11.41  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.41

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.176  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	4.30	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.70	0.30	0.400	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.20	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 7.10 SUBAREA RUNOFF (CFS) = 19.86  
 EFFECTIVE AREA (ACRES) = 77.05 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 87.3 PEAK FLOW RATE (CFS) = 208.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 11.41  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.176  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.56  
 EFFECTIVE AREA (ACRES) = 77.25 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 87.5 PEAK FLOW RATE (CFS) = 209.37

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 11.41  
 RAINFALL INTENSITY (INCH/HR) = 3.18  
 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.55  
 EFFECTIVE STREAM AREA (ACRES) = 77.25  
 TOTAL STREAM AREA (ACRES) = 87.50  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 209.37

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21  
 -----

-----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====  
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 557.00 DOWNSTREAM (FEET) = 546.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.105  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.843  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.50	0.30	0.100	56	6.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 2.17  
 TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 2.17

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION (FEET) = 546.00 DOWNSTREAM ELEVATION (FEET) = 488.00  
 STREET LENGTH (FEET) = 671.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00  
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.97  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.33  
 HALfstREET FLOOD WIDTH (FEET) = 9.22  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.28  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.06  
 STREET FLOW TRAVEL TIME (MIN.) = 1.78 Tc (MIN.) = 7.89  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.182  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.50	0.30	0.200	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	3.90	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293  
 SUBAREA AREA (ACRES) = 5.30 SUBAREA RUNOFF (CFS) = 19.53  
 EFFECTIVE AREA (ACRES) = 5.80 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA (ACRES) = 5.8 PEAK FLOW RATE (CFS) = 21.40

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.15  
 FLOW VELOCITY(FEET/SEC.) = 7.08 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.69  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1001.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 7.89  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.182  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	14.60	0.30	0.200	56
COMMERCIAL	B	1.10	0.30	0.100	56
CONDOMINIUMS	B	4.30	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.227  
 SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 74.05  
 EFFECTIVE AREA(ACRES) = 25.80 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 25.8 PEAK FLOW RATE(CFS) = 95.44

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

-----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 488.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
 STREET LENGTH(FEET) = 371.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 119.45  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.61  
 HALFSTREET FLOOD WIDTH(FEET) = 25.27  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.13  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.22  
 STREET FLOW TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 8.50  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.955

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.50	0.30	0.200	56

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 10.00 0.30 0.200 56  
 APARTMENTS B 1.70 0.30 0.200 56  
 COMMERCIAL B 0.50 0.30 0.100 56  
 CONDOMINIUMS B 1.00 0.30 0.350 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.207  
 SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 48.00  
 EFFECTIVE AREA(ACRES) = 39.50 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA(ACRES) = 39.5 PEAK FLOW RATE(CFS) = 138.17

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.64 HALFSTREET FLOOD WIDTH(FEET) = 26.76  
 FLOW VELOCITY(FEET/SEC.) = 10.49 DEPTH\*VELOCITY(FT\*FT/SEC.) = 6.72  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1372.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 113.00 TO NODE 126.00 IS CODE = 31

-----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 438.00  
 FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.19  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 138.17  
 PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 8.87  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 1872.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 8.87  
 RAINFALL INTENSITY(INCH/HR) = 3.82  
 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.23  
 EFFECTIVE STREAM AREA(ACRES) = 39.50  
 TOTAL STREAM AREA(ACRES) = 39.50  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 138.17

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	209.37	11.41	3.176	0.30( 0.16)	0.55	77.2	100.00
1	189.04	15.41	2.580	0.30( 0.18)	0.60	87.5	130.00
2	138.17	8.87	3.815	0.30( 0.07)	0.23	39.5	110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	335.52	8.87	3.815	0.30 ( 0.13)	0.42	99.6	110.00
2	323.95	11.41	3.176	0.30 ( 0.13)	0.44	116.7	100.00
3	281.67	15.41	2.580	0.30 ( 0.15)	0.48	127.0	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 335.52 Tc(MIN.) = 8.87  
EFFECTIVE AREA(ACRES) = 99.56 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 127.0  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 435.00  
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 69.0 INCH PIPE IS 52.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.79  
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 335.52  
PIPE TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 9.18  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.18

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.699

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	5.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.366

SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 25.20

EFFECTIVE AREA(ACRES) = 107.36 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 134.8 PEAK FLOW RATE(CFS) = 345.36

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.18

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.699

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	1.50	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519

SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 15.63

EFFECTIVE AREA(ACRES) = 112.26 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 139.7 PEAK FLOW RATE(CFS) = 360.98

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	360.98	9.18	3.699	0.30 ( 0.13)	0.42	112.3	110.00
2	348.97	11.72	3.127	0.30 ( 0.13)	0.44	129.4	100.00
3	302.85	15.74	2.552	0.30 ( 0.14)	0.48	139.7	130.00

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	186.48	12.91	2.942	0.30 ( 0.09)	0.29	71.2	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	528.88	9.18	3.699	0.30 ( 0.11)	0.38	162.9	110.00
2	529.33	11.72	3.127	0.30 ( 0.12)	0.39	194.1	100.00
3	521.87	12.91	2.942	0.30 ( 0.12)	0.39	203.7	100.00
4	463.87	15.74	2.552	0.30 ( 0.12)	0.42	210.9	130.00

TOTAL AREA(ACRES) = 210.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 529.33 Tc(MIN.) = 11.725

EFFECTIVE AREA(ACRES) = 194.13 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39

TOTAL AREA(ACRES) = 210.9

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

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FLOW PROCESS FROM NODE 127.00 TO NODE 127.10 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 500.20 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 46.16
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 529.33
PIPE TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 11.91
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.10 = 4750.20 FEET.

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FLOW PROCESS FROM NODE 127.10 TO NODE 127.20 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 353.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 595.30 CHANNEL SLOPE = 0.0218
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.908
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         3.50   0.30  0.100  56
COMMERCIAL          B         0.10   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 533.99
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.16
AVERAGE FLOW DEPTH(FEET) = 1.25 TRAVEL TIME(MIN.) = 1.22
Tc(MIN.) = 13.12
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 9.33
EFFECTIVE AREA(ACRES) = 197.73 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 214.5 PEAK FLOW RATE(CFS) = 529.33
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.24 FLOW VELOCITY(FEET/SEC.) = 8.13
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.20 = 5345.50 FEET.

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FLOW PROCESS FROM NODE 127.20 TO NODE 127.30 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 340.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 476.00 CHANNEL SLOPE = 0.0273
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.767
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS

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LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         3.10   0.30  0.100  56
COMMERCIAL          B         0.10   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 533.27
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.75
AVERAGE FLOW DEPTH(FEET) = 1.16 TRAVEL TIME(MIN.) = 0.91
Tc(MIN.) = 14.03
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 7.88
EFFECTIVE AREA(ACRES) = 200.93 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 217.7 PEAK FLOW RATE(CFS) = 529.33
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.16 FLOW VELOCITY(FEET/SEC.) = 8.70
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.30 = 5821.50 FEET.

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FLOW PROCESS FROM NODE 127.30 TO NODE 13569.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 338.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 506.00 CHANNEL SLOPE = 0.0040
CHANNEL BASE(FEET) = 150.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.477
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         2.80   0.30  0.100  56
COMMERCIAL          B         0.60   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 533.07
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.24
AVERAGE FLOW DEPTH(FEET) = 1.08 TRAVEL TIME(MIN.) = 2.60
Tc(MIN.) = 16.63
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 7.49
EFFECTIVE AREA(ACRES) = 204.33 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 221.1 PEAK FLOW RATE(CFS) = 529.33
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.08 FLOW VELOCITY(FEET/SEC.) = 3.23
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 13569.00 = 6327.50 FEET.

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FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 12
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>>>>CLEAR MEMORY BANK # 1 <<<<
=====
END OF STUDY SUMMARY:

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TOTAL AREA (ACRES) = 221.1 TC (MIN.) = 16.63  
 EFFECTIVE AREA (ACRES) = 204.33 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.375  
 PEAK FLOW RATE (CFS) = 529.33

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	528.88	14.09	2.758	0.30 ( 0.11)	0.36	173.1	110.00
2	529.33	16.63	2.477	0.30 ( 0.11)	0.37	204.3	100.00
3	521.87	17.83	2.374	0.30 ( 0.11)	0.38	213.9	100.00
4	463.87	20.89	2.138	0.30 ( 0.12)	0.40	221.1	130.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2012 Advanced Engineering Software (aes)  
Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 50-YR ULTIMATE EV DECEMBER 2013 MCHANDOO/TMULI \*  
\*\*\*\*\*

FILE NAME: 2P50EVBB.DAT  
TIME/DATE OF STUDY: 16:36 12/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.305
- 2) 10.00; 3.420
- 3) 15.00; 2.629
- 4) 20.00; 2.200
- 5) 25.00; 1.906
- 6) 30.00; 1.714
- 7) 40.00; 1.452
- 8) 50.00; 1.290
- 9) 60.00; 1.181
- 10) 90.00; 0.979
- 11) 120.00; 0.849
- 12) 180.00; 0.725
- 13) 360.00; 0.534
- 14) 1200.00; 0.233

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00  
ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 543.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.596  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.326  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.80	0.30	0.100	56	7.60

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 3.09  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 3.09

\*\*\*\*\*  
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 543.00 DOWNSTREAM ELEVATION(FEET) = 523.00  
STREET LENGTH(FEET) = 502.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.92  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.30  
HALFSTREET FLOOD WIDTH(FEET) = 7.30  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.10  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.25  
STREET FLOW TRAVEL TIME(MIN.) = 2.04 Tc(MIN.) = 9.64  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.557

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.20	0.30	0.200	56
COMMERCIAL	B	1.30	0.30	0.100	56



NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.261  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.63  
 EFFECTIVE AREA(ACRES) = 2.60 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 8.17

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.65  
 FLOW VELOCITY(FEET/SEC.) = 4.36 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.44  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 810.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.64  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.557  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 1.40 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 4.44  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 12.62

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 523.00 DOWNSTREAM ELEVATION(FEET) = 468.00  
 STREET LENGTH(FEET) = 987.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.13  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.39  
 HALFSTREET FLOOD WIDTH(FEET) = 11.58  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.92  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.31  
 STREET FLOW TRAVEL TIME(MIN.) = 2.78 Tc(MIN.) = 12.41  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.038  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56  
 COMMERCIAL B 2.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.426  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 11.00  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 21.75

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 12.52  
 FLOW VELOCITY(FEET/SEC.) = 6.19 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.53  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 1797.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 468.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 25.33  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.42  
 HALFSTREET FLOOD WIDTH(FEET) = 14.18  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.37  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.65  
 STREET FLOW TRAVEL TIME(MIN.) = 2.56 Tc(MIN.) = 14.97  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.633  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.10 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 COMMERCIAL B 1.90 0.30 0.100 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 7.15  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 25.92

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 14.34  
 FLOW VELOCITY(FEET/SEC.) = 6.39 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.67  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2774.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
 MAINLINE Tc(MIN.) = 14.97  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.633  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	1.30	0.30	1.000	66

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 2.73  
 EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
 TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 28.65

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 204.00 TO NODE 218.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

-----  
 UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 343.00  
 STREET LENGTH(FEET) = 1228.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 32.66  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.45  
 HALFSTREET FLOOD WIDTH(FEET) = 16.05  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.54  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.94  
 STREET FLOW TRAVEL TIME(MIN.) = 3.13 Tc(MIN.) = 18.10  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.363

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
COMMERCIAL	B	0.50	0.30	0.100	56
NATURAL FAIR COVER "OPEN BRUSH"	B	0.40	0.30	1.000	66
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	0.70	0.30	0.500	56
COMMERCIAL	B	1.50	0.30	0.100	56
NATURAL FAIR COVER "OPEN BRUSH"	B	0.80	0.30	1.000	66

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 8.02  
 EFFECTIVE AREA(ACRES) = 16.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 16.6 PEAK FLOW RATE(CFS) = 33.60

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.45 HALFSTREET FLOOD WIDTH(FEET) = 16.21  
 FLOW VELOCITY(FEET/SEC.) = 6.61 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.99  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
 MAINLINE Tc(MIN.) = 18.10  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.363  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	1.20	0.30	0.500	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
COMMERCIAL	B	0.10	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450  
 SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 3.21  
 EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 36.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

-----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 18.10  
 RAINFALL INTENSITY(INCH/HR) = 2.36  
 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.39  
EFFECTIVE STREAM AREA (ACRES) = 18.20  
TOTAL STREAM AREA (ACRES) = 18.20  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 36.81

\*\*\*\*\*  
FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----

INITIAL SUBAREA FLOW-LENGTH (FEET) = 268.00  
ELEVATION DATA: UPSTREAM (FEET) = 514.00 DOWNSTREAM (FEET) = 511.50

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.724  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.278

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	B	2.30	0.30	0.500	56	9.27
APARTMENTS	B	0.40	0.30	0.200	56	7.72

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456

SUBAREA RUNOFF (CFS) = 10.06

TOTAL AREA (ACRES) = 2.70 PEAK FLOW RATE (CFS) = 10.06

\*\*\*\*\*  
FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 511.50 DOWNSTREAM ELEVATION (FEET) = 503.00  
STREET LENGTH (FEET) = 503.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 20.81  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.47  
HALFSTREET FLOOD WIDTH (FEET) = 16.99  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.75  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.75  
STREET FLOW TRAVEL TIME (MIN.) = 2.23 Tc (MIN.) = 9.96  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.436  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.20	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.475  
SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 21.34  
EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.14  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47  
TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 29.36

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.51 HALFSTREET FLOOD WIDTH (FEET) = 19.49  
FLOW VELOCITY (FEET/SEC.) = 4.09 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.09  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 771.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc (MIN.) = 9.96

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.436

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.281

SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 3.92

EFFECTIVE AREA (ACRES) = 11.20 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45

TOTAL AREA (ACRES) = 11.2 PEAK FLOW RATE (CFS) = 33.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 503.00 DOWNSTREAM ELEVATION (FEET) = 476.00  
STREET LENGTH (FEET) = 423.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.97  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.45  
HALFSTREET FLOOD WIDTH(FEET) = 15.98  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.07  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.17  
STREET FLOW TRAVEL TIME(MIN.) = 1.00 Tc(MIN.) = 10.95  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.269

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 1.00 0.30 0.500 56  
COMMERCIAL B 0.10 0.30 0.100 56  
CONDOMINIUMS B 0.10 0.30 0.350 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.454  
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 3.38  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 34.98

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.45 HALFSTREET FLOOD WIDTH(FEET) = 15.98  
FLOW VELOCITY(FEET/SEC.) = 7.07 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.17  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.95  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.269  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.50 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
COMMERCIAL B 0.30 0.30 0.100 56  
CONDOMINIUMS B 3.30 0.30 0.350 56  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.332  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 13.98  
EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 48.96

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.95  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.269  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 3.40 0.30 0.100 56  
CONDOMINIUMS B 8.10 0.30 0.350 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.276  
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 32.98  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 81.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 476.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
STREET LENGTH(FEET) = 789.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 81.94  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.67  
HALFSTREET FLOOD WIDTH(FEET) = 28.16  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.63  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.75  
STREET FLOW TRAVEL TIME(MIN.) = 2.34 Tc(MIN.) = 13.29  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.899  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 81.94  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.67 HALFSTREET FLOOD WIDTH(FEET) = 28.16  
FLOW VELOCITY(FEET/SEC.) = 5.63 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.75  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1983.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.29  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.899  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	8.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.40	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 35.63  
 EFFECTIVE AREA(ACRES) = 43.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
 TOTAL AREA(ACRES) = 43.2 PEAK FLOW RATE(CFS) = 107.99

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 460.00 DOWNSTREAM ELEVATION(FEET) = 419.00  
STREET LENGTH(FEET) = 529.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 112.69  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.60  
 HALFSTREET FLOOD WIDTH(FEET) = 24.57  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.09  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.07  
 STREET FLOW TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 14.16  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.761  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 9.40  
 EFFECTIVE AREA(ACRES) = 47.20 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 47.2 PEAK FLOW RATE(CFS) = 112.02

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.60 HALFSTREET FLOOD WIDTH(FEET) = 24.49  
FLOW VELOCITY(FEET/SEC.) = 10.09 DEPTH\*VELOCITY(FT\*FT/SEC.) = 6.05  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 2512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.16  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.761  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.70	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 13.16  
 EFFECTIVE AREA(ACRES) = 52.80 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
 TOTAL AREA(ACRES) = 52.8 PEAK FLOW RATE(CFS) = 125.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.16  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.761  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.90	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.50	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 17.63  
 EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 142.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 419.00 DOWNSTREAM ELEVATION(FEET) = 405.00  
STREET LENGTH(FEET) = 174.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 142.80  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.64  
HALFSTREET FLOOD WIDTH(FEET) = 26.76  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.84  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.94  
STREET FLOW TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 14.43  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.719  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 142.80  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.64 HALFSTREET FLOOD WIDTH(FEET) = 26.76  
FLOW VELOCITY(FEET/SEC.) = 10.84 DEPTH\*VELOCITY(FT\*FT/SEC.) = 6.94  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 2686.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 372.00  
FLOW LENGTH(FEET) = 395.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.83  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 142.80  
PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 14.67  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 3081.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 14.67  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.681  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500					
SUBAREA AREA(ACRES) = 2.20		SUBAREA RUNOFF(CFS) = 5.01			
EFFECTIVE AREA(ACRES) = 62.50		AREA-AVERAGED Fm(INCH/HR) = 0.13			
AREA-AVERAGED Fp(INCH/HR) = 0.30		AREA-AVERAGED Ap = 0.44			
TOTAL AREA(ACRES) = 62.5		PEAK FLOW RATE(CFS) = 143.49			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 14.67  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.681  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 3.50 0.30 0.500 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 6.90 0.30 0.500 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 24.15  
EFFECTIVE AREA(ACRES) = 73.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 73.1 PEAK FLOW RATE(CFS) = 167.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 343.00  
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.52  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 167.64  
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 15.10  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 3688.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 15.10

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.621  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.443  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.57  
 EFFECTIVE AREA (ACRES) = 73.80 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 73.8 PEAK FLOW RATE (CFS) = 167.64  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
 -----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 15.10  
 RAINFALL INTENSITY (INCH/HR) = 2.62  
 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.44  
 EFFECTIVE STREAM AREA (ACRES) = 73.80  
 TOTAL STREAM AREA (ACRES) = 73.80  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 167.64

\*\* CONFLUENCE DATA \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	36.81	18.10	2.363	0.30 ( 0.12)	0.39	18.2	200.00
2	167.64	15.10	2.621	0.30 ( 0.13)	0.44	73.8	210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	201.86	15.10	2.621	0.30 ( 0.13)	0.43	89.0	210.00
2	187.09	18.10	2.363	0.30 ( 0.13)	0.43	92.0	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 201.86 Tc (MIN.) = 15.10  
 EFFECTIVE AREA (ACRES) = 88.98 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA (ACRES) = 92.0  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 343.00 DOWNSTREAM (FEET) = 326.50  
 FLOW LENGTH (FEET) = 734.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.8 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 18.53  
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 201.86  
 PIPE TRAVEL TIME (MIN.) = 0.66 Tc (MIN.) = 15.76  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 219.00 = 4736.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 15.76  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.564  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56  
 COMMERCIAL  
 B 0.60 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.70 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.90 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 6.26  
 EFFECTIVE AREA (ACRES) = 91.88 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 94.9 PEAK FLOW RATE (CFS) = 201.86  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 15.76  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.564  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL  
 B 0.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 1.32  
 EFFECTIVE AREA (ACRES) = 92.48 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA (ACRES) = 95.5 PEAK FLOW RATE (CFS) = 202.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 326.50 DOWNSTREAM(FEET) = 325.00  
FLOW LENGTH(FEET) = 161.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.38  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 202.47  
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 15.96  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 220.00 = 4897.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.96  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.547  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.90	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.60	0.30	0.400	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	18.40	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	4.30	0.30	0.400	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.50	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	6.90	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462  
SUBAREA AREA(ACRES) = 38.60 SUBAREA RUNOFF(CFS) = 83.66  
EFFECTIVE AREA(ACRES) = 131.08 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 134.1 PEAK FLOW RATE(CFS) = 284.70

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 245.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 315.00  
FLOW LENGTH(FEET) = 1019.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 66.0 INCH PIPE IS 49.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.04  
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 284.70  
PIPE TRAVEL TIME(MIN.) = 1.13 Tc(MIN.) = 17.09  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.09  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.450  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.30	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.00	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379  
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 6.10  
EFFECTIVE AREA(ACRES) = 133.98 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 137.0 PEAK FLOW RATE(CFS) = 284.70  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.09  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.450  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.264  
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 2.35  
EFFECTIVE AREA(ACRES) = 135.08 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 138.1 PEAK FLOW RATE(CFS) = 284.70  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<



MAINLINE Tc(MIN.) = 17.09  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.450  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.40	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.434  
 SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 6.68  
 EFFECTIVE AREA(ACRES) = 138.28 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA(ACRES) = 141.3 PEAK FLOW RATE(CFS) = 288.39

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3<<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 220.50 TO NODE 221.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 251.00  
 ELEVATION DATA: UPSTREAM(FEET) = 551.00 DOWNSTREAM(FEET) = 547.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.785  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.501  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"1 DWELLING/ACRE"	B	3.10	0.30	0.800	56	9.79
RESIDENTIAL						
"1 DWELLING/ACRE"	B	3.10	0.30	0.800	56	9.79

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA RUNOFF(CFS) = 18.20  
 TOTAL AREA(ACRES) = 6.20 PEAK FLOW RATE(CFS) = 18.20

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 542.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0130  
 CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.278  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.163  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 25.03  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.77  
 AVERAGE FLOW DEPTH(FEET) = 0.40 TRAVEL TIME(MIN.) = 1.11  
 Tc(MIN.) = 10.90  
 SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 13.66  
 EFFECTIVE AREA(ACRES) = 10.90 AREA-AVERAGED Fm(INCH/HR) = 0.16  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA(ACRES) = 10.9 PEAK FLOW RATE(CFS) = 30.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 6.20  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 222.00 = 637.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 542.00 DOWNSTREAM ELEVATION(FEET) = 531.00  
 STREET LENGTH(FEET) = 1146.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 50.26  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.64  
 HALFSTREET FLOOD WIDTH(FEET) = 26.91  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.77  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.43  
 STREET FLOW TRAVEL TIME(MIN.) = 5.06 Tc(MIN.) = 15.96  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.546

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					

"11+ DWELLINGS/ACRE" B 11.50 0.30 0.200 56  
 APARTMENTS B 2.90 0.30 0.200 56  
 COMMERCIAL B 0.70 0.30 0.100 56  
 PUBLIC PARK B 2.60 0.30 0.850 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.292  
 SUBAREA AREA(ACRES) = 17.70 SUBAREA RUNOFF(CFS) = 39.17  
 EFFECTIVE AREA(ACRES) = 28.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 28.6 PEAK FLOW RATE(CFS) = 62.60

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.69 HALFSTREET FLOOD WIDTH(FEET) = 30.33  
 FLOW VELOCITY(FEET/SEC.) = 3.97 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.72  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 223.00 = 1783.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 531.00 DOWNSTREAM ELEVATION(FEET) = 520.00  
 STREET LENGTH(FEET) = 702.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 74.99  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.67  
 HALFSTREET FLOOD WIDTH(FEET) = 29.00  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.99  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.36  
 STREET FLOW TRAVEL TIME(MIN.) = 2.35 Tc(MIN.) = 18.31  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.345

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.40	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
CONDOMINIUMS	B	0.70	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175  
 SUBAREA AREA(ACRES) = 12.00 SUBAREA RUNOFF(CFS) = 24.76  
 EFFECTIVE AREA(ACRES) = 40.60 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32

TOTAL AREA(ACRES) = 40.6 PEAK FLOW RATE(CFS) = 82.18

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.69 HALFSTREET FLOOD WIDTH(FEET) = 30.92  
 FLOW VELOCITY(FEET/SEC.) = 5.10 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.53  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 224.00 = 2485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 463.00  
 FLOW LENGTH(FEET) = 1760.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.23  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 82.18  
 PIPE TRAVEL TIME(MIN.) = 1.70 Tc(MIN.) = 20.01  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 225.00 = 4245.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.01  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.199  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.20	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	0.30	0.30	0.350	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	2.00	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.235  
 SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 22.03  
 EFFECTIVE AREA(ACRES) = 52.10 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 52.1 PEAK FLOW RATE(CFS) = 98.89

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.01  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.199  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.40	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
CONDOMINIUMS	B	0.70	0.30	0.350	56

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      6.40     0.30      0.500     56
CONDOMINIUMS          B      0.90     0.30      0.350     56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      5.20     0.30      0.500     56
CONDOMINIUMS          B      0.80     0.30      0.350     56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.481
SUBAREA AREA(ACRES) = 13.30      SUBAREA RUNOFF(CFS) = 24.60
EFFECTIVE AREA(ACRES) = 65.40     AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 65.4         PEAK FLOW RATE(CFS) = 123.49

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*****
FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 425.00
FLOW LENGTH(FEET) = 639.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.25
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 123.49
PIPE TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 20.45
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 226.00 = 4884.00 FEET.

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*****
FLOW PROCESS FROM NODE 226.00 TO NODE 226.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.45
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.174
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B      2.90     0.30     0.200     56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      2.90     0.30     0.500     56
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B      6.30     0.30     0.200     56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      6.00     0.30     0.500     56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348
SUBAREA AREA(ACRES) = 18.10      SUBAREA RUNOFF(CFS) = 33.71
EFFECTIVE AREA(ACRES) = 83.50     AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 83.5         PEAK FLOW RATE(CFS) = 155.68

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*****
FLOW PROCESS FROM NODE 226.00 TO NODE 243.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

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>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 653.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.32
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 155.68
PIPE TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 20.92
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 243.00 = 5537.00 FEET.

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.92
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.146
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B      2.90     0.30     0.200     56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      1.60     0.30     0.500     56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307
SUBAREA AREA(ACRES) = 4.50      SUBAREA RUNOFF(CFS) = 8.32
EFFECTIVE AREA(ACRES) = 88.00     AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 88.0         PEAK FLOW RATE(CFS) = 161.93

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 20.92
RAINFALL INTENSITY(INCH/HR) = 2.15
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.34
EFFECTIVE STREAM AREA(ACRES) = 88.00
TOTAL STREAM AREA(ACRES) = 88.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 161.93

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FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 547.50

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

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SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.751  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.891  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 APARTMENTS B 0.60 0.30 0.200 56 8.75  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 2.07  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 2.07

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 547.50 DOWNSTREAM(FEET) = 541.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 802.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 3.00  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.214  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 APARTMENTS B 0.20 0.30 0.200 56  
 COMMERCIAL B 5.90 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.85  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.24  
 AVERAGE FLOW DEPTH(FEET) = 1.02 TRAVEL TIME(MIN.) = 2.55  
 Tc(MIN.) = 11.30  
 SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 17.47  
 EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 19.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.26 FLOW VELOCITY(FEET/SEC.) = 6.08  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1132.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 541.00 DOWNSTREAM(FEET) = 533.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 849.00 CHANNEL SLOPE = 0.0094  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.921  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 14.90 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.59  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.64  
 AVERAGE FLOW DEPTH(FEET) = 1.59 TRAVEL TIME(MIN.) = 1.85  
 Tc(MIN.) = 13.16  
 SUBAREA AREA(ACRES) = 14.90 SUBAREA RUNOFF(CFS) = 38.77  
 EFFECTIVE AREA(ACRES) = 21.60 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 21.6 PEAK FLOW RATE(CFS) = 56.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.83 FLOW VELOCITY(FEET/SEC.) = 8.40  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1981.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.16  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.921  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 APARTMENTS B 0.20 0.30 0.200 56  
 COMMERCIAL B 1.80 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124  
 SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 5.45  
 EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 61.63

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.16  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.921  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.40 0.30 0.100 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 COMMERCIAL B 1.30 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.117  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.68  
 EFFECTIVE AREA(ACRES) = 25.50 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 25.5 PEAK FLOW RATE(CFS) = 66.30

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31

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=====
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 537.00 DOWNSTREAM(FEET) = 510.00
FLOW LENGTH(FEET) = 513.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.33
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 66.30
PIPE TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 13.60
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2494.00 FEET.

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

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=====
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.60
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.851
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B        9.40    0.30    0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 23.10
EFFECTIVE AREA(ACRES) = 34.90 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 34.9 PEAK FLOW RATE(CFS) = 87.80

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

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=====
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.60
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.851
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        0.70    0.30    0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B        2.50    0.30    0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 7.90
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 95.70

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 478.00
FLOW LENGTH(FEET) = 474.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.43
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 95.70
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 13.93
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 2968.00 FEET.

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*****
FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.93
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.798
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        1.70    0.30    0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B        1.60    0.30    0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 8.04
EFFECTIVE AREA(ACRES) = 41.40 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21
TOTAL AREA(ACRES) = 41.4 PEAK FLOW RATE(CFS) = 101.92

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*****
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 478.00 DOWNSTREAM(FEET) = 471.00
FLOW LENGTH(FEET) = 473.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.61
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 101.92
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 14.51
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 3441.00 FEET.

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*****
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.51
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.706
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        1.40    0.30    0.200    56

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RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 7.10 0.30 0.400 56  
 APARTMENTS B 2.70 0.30 0.200 56  
 COMMERCIAL B 1.10 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
 SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 28.94  
 EFFECTIVE AREA(ACRES) = 53.70 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA(ACRES) = 53.7 PEAK FLOW RATE(CFS) = 127.44

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.51  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.706  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.90 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 5.40 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
 COMMERCIAL B 0.60 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.378  
 SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 23.10  
 EFFECTIVE AREA(ACRES) = 63.60 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 63.6 PEAK FLOW RATE(CFS) = 150.54

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 471.00 DOWNSTREAM(FEET) = 468.00  
 FLOW LENGTH(FEET) = 283.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.18  
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 150.54  
 PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 14.87  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 237.00 = 3724.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.87  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.649  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 6.10 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.60 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.218  
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 15.58  
 EFFECTIVE AREA(ACRES) = 70.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 70.3 PEAK FLOW RATE(CFS) = 162.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 468.00 DOWNSTREAM(FEET) = 461.00  
 FLOW LENGTH(FEET) = 698.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.24  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 162.88  
 PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 15.75  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 238.00 = 4422.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.75  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.565  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 8.40 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.220  
 SUBAREA AREA(ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 20.24  
 EFFECTIVE AREA(ACRES) = 79.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 79.3 PEAK FLOW RATE(CFS) = 177.76

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 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.75  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.565  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B          2.10      0.30      0.200      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 2.10      SUBAREA RUNOFF (CFS) = 4.73
EFFECTIVE AREA (ACRES) = 81.40      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.25
TOTAL AREA (ACRES) = 81.4      PEAK FLOW RATE (CFS) = 182.49

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FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 461.00 DOWNSTREAM(FEET) = 440.00
FLOW LENGTH(FEET) = 582.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 22.09
ESTIMATED PIPE DIAMETER(INCH) = 45.00      NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 182.49
PIPE TRAVEL TIME (MIN.) = 0.44      Tc (MIN.) = 16.19
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 5004.00 FEET.

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FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.19
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.527
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B          5.00      0.30      0.200      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 5.00      SUBAREA RUNOFF (CFS) = 11.10
EFFECTIVE AREA (ACRES) = 86.40      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 86.4      PEAK FLOW RATE (CFS) = 190.83

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FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 418.00
FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 21.64
ESTIMATED PIPE DIAMETER(INCH) = 45.00      NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 190.83
PIPE TRAVEL TIME (MIN.) = 0.50      Tc (MIN.) = 16.69
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 5654.00 FEET.

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FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.69
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.484
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B          5.30      0.30      0.200      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 5.30      SUBAREA RUNOFF (CFS) = 11.56
EFFECTIVE AREA (ACRES) = 91.70      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 91.7      PEAK FLOW RATE (CFS) = 199.06

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FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.69
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.484
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B          1.20      0.30      0.200      56
COMMERCIAL              B          0.20      0.30      0.100      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186
SUBAREA AREA (ACRES) = 1.40      SUBAREA RUNOFF (CFS) = 3.06
EFFECTIVE AREA (ACRES) = 93.10      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 93.1      PEAK FLOW RATE (CFS) = 202.12

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FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.69
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.484
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B          1.20      0.30      0.200      56
SCHOOL                  B          0.70      0.30      0.600      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA (ACRES) = 1.90      SUBAREA RUNOFF (CFS) = 4.07
EFFECTIVE AREA (ACRES) = 95.00      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24

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TOTAL AREA (ACRES) = 95.0 PEAK FLOW RATE (CFS) = 206.18

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FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 418.00 DOWNSTREAM(FEET) = 404.00
FLOW LENGTH(FEET) = 1279.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 42.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.43
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 206.18
PIPE TRAVEL TIME(MIN.) = 1.48 Tc(MIN.) = 18.17
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 241.00 = 6933.00 FEET.

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FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.17
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.357
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.10 0.30 0.200 56
COMMERCIAL B 1.20 0.30 0.100 56
PUBLIC PARK B 6.30 0.30 0.850 56
SCHOOL B 4.60 0.30 0.600 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.60 0.30 0.200 56
COMMERCIAL B 4.00 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 18.80 SUBAREA RUNOFF(CFS) = 37.41
EFFECTIVE AREA(ACRES) = 113.80 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 113.8 PEAK FLOW RATE(CFS) = 232.75

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FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.17
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.357
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK B 3.90 0.30 0.850 56
SCHOOL B 10.80 0.30 0.600 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.666
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 28.54
EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 261.29

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 403.00
FLOW LENGTH(FEET) = 66.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 46.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.06
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 261.29
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 18.23
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 6999.00 FEET.

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FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.23
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.352
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.40 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 16.40 0.30 0.200 56
COMMERCIAL B 1.30 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.193
SUBAREA AREA(ACRES) = 19.10 SUBAREA RUNOFF(CFS) = 39.43
EFFECTIVE AREA(ACRES) = 147.60 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 147.6 PEAK FLOW RATE(CFS) = 300.08

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 1270.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 56.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.26
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 300.08
PIPE TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 19.83
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

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FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81



>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 19.83  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.215  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.00	0.30	0.200	56
PUBLIC PARK	B	2.00	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.80	0.30	0.200	56
COMMERCIAL	B	1.50	0.30	0.100	56
CONDOMINIUMS	B	0.10	0.30	0.350	56
PUBLIC PARK	B	1.10	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.421  
 SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 15.98  
 EFFECTIVE AREA(ACRES) = 156.10 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32  
 TOTAL AREA(ACRES) = 156.1 PEAK FLOW RATE(CFS) = 300.08  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

-----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 19.83  
 RAINFALL INTENSITY(INCH/HR) = 2.21  
 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.32  
 EFFECTIVE STREAM AREA(ACRES) = 156.10  
 TOTAL STREAM AREA(ACRES) = 156.10  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 300.08

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	161.93	20.92	2.146	0.30( 0.10)	0.34	88.0	220.50
2	300.08	19.83	2.215	0.30( 0.09)	0.32	156.1	230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	458.74	19.83	2.215	0.30( 0.10)	0.32	239.5	230.00
2	452.31	20.92	2.146	0.30( 0.10)	0.32	244.1	220.50

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 458.74 Tc(MIN.) = 19.83  
 EFFECTIVE AREA(ACRES) = 239.52 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32  
 TOTAL AREA(ACRES) = 244.1  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 244.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 394.00 DOWNSTREAM(FEET) = 340.00  
 FLOW LENGTH(FEET) = 849.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 33.71  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 458.74  
 PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 20.25  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 244.00 = 9118.00 FEET.

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FLOW PROCESS FROM NODE 244.00 TO NODE 244.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN.) = 20.25  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.185  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.70	0.30	0.500	56
PUBLIC PARK	B	0.30	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
PUBLIC PARK	B	0.10	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.537  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.47  
 EFFECTIVE AREA(ACRES) = 242.52 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33  
 TOTAL AREA(ACRES) = 247.1 PEAK FLOW RATE(CFS) = 458.74  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 244.00 TO NODE 245.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 315.00  
 FLOW LENGTH(FEET) = 777.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.42  
 ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 458.74  
 PIPE TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 20.74

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.74

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.157

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56

PUBLIC PARK B 0.20 0.30 0.850 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56

PUBLIC PARK B 0.10 0.30 0.850 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631

SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 1.42

EFFECTIVE AREA(ACRES) = 243.32 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33

TOTAL AREA(ACRES) = 247.9 PEAK FLOW RATE(CFS) = 458.74

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	458.74	20.74	2.157	0.30( 0.10)	0.33	243.3	230.00
2	452.31	21.83	2.092	0.30( 0.10)	0.33	247.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	288.39	17.09	2.450	0.30( 0.13)	0.44	138.3	210.00
2	262.02	20.13	2.193	0.30( 0.13)	0.44	141.3	200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	720.23	17.09	2.450	0.30( 0.11)	0.37	338.8	210.00
2	714.99	20.13	2.193	0.30( 0.11)	0.37	377.4	200.00
3	716.17	20.74	2.157	0.30( 0.11)	0.37	384.6	230.00
4	701.60	21.83	2.092	0.30( 0.11)	0.37	389.2	220.50

TOTAL AREA(ACRES) = 389.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 720.23 Tc(MIN.) = 17.088

EFFECTIVE AREA(ACRES) = 338.77 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 389.2

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 3 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 246.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 306.00

FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 84.0 INCH PIPE IS 67.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.65

ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 720.23

PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 17.57

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 246.00 = 10514.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.57

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.409

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.90 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.50 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56

CONDOMINIUMS B 9.10 0.30 0.350 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.80 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.410

SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 33.53

EFFECTIVE AREA(ACRES) = 355.07 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38

TOTAL AREA(ACRES) = 405.5 PEAK FLOW RATE(CFS) = 733.81

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.57  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.409  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.60	0.30	0.400	56
CONDOMINIUMS	B	7.40	0.30	0.350	56
PUBLIC PARK	B	0.30	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.375  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 19.22  
 EFFECTIVE AREA(ACRES) = 364.37 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 414.8 PEAK FLOW RATE(CFS) = 753.03

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 246.00 TO NODE 247.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 306.00 DOWNSTREAM(FEET) = 300.00  
 FLOW LENGTH(FEET) = 185.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 75.0 INCH PIPE IS 57.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 29.88  
 ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 753.03  
 PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 17.67  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 247.00 = 10699.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 17.67  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.400  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.30	0.30	0.400	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.413  
 SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 4.10  
 EFFECTIVE AREA(ACRES) = 366.37 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 416.8 PEAK FLOW RATE(CFS) = 754.23

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 17.67  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.400  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.40	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.80	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.365  
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 5.36  
 EFFECTIVE AREA(ACRES) = 368.97 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 419.4 PEAK FLOW RATE(CFS) = 759.59

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 271.00  
 FLOW LENGTH(FEET) = 859.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 75.0 INCH PIPE IS 56.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 30.45  
 ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 759.59  
 PIPE TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 18.14  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 18.14  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.60	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.60	0.30	0.400	56
COMMERCIAL	B	1.00	0.30	0.100	56

NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356  
 SUBAREA AREA(ACRES) = 4.80 SUBAREA RUNOFF(CFS) = 9.73  
 EFFECTIVE AREA(ACRES) = 373.77 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 424.2 PEAK FLOW RATE(CFS) = 759.59  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
 MAINLINE Tc(MIN.) = 18.14  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.50 0.30 0.400 56  
 COMMERCIAL B 0.30 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367  
 SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.82  
 EFFECTIVE AREA(ACRES) = 374.67 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 425.1 PEAK FLOW RATE(CFS) = 759.59  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
 MAINLINE Tc(MIN.) = 18.14  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 2.20 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.80 0.30 0.400 56  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 3.20 0.30 0.500 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.466  
 SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 16.38  
 EFFECTIVE AREA(ACRES) = 382.87 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 433.3 PEAK FLOW RATE(CFS) = 774.13

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
 MAINLINE Tc(MIN.) = 18.14  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 5.70 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 11.49  
 EFFECTIVE AREA(ACRES) = 388.57 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 439.0 PEAK FLOW RATE(CFS) = 785.62

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
 MAINLINE Tc(MIN.) = 18.14  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 6.40 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.40 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.60 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 8.40 SUBAREA RUNOFF(CFS) = 15.57  
 EFFECTIVE AREA(ACRES) = 396.97 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA(ACRES) = 447.4 PEAK FLOW RATE(CFS) = 801.19

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00

ELEVATION DATA: UPSTREAM(FEET) = 413.04 DOWNSTREAM(FEET) = 405.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.928

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.578

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
CONDOMINIUMS RESIDENTIAL	B	0.20	0.30	0.350	56	7.70
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56	6.93
CONDOMINIUMS	B	0.10	0.30	0.350	56	7.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.312  
SUBAREA RUNOFF(CFS) = 1.61  
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.61

\*\*\*\*\*

FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 405.00 DOWNSTREAM ELEVATION(FEET) = 385.00

STREET LENGTH(FEET) = 587.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.94

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.31

HALFSTREET FLOOD WIDTH(FEET) = 8.16

AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.77

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.16

STREET FLOW TRAVEL TIME(MIN.) = 2.60 Tc(MIN.) = 9.52

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.599

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.20	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.224  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 8.58  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.07

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24

TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 9.85

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.51

FLOW VELOCITY(FEET/SEC.) = 4.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.46

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 917.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 385.00 DOWNSTREAM(FEET) = 378.50

FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.9 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.26

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 9.85

PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 9.76

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1079.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.76

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.509

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56
COMMERCIAL	B	1.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 7.51

EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.05

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18

TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 17.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 378.50 DOWNSTREAM(FEET) = 348.50

FLOW LENGTH(FEET) = 637.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 13.57

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 17.11

PIPE TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 10.55

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 1716.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.55

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.334

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.60	0.30	0.500	56
COMMERCIAL	B	1.70	0.30	0.100	56
CONDOMINIUMS	B	1.00	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
COMMERCIAL	B	0.70	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.240					
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 13.21					
EFFECTIVE AREA(ACRES) = 10.00 AREA-AVERAGED Fm(INCH/HR) = 0.06					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21					
TOTAL AREA(ACRES) = 10.0 PEAK FLOW RATE(CFS) = 29.45					

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 348.50 DOWNSTREAM(FEET) = 306.00  
 FLOW LENGTH(FEET) = 944.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.05  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 29.45  
 PIPE TRAVEL TIME(MIN.) = 1.05 Tc(MIN.) = 11.59  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.59

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.168

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.20	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.50	0.30	0.500	56
RESIDENTIAL					

"8-10 DWELLINGS/ACRE" B 1.90 0.30 0.400 56  
 COMMERCIAL B 2.00 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
 SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 20.13  
 EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.27  
 TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 48.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.59

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.168

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	4.40	0.30	0.200	56
COMMERCIAL	B	0.10	0.30	0.100	56
APARTMENTS	B	6.70	0.30	0.200	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.199					
SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 31.33					
EFFECTIVE AREA(ACRES) = 28.50 AREA-AVERAGED Fm(INCH/HR) = 0.07					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24					
TOTAL AREA(ACRES) = 28.5 PEAK FLOW RATE(CFS) = 79.42					

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.59

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.168

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.10	0.30	1.000	66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 8.00					
EFFECTIVE AREA(ACRES) = 31.60 AREA-AVERAGED Fm(INCH/HR) = 0.09					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31					
TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 87.42					

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 11.59  
 RAINFALL INTENSITY(INCH/HR) = 3.17  
 AREA-AVERAGED Fm(INCH/HR) = 0.09

AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.31  
EFFECTIVE STREAM AREA(ACRES) = 31.60  
TOTAL STREAM AREA(ACRES) = 31.60  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 87.42

\*\*\*\*\*  
FLOW PROCESS FROM NODE 400.00 TO NODE 420.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----

INITIAL SUBAREA FLOW-LENGTH(FEET) = 300.40  
ELEVATION DATA: UPSTREAM(FEET) = 312.80 DOWNSTREAM(FEET) = 310.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.115  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.131  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL B 0.50 0.30 0.100 56 8.11  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 1.85  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<  
-----

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 307.00  
STREET LENGTH(FEET) = 266.50 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 67.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 62.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.78  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 10.18  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.58  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.87  
STREET FLOW TRAVEL TIME(MIN.) = 1.72 Tc(MIN.) = 9.83  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.483

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.60 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.86  
EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 3.42

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 11.21  
FLOW VELOCITY(FEET/SEC.) = 2.71 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.96  
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.00 = 566.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.00 TO NODE 421.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 307.00 DOWNSTREAM(FEET) = 305.50  
FLOW LENGTH(FEET) = 105.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.82  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 3.42  
PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 10.13  
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.10 = 671.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
-----

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 10.13  
RAINFALL INTENSITY(INCH/HR) = 3.40  
AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 1.10  
TOTAL STREAM AREA(ACRES) = 1.10  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.42

\*\* CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 87.42 11.59 3.168 0.30( 0.09) 0.31 31.6 300.00  
2 3.42 10.13 3.399 0.30( 0.03) 0.10 1.1 400.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 85.59 10.13 3.399 0.30( 0.09) 0.31 28.7 400.00

2 90.61 11.59 3.168 0.30( 0.09) 0.31 32.7 300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 90.61 Tc(MIN.) = 11.59
EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.7
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 426.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 305.50 DOWNSTREAM(FEET) = 301.00
FLOW LENGTH(FEET) = 261.40 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.98
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.61
PIPE TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 11.90
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.10 = 2921.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.90
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.119
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.54
EFFECTIVE AREA(ACRES) = 32.90 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.9 PEAK FLOW RATE(CFS) = 90.61
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.20 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 289.00
FLOW LENGTH(FEET) = 448.56 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.51
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.61
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 12.36
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.20 = 3369.96 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.20 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.36
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.047
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.32
EFFECTIVE AREA(ACRES) = 33.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 33.4 PEAK FLOW RATE(CFS) = 90.61
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.30 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 289.00 DOWNSTREAM(FEET) = 282.00
FLOW LENGTH(FEET) = 260.45 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.54
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.61
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 12.62
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.30 = 3630.41 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.30 TO NODE 426.30 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.62
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.006
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.80 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 2.86
EFFECTIVE AREA(ACRES) = 34.50 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 34.5 PEAK FLOW RATE(CFS) = 90.61



NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 426.30 TO NODE 248.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 271.00
FLOW LENGTH(FEET) = 411.44 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.50
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.61
PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 13.03
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.
*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.03
RAINFALL INTENSITY(INCH/HR) = 2.94
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 34.50
TOTAL STREAM AREA(ACRES) = 34.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 90.61
*****
FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----
INITIAL SUBAREA FLOW-LENGTH(FEET) = 233.60
ELEVATION DATA: UPSTREAM(FEET) = 306.50 DOWNSTREAM(FEET) = 301.80

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.882
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.972
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.20 0.30 0.100 56 5.88
COMMERCIAL B 0.20 0.30 0.100 56 5.88
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 1.78
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.78
*****
FLOW PROCESS FROM NODE 426.00 TO NODE 427.00 IS CODE = 61
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 301.80 DOWNSTREAM ELEVATION(FEET) = 294.00
STREET LENGTH(FEET) = 478.70 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.00
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.34
HALFSTREET FLOOD WIDTH(FEET) = 10.23
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.77
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.94
STREET FLOW TRAVEL TIME(MIN.) = 2.88 Tc(MIN.) = 8.76
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.886
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.20 0.30 0.100 56
COMMERCIAL B 0.50 0.30 0.100 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 2.43
EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 3.82

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.42
FLOW VELOCITY(FEET/SEC.) = 2.93 DEPTH*VELOCITY(FT*FT/SEC.) = 1.05
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 427.00 = 712.30 FEET.
*****
FLOW PROCESS FROM NODE 427.00 TO NODE 428.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 294.00 DOWNSTREAM ELEVATION(FEET) = 286.00
STREET LENGTH(FEET) = 300.80 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
```

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.58

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.35

HALFSTREET FLOOD WIDTH(FEET) = 11.07

AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.70

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.30

STREET FLOW TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 10.12

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.401

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.52

EFFECTIVE AREA(ACRES) = 1.60 AREA-AVERAGED Fm(INCH/HR) = 0.03

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 4.85

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.39

FLOW VELOCITY(FEET/SEC.) = 3.74 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.34

LONGEST FLOWPATH FROM NODE 425.00 TO NODE 428.00 = 1013.10 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 428.00 TO NODE 429.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 286.00 DOWNSTREAM ELEVATION(FEET) = 276.00

STREET LENGTH(FEET) = 242.40 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.44

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.35

HALFSTREET FLOOD WIDTH(FEET) = 10.85

AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.54

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.58

STREET FLOW TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 11.01

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.16

EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.03

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 5.81

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 11.18

FLOW VELOCITY(FEET/SEC.) = 4.62 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.64

LONGEST FLOWPATH FROM NODE 425.00 TO NODE 429.00 = 1255.50 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 429.00 TO NODE 429.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.01

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.50	0.30	0.400	56

RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 1.50 0.30 0.400 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 5.65

EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.08

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25

TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 11.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 429.00 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 273.00

FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.45

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 11.47

PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 11.17

LONGEST FLOWPATH FROM NODE 425.00 TO NODE 248.00 = 1355.50 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 11.17

RAINFALL INTENSITY(INCH/HR) = 3.23

AREA-AVERAGED Fm(INCH/HR) = 0.08  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.25  
EFFECTIVE STREAM AREA(ACRES) = 4.00  
TOTAL STREAM AREA(ACRES) = 4.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.47

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	86.31	11.59	3.169	0.30(0.09)	0.31	30.5	400.00
1	90.61	13.03	2.940	0.30(0.09)	0.31	34.5	300.00
2	11.47	11.17	3.235	0.30(0.08)	0.25	4.0	425.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	96.45	11.17	3.235	0.30(0.09)	0.30	33.4	425.00
2	97.54	11.59	3.169	0.30(0.09)	0.30	34.5	400.00
3	101.01	13.03	2.940	0.30(0.09)	0.31	38.5	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 101.01 Tc(MIN.) = 13.03  
EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.09  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
TOTAL AREA(ACRES) = 38.5  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 11

=====  
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<  
=====

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	96.45	11.17	3.235	0.30(0.09)	0.30	33.4	425.00
2	97.54	11.59	3.169	0.30(0.09)	0.30	34.5	400.00
3	101.01	13.03	2.940	0.30(0.09)	0.31	38.5	300.00

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	801.19	18.14	2.360	0.30(0.12)	0.39	397.0	210.00
2	790.08	21.18	2.131	0.30(0.12)	0.39	435.6	200.00
3	788.87	21.79	2.095	0.30(0.12)	0.38	442.8	230.00
4	771.04	22.89	2.030	0.30(0.12)	0.38	447.4	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	782.38	11.17	3.235	0.30(0.11)	0.38	277.9	425.00

2	794.10	11.59	3.169	0.30(0.11)	0.38	288.2	400.00
3	825.71	13.03	2.940	0.30(0.11)	0.38	323.8	300.00
4	881.62	18.14	2.360	0.30(0.11)	0.38	435.5	210.00
5	862.39	21.18	2.131	0.30(0.11)	0.38	474.1	200.00
6	859.90	21.79	2.095	0.30(0.11)	0.38	481.3	230.00
7	839.78	22.89	2.030	0.30(0.11)	0.38	485.9	220.50

TOTAL AREA(ACRES) = 485.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 881.62 Tc(MIN.) = 18.138  
EFFECTIVE AREA(ACRES) = 435.47 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA(ACRES) = 485.9  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 12

=====  
>>>>CLEAR MEMORY BANK # 1<<<<  
=====

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 249.00 IS CODE = 31

=====  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 261.00  
FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 81.0 INCH PIPE IS 62.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.76  
ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 881.62  
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 18.33  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 10

=====  
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<  
=====

\*\*\*\*\*  
FLOW PROCESS FROM NODE 429.00 TO NODE 430.00 IS CODE = 21

=====  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 262.70

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.459  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.755  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL B 0.20 0.30 0.100 56 6.46

COMMERCIAL B 0.40 0.30 0.100 56 6.46  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF (CFS) = 2.55  
TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 2.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 61  
-----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
>>>> (STANDARD CURB SECTION USED) <<<<<

=====

UPSTREAM ELEVATION (FEET) = 262.70 DOWNSTREAM ELEVATION (FEET) = 258.98  
STREET LENGTH (FEET) = 345.60 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 51.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.59

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.37  
HALFSTREET FLOOD WIDTH (FEET) = 12.22  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.45  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.91  
STREET FLOW TRAVEL TIME (MIN.) = 2.35 Tc (MIN.) = 8.81  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.869

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.50	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 2.07  
EFFECTIVE AREA (ACRES) = 1.20 AREA-AVERAGED Fm (INCH/HR) = 0.03  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA (ACRES) = 1.2 PEAK FLOW RATE (CFS) = 4.15

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.39 HALFSTREET FLOOD WIDTH (FEET) = 13.02  
FLOW VELOCITY (FEET/SEC.) = 2.53 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.98  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.00 = 675.60 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.00 TO NODE 431.10 IS CODE = 31  
-----

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<  
>>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 258.98 DOWNSTREAM (FEET) = 258.00  
FLOW LENGTH (FEET) = 91.03 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.9 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.53  
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 4.15  
PIPE TRAVEL TIME (MIN.) = 0.27 Tc (MIN.) = 9.08  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.10 = 766.63 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
-----

>>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE <<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 9.08  
RAINFALL INTENSITY (INCH/HR) = 3.77  
AREA-AVERAGED Fm (INCH/HR) = 0.03  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA (ACRES) = 1.20  
TOTAL STREAM AREA (ACRES) = 1.20  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 4.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 410.00 TO NODE 440.00 IS CODE = 21  
-----

>>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS <<<<<  
>> USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA <<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 299.70  
ELEVATION DATA: UPSTREAM (FEET) = 312.69 DOWNSTREAM (FEET) = 310.80

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.196  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.100  
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.40	0.30	0.100	56	8.20

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF (CFS) = 1.47  
TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 1.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 61  
-----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
>>>> (STANDARD CURB SECTION USED) <<<<<

=====

UPSTREAM ELEVATION (FEET) = 310.80 DOWNSTREAM ELEVATION (FEET) = 306.50  
STREET LENGTH (FEET) = 299.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 55.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.07  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 8.81  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.42  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.76  
STREET FLOW TRAVEL TIME(MIN.) = 2.06 Tc(MIN.) = 10.26  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.379

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.10 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.21  
EFFECTIVE AREA(ACRES) = 0.80 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 2.41

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 9.46  
FLOW VELOCITY(FEET/SEC.) = 2.52 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.82  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 441.00 = 598.70 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 306.50 DOWNSTREAM ELEVATION(FEET) = 299.00  
STREET LENGTH(FEET) = 341.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.24  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.33  
HALFSTREET FLOOD WIDTH(FEET) = 9.83  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.18  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.06  
STREET FLOW TRAVEL TIME(MIN.) = 1.79 Tc(MIN.) = 12.04  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.097

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.20 0.30 0.100 56  
COMMERCIAL B 0.40 0.30 0.100 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.66  
EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 3.86

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.73  
FLOW VELOCITY(FEET/SEC.) = 3.29 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.14  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 442.00 = 940.30 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 299.00 DOWNSTREAM ELEVATION(FEET) = 288.50  
STREET LENGTH(FEET) = 390.10 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.62  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 11.13  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.70  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.31  
STREET FLOW TRAVEL TIME(MIN.) = 1.76 Tc(MIN.) = 13.80  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.819

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.30 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.51  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 5.02

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.52

FLOW VELOCITY(FEET/SEC.) = 3.79 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.37  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 443.00 = 1330.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 443.00 TO NODE 444.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 288.50 DOWNSTREAM ELEVATION(FEET) = 281.00  
STREET LENGTH(FEET) = 272.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.49  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 12.02  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.85  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.42  
STREET FLOW TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 14.98  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.632

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.40 0.30 0.100 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.94  
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 5.62

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 12.12  
FLOW VELOCITY(FEET/SEC.) = 3.89 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.44  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 444.00 = 1603.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 444.00 TO NODE 445.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 281.00 DOWNSTREAM ELEVATION(FEET) = 268.10  
STREET LENGTH(FEET) = 462.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.39  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 12.82  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.01  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.53  
STREET FLOW TRAVEL TIME(MIN.) = 1.92 Tc(MIN.) = 16.90  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.466

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.70 0.30 0.100 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.53  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 6.80

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 13.12  
FLOW VELOCITY(FEET/SEC.) = 4.10 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.59  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 445.00 = 2065.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 445.00 TO NODE 446.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 268.10 DOWNSTREAM ELEVATION(FEET) = 257.00  
STREET LENGTH(FEET) = 532.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.80  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.42  
HALFSTREET FLOOD WIDTH(FEET) = 14.83  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.78  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.57  
STREET FLOW TRAVEL TIME(MIN.) = 2.35 Tc(MIN.) = 19.25  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.264

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.60	0.30	0.100	56
COMMERCIAL	B	0.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 2.01  
 EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 8.24

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 15.15  
 FLOW VELOCITY(FEET/SEC.) = 3.84 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.62  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 446.00 = 2598.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 446.00 TO NODE 431.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 257.00 DOWNSTREAM(FEET) = 256.50  
 FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.88  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 8.24  
 PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 19.60  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 19.60  
 RAINFALL INTENSITY(INCH/HR) = 2.23  
 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.10  
 EFFECTIVE STREAM AREA(ACRES) = 4.10  
 TOTAL STREAM AREA(ACRES) = 4.10  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.24

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	4.15	9.08	3.765	0.30( 0.03)	0.10	1.2	429.00
2	8.24	19.60	2.235	0.30( 0.03)	0.10	4.1	410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	10.62	9.08	3.765	0.30( 0.03)	0.10	3.1	429.00
2	10.69	19.60	2.235	0.30( 0.03)	0.10	5.3	410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 10.69 Tc(MIN.) = 19.60  
 EFFECTIVE AREA(ACRES) = 5.30 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 5.3  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 249.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 258.00 DOWNSTREAM(FEET) = 257.00  
 FLOW LENGTH(FEET) = 230.42 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.95  
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 10.69  
 PIPE TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 20.37  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	10.62	9.86	3.472	0.30( 0.03)	0.10	3.1	429.00
2	10.69	20.37	2.178	0.30( 0.03)	0.10	5.3	410.00

LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	782.38	11.37	3.204	0.30( 0.11)	0.38	277.9	425.00
2	794.10	11.79	3.137	0.30( 0.11)	0.38	288.2	400.00
3	825.71	13.23	2.909	0.30( 0.11)	0.38	323.8	300.00
4	881.62	18.33	2.343	0.30( 0.11)	0.38	435.5	210.00
5	862.39	21.37	2.119	0.30( 0.11)	0.38	474.1	200.00
6	859.90	21.98	2.083	0.30( 0.11)	0.38	481.3	230.00
7	839.78	23.09	2.018	0.30( 0.11)	0.38	485.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	748.33	9.86	3.472	0.30( 0.11)	0.38	244.2	429.00

2	793.01	11.37	3.204	0.30	( 0.11)	0.38	281.3	425.00
3	804.73	11.79	3.137	0.30	( 0.11)	0.38	291.7	400.00
4	836.36	13.23	2.909	0.30	( 0.11)	0.38	327.6	300.00
5	892.30	18.33	2.343	0.30	( 0.11)	0.38	440.3	210.00
6	879.40	20.37	2.178	0.30	( 0.11)	0.38	466.7	410.00
7	872.79	21.37	2.119	0.30	( 0.11)	0.38	479.4	200.00
8	870.12	21.98	2.083	0.30	( 0.11)	0.38	486.6	230.00
9	849.67	23.09	2.018	0.30	( 0.11)	0.37	491.2	220.50
TOTAL AREA (ACRES) =			491.2					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 892.30 Tc (MIN.) = 18.332  
EFFECTIVE AREA (ACRES) = 440.34 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA (ACRES) = 491.2  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<<

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 491.2 TC (MIN.) = 18.33  
EFFECTIVE AREA (ACRES) = 440.34 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.380  
PEAK FLOW RATE (CFS) = 892.30

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	748.33	9.86	3.472	0.30 ( 0.11)	0.38	244.2	429.00
2	793.01	11.37	3.204	0.30 ( 0.11)	0.38	281.3	425.00
3	804.73	11.79	3.137	0.30 ( 0.11)	0.38	291.7	400.00
4	836.36	13.23	2.909	0.30 ( 0.11)	0.38	327.6	300.00
5	892.30	18.33	2.343	0.30 ( 0.11)	0.38	440.3	210.00
6	879.40	20.37	2.178	0.30 ( 0.11)	0.38	466.7	410.00
7	872.79	21.37	2.119	0.30 ( 0.11)	0.38	479.4	200.00
8	870.12	21.98	2.083	0.30 ( 0.11)	0.38	486.6	230.00
9	849.67	23.09	2.018	0.30 ( 0.11)	0.37	491.2	220.50

END OF RATIONAL METHOD ANALYSIS



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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

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FILE NAME: 0506101C.DAT  
TIME/DATE OF STUDY: 12:41 04/15/2013  
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--\*TIME-OF-CONCENTRATION MODEL\*--  
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\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10100.00 TO NODE 10101.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 327.00

ELEVATION DATA: UPSTREAM (FEET) = 895.00 DOWNSTREAM (FEET) = 820.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.606

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.971

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER

"GRASS" - 0.10 0.30 1.000 98 9.61

NATURAL FAIR COVER

"OPEN BRUSH" - 0.30 0.30 1.000 98 9.61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 0.96

TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 0.96

\*\*\*\*\*

FLOW PROCESS FROM NODE 10101.00 TO NODE 10102.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

=====

ELEVATION DATA: UPSTREAM (FEET) = 820.00 DOWNSTREAM (FEET) = 790.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 152.00 CHANNEL SLOPE = 0.1974

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00

CHANNEL FLOW THRU SUBAREA (CFS) = 0.96

FLOW VELOCITY (FEET/SEC.) = 4.16 FLOW DEPTH (FEET) = 0.28

TRAVEL TIME (MIN.) = 0.61 Tc (MIN.) = 10.21

LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10102.00 = 479.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10102.00 TO NODE 10102.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

=====

MAINLINE Tc (MIN.) = 10.21

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.868

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

```

LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.50     0.30      1.000     -
USER-DEFINED  -        0.30     0.30      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.80 SUBAREA RUNOFF (CFS) = 1.85
EFFECTIVE AREA (ACRES) = 1.20 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.2 PEAK FLOW RATE (CFS) = 2.77

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*****
FLOW PROCESS FROM NODE 10102.00 TO NODE 10103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 762.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.1400
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.77
FLOW VELOCITY(FEET/SEC.) = 4.82 FLOW DEPTH(FEET) = 0.44
TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 10.91
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10103.00 = 679.00 FEET.

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 10.91
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.764
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -        0.40   0.30    1.000   -
USER-DEFINED       -        0.80   0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 2.66
EFFECTIVE AREA (ACRES) = 2.40 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 2.4 PEAK FLOW RATE (CFS) = 5.32

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 762.00 DOWNSTREAM(FEET) = 754.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 124.00 CHANNEL SLOPE = 0.0645
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.32
FLOW VELOCITY(FEET/SEC.) = 4.28 FLOW DEPTH(FEET) = 0.64
TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 11.39
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10104.00 = 803.00 FEET.

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.39
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.696
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -        0.70   0.30    1.000   -
USER-DEFINED       -        1.10   0.30    1.000   -
USER-DEFINED       -        0.10   0.30    1.000   -
USER-DEFINED       -        0.40   0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 4.96
EFFECTIVE AREA (ACRES) = 4.70 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.7 PEAK FLOW RATE (CFS) = 10.13

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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ELEVATION DATA: UPSTREAM(FEET) = 754.00 DOWNSTREAM(FEET) = 740.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00 CHANNEL SLOPE = 0.0255
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.13
FLOW VELOCITY(FEET/SEC.) = 3.56 FLOW DEPTH(FEET) = 0.97
TRAVEL TIME(MIN.) = 2.57 Tc(MIN.) = 13.96
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10105.00 = 1353.00 FEET.

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.96
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.394
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -        3.40   0.30    1.000   -
USER-DEFINED       -        0.60   0.30    1.000   -
USER-DEFINED       -        6.00   0.30    1.000   -
USER-DEFINED       -        0.60   0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 10.60 SUBAREA RUNOFF (CFS) = 19.98
EFFECTIVE AREA (ACRES) = 15.30 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 15.3 PEAK FLOW RATE (CFS) = 28.84

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10106.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 740.00 DOWNSTREAM(FEET) = 623.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 929.00 CHANNEL SLOPE = 0.1259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 28.84
FLOW VELOCITY(FEET/SEC.) = 8.38 FLOW DEPTH(FEET) = 1.07
TRAVEL TIME(MIN.) = 1.85 Tc(MIN.) = 15.81
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10106.00 = 2282.00 FEET.
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10106.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.81
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.243
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 10.40 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 4.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 27.11
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 53.87
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 592.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 417.00 CHANNEL SLOPE = 0.0743
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 53.87
FLOW VELOCITY(FEET/SEC.) = 8.06 FLOW DEPTH(FEET) = 1.49
TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 16.67
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10107.00 = 2699.00 FEET.
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10107.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.67

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* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.183
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 5.10 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 2.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 16.10
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 68.30
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 592.00 DOWNSTREAM(FEET) = 590.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0333
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.000
CHANNEL FLOW THRU SUBAREA(CFS) = 68.30
FLOW VELOCITY(FEET/SEC.) = 6.33 FLOW DEPTH(FEET) = 1.90
TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 16.83
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10108.00 = 2759.00 FEET.
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.83
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.172
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 7.00 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 7.50 0.30 1.000 -
USER-DEFINED - 1.80 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 30.50
EFFECTIVE AREA(ACRES) = 58.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.4 PEAK FLOW RATE(CFS) = 98.40
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 16.83
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.172
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.20     0.30     1.000    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20     SUBAREA RUNOFF(CFS) = 0.34
EFFECTIVE AREA(ACRES) = 58.60   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.6     PEAK FLOW RATE(CFS) = 98.73

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*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10109.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 526.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 973.00 CHANNEL SLOPE = 0.0658
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 98.73
FLOW VELOCITY(FEET/SEC.) = 8.95 FLOW DEPTH(FEET) = 1.92
TRAVEL TIME(MIN.) = 1.81 Tc(MIN.) = 18.64
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10109.00 = 3732.00 FEET.

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*****
FLOW PROCESS FROM NODE 10109.00 TO NODE 10109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 18.64
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.045
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        16.40    0.30     1.000    -
USER-DEFINED        -         0.60    0.30     1.000    -
USER-DEFINED        -         3.00    0.30     1.000    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.00     SUBAREA RUNOFF(CFS) = 31.41
EFFECTIVE AREA(ACRES) = 78.60   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.6     PEAK FLOW RATE(CFS) = 123.46

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*****
FLOW PROCESS FROM NODE 10109.00 TO NODE 10110.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 526.00 DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1045.00 CHANNEL SLOPE = 0.0679

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CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 123.46
FLOW VELOCITY(FEET/SEC.) = 9.58 FLOW DEPTH(FEET) = 2.07
TRAVEL TIME(MIN.) = 1.82 Tc(MIN.) = 20.46
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10110.00 = 4777.00 FEET.

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*****
FLOW PROCESS FROM NODE 10110.00 TO NODE 10110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 20.46
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.929
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.00    0.30     1.000    -
USER-DEFINED        -         0.50    0.30     1.000    -
USER-DEFINED        -        31.60    0.30     1.000    -
USER-DEFINED        -         1.60    0.30     1.000    -
USER-DEFINED        -         0.40    0.30     1.000    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.10     SUBAREA RUNOFF(CFS) = 51.46
EFFECTIVE AREA(ACRES) = 113.70   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.7     PEAK FLOW RATE(CFS) = 166.70

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*****
FLOW PROCESS FROM NODE 10110.00 TO NODE 10111.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 675.00 CHANNEL SLOPE = 0.0667
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 166.70
FLOW VELOCITY(FEET/SEC.) = 10.24 FLOW DEPTH(FEET) = 2.33
TRAVEL TIME(MIN.) = 1.10 Tc(MIN.) = 21.56
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10111.00 = 5452.00 FEET.

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*****
FLOW PROCESS FROM NODE 10111.00 TO NODE 10111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 21.56
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.878
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         7.40    0.30     1.000    -
USER-DEFINED        -         6.00    0.30     1.000    -
USER-DEFINED        -        24.80    0.30     1.000    -
USER-DEFINED        -         0.90    0.30     1.000    -

```

USER-DEFINED - 4.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 43.20 SUBAREA RUNOFF (CFS) = 61.37  
EFFECTIVE AREA (ACRES) = 156.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 156.9 PEAK FLOW RATE (CFS) = 222.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10111.00 TO NODE 10112.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	410.00	DOWNSTREAM (FEET) =	405.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	143.00	CHANNEL SLOPE =	0.0350
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	4.00
CHANNEL FLOW THRU SUBAREA (CFS) =	222.89		
FLOW VELOCITY (FEET/SEC.) =	8.64	FLOW DEPTH (FEET) =	2.93
TRAVEL TIME (MIN.) =	0.28	Tc (MIN.) =	21.83
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10112.00 =	5595.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 21.83

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.866

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	7.90	0.30	1.000	-
USER-DEFINED	-	25.90	0.30	1.000	-
USER-DEFINED	-	19.30	0.30	1.000	-
USER-DEFINED	-	2.10	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 56.20 SUBAREA RUNOFF (CFS) = 79.20  
EFFECTIVE AREA (ACRES) = 213.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 213.1 PEAK FLOW RATE (CFS) = 300.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10113.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	405.00	DOWNSTREAM (FEET) =	363.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	1642.00	CHANNEL SLOPE =	0.0256
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	300.30		
FLOW VELOCITY (FEET/SEC.) =	8.29	FLOW DEPTH (FEET) =	3.47

TRAVEL TIME (MIN.) = 3.30 Tc (MIN.) = 25.13  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10113.00 = 7237.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 25.13

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.715

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	33.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 35.40 SUBAREA RUNOFF (CFS) = 45.10  
EFFECTIVE AREA (ACRES) = 248.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 248.5 PEAK FLOW RATE (CFS) = 316.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10114.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	363.00	DOWNSTREAM (FEET) =	340.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	918.00	CHANNEL SLOPE =	0.0251
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	316.59		
FLOW VELOCITY (FEET/SEC.) =	8.34	FLOW DEPTH (FEET) =	3.56
TRAVEL TIME (MIN.) =	1.84	Tc (MIN.) =	26.97
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10114.00 =	8155.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 26.97

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.653

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	10.10	0.30	1.000	-
USER-DEFINED	-	17.70	0.30	1.000	-
USER-DEFINED	-	52.90	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 83.10 SUBAREA RUNOFF (CFS) = 101.20

EFFECTIVE AREA(ACRES) = 331.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 331.6 PEAK FLOW RATE(CFS) = 403.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 26.97  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.653  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 1.83  
EFFECTIVE AREA(ACRES) = 333.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 333.1 PEAK FLOW RATE(CFS) = 405.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10115.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 301.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1467.00 CHANNEL SLOPE = 0.0266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 405.66  
FLOW VELOCITY(FEET/SEC.) = 9.06 FLOW DEPTH(FEET) = 3.86  
TRAVEL TIME(MIN.) = 2.70 Tc(MIN.) = 29.67  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10115.00 = 9622.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10115.00 TO NODE 10115.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 29.67  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.561  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.60 0.30 1.000 -  
USER-DEFINED - 24.30 0.30 1.000 -  
USER-DEFINED - 47.70 0.30 1.000 -  
USER-DEFINED - 9.80 0.30 1.000 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 94.00 SUBAREA RUNOFF(CFS) = 106.71  
EFFECTIVE AREA(ACRES) = 427.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 427.1 PEAK FLOW RATE(CFS) = 484.87

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10115.00 TO NODE 10116.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 272.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1696.00 CHANNEL SLOPE = 0.0171  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 484.87  
FLOW VELOCITY(FEET/SEC.) = 8.04 FLOW DEPTH(FEET) = 4.48  
TRAVEL TIME(MIN.) = 3.52 Tc(MIN.) = 33.18  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10116.00 = 11318.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 33.18  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.474  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.90 0.30 1.000 -  
USER-DEFINED - 4.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 32.00 0.30 1.000 -  
USER-DEFINED - 3.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 45.60 SUBAREA RUNOFF(CFS) = 48.17  
EFFECTIVE AREA(ACRES) = 472.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 472.7 PEAK FLOW RATE(CFS) = 499.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 33.18  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.474  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 1.000 -  
USER-DEFINED - 7.70 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.70 SUBAREA RUNOFF(CFS) = 10.25  
EFFECTIVE AREA(ACRES) = 482.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 482.4 PEAK FLOW RATE(CFS) = 509.57

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*****
FLOW PROCESS FROM NODE 10116.00 TO NODE 10117.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 272.00 DOWNSTREAM(FEET) = 252.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 878.00 CHANNEL SLOPE = 0.0228
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 509.57
FLOW VELOCITY(FEET/SEC.) = 9.06 FLOW DEPTH(FEET) = 4.33
TRAVEL TIME(MIN.) = 1.62 Tc(MIN.) = 34.80
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10117.00 = 12196.00 FEET.
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 34.80
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.435
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 8.20 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 12.59
EFFECTIVE AREA(ACRES) = 494.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 494.7 PEAK FLOW RATE(CFS) = 509.57
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 34.80
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.435
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 14.60 0.30 1.000 -
USER-DEFINED - 6.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 3.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996
SUBAREA AREA(ACRES) = 25.00 SUBAREA RUNOFF(CFS) = 25.56
EFFECTIVE AREA(ACRES) = 519.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

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AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 519.7 PEAK FLOW RATE(CFS) = 530.88
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10118.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 252.00 DOWNSTREAM(FEET) = 249.00
FLOW LENGTH(FEET) = 280.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 81.0 INCH PIPE IS 62.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.08
ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 530.88
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 35.06
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10118.00 = 12476.00 FEET.
*****
FLOW PROCESS FROM NODE 10118.00 TO NODE 10119.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 249.00 DOWNSTREAM(FEET) = 240.00
FLOW LENGTH(FEET) = 892.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 81.0 INCH PIPE IS 63.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.58
ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 530.88
PIPE TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 35.90
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10119.00 = 13368.00 FEET.
*****
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 35.90
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.408
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.100 -
USER-DEFINED - 1.00 0.30 0.600 -
USER-DEFINED - 0.80 0.30 0.850 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.706
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 3.88
EFFECTIVE AREA(ACRES) = 523.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 523.3 PEAK FLOW RATE(CFS) = 530.88
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****

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FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 35.90  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.408  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	9.60	0.30	0.600	-
USER-DEFINED	-	1.00	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.627  
 SUBAREA AREA (ACRES) = 13.60 SUBAREA RUNOFF (CFS) = 14.94  
 EFFECTIVE AREA (ACRES) = 536.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 536.9 PEAK FLOW RATE (CFS) = 537.31

FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 35.90  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.408  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.10  
 EFFECTIVE AREA (ACRES) = 537.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 537.0 PEAK FLOW RATE (CFS) = 537.41

FLOW PROCESS FROM NODE 10119.00 TO NODE 10120.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 240.00 DOWNSTREAM(FEET) = 239.00  
 FLOW LENGTH(FEET) = 120.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 66.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.38  
 ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 537.41  
 PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 36.02  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10120.00 = 13488.00 FEET.

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.02  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.405  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.657  
 SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 6.09  
 EFFECTIVE AREA (ACRES) = 542.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA (ACRES) = 542.6 PEAK FLOW RATE (CFS) = 542.08

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.02  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.405  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.717  
 SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 5.46  
 EFFECTIVE AREA (ACRES) = 547.70 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA (ACRES) = 547.7 PEAK FLOW RATE (CFS) = 547.54

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.02  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.405  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	2.70	0.30	1.000	-
USER-DEFINED	-	11.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 15.72  
EFFECTIVE AREA(ACRES) = 563.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 563.5 PEAK FLOW RATE(CFS) = 563.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10121.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 239.00 DOWNSTREAM(FEET) = 213.00  
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 47.07  
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 563.26  
PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 36.09  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10121.00 = 13682.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10121.00 TO NODE 10122.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 213.00 DOWNSTREAM(FEET) = 176.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 995.00 CHANNEL SLOPE = 0.0372  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 563.26  
FLOW VELOCITY(FEET/SEC.) = 11.16 FLOW DEPTH(FEET) = 4.10  
TRAVEL TIME(MIN.) = 1.49 Tc(MIN.) = 37.58  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10122.00 = 14677.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 37.58  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.368  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.80 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 7.02  
EFFECTIVE AREA(ACRES) = 570.80 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98

TOTAL AREA(ACRES) = 570.8 PEAK FLOW RATE(CFS) = 563.26  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 37.58  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.368  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 3.30 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 3.00 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 10.09  
EFFECTIVE AREA(ACRES) = 581.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 581.3 PEAK FLOW RATE(CFS) = 563.26  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 37.58  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.368  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 3.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 3.50 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 7.59  
EFFECTIVE AREA(ACRES) = 589.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 589.2 PEAK FLOW RATE(CFS) = 569.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 37.58  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.368  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 1.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$  (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 1.73  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.98  
TOTAL AREA (ACRES) = 591.0 PEAK FLOW RATE (CFS) = 570.78

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 591.0 TC (MIN.) = 37.58  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.984  
PEAK FLOW RATE (CFS) = 570.78

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.4 Release Date: 01/25/2007 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506102C.DAT  
TIME/DATE OF STUDY: 14:26 01/08/2009  
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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

=====

=====

- USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14  
1) 5.00; 4.440  
2) 10.00; 3.011  
3) 15.00; 2.390  
4) 20.00; 2.029  
5) 25.00; 1.787  
6) 30.00; 1.600  
7) 40.00; 1.368  
8) 50.00; 1.205  
9) 60.00; 1.060  
10) 90.00; 0.862  
11) 120.00; 0.732  
12) 180.00; 0.593  
13) 360.00; 0.412  
14) 1440.00; 0.172

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10200.00 TO NODE 10201.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 293.00  
ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 617.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.991

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.014

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "3-4 DWELLINGS/ACRE"	-	0.73	0.30	0.600	0	9.99
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600						
SUBAREA RUNOFF(CFS) = 1.87						
TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 1.87						

\*\*\*\*\*

FLOW PROCESS FROM NODE 10201.00 TO NODE 10202.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 617.00 DOWNSTREAM ELEVATION(FEET) = 613.00  
STREET LENGTH(FEET) = 323.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.89

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 9.68  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.56  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.90  
STREET FLOW TRAVEL TIME(MIN.) = 2.10 Tc(MIN.) = 12.09  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.751

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.88	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 2.05  
EFFECTIVE AREA(ACRES) = 1.62 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 3.74

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 10.89  
FLOW VELOCITY(FEET/SEC.) = 2.72 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.02  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10202.00 = 616.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10202.00 TO NODE 10203.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 613.00 DOWNSTREAM ELEVATION(FEET) = 594.00  
STREET LENGTH(FEET) = 613.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.60

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 10.67  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.22  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.57  
STREET FLOW TRAVEL TIME(MIN.) = 2.42 Tc(MIN.) = 14.51

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.451

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.82	0.30	0.614	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.614

SUBAREA AREA(ACRES) = 1.82 SUBAREA RUNOFF(CFS) = 3.72  
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 7.02

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.76  
FLOW VELOCITY(FEET/SEC.) = 4.46 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.76  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10203.00 = 1229.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10203.00 TO NODE 10204.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 594.00 DOWNSTREAM ELEVATION(FEET) = 578.00  
STREET LENGTH(FEET) = 433.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.17

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.40  
HALFSTREET FLOOD WIDTH(FEET) = 12.09  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.95  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.98  
STREET FLOW TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 15.97  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.320

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.21	0.30	0.655	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.655

SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 2.31  
EFFECTIVE AREA(ACRES) = 4.64 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 8.92

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 12.58

FLOW VELOCITY(FEET/SEC.) = 5.03 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.06

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10204.00 = 1662.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 578.00 DOWNSTREAM(FEET) = 575.00  
FLOW LENGTH(FEET) = 147.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 8.50

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 8.92

PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 16.26

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10205.00 = 1809.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.26  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.299  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.61	0.30	0.917	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917  
 SUBAREA AREA(ACRES) = 3.61 SUBAREA RUNOFF(CFS) = 6.57  
 EFFECTIVE AREA(ACRES) = 8.25 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
 TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 15.40

FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 563.00  
 FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.86  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 15.40  
 PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 17.21  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10206.00 = 2374.00 FEET.

FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.21  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.230  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.75	0.30	0.669	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.669  
 SUBAREA AREA(ACRES) = 4.75 SUBAREA RUNOFF(CFS) = 8.67  
 EFFECTIVE AREA(ACRES) = 13.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA(ACRES) = 13.0 PEAK FLOW RATE(CFS) = 23.56

FLOW PROCESS FROM NODE 10206.00 TO NODE 10207.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 563.00 DOWNSTREAM(FEET) = 547.00  
 FLOW LENGTH(FEET) = 599.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.63  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 23.56  
 PIPE TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 18.07  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10207.00 = 2973.00 FEET.

FLOW PROCESS FROM NODE 10206.10 TO NODE 10207.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.07  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.168  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.59	0.30	0.664	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.664  
 SUBAREA AREA(ACRES) = 4.59 SUBAREA RUNOFF(CFS) = 8.13  
 EFFECTIVE AREA(ACRES) = 17.58 AREA-AVERAGED Fm(INCH/HR) = 0.21  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71  
 TOTAL AREA(ACRES) = 17.6 PEAK FLOW RATE(CFS) = 30.97

FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 516.00  
 FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.09  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 30.97  
 PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 18.69  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10208.00 = 3573.00 FEET.

FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.69  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.123  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.60	0.30	0.697	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.697  
 SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 6.20  
 EFFECTIVE AREA(ACRES) = 21.18 AREA-AVERAGED Fm(INCH/HR) = 0.21  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
 TOTAL AREA(ACRES) = 21.2 PEAK FLOW RATE(CFS) = 36.46

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*****
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 516.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 604.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 17.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.40
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 36.46
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 19.27
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10209.00 = 4177.00 FEET.

*****
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.27
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.082
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 8.21 0.30 0.645 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645
SUBAREA AREA(ACRES) = 8.21 SUBAREA RUNOFF(CFS) = 13.96
EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 49.62

*****
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 678.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.31
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 49.62
PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 19.86
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10210.00 = 4855.00 FEET.

*****
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.86
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.039
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

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USER-DEFINED - 10.49 0.30 0.986 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 10.49 SUBAREA RUNOFF(CFS) = 16.47
EFFECTIVE AREA(ACRES) = 39.89 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 39.9 PEAK FLOW RATE(CFS) = 64.97

*****
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 280.00
FLOW LENGTH(FEET) = 2662.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.39
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 64.97
PIPE TRAVEL TIME(MIN.) = 2.18 Tc(MIN.) = 22.03
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10211.00 = 7517.00 FEET.

*****
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.03
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.931
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 10.00 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 14.68
EFFECTIVE AREA(ACRES) = 49.89 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 49.9 PEAK FLOW RATE(CFS) = 75.75

*****
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 280.00 DOWNSTREAM(FEET) = 176.00
FLOW LENGTH(FEET) = 935.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.21
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 75.75
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 22.60
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10212.00 = 8452.00 FEET.

*****
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 81

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=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 22.60  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.903  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.37 0.30 0.926 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.926  
SUBAREA AREA(ACRES) = 18.37 SUBAREA RUNOFF(CFS) = 26.87  
EFFECTIVE AREA(ACRES) = 68.26 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 68.3 PEAK FLOW RATE(CFS) = 101.37

\*\*\*\*\*

FLOW PROCESS FROM NODE 10212.00 TO NODE 10242.00 IS CODE = 51

=====  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
=====

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 176.00 DOWNSTREAM(FEET) = 169.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00 CHANNEL SLOPE = 0.0211  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.858  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.97 0.30 0.970 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 102.76  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.91  
AVERAGE FLOW DEPTH(FEET) = 2.41 TRAVEL TIME(MIN.) = 0.94  
Tc(MIN.) = 23.54  
SUBAREA AREA(ACRES) = 1.97 SUBAREA RUNOFF(CFS) = 2.78  
EFFECTIVE AREA(ACRES) = 70.23 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 101.37  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.40 FLOW VELOCITY(FEET/SEC.) = 5.87  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 10

=====  
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<  
=====

\*\*\*\*\*

FLOW PROCESS FROM NODE 10220.00 TO NODE 10221.00 IS CODE = 21

=====  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
=====

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 308.00 DOWNSTREAM(FEET) = 300.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.111  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.382  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"GRASS" - 1.03 0.30 1.000 0 15.11  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.93  
TOTAL AREA(ACRES) = 1.03 PEAK FLOW RATE(CFS) = 1.93

\*\*\*\*\*

FLOW PROCESS FROM NODE 10221.10 TO NODE 10222.00 IS CODE = 63

=====  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
=====

>>>>(STREET TABLE SECTION # 4 USED)<<<<  
=====

UPSTREAM ELEVATION(FEET) = 300.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.40

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.22  
HALFSTREET FLOOD WIDTH(FEET) = 3.29  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.70  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.28  
STREET FLOW TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 16.38

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.290

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.64 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 2.93  
EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 4.78

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 4.87

FLOW VELOCITY(FEET/SEC.) = 5.60 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.43  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10222.00 = 764.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10221.20 TO NODE 10222.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) =	16.38
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	2.290
SUBAREA LOSS RATE DATA(AMC II):	
DEVELOPMENT TYPE/	SCS SOIL AREA Fp Ap SCS
LAND USE	GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED	- 3.12 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.12 SUBAREA RUNOFF(CFS) = 5.58  
EFFECTIVE AREA(ACRES) = 5.78 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 10.36

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10222.10 TO NODE 10223.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<

-----

UPSTREAM ELEVATION(FEET) =	261.00	DOWNSTREAM ELEVATION(FEET) =	208.00
STREET LENGTH(FEET) =	622.00	CURB HEIGHT(INCHES) =	8.0
STREET HALFWIDTH(FEET) =	30.00		

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.84  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.33  
HALFSTREET FLOOD WIDTH(FEET) = 8.58  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.40  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.11  
STREET FLOW TRAVEL TIME(MIN.) = 1.62 Tc(MIN.) = 18.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.173

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL AREA Fp Ap SCS
LAND USE	GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED	- 1.75 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 2.96  
EFFECTIVE AREA(ACRES) = 7.54 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 7.5 PEAK FLOW RATE(CFS) = 12.71

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 8.88  
FLOW VELOCITY(FEET/SEC.) = 6.50 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.18  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10223.00 = 1386.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10222.20 TO NODE 10223.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) =	18.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	2.173
SUBAREA LOSS RATE DATA(AMC II):	
DEVELOPMENT TYPE/	SCS SOIL AREA Fp Ap SCS
LAND USE	GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED	- 7.91 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.91 SUBAREA RUNOFF(CFS) = 13.34  
EFFECTIVE AREA(ACRES) = 15.45 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 26.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.10 TO NODE 10224.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<

-----

UPSTREAM ELEVATION(FEET) =	208.00	DOWNSTREAM ELEVATION(FEET) =	204.00
STREET LENGTH(FEET) =	758.00	CURB HEIGHT(INCHES) =	8.0
STREET HALFWIDTH(FEET) =	30.00		

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.44  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.62  
HALFSTREET FLOOD WIDTH(FEET) = 22.88  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.71  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.67  
STREET FLOW TRAVEL TIME(MIN.) = 4.66 Tc(MIN.) = 22.66  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.900

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL AREA Fp Ap SCS
LAND USE	GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED	- 4.70 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30



SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.70 SUBAREA RUNOFF (CFS) = 6.77  
EFFECTIVE AREA (ACRES) = 20.15 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.1 PEAK FLOW RATE (CFS) = 29.02

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.61 HALFSTREET FLOOD WIDTH (FEET) = 22.76  
FLOW VELOCITY (FEET/SEC.) = 2.70 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.66  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10224.00 = 2144.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.20 TO NODE 10224.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 22.66  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.900  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.21 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.21 SUBAREA RUNOFF (CFS) = 1.74  
EFFECTIVE AREA (ACRES) = 21.35 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 21.4 PEAK FLOW RATE (CFS) = 30.76

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 204.00 DOWNSTREAM (FEET) = 201.00  
FLOW LENGTH (FEET) = 422.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.1 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 7.60  
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 30.76  
PIPE TRAVEL TIME (MIN.) = 0.93 Tc (MIN.) = 23.58  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10225.00 = 2566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 23.58  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.856  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.81 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.81 SUBAREA RUNOFF (CFS) = 6.74

EFFECTIVE AREA (ACRES) = 26.17 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.2 PEAK FLOW RATE (CFS) = 36.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 201.00 DOWNSTREAM (FEET) = 197.00  
FLOW LENGTH (FEET) = 799.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 7.06  
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 36.64  
PIPE TRAVEL TIME (MIN.) = 1.88 Tc (MIN.) = 25.47  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10238.00 = 3365.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 25.47  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.770  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.24 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.24 SUBAREA RUNOFF (CFS) = 5.61  
EFFECTIVE AREA (ACRES) = 30.41 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 30.4 PEAK FLOW RATE (CFS) = 40.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 25.47  
RAINFALL INTENSITY (INCH/HR) = 1.77  
AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA (ACRES) = 30.41  
TOTAL STREAM AREA (ACRES) = 30.41  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 40.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10230.00 TO NODE 10231.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 276.00
ELEVATION DATA: UPSTREAM (FEET) = 503.00 DOWNSTREAM (FEET) = 390.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.944
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.170
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
AGRICULTURAL POOR COVER
"FALLOW" - 0.95 0.30 1.000 0 5.94
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 3.31
TOTAL AREA (ACRES) = 0.95 PEAK FLOW RATE (CFS) = 3.31

\*\*\*\*\*
FLOW PROCESS FROM NODE 10231.10 TO NODE 10232.00 IS CODE = 51
-----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<
>>>> TRAVEL TIME THRU SUBAREA (EXISTING ELEMENT) <<<<

=====
ELEVATION DATA: UPSTREAM (FEET) = 390.00 DOWNSTREAM (FEET) = 301.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 394.00 CHANNEL SLOPE = 0.2259
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.959
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.68 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.08
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.88
AVERAGE FLOW DEPTH (FEET) = 0.48 TRAVEL TIME (MIN.) = 0.74
Tc (MIN.) = 6.68
SUBAREA AREA (ACRES) = 1.68 SUBAREA RUNOFF (CFS) = 5.55
EFFECTIVE AREA (ACRES) = 2.63 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 2.6 PEAK FLOW RATE (CFS) = 8.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.55 FLOW VELOCITY (FEET/SEC.) = 9.69
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10232.00 = 670.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10231.20 TO NODE 10232.00 IS CODE = 81
-----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<

=====
MAINLINE Tc (MIN.) = 6.68
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.959
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.38 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 6.38 SUBAREA RUNOFF (CFS) = 21.00
EFFECTIVE AREA (ACRES) = 9.01 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 9.0 PEAK FLOW RATE (CFS) = 29.68

\*\*\*\*\*
FLOW PROCESS FROM NODE 10232.00 TO NODE 10233.00 IS CODE = 63
-----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<
>>>> (STREET TABLE SECTION # 4 USED) <<<<

=====
UPSTREAM ELEVATION (FEET) = 301.00 DOWNSTREAM ELEVATION (FEET) = 277.00
STREET LENGTH (FEET) = 341.00 CURB HEIGHT (INCHES) = 8.0
STREET HALF WIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.61

\*\* TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 35.11
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.45
HALFSTREET FLOOD WIDTH (FEET) = 14.62
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.54
PRODUCT OF DEPTH & VELOCITY (FT\*FT/SEC.) = 3.40
STREET FLOW TRAVEL TIME (MIN.) = 0.75 Tc (MIN.) = 7.44
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.744

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 3.50 SUBAREA RUNOFF (CFS) = 10.86
EFFECTIVE AREA (ACRES) = 12.52 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 12.5 PEAK FLOW RATE (CFS) = 38.79

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.46 HALFSTREET FLOOD WIDTH (FEET) = 15.21
FLOW VELOCITY (FEET/SEC.) = 7.75 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.58
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10233.00 = 1011.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10233.10 TO NODE 10234.00 IS CODE = 63
-----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<
>>>> (STREET TABLE SECTION # 4 USED) <<<<

=====
UPSTREAM ELEVATION (FEET) = 277.00 DOWNSTREAM ELEVATION (FEET) = 226.00

STREET LENGTH(FEET) = 682.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 44.65  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.48  
HALFSTREET FLOOD WIDTH(FEET) = 15.97  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.15  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.89  
STREET FLOW TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 8.83  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.345  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.27 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.27 SUBAREA RUNOFF(CFS) = 11.70  
EFFECTIVE AREA(ACRES) = 16.78 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 46.00

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 16.14  
FLOW VELOCITY(FEET/SEC.) = 8.23 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.96  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10234.00 = 1693.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10233.20 TO NODE 10234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 8.83  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.345  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 15.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 42.75  
EFFECTIVE AREA(ACRES) = 32.38 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 88.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10234.10 TO NODE 10235.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 3 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 226.00 DOWNSTREAM ELEVATION(FEET) = 205.00  
STREET LENGTH(FEET) = 759.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 94.35  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.68  
HALFSTREET FLOOD WIDTH(FEET) = 26.85  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.72  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.57  
STREET FLOW TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 10.71  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.922  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.74 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 11.20  
EFFECTIVE AREA(ACRES) = 37.13 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 88.75  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.67 HALFSTREET FLOOD WIDTH(FEET) = 25.60  
FLOW VELOCITY(FEET/SEC.) = 6.63 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.43

\*NOTE: ESTIMATED STREET FLOW DEPTH IS GREATER THAN  
THE MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67  
SIZE PIPE(S) TO SATISFY THE STREET CONSTRAINT AS FOLLOWS:  
\*\* PIPE SIZED TO MAXIMIZE STREETFLOW AT DOWNSTREAM NODE \*\*  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
ASSUME FULL-FLOWING PIPELINE  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.37  
PIPE-FLOW(CFS) = 16.57  
PIPEFLOW TRAVEL TIME(MIN.) = 1.35 Tc(MIN.) = 10.18  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.988  
SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 11.48  
TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 89.84  
STREETFLOW HYDRAULICS BASED ON MAINLINE Tc :  
STREET HYDRAULICS COMPUTED USING ESTIMATED FLOW(CFS) = 73.27  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.63  
HALFSTREET FLOOD WIDTH(FEET) = 23.63

AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.34  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 4.00  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10235.00 = 2452.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.20 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.18  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.988  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.02 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 8.02 SUBAREA RUNOFF (CFS) = 19.40  
EFFECTIVE AREA (ACRES) = 45.15 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.1 PEAK FLOW RATE (CFS) = 109.24

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.30 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.18  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.988  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.62 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.62 SUBAREA RUNOFF (CFS) = 6.33  
EFFECTIVE AREA (ACRES) = 47.76 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 115.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.00 TO NODE 10236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 205.00 DOWNSTREAM (FEET) = 201.00  
FLOW LENGTH (FEET) = 489.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.9 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.15  
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 115.57  
PIPE TRAVEL TIME (MIN.) = 0.73 Tc (MIN.) = 10.91  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10236.00 = 2941.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.10 TO NODE 10236.00 IS CODE = 81

\*\*\*\*\*

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.91  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.898  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.89 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.89 SUBAREA RUNOFF (CFS) = 6.76  
EFFECTIVE AREA (ACRES) = 50.65 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 50.7 PEAK FLOW RATE (CFS) = 118.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.20 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.91  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.898  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.84 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.84 SUBAREA RUNOFF (CFS) = 11.31  
EFFECTIVE AREA (ACRES) = 55.49 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 129.74

\*\*\*\*\*

FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 201.00 DOWNSTREAM (FEET) = 199.00  
FLOW LENGTH (FEET) = 278.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 39.9 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.90  
ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 129.74  
PIPE TRAVEL TIME (MIN.) = 0.42 Tc (MIN.) = 11.34  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10237.00 = 3219.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.34  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.845  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 1.62 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.62 SUBAREA RUNOFF (CFS) = 3.71  
 EFFECTIVE AREA (ACRES) = 57.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 57.1 PEAK FLOW RATE (CFS) = 130.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 199.00 DOWNSTREAM (FEET) = 197.00  
 FLOW LENGTH (FEET) = 345.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.9 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.13  
 ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 130.81  
 PIPE TRAVEL TIME (MIN.) = 0.57 Tc (MIN.) = 11.90  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 11.90  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.774  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.38 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.38 SUBAREA RUNOFF (CFS) = 3.07  
 EFFECTIVE AREA (ACRES) = 58.49 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 58.5 PEAK FLOW RATE (CFS) = 130.81  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
 =====  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 11.90  
 RAINFALL INTENSITY (INCH/HR) = 2.77  
 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 58.49  
 TOTAL STREAM AREA (ACRES) = 58.49  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 130.81

\*\* CONFLUENCE DATA \*\*  
 STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 40.22 25.47 1.770 0.30 ( 0.30) 1.00 30.4 10220.00  
 2 130.81 11.90 2.774 0.30 ( 0.30) 1.00 58.5 10230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 162.47 11.90 2.774 0.30 ( 0.30) 1.00 72.7 10230.00  
 2 117.91 25.47 1.770 0.30 ( 0.30) 1.00 88.9 10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 162.47 Tc (MIN.) = 11.90  
 EFFECTIVE AREA (ACRES) = 72.71 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 88.9  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.00 TO NODE 10239.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 197.00 DOWNSTREAM (FEET) = 193.00  
 FLOW LENGTH (FEET) = 753.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 60.0 INCH PIPE IS 44.6 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.38  
 ESTIMATED PIPE DIAMETER (INCH) = 60.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 162.47  
 PIPE TRAVEL TIME (MIN.) = 1.21 Tc (MIN.) = 13.11  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10239.00 = 4317.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.10 TO NODE 10239.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 13.11  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.624  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.72 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.72 SUBAREA RUNOFF (CFS) = 5.69  
 EFFECTIVE AREA (ACRES) = 75.43 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 91.6 PEAK FLOW RATE (CFS) = 162.47  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.20 TO NODE 10239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.11
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.624
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 34.37 0.30 0.991 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991
SUBAREA AREA(ACRES) = 34.37 SUBAREA RUNOFF(CFS) = 71.98
EFFECTIVE AREA(ACRES) = 109.79 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 126.0 PEAK FLOW RATE(CFS) = 229.77

FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 193.00 DOWNSTREAM(FEET) = 191.00
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 48.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.34
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 229.77
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 13.52
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10240.00 = 4618.00 FEET.

FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.52
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.574
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.22 0.30 0.916 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.916
SUBAREA AREA(ACRES) = 2.22 SUBAREA RUNOFF(CFS) = 4.60
EFFECTIVE AREA(ACRES) = 112.02 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 128.2 PEAK FLOW RATE(CFS) = 229.77
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 10240.00 TO NODE 10241.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 191.00 DOWNSTREAM(FEET) = 180.00

FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 30.35
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 229.77
PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 13.60
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10241.00 = 4768.00 FEET.

FLOW PROCESS FROM NODE 10241.00 TO NODE 10242.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 169.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 267.00 CHANNEL SLOPE = 0.0412
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.516
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.16 0.30 0.958 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 231.93
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.53
AVERAGE FLOW DEPTH(FEET) = 2.59 TRAVEL TIME(MIN.) = 0.39
Tc(MIN.) = 13.99
SUBAREA AREA(ACRES) = 2.16 SUBAREA RUNOFF(CFS) = 4.33
EFFECTIVE AREA(ACRES) = 114.18 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 130.4 PEAK FLOW RATE(CFS) = 229.77
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.58 FLOW VELOCITY(FEET/SEC.) = 11.49
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 229.77 13.99 2.516 0.30( 0.30) 0.99 114.2 10230.00
2 162.67 27.73 1.685 0.30( 0.30) 1.00 130.4 10220.00
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 101.37 23.54 1.858 0.30( 0.25) 0.85 70.2 10200.00
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	314.72	13.99	2.516	0.30 ( 0.29)	0.96	155.9	10230.00
2	284.49	23.54	1.858	0.30 ( 0.28)	0.94	195.7	10200.00
3	253.13	27.73	1.685	0.30 ( 0.28)	0.94	200.6	10220.00
TOTAL AREA (ACRES) =			200.6				

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 314.72 Tc(MIN.) = 13.988  
EFFECTIVE AREA (ACRES) = 155.91 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
TOTAL AREA (ACRES) = 200.6  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

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FLOW PROCESS FROM NODE 10242.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 169.00 DOWNSTREAM(FEET) = 163.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 315.00 CHANNEL SLOPE = 0.0190  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.446

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.10	0.30	0.995	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =			0.30		
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =			0.995		
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =			323.52		
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =			9.38		
AVERAGE FLOW DEPTH(FEET) = 3.39		TRAVEL TIME (MIN.) =		0.56	
Tc(MIN.) = 14.55		SUBAREA AREA (ACRES) =		9.10	
		SUBAREA RUNOFF(CFS) =		17.60	
EFFECTIVE AREA (ACRES) =		AREA-AVERAGED Fm (INCH/HR) =		0.29	
AREA-AVERAGED Fp (INCH/HR) =		AREA-AVERAGED Ap =		0.96	
TOTAL AREA (ACRES) =		PEAK FLOW RATE (CFS) =		320.64	

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.38 FLOW VELOCITY(FEET/SEC.) = 9.37  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10243.00 TO NODE 10256.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.55  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.446

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.01	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =			0.30		
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =			1.000		
SUBAREA AREA (ACRES) =			7.01		
SUBAREA RUNOFF (CFS) =			13.53		
EFFECTIVE AREA (ACRES) =		AREA-AVERAGED Fm (INCH/HR) =		0.29	
AREA-AVERAGED Fp (INCH/HR) =		AREA-AVERAGED Ap =		0.96	
TOTAL AREA (ACRES) =		PEAK FLOW RATE (CFS) =		334.17	

\*\*\*\*\*

FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 14.55

RAINFALL INTENSITY (INCH/HR) = 2.45

AREA-AVERAGED Fm (INCH/HR) = 0.29

AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.96

EFFECTIVE STREAM AREA (ACRES) = 172.02

TOTAL STREAM AREA (ACRES) = 216.71

PEAK FLOW RATE (CFS) AT CONFLUENCE = 334.17

\*\*\*\*\*

FLOW PROCESS FROM NODE 10250.00 TO NODE 10251.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 284.00

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 243.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.802

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.260

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "WOODLAND,GRASS"	-	1.04	0.30	1.000	0	16.80
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =			0.30			
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =			1.000			
SUBAREA RUNOFF (CFS) =			1.84			
TOTAL AREA (ACRES) =			1.04		PEAK FLOW RATE (CFS) = 1.84	

\*\*\*\*\*

FLOW PROCESS FROM NODE 10251.00 TO NODE 10252.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 243.00 DOWNSTREAM ELEVATION (FEET) = 240.00

STREET LENGTH (FEET) = 301.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.02  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.34  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.07  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.63  
STREET FLOW TRAVEL TIME(MIN.) = 2.42 Tc(MIN.) = 19.23  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.085  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.47	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 2.36  
EFFECTIVE AREA(ACRES) = 2.51 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 4.03

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.59  
FLOW VELOCITY(FEET/SEC.) = 2.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.72  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10252.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10252.00 TO NODE 10253.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 240.00 DOWNSTREAM ELEVATION(FEET) = 234.00  
STREET LENGTH(FEET) = 544.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.35  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38

HALFSTREET FLOOD WIDTH(FEET) = 11.13  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.57  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.98  
STREET FLOW TRAVEL TIME(MIN.) = 3.53 Tc(MIN.) = 22.75  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.896

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.60 SUBAREA RUNOFF(CFS) = 6.61  
EFFECTIVE AREA(ACRES) = 7.12 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 10.22

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 12.85  
FLOW VELOCITY(FEET/SEC.) = 2.78 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.15  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10253.00 = 1129.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 234.00 DOWNSTREAM(FEET) = 219.00  
FLOW LENGTH(FEET) = 362.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.50  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 10.22  
PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 23.28  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10254.00 = 1491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc(MIN.) = 23.28  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.870  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.55	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 12.08  
EFFECTIVE AREA(ACRES) = 15.66 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.7 PEAK FLOW RATE(CFS) = 22.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10254.00 TO NODE 10255.00 IS CODE = 31



```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 219.00 DOWNSTREAM(FEET) = 182.00
FLOW LENGTH(FEET) = 716.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.61
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 22.14
PIPE TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 24.09
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10255.00 = 2207.00 FEET.

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*****
FLOW PROCESS FROM NODE 10255.00 TO NODE 10256.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 182.00 DOWNSTREAM(FEET) = 163.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.0833
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.811
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 13.88 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.57
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.14
AVERAGE FLOW DEPTH(FEET) = 1.07 TRAVEL TIME(MIN.) = 0.42
Tc(MIN.) = 24.51
SUBAREA AREA(ACRES) = 13.88 SUBAREA RUNOFF(CFS) = 18.87
EFFECTIVE AREA(ACRES) = 29.54 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 29.5 PEAK FLOW RATE(CFS) = 40.17

```

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.18 FLOW VELOCITY(FEET/SEC.) = 9.65
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10256.00 = 2435.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1
-----

```

```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====

```

```

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 24.51
RAINFALL INTENSITY(INCH/HR) = 1.81
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 29.54
TOTAL STREAM AREA(ACRES) = 29.54
PEAK FLOW RATE(CFS) AT CONFLUENCE = 40.17

```

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	334.17	14.55	2.446	0.30 ( 0.29)	0.96	172.0	10230.00
1	294.68	24.11	1.830	0.30 ( 0.28)	0.95	211.8	10200.00
1	268.89	28.32	1.663	0.30 ( 0.28)	0.95	216.7	10220.00
2	40.17	24.51	1.811	0.30 ( 0.30)	1.00	29.5	10250.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	368.04	14.55	2.446	0.30 ( 0.29)	0.96	189.6	10230.00
2	334.70	24.11	1.830	0.30 ( 0.29)	0.95	240.8	10200.00
3	332.42	24.51	1.811	0.30 ( 0.29)	0.95	241.8	10250.00
4	305.13	28.32	1.663	0.30 ( 0.29)	0.95	246.3	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

```

PEAK FLOW RATE(CFS) = 368.04 Tc(MIN.) = 14.55
EFFECTIVE AREA(ACRES) = 189.56 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 246.3
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

```

END OF STUDY SUMMARY:

```

TOTAL AREA(ACRES) = 246.3 TC(MIN.) = 14.55
EFFECTIVE AREA(ACRES) = 189.56 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.963
PEAK FLOW RATE(CFS) = 368.04

```

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	368.04	14.55	2.446	0.30 ( 0.29)	0.96	189.6	10230.00
2	334.70	24.11	1.830	0.30 ( 0.29)	0.95	240.8	10200.00
3	332.42	24.51	1.811	0.30 ( 0.29)	0.95	241.8	10250.00
4	305.13	28.32	1.663	0.30 ( 0.29)	0.95	246.3	10220.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506103C.DAT  
TIME/DATE OF STUDY: 12:44 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.310
- 2) 6.00; 3.880
- 3) 7.00; 3.560
- 4) 8.00; 3.300
- 5) 9.00; 3.080
- 6) 10.00; 2.900
- 7) 11.00; 2.750
- 8) 12.00; 2.610
- 9) 13.00; 2.500
- 10) 14.00; 2.390
- 11) 15.00; 2.300
- 12) 20.00; 1.950
- 13) 25.00; 1.720
- 14) 30.00; 1.550
- 15) 40.00; 1.310
- 16) 50.00; 1.160
- 17) 60.00; 1.040
- 18) 90.00; 0.830
- 19) 120.00; 0.700
- 20) 180.00; 0.560

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10300.00 TO NODE 10301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 627.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 5.147  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.247  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "5-7 DWELLINGS/ACRE"	-	1.20	0.30	0.500	95	5.15

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.500  
 SUBAREA RUNOFF(CFS) = 4.42  
 TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 4.42

\*\*\*\*\*

FLOW PROCESS FROM NODE 10301.00 TO NODE 10302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 510.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.2609  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.42  
 FLOW VELOCITY(FEET/SEC.) = 6.89 FLOW DEPTH(FEET) = 0.46  
 TRAVEL TIME(MIN.) = 0.28  $T_c$ (MIN.) = 5.43  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10302.00 = 443.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10302.00 TO NODE 10302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 5.43  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.127  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 5.37  
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 9.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10302.00 TO NODE 10303.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 467.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.2575  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.66  
FLOW VELOCITY(FEET/SEC.) = 8.36 FLOW DEPTH(FEET) = 0.62  
TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 5.76  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10303.00 = 610.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10303.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.76  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.984  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 7.59  
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 16.91

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10304.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 467.00 DOWNSTREAM(FEET) = 446.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 16.91  
FLOW VELOCITY(FEET/SEC.) = 8.40 FLOW DEPTH(FEET) = 0.82  
TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 5.99  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10304.00 = 725.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10304.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.99  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.886  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.500 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 8.02  
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 24.49

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10305.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 446.00 DOWNSTREAM(FEET) = 366.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 423.00 CHANNEL SLOPE = 0.1891  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 24.49  
FLOW VELOCITY(FEET/SEC.) = 9.37 FLOW DEPTH(FEET) = 0.93  
TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 6.74  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10305.00 = 1148.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10305.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.74  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.643  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.912  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 10.31  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.65  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 33.21

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10306.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 300.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 574.00 CHANNEL SLOPE = 0.1150  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 33.21  
FLOW VELOCITY (FEET/SEC.) = 8.41 FLOW DEPTH (FEET) = 1.15  
TRAVEL TIME (MIN.) = 1.14 Tc (MIN.) = 7.88  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10306.00 = 1722.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10306.00 TO NODE 10306.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

MAINLINE Tc (MIN.) = 7.88  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.332  
SUBAREA LOSS RATE DATA (AMC II):  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 9.84  
EFFECTIVE AREA (ACRES) = 14.30 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA (ACRES) = 14.3 PEAK FLOW RATE (CFS) = 40.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10306.00 TO NODE 10307.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 300.00 DOWNSTREAM (FEET) = 293.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0350  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 40.05  
FLOW VELOCITY (FEET/SEC.) = 5.64 FLOW DEPTH (FEET) = 1.54  
TRAVEL TIME (MIN.) = 0.59 Tc (MIN.) = 8.47  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10307.00 = 1922.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10307.00 TO NODE 10307.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

MAINLINE Tc (MIN.) = 8.47  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.197  
SUBAREA LOSS RATE DATA (AMC II):  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.83  
EFFECTIVE AREA (ACRES) = 15.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 15.0 PEAK FLOW RATE (CFS) = 40.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10307.00 TO NODE 10308.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 293.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0850  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 40.14  
FLOW VELOCITY (FEET/SEC.) = 9.77 FLOW DEPTH (FEET) = 1.17  
TRAVEL TIME (MIN.) = 0.34 Tc (MIN.) = 8.81  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10308.00 = 2122.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10308.00 TO NODE 10308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	8.50	0.30	0.500	-
USER-DEFINED	-	3.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-

MAINLINE Tc (MIN.) = 8.81  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.122  
SUBAREA LOSS RATE DATA (AMC II):  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.696  
SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 36.71  
EFFECTIVE AREA (ACRES) = 29.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA (ACRES) = 29.0 PEAK FLOW RATE (CFS) = 75.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10308.00 TO NODE 10309.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 250.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 600.00 CHANNEL SLOPE = 0.0433  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 75.83  
FLOW VELOCITY (FEET/SEC.) = 8.86 FLOW DEPTH (FEET) = 1.69  
TRAVEL TIME (MIN.) = 1.13 Tc (MIN.) = 9.94  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10309.00 = 2722.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.94  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.911  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.00	0.30	0.600	-
USER-DEFINED	-	1.80	0.30	0.850	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	0.500	-
USER-DEFINED	-	2.10	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.662  
 SUBAREA AREA(ACRES) = 15.40 SUBAREA RUNOFF(CFS) = 37.60  
 EFFECTIVE AREA(ACRES) = 44.40 AREA-AVERAGED Fm(INCH/HR) = 0.21  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
 TOTAL AREA(ACRES) = 44.4 PEAK FLOW RATE(CFS) = 107.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.94  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.911  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.30	0.850	-
USER-DEFINED	-	8.80	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.967  
 SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 37.28  
 EFFECTIVE AREA(ACRES) = 60.20 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA(ACRES) = 60.2 PEAK FLOW RATE(CFS) = 145.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10309.00 TO NODE 10310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 250.00 DOWNSTREAM(FEET) = 208.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1021.00 CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 145.20  
 FLOW VELOCITY(FEET/SEC.) = 10.26 FLOW DEPTH(FEET) = 2.17  
 TRAVEL TIME(MIN.) = 1.66 Tc(MIN.) = 11.60  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10310.00 = 3743.00 FEET.

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.60  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.667  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	1.80	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.668  
 SUBAREA AREA(ACRES) = 6.60 SUBAREA RUNOFF(CFS) = 14.65  
 EFFECTIVE AREA(ACRES) = 66.80 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA(ACRES) = 66.8 PEAK FLOW RATE(CFS) = 146.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.60  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.667  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	8.00	0.30	0.600	-
USER-DEFINED	-	7.10	0.30	0.850	-
USER-DEFINED	-	8.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814  
 SUBAREA AREA(ACRES) = 23.50 SUBAREA RUNOFF(CFS) = 51.24  
 EFFECTIVE AREA(ACRES) = 90.30 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA(ACRES) = 90.3 PEAK FLOW RATE(CFS) = 197.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10310.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 208.00 DOWNSTREAM(FEET) = 189.00  
 FLOW LENGTH(FEET) = 1595.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 42.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.59  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 197.84  
 PIPE TRAVEL TIME(MIN.) = 1.82 Tc(MIN.) = 13.42  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10335.00 = 5338.00 FEET.

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*****
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.42
RAINFALL INTENSITY(INCH/HR) = 2.45
AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.77
EFFECTIVE STREAM AREA(ACRES) = 90.30
TOTAL STREAM AREA(ACRES) = 90.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 197.84

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*****
FLOW PROCESS FROM NODE 10320.00 TO NODE 10321.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 671.00 DOWNSTREAM(FEET) = 622.00

Tc = K*(LENGTH** 3.00)/(ELEVATION CHANGE)**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.795
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.968
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.00 0.30 0.500 95 5.79
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 3.44
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 3.44

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*****
FLOW PROCESS FROM NODE 10321.00 TO NODE 10322.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 622.00 DOWNSTREAM(FEET) = 599.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 227.00 CHANNEL SLOPE = 0.1013
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.44
FLOW VELOCITY(FEET/SEC.) = 5.58 FLOW DEPTH(FEET) = 0.45
TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 6.47
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10322.00 = 557.00 FEET.

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*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10322.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 6.47
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.729
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.30 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 4.51
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 7.73

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*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10323.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 599.00 DOWNSTREAM(FEET) = 539.00
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.55
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.73
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 6.59
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10323.00 = 719.00 FEET.

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*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10323.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 6.59
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.692
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.30 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.59
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 9.25

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*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10324.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 539.00 DOWNSTREAM(FEET) = 530.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 97.00 CHANNEL SLOPE = 0.0928
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 9.25

```

FLOW VELOCITY(FEET/SEC.) = 5.67 FLOW DEPTH(FEET) = 0.74  
TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 6.87  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10324.00 = 816.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10324.00 TO NODE 10324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.87  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.601

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.59  
EFFECTIVE AREA(ACRES) = 4.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.7 PEAK FLOW RATE(CFS) = 14.60

\*\*\*\*\*

FLOW PROCESS FROM NODE 10324.00 TO NODE 10325.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 210.00 CHANNEL SLOPE = 0.1429  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 14.60  
FLOW VELOCITY(FEET/SEC.) = 7.39 FLOW DEPTH(FEET) = 0.81  
TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 7.35  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10325.00 = 1026.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.35  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.470

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 5.08  
EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 19.12

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10326.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 460.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 345.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 19.12  
FLOW VELOCITY(FEET/SEC.) = 7.31 FLOW DEPTH(FEET) = 0.93  
TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 8.13  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10326.00 = 1371.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10326.00 TO NODE 10326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.13  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.271

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 5.34  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 23.31

\*\*\*\*\*

FLOW PROCESS FROM NODE 10326.00 TO NODE 10327.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 430.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 263.00 CHANNEL SLOPE = 0.1141  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 23.31  
FLOW VELOCITY(FEET/SEC.) = 7.71 FLOW DEPTH(FEET) = 1.00  
TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 8.70  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10327.00 = 1634.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10327.00 TO NODE 10327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.70  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.146

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.10	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500



SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 11.05  
EFFECTIVE AREA (ACRES) = 12.40 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 12.4 PEAK FLOW RATE (CFS) = 33.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10327.00 TO NODE 10328.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 430.00 DOWNSTREAM (FEET) = 375.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 437.00 CHANNEL SLOPE = 0.1259  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 33.43  
FLOW VELOCITY (FEET/SEC.) = 10.76 FLOW DEPTH (FEET) = 1.02  
TRAVEL TIME (MIN.) = 0.68 Tc (MIN.) = 9.38  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10328.00 = 2071.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10328.00 TO NODE 10328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.38  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.012  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.500 -  
USER-DEFINED - 1.20 0.30 0.850 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.772  
SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 8.01  
EFFECTIVE AREA (ACRES) = 15.60 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 15.6 PEAK FLOW RATE (CFS) = 39.95

\*\*\*\*\*

FLOW PROCESS FROM NODE 10328.00 TO NODE 10329.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 375.00 DOWNSTREAM (FEET) = 372.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 224.00 CHANNEL SLOPE = 0.0134  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 39.95  
FLOW VELOCITY (FEET/SEC.) = 4.88 FLOW DEPTH (FEET) = 1.65  
TRAVEL TIME (MIN.) = 0.77 Tc (MIN.) = 10.14  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10329.00 = 2295.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10329.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.14  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.878  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.20 0.30 0.500 -  
USER-DEFINED - 1.40 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.571  
SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 27.29  
EFFECTIVE AREA (ACRES) = 26.80 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 26.8 PEAK FLOW RATE (CFS) = 65.36

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10330.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 372.00 DOWNSTREAM (FEET) = 300.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 452.00 CHANNEL SLOPE = 0.1593  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 65.36  
FLOW VELOCITY (FEET/SEC.) = 13.98 FLOW DEPTH (FEET) = 1.25  
TRAVEL TIME (MIN.) = 0.54 Tc (MIN.) = 10.68  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10330.00 = 2747.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10330.00 TO NODE 10330.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.68  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.798  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 4.20 0.30 0.500 -  
USER-DEFINED - 2.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.673  
SUBAREA AREA (ACRES) = 7.80 SUBAREA RUNOFF (CFS) = 18.22  
EFFECTIVE AREA (ACRES) = 34.60 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 34.6 PEAK FLOW RATE (CFS) = 81.64

\*\*\*\*\*

FLOW PROCESS FROM NODE 10330.00 TO NODE 10331.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 295.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 182.00 CHANNEL SLOPE = 0.0275  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 81.64  
FLOW VELOCITY(FEET/SEC.) = 7.62 FLOW DEPTH(FEET) = 1.89  
TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 11.08  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10331.00 = 2929.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10331.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 11.08  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.739  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 11.30 0.30 0.500 -  
USER-DEFINED - 0.20 0.30 0.600 -  
USER-DEFINED - 4.20 0.30 0.850 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.652  
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 43.49  
EFFECTIVE AREA(ACRES) = 53.60 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 53.6 PEAK FLOW RATE(CFS) = 123.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10332.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 295.00 DOWNSTREAM(FEET) = 245.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.00 CHANNEL SLOPE = 0.0542  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 123.29  
FLOW VELOCITY(FEET/SEC.) = 10.91 FLOW DEPTH(FEET) = 1.94  
TRAVEL TIME(MIN.) = 1.41 Tc(MIN.) = 12.49  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10332.00 = 3851.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10332.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 12.49  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.556  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.850 -

USER-DEFINED - 1.40 0.30 0.500 -  
USER-DEFINED - 15.40 0.30 0.850 -  
USER-DEFINED - 8.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.881  
SUBAREA AREA(ACRES) = 25.60 SUBAREA RUNOFF(CFS) = 52.81  
EFFECTIVE AREA(ACRES) = 79.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 79.2 PEAK FLOW RATE(CFS) = 167.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10333.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 199.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 564.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 167.30  
FLOW VELOCITY(FEET/SEC.) = 13.71 FLOW DEPTH(FEET) = 2.02  
TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 13.17  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10333.00 = 4415.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10333.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 13.17  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.481  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 0.500 -  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 5.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.761  
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 16.83  
EFFECTIVE AREA(ACRES) = 87.50 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 87.5 PEAK FLOW RATE(CFS) = 178.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10334.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 195.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 454.00 CHANNEL SLOPE = 0.0088  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 178.75  
FLOW VELOCITY(FEET/SEC.) = 6.05 FLOW DEPTH(FEET) = 3.14

TRAVEL TIME(MIN.) = 1.25 Tc(MIN.) = 14.43  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10334.00 = 4869.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10334.00 TO NODE 10334.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 14.43

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.352

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN

USER-DEFINED	-	1.10	0.30	0.800	-
USER-DEFINED	-	2.60	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835

SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 7.00

EFFECTIVE AREA(ACRES) = 91.20 AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71

TOTAL AREA(ACRES) = 91.2 PEAK FLOW RATE(CFS) = 178.75

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10334.00 TO NODE 10335.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 195.00 DOWNSTREAM(FEET) = 189.00

FLOW LENGTH(FEET) = 1291.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 63.0 INCH PIPE IS 48.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.07

ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 178.75

PIPE TRAVEL TIME(MIN.) = 2.14 Tc(MIN.) = 16.56

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 16.56

RAINFALL INTENSITY(INCH/HR) = 2.19

AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.71

EFFECTIVE STREAM AREA(ACRES) = 91.20

TOTAL STREAM AREA(ACRES) = 91.20

PEAK FLOW RATE(CFS) AT CONFLUENCE = 178.75

\*\* CONFLUENCE DATA \*\*

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE

1	197.84	13.42	2.454	0.30( 0.23)	0.77	90.3	10300.00
2	178.75	16.56	2.191	0.30( 0.21)	0.71	91.2	10320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	361.93	13.42	2.454	0.30( 0.22)	0.75	164.2	10300.00
2	353.12	16.56	2.191	0.30( 0.22)	0.74	181.5	10320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 361.93 Tc(MIN.) = 13.42

EFFECTIVE AREA(ACRES) = 164.18 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75

TOTAL AREA(ACRES) = 181.5

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10336.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 189.00 DOWNSTREAM(FEET) = 188.00

FLOW LENGTH(FEET) = 103.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.87

ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 361.93

PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 13.53

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10336.00 = 6263.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10336.00 TO NODE 10337.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 180.00

FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 54.0 INCH PIPE IS 44.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 25.97

ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 361.93

PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 13.66

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10337.00 = 6475.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10337.00 TO NODE 10338.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 161.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0218

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 361.93  
FLOW VELOCITY (FEET/SEC.) = 10.16 FLOW DEPTH (FEET) = 3.45  
TRAVEL TIME (MIN.) = 1.43 Tc (MIN.) = 15.09  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10338.00 = 7347.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.09  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.294  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.850 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.943  
SUBAREA AREA (ACRES) = 4.20 SUBAREA RUNOFF (CFS) = 7.60  
EFFECTIVE AREA (ACRES) = 168.38 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 185.7 PEAK FLOW RATE (CFS) = 361.93  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.09  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.294  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 8.97  
EFFECTIVE AREA (ACRES) = 173.38 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 190.7 PEAK FLOW RATE (CFS) = 361.93  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10339.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 161.00 DOWNSTREAM (FEET) = 159.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 328.00 CHANNEL SLOPE = 0.0061

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 361.93  
FLOW VELOCITY (FEET/SEC.) = 6.30 FLOW DEPTH (FEET) = 4.38  
TRAVEL TIME (MIN.) = 0.87 Tc (MIN.) = 15.96  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10339.00 = 7675.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.96  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.233  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 2.30 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.767  
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 12.44  
EFFECTIVE AREA (ACRES) = 180.28 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 361.93  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.96  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.233  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 6.30 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 2.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.876  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 16.31  
EFFECTIVE AREA (ACRES) = 189.48 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 206.8 PEAK FLOW RATE (CFS) = 361.93  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10390.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 159.00 DOWNSTREAM(FEET) = 155.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 782.00 CHANNEL SLOPE = 0.0051
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 361.93
FLOW VELOCITY(FEET/SEC.) = 5.90 FLOW DEPTH(FEET) = 4.52
TRAVEL TIME(MIN.) = 2.21 Tc(MIN.) = 18.17
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 18.17
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.078
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      0.30    0.30    0.800  -
USER-DEFINED        -      3.70    0.30    0.850  -
USER-DEFINED        -      0.10    0.30    1.000  -
USER-DEFINED        -      2.10    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.901
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 10.09
EFFECTIVE AREA(ACRES) = 195.68 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 213.0 PEAK FLOW RATE(CFS) = 361.93
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
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*****
FLOW PROCESS FROM NODE 10340.00 TO NODE 10341.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 585.00

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Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.581
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.813
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS  Tc
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE"   -      0.10    0.30    0.800  95  10.58
PUBLIC PARK        -      0.50    0.30    0.850  95  10.90
AGRICULTURAL GOOD COVER

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"ROW CROPS, STRAIGHT ROW" - 0.40 0.30 1.000 95 21.09
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA RUNOFF(CFS) = 2.29
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.29

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*****
FLOW PROCESS FROM NODE 10341.00 TO NODE 10342.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
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UPSTREAM ELEVATION(FEET) = 585.00 DOWNSTREAM ELEVATION(FEET) = 570.00
STREET LENGTH(FEET) = 250.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.56
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.27
HALFSTREET FLOOD WIDTH(FEET) = 5.48
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.66
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.25
STREET FLOW TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 11.48
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.683
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      0.70    0.30    0.800  -
USER-DEFINED        -      1.40    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 4.54
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 6.71

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.00
FLOW VELOCITY(FEET/SEC.) = 4.94 DEPTH*VELOCITY(FT*FT/SEC.) = 1.47
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10342.00 = 558.00 FEET.

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*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
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UPSTREAM ELEVATION(FEET) = 570.00 DOWNSTREAM ELEVATION(FEET) = 560.00

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STREET LENGTH(FEET) = 415.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.10  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.36  
 HALfstREET FLOOD WIDTH(FEET) = 10.25  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.67  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.33  
 STREET FLOW TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 13.36  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.460  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.800	-
USER-DEFINED	-	1.20	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.825  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.78  
 EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
 TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 10.87

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.38 HALfstREET FLOOD WIDTH(FEET) = 11.12  
 FLOW VELOCITY(FEET/SEC.) = 3.81 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.45  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10343.00 = 973.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10343.00 TO NODE 10344.00 IS CODE = 63  
 -----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 4 USED)<<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 560.00 DOWNSTREAM ELEVATION(FEET) = 550.00  
 STREET LENGTH(FEET) = 616.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.43  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.42  
 HALfstREET FLOOD WIDTH(FEET) = 13.30  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.43  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.46  
 STREET FLOW TRAVEL TIME(MIN.) = 2.99 Tc(MIN.) = 16.35  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.205  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.30	0.800	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814  
 SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 5.12  
 EFFECTIVE AREA(ACRES) = 8.40 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 14.73

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.43 HALfstREET FLOOD WIDTH(FEET) = 13.81  
 FLOW VELOCITY(FEET/SEC.) = 3.51 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.53  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10344.00 = 1589.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10344.00 TO NODE 10345.00 IS CODE = 63  
 -----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 4 USED)<<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 550.00 DOWNSTREAM ELEVATION(FEET) = 510.00  
 STREET LENGTH(FEET) = 474.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.27  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.36  
 HALfstREET FLOOD WIDTH(FEET) = 10.30  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.90  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.51  
 STREET FLOW TRAVEL TIME(MIN.) = 1.14 Tc(MIN.) = 17.50  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.125  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.80	0.30	0.800	-
USER-DEFINED	-	0.20	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.09  
EFFECTIVE AREA(ACRES) = 11.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 11.4 PEAK FLOW RATE(CFS) = 19.21

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.81  
FLOW VELOCITY(FEET/SEC.) = 7.07 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.65  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10345.00 = 2063.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10345.00 TO NODE 10346.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 510.00 DOWNSTREAM ELEVATION(FEET) = 484.00  
STREET LENGTH(FEET) = 231.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.54

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.21  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 10.61  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.07  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.99  
STREET FLOW TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 17.98  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.092

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.40 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.00  
EFFECTIVE AREA(ACRES) = 13.80 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 13.8 PEAK FLOW RATE(CFS) = 22.87

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 10.96  
FLOW VELOCITY(FEET/SEC.) = 8.22 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.10  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10346.00 = 2294.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10346.00 TO NODE 10347.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 484.00 DOWNSTREAM ELEVATION(FEET) = 378.00  
STREET LENGTH(FEET) = 995.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.55

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.02  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.78  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.26  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.25  
STREET FLOW TRAVEL TIME(MIN.) = 2.01 Tc(MIN.) = 19.98  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.951

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 6.31  
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 27.43

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 12.03  
FLOW VELOCITY(FEET/SEC.) = 8.38 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.34  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10347.00 = 3289.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10347.00 TO NODE 10348.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 378.00 DOWNSTREAM ELEVATION(FEET) = 303.00  
STREET LENGTH(FEET) = 751.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.56

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.50  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.42  
HALFSTREET FLOOD WIDTH(FEET) = 13.30  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.55  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.63  
STREET FLOW TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 21.45  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.883

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.20 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 12.13  
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 38.47

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 14.11  
FLOW VELOCITY(FEET/SEC.) = 8.82 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.89  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10348.00 = 4040.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10348.00 TO NODE 10349.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 303.00 DOWNSTREAM ELEVATION(FEET) = 252.00  
STREET LENGTH(FEET) = 607.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.82  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.47  
HALFSTREET FLOOD WIDTH(FEET) = 15.73  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.60  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.07  
STREET FLOW TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 22.62  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.829  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.30 0.30 0.800 -  
USER-DEFINED - 3.00 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.815  
SUBAREA AREA(ACRES) = 10.30 SUBAREA RUNOFF(CFS) = 14.69  
EFFECTIVE AREA(ACRES) = 36.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 36.4 PEAK FLOW RATE(CFS) = 51.89

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 16.55  
FLOW VELOCITY(FEET/SEC.) = 8.86 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.33  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10349.00 = 4647.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10349.00 TO NODE 10350.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 252.00 DOWNSTREAM ELEVATION(FEET) = 246.00  
STREET LENGTH(FEET) = 224.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 61.09  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.60  
HALFSTREET FLOOD WIDTH(FEET) = 22.18  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.98  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.60  
STREET FLOW TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 23.25  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.801  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 12.60 0.30 0.800 -  
USER-DEFINED - 0.50 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.802  
SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 18.39  
EFFECTIVE AREA(ACRES) = 49.50 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 49.5 PEAK FLOW RATE(CFS) = 69.34

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 23.29  
FLOW VELOCITY(FEET/SEC.) = 6.18 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.85



LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10350.00 = 4871.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10350.00 TO NODE 10351.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 237.00
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.19
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 69.34
PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 23.90
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10351.00 = 5390.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10351.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.90
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.770
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 0.100 -
USER-DEFINED - 5.60 0.30 0.800 -
USER-DEFINED - 0.70 0.30 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.784
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 8.98
EFFECTIVE AREA(ACRES) = 56.00 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 56.0 PEAK FLOW RATE(CFS) = 76.98

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10352.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 237.00 DOWNSTREAM(FEET) = 230.00
FLOW LENGTH(FEET) = 675.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 30.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.95
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 76.98
PIPE TRAVEL TIME(MIN.) = 1.03 Tc(MIN.) = 24.93
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10352.00 = 6065.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.93

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.723

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.30 0.100 -
USER-DEFINED - 0.40 0.30 0.800 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.300
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.06
EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 76.98
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.93
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.723
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.80 0.30 0.100 -
USER-DEFINED - 9.40 0.30 0.800 -
USER-DEFINED - 1.10 0.30 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 15.22
EFFECTIVE AREA(ACRES) = 68.70 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79
TOTAL AREA(ACRES) = 68.7 PEAK FLOW RATE(CFS) = 91.88

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10353.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 230.00 DOWNSTREAM(FEET) = 180.00
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 33.20
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 91.88
PIPE TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 25.08
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10353.00 = 6366.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10353.00 TO NODE 10353.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 25.08
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.717
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 6.00 0.30 0.800 -  
 USER-DEFINED - 1.30 0.30 0.850 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.799  
 SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 9.84  
 EFFECTIVE AREA(ACRES) = 76.10 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 76.1 PEAK FLOW RATE(CFS) = 101.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10353.00 TO NODE 10354.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 172.00  
 FLOW LENGTH(FEET) = 458.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.22  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 101.35  
 PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 25.62  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10354.00 = 6824.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10354.00 TO NODE 10390.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 172.00 DOWNSTREAM(FEET) = 155.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00 CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 101.35  
 FLOW VELOCITY(FEET/SEC.) = 9.39 FLOW DEPTH(FEET) = 1.90  
 TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 26.35  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 26.35  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.674  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 0.100 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.100 -  
 USER-DEFINED - 0.90 0.30 0.850 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 2.73  
 EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
 TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 101.35  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 26.35  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.674  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 2.10 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.964  
 SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 4.74  
 EFFECTIVE AREA(ACRES) = 81.90 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 81.9 PEAK FLOW RATE(CFS) = 105.86

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 26.35  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.674  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.50 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 3.09  
 EFFECTIVE AREA(ACRES) = 84.40 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 84.4 PEAK FLOW RATE(CFS) = 108.95

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
 =====  
 \*\* MAIN STREAM CONFLUENCE DATA \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 108.95 26.35 1.674 0.30( 0.24) 0.80 84.4 10340.00  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	361.93	18.17	2.078	0.30 ( 0.23)	0.77	195.7	10300.00
2	353.12	21.35	1.888	0.30 ( 0.23)	0.76	213.0	10320.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	458.20	18.17	2.078	0.30 ( 0.23)	0.77	253.9	10300.00
2	454.55	21.35	1.888	0.30 ( 0.23)	0.77	281.4	10320.00
3	416.52	26.35	1.674	0.30 ( 0.23)	0.77	297.4	10340.00

TOTAL AREA (ACRES) = 297.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 458.20 Tc (MIN.) = 18.168  
EFFECTIVE AREA (ACRES) = 253.87 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
TOTAL AREA (ACRES) = 297.4  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10360.00 TO NODE 10361.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
ELEVATION DATA: UPSTREAM (FEET) = 337.00 DOWNSTREAM (FEET) = 292.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.697

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.795

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.30	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"GRASS"	-	0.50	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.10	0.30	1.000	95	10.70

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 2.02  
TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 2.02

\*\*\*\*\*

FLOW PROCESS FROM NODE 10361.00 TO NODE 10362.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 292.00 DOWNSTREAM (FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 199.00 CHANNEL SLOPE = 0.0101  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.02  
FLOW VELOCITY (FEET/SEC.) = 2.08 FLOW DEPTH (FEET) = 0.57  
TRAVEL TIME (MIN.) = 1.60 Tc (MIN.) = 12.29  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10362.00 = 529.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.29

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.578

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.26  
EFFECTIVE AREA (ACRES) = 2.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 4.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10363.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 290.00 DOWNSTREAM (FEET) = 288.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.10  
FLOW VELOCITY (FEET/SEC.) = 2.75 FLOW DEPTH (FEET) = 0.70  
TRAVEL TIME (MIN.) = 0.89 Tc (MIN.) = 13.18  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10363.00 = 676.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10363.00 TO NODE 10363.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.18  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.480  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.72  
 EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 8.64

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10363.00 TO NODE 10364.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 288.00 DOWNSTREAM(FEET) = 286.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.64  
 FLOW VELOCITY(FEET/SEC.) = 3.35 FLOW DEPTH(FEET) = 0.93  
 TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 13.91  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10364.00 = 823.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10364.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.91  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.399  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
 SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 3.60  
 EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 11.92

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10365.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 286.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 11.92  
 FLOW VELOCITY(FEET/SEC.) = 2.98 FLOW DEPTH(FEET) = 1.15  
 TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 15.30  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10365.00 = 1071.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10365.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.30  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.279  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.50	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 6.25  
 EFFECTIVE AREA(ACRES) = 9.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 17.49

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10366.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 17.49  
 FLOW VELOCITY(FEET/SEC.) = 3.28 FLOW DEPTH(FEET) = 1.33  
 TRAVEL TIME(MIN.) = 1.26 Tc(MIN.) = 16.56  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10366.00 = 1319.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10366.00 TO NODE 10366.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.56  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.191  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	2.30	0.30	1.000	-

USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 2.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995  
SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 14.48  
EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 31.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 10366.00 TO NODE 10367.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 279.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 292.00 CHANNEL SLOPE = 0.0103  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.19  
FLOW VELOCITY (FEET/SEC.) = 4.14 FLOW DEPTH (FEET) = 1.58  
TRAVEL TIME (MIN.) = 1.17 Tc (MIN.) = 17.73  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10367.00 = 1611.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10367.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.73

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.109

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972

SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 2.62

EFFECTIVE AREA (ACRES) = 19.90 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 19.9 PEAK FLOW RATE (CFS) = 32.45

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10368.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 279.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 378.00 CHANNEL SLOPE = 0.0079  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 32.45  
FLOW VELOCITY (FEET/SEC.) = 3.79 FLOW DEPTH (FEET) = 1.69

TRAVEL TIME (MIN.) = 1.66 Tc (MIN.) = 19.40  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10368.00 = 1989.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10368.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 19.40

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.992

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.973  
SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 3.37  
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 33.73

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10369.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 247.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 229.00 CHANNEL SLOPE = 0.1266  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 33.73  
FLOW VELOCITY (FEET/SEC.) = 10.86 FLOW DEPTH (FEET) = 1.02  
TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 19.75  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10369.00 = 2218.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10369.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 19.75

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.968

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	9.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996  
SUBAREA AREA (ACRES) = 11.60 SUBAREA RUNOFF (CFS) = 17.42  
EFFECTIVE AREA (ACRES) = 33.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 33.7 PEAK FLOW RATE (CFS) = 50.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10369.00 TO NODE 10370.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	247.00	DOWNSTREAM(FEET) =	226.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	179.00	CHANNEL SLOPE =	0.1173
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH(FEET) =	2.00
CHANNEL FLOW THRU SUBAREA(CFS) =	50.67		
FLOW VELOCITY(FEET/SEC.) =	11.68	FLOW DEPTH(FEET) =	1.20
TRAVEL TIME(MIN.) =	0.26	Tc(MIN.) =	20.00
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10370.00 =	2397.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10370.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	20.00				
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	1.950				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	3.60	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	5.60	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.997				
SUBAREA AREA(ACRES) =	11.10	SUBAREA RUNOFF(CFS) =	16.49		
EFFECTIVE AREA(ACRES) =	44.80	AREA-AVERAGED Fm(INCH/HR) =	0.30		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.99		
TOTAL AREA(ACRES) =	44.8	PEAK FLOW RATE(CFS) =	66.62		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10371.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	226.00	DOWNSTREAM(FEET) =	188.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	434.00	CHANNEL SLOPE =	0.0876
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH(FEET) =	2.00
CHANNEL FLOW THRU SUBAREA(CFS) =	66.62		
FLOW VELOCITY(FEET/SEC.) =	11.19	FLOW DEPTH(FEET) =	1.41
TRAVEL TIME(MIN.) =	0.65	Tc(MIN.) =	20.65
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10371.00 =	2831.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10371.00 TO NODE 10371.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.65  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.920  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.20	0.30	0.850	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	7.20	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.958				
SUBAREA AREA(ACRES) =	10.70	SUBAREA RUNOFF(CFS) =	15.72		
EFFECTIVE AREA(ACRES) =	55.50	AREA-AVERAGED Fm(INCH/HR) =	0.30		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.99		
TOTAL AREA(ACRES) =	55.5	PEAK FLOW RATE(CFS) =	81.14		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10371.00 TO NODE 10389.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	188.00	DOWNSTREAM(FEET) =	157.00
FLOW LENGTH(FEET) =	1918.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	39.0 INCH PIPE IS	26.7 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) =	13.38		
ESTIMATED PIPE DIAMETER(INCH) =	39.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	81.14		
PIPE TRAVEL TIME(MIN.) =	2.39	Tc(MIN.) =	23.04
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 =	4749.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS =	2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:	
TIME OF CONCENTRATION(MIN.) =	23.04
RAINFALL INTENSITY(INCH/HR) =	1.81
AREA-AVERAGED Fm(INCH/HR) =	0.30
AREA-AVERAGED Fp(INCH/HR) =	0.30
AREA-AVERAGED Ap =	0.99
EFFECTIVE STREAM AREA(ACRES) =	55.50
TOTAL STREAM AREA(ACRES) =	55.50
PEAK FLOW RATE(CFS) AT CONFLUENCE =	81.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10380.00 TO NODE 10381.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) =	241.00		
ELEVATION DATA: UPSTREAM(FEET) =	275.00	DOWNSTREAM(FEET) =	273.00

Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.110  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.531  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.30	0.100	95	7.11
PUBLIC PARK	-	1.10	0.30	0.850	95	11.30

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.735  
 SUBAREA RUNOFF(CFS) = 3.87  
 TOTAL AREA(ACRES) = 1.30 PEAK FLOW RATE(CFS) = 3.87

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10381.00 TO NODE 10382.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 273.00 DOWNSTREAM ELEVATION(FEET) = 271.00  
 STREET LENGTH(FEET) = 238.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.09  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.37  
 HALFSTREET FLOOD WIDTH(FEET) = 10.82  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.24  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.84  
 STREET FLOW TRAVEL TIME(MIN.) = 1.77 Tc(MIN.) = 8.88

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.106  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	1.40	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.718  
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 4.42  
 EFFECTIVE AREA(ACRES) = 3.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 7.80

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 12.15  
 FLOW VELOCITY(FEET/SEC.) = 2.34 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.94  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10382.00 = 479.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10382.00 TO NODE 10383.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 271.00 DOWNSTREAM ELEVATION(FEET) = 268.00  
 STREET LENGTH(FEET) = 357.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.29  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.44  
 HALFSTREET FLOOD WIDTH(FEET) = 14.18  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.57  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.13  
 STREET FLOW TRAVEL TIME(MIN.) = 2.32 Tc(MIN.) = 11.20  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.722

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	1.30	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.452  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 6.98  
 EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 13.74

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 15.35  
 FLOW VELOCITY(FEET/SEC.) = 2.70 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.26  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10383.00 = 836.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10383.00 TO NODE 10384.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 268.00 DOWNSTREAM ELEVATION(FEET) = 264.00  
 STREET LENGTH(FEET) = 473.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.07  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.50  
 HALFSTREET FLOOD WIDTH(FEET) = 17.15  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.89  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.45  
 STREET FLOW TRAVEL TIME(MIN.) = 2.73 Tc(MIN.) = 13.93  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.397

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.60	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 8.64  
 EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.57  
 TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 20.63

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 18.16  
 FLOW VELOCITY(FEET/SEC.) = 2.96 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.54  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10384.00 = 1309.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10384.00 TO NODE 10385.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 264.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
 STREET LENGTH(FEET) = 463.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.38  
 \*\*\*STREET FLOWING FULL\*\*\*

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.58  
 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.90  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.67  
 STREET FLOW TRAVEL TIME(MIN.) = 2.66 Tc(MIN.) = 16.59  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.189

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.600	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.650  
 SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 11.48  
 EFFECTIVE AREA(ACRES) = 16.70 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.7 PEAK FLOW RATE(CFS) = 30.18

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
 FLOW VELOCITY(FEET/SEC.) = 3.07 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.83  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10385.00 = 1772.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10385.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 16.59  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.189  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.37  
 EFFECTIVE AREA(ACRES) = 16.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.9 PEAK FLOW RATE(CFS) = 30.55

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10386.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 261.00 DOWNSTREAM(FEET) = 200.00  
 FLOW LENGTH(FEET) = 712.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.76  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 30.55



PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 17.19  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10386.00 = 2484.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.19

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.561

SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.49

EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60

TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 32.40

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.19

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	1.70	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.544

SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 7.32

EFFECTIVE AREA(ACRES) = 22.40 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59

TOTAL AREA(ACRES) = 22.4 PEAK FLOW RATE(CFS) = 39.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.19

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	2.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223

SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 6.55

EFFECTIVE AREA(ACRES) = 25.90 AREA-AVERAGED Fm(INCH/HR) = 0.16

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54

TOTAL AREA(ACRES) = 25.9 PEAK FLOW RATE(CFS) = 46.27

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.19

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.228

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 3.74

EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52

TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 50.01

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.19

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	0.850	-
USER-DEFINED	-	2.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.225

SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.61

EFFECTIVE AREA(ACRES) = 30.90 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49

TOTAL AREA(ACRES) = 30.9 PEAK FLOW RATE(CFS) = 55.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.19  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.100 -  
USER-DEFINED - 1.50 0.30 0.600 -  
USER-DEFINED - 1.70 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.204  
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 13.51  
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 69.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10387.00 IS CODE = 31  
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 200.00 DOWNSTREAM(FEET) = 163.00  
FLOW LENGTH(FEET) = 1145.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.25  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 69.14  
PIPE TRAVEL TIME(MIN.) = 1.17 Tc(MIN.) = 18.37  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10387.00 = 3629.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.37  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.064  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.100 -  
USER-DEFINED - 23.80 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 0.100 -  
USER-DEFINED - 6.90 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.830  
SUBAREA AREA(ACRES) = 32.90 SUBAREA RUNOFF(CFS) = 53.75  
EFFECTIVE AREA(ACRES) = 71.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 71.0 PEAK FLOW RATE(CFS) = 120.08

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81  
=====

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.37  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.064  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 1.20 0.30 0.100 -  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.641  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 6.40  
EFFECTIVE AREA(ACRES) = 74.80 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 74.8 PEAK FLOW RATE(CFS) = 126.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10388.00 IS CODE = 31  
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 163.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.46  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 126.48  
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 18.50  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10388.00 = 3779.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.50  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.055  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.80 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.400 -  
USER-DEFINED - 0.60 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 10.92  
EFFECTIVE AREA(ACRES) = 80.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 80.9 PEAK FLOW RATE(CFS) = 136.79

```

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.055
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.30     0.100    -
USER-DEFINED        -        10.70     0.30     0.400    -
USER-DEFINED        -         2.30     0.30     0.850    -
USER-DEFINED        -         0.50     0.30     1.000    -
USER-DEFINED        -         0.30     0.30     1.000    -
USER-DEFINED        -         0.70     0.30     0.400    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.502
SUBAREA AREA(ACRES) = 14.60   SUBAREA RUNOFF(CFS) = 25.03
EFFECTIVE AREA(ACRES) = 95.50   AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 95.5     PEAK FLOW RATE(CFS) = 161.82

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.055
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70     0.30     0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.70   SUBAREA RUNOFF(CFS) = 1.13
EFFECTIVE AREA(ACRES) = 96.20   AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 96.2     PEAK FLOW RATE(CFS) = 162.95

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10389.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 158.00   DOWNSTREAM(FEET) = 157.00
FLOW LENGTH(FEET) = 51.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.06
ESTIMATED PIPE DIAMETER(INCH) = 48.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 162.95
PIPE TRAVEL TIME(MIN.) = 0.05   Tc(MIN.) = 18.55
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10389.00 = 3830.00 FEET.

*****

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FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 18.55
RAINFALL INTENSITY(INCH/HR) = 2.05
AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.58
EFFECTIVE STREAM AREA(ACRES) = 96.20
TOTAL STREAM AREA(ACRES) = 96.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 162.95

** CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1          81.14 23.04  1.810 0.30( 0.30) 0.99 55.5 10360.00
2         162.95 18.55  2.052 0.30( 0.17) 0.58 96.2 10380.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1          238.69 18.55  2.052 0.30( 0.21) 0.71 140.9 10380.00
2          223.14 23.04  1.810 0.30( 0.22) 0.73 151.7 10360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 238.69   Tc(MIN.) = 18.55
EFFECTIVE AREA(ACRES) = 140.88   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 151.7
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

*****
FLOW PROCESS FROM NODE 10389.00 TO NODE 10390.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 157.00   DOWNSTREAM(FEET) = 155.00
FLOW LENGTH(FEET) = 312.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 50.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.20
ESTIMATED PIPE DIAMETER(INCH) = 66.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 238.69
PIPE TRAVEL TIME(MIN.) = 0.43   Tc(MIN.) = 18.97
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

MAINLINE Tc(MIN.) = 18.97  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.022  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 5.70 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 14.73  
 EFFECTIVE AREA(ACRES) = 150.38 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 161.2 PEAK FLOW RATE(CFS) = 244.21

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.97  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.022  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 3.41  
 EFFECTIVE AREA(ACRES) = 152.58 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 163.4 PEAK FLOW RATE(CFS) = 247.62

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	247.62	18.97	2.022	0.30( 0.22)	0.73	152.6	10380.00
2	230.33	23.48	1.790	0.30( 0.22)	0.75	163.4	10360.00

LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	458.20	18.17	2.078	0.30( 0.23)	0.77	253.9	10300.00
2	454.55	21.35	1.888	0.30( 0.23)	0.77	281.4	10320.00
3	416.52	26.35	1.674	0.30( 0.23)	0.77	297.4	10340.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	702.74	18.17	2.078	0.30( 0.23)	0.76	400.0	10300.00
2	704.90	18.97	2.022	0.30( 0.23)	0.76	413.4	10380.00
3	693.05	21.35	1.888	0.30( 0.23)	0.76	439.7	10320.00
4	668.71	23.48	1.790	0.30( 0.23)	0.76	451.6	10360.00
5	629.78	26.35	1.674	0.30( 0.23)	0.76	460.8	10340.00

TOTAL AREA(ACRES) = 460.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 704.90 Tc(MIN.) = 18.971  
 EFFECTIVE AREA(ACRES) = 413.39 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA(ACRES) = 460.8  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12  
 -----

>>>>CLEAR MEMORY BANK # 1 <<<<<

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 460.8 TC(MIN.) = 18.97  
 EFFECTIVE AREA(ACRES) = 413.39 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.758  
 PEAK FLOW RATE(CFS) = 704.90

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	702.74	18.17	2.078	0.30( 0.23)	0.76	400.0	10300.00
2	704.90	18.97	2.022	0.30( 0.23)	0.76	413.4	10380.00
3	693.05	21.35	1.888	0.30( 0.23)	0.76	439.7	10320.00
4	668.71	23.48	1.790	0.30( 0.23)	0.76	451.6	10360.00
5	629.78	26.35	1.674	0.30( 0.23)	0.76	460.8	10340.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506104C.DAT  
TIME/DATE OF STUDY: 12:47 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.310
- 2) 6.00; 3.880
- 3) 7.00; 3.560
- 4) 8.00; 3.300
- 5) 9.00; 3.080
- 6) 10.00; 2.900
- 7) 11.00; 2.750
- 8) 12.00; 2.610
- 9) 13.00; 2.500
- 10) 14.00; 2.390
- 11) 15.00; 2.300
- 12) 20.00; 1.950
- 13) 25.00; 1.720
- 14) 30.00; 1.550
- 15) 40.00; 1.310
- 16) 50.00; 1.160
- 17) 60.00; 1.040
- 18) 90.00; 0.830
- 19) 120.00; 0.700
- 20) 180.00; 0.560

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10400.00 TO NODE 10401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00  
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.434  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.741  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
PUBLIC PARK	-	0.50	0.30	0.850	95	6.43

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.850  
 SUBAREA RUNOFF(CFS) = 1.57  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 10401.00 TO NODE 10402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.3419  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.57  
 FLOW VELOCITY(FEET/SEC.) = 5.79 FLOW DEPTH(FEET) = 0.30  
 TRAVEL TIME(MIN.) = 0.34  $T_c$ (MIN.) = 6.77  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10402.00 = 424.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 6.77  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.634  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.940  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.51  
EFFECTIVE AREA(ACRES) = 1.00 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 3.03

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10402.00 TO NODE 10403.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.2439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.03  
FLOW VELOCITY(FEET/SEC.) = 6.09 FLOW DEPTH(FEET) = 0.41  
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 7.11  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10403.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10403.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 7.11  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.532  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 2.64  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 5.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10404.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 420.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 266.00 CHANNEL SLOPE = 0.1880  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 5.58  
FLOW VELOCITY(FEET/SEC.) = 6.45 FLOW DEPTH(FEET) = 0.54  
TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 7.79  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10404.00 = 813.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10404.00 IS CODE = 81  
-----

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc(MIN.) = 7.79  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.532  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.863  
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 6.41  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 11.68

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10405.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 370.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 289.00 CHANNEL SLOPE = 0.1730  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 11.68  
FLOW VELOCITY(FEET/SEC.) = 7.51 FLOW DEPTH(FEET) = 0.72  
TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 8.44  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10405.00 = 1102.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10405.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 8.44  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.204  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 10.62  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 21.73

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10406.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 367.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 23.00 CHANNEL SLOPE = 0.1304  
-----

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 21.73  
FLOW VELOCITY (FEET/SEC.) = 7.92 FLOW DEPTH (FEET) = 0.96  
TRAVEL TIME (MIN.) = 0.05 Tc (MIN.) = 8.48  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10406.00 = 1125.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.48  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.193  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 5.55  
EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 27.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 367.00 DOWNSTREAM (FEET) = 344.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 214.00 CHANNEL SLOPE = 0.1075  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 27.20  
FLOW VELOCITY (FEET/SEC.) = 7.79 FLOW DEPTH (FEET) = 1.08  
TRAVEL TIME (MIN.) = 0.46 Tc (MIN.) = 8.94  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10407.00 = 1339.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.94  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.093  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 5.11  
EFFECTIVE AREA (ACRES) = 12.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 31.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 344.00 DOWNSTREAM (FEET) = 327.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 919.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.38  
FLOW VELOCITY (FEET/SEC.) = 5.17 FLOW DEPTH (FEET) = 1.42  
TRAVEL TIME (MIN.) = 2.96 Tc (MIN.) = 11.90  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10408.00 = 2258.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10408.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.90  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.624  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.800 -  
USER-DEFINED - 7.90 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.849  
SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 17.06  
EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 43.24

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 327.00 DOWNSTREAM (FEET) = 314.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 807.00 CHANNEL SLOPE = 0.0161  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 43.24  
FLOW VELOCITY (FEET/SEC.) = 5.33 FLOW DEPTH (FEET) = 1.65  
TRAVEL TIME (MIN.) = 2.53 Tc (MIN.) = 14.43  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10409.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10409.00 TO NODE 10409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 14.43  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.351  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS



LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.90 0.30 0.800 -  
 USER-DEFINED - 5.70 0.30 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.823  
 SUBAREA AREA (ACRES) = 12.60 SUBAREA RUNOFF (CFS) = 23.87  
 EFFECTIVE AREA (ACRES) = 32.90 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA (ACRES) = 32.9 PEAK FLOW RATE (CFS) = 62.14

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10409.00 TO NODE 10410.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 314.00 DOWNSTREAM(FEET) = 266.00  
 FLOW LENGTH(FEET) = 213.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 33.42  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 62.14  
 PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 14.53  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10410.00 = 3278.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10410.00 TO NODE 10411.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 266.00 DOWNSTREAM(FEET) = 170.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1470.00 CHANNEL SLOPE = 0.0653  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 62.14  
 FLOW VELOCITY(FEET/SEC.) = 9.90 FLOW DEPTH(FEET) = 1.45  
 TRAVEL TIME(MIN.) = 2.48 Tc(MIN.) = 17.01  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10411.00 = 4748.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10411.00 TO NODE 10411.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.01  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.159  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	6.60	0.30	0.800	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.723  
 SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 14.86

EFFECTIVE AREA (ACRES) = 41.40 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 41.4 PEAK FLOW RATE (CFS) = 71.30

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10411.00 TO NODE 10412.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 170.00 DOWNSTREAM(FEET) = 161.00  
 FLOW LENGTH(FEET) = 1129.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.92  
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 71.30  
 PIPE TRAVEL TIME(MIN.) = 1.90 Tc(MIN.) = 18.91  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10412.00 = 5877.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10412.00 TO NODE 10413.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 161.00 DOWNSTREAM(FEET) = 141.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 360.00 CHANNEL SLOPE = 0.0556  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 71.30  
 FLOW VELOCITY(FEET/SEC.) = 9.59 FLOW DEPTH(FEET) = 1.57  
 TRAVEL TIME(MIN.) = 0.63 Tc(MIN.) = 19.53  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10413.00 = 6237.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10413.00 TO NODE 10413.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 19.53  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.983  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.509  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 4.78  
 EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA (ACRES) = 44.3 PEAK FLOW RATE (CFS) = 71.30  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 44.3 TC (MIN.) = 19.53  
EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.24  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.798  
PEAK FLOW RATE (CFS) = 71.30

=====  
=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506105J.DAT  
TIME/DATE OF STUDY: 12:50 04/15/2013  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.310
- 2) 6.00; 3.880
- 3) 7.00; 3.560
- 4) 8.00; 3.300
- 5) 9.00; 3.080
- 6) 10.00; 2.900
- 7) 11.00; 2.750
- 8) 12.00; 2.610
- 9) 13.00; 2.500
- 10) 14.00; 2.390
- 11) 15.00; 2.300
- 12) 20.00; 1.950
- 13) 25.00; 1.720
- 14) 30.00; 1.550
- 15) 40.00; 1.310
- 16) 50.00; 1.160
- 17) 60.00; 1.040
- 18) 90.00; 0.830
- 19) 120.00; 0.700
- 20) 180.00; 0.560

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10500.00 TO NODE 10501.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 1123.00 DOWNSTREAM(FEET) = 1085.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.984  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.752  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.20	0.30	1.000	95	10.98
NATURAL FAIR COVER "GRASS"	-	0.30	0.30	1.000	95	10.98

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
 SUBAREA RUNOFF(CFS) = 1.10  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 10501.00 TO NODE 10502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 1085.00 DOWNSTREAM(FEET) = 1050.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 181.00 CHANNEL SLOPE = 0.1934  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.10  
 FLOW VELOCITY(FEET/SEC.) = 4.29 FLOW DEPTH(FEET) = 0.29  
 TRAVEL TIME(MIN.) = 0.70  $T_c$ (MIN.) = 11.69  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10502.00 = 507.00 FEET.

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FLOW PROCESS FROM NODE 10502.00 TO NODE 10502.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 11.69  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.654  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.10     0.30      1.000     -
USER-DEFINED  -        0.80     0.30      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 1.91
EFFECTIVE AREA (ACRES) = 1.40  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.4    PEAK FLOW RATE (CFS) = 2.97

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*****
FLOW PROCESS FROM NODE 10502.00 TO NODE 10503.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1025.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 193.00  CHANNEL SLOPE = 0.1295
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.97
FLOW VELOCITY(FEET/SEC.) = 4.82  FLOW DEPTH(FEET) = 0.45
TRAVEL TIME(MIN.) = 0.67  Tc(MIN.) = 12.36
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10503.00 = 700.00 FEET.

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10503.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.36
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.571
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.50   0.30  1.000  -
USER-DEFINED      -        1.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 4.70
EFFECTIVE AREA (ACRES) = 3.70  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 3.7    PEAK FLOW RATE (CFS) = 7.56

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10504.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1025.00  DOWNSTREAM(FEET) = 1020.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00  CHANNEL SLOPE = 0.0151
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.56
FLOW VELOCITY(FEET/SEC.) = 3.35  FLOW DEPTH(FEET) = 0.87
TRAVEL TIME(MIN.) = 1.65  Tc(MIN.) = 14.00
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10504.00 = 1032.00 FEET.

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10504.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.390
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.10   0.30  1.000  -
USER-DEFINED      -        0.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 1.69
EFFECTIVE AREA (ACRES) = 4.60  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.6    PEAK FLOW RATE (CFS) = 8.65

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10505.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1020.00  DOWNSTREAM(FEET) = 975.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 397.00  CHANNEL SLOPE = 0.1134
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 8.65
FLOW VELOCITY(FEET/SEC.) = 7.44  FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 0.89  Tc(MIN.) = 14.89
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10505.00 = 1429.00 FEET.

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10505.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.89
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.309
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.20   0.30  1.000  -
USER-DEFINED      -        1.20   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.40  SUBAREA RUNOFF (CFS) = 2.53
EFFECTIVE AREA (ACRES) = 6.00  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.0    PEAK FLOW RATE (CFS) = 10.85

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10506.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 905.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 334.00 CHANNEL SLOPE = 0.2096
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.85
FLOW VELOCITY(FEET/SEC.) = 9.86 FLOW DEPTH(FEET) = 0.61
TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 15.46
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10506.00 = 1763.00 FEET.

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10506.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.46
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.268
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap      SCS
LAND USE           GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED       -        6.10    0.30    1.000    -
USER-DEFINED       -        3.70    0.30    1.000    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 17.36
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 27.98

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10507.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 790.00 CHANNEL SLOPE = 0.0380
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 27.98
FLOW VELOCITY(FEET/SEC.) = 5.32 FLOW DEPTH(FEET) = 1.32
TRAVEL TIME(MIN.) = 2.48 Tc(MIN.) = 17.94
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10507.00 = 2553.00 FEET.

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10507.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 17.94
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.095
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap      SCS
LAND USE           GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED       -        2.70    0.30    1.000    -
USER-DEFINED       -        6.30    0.30    1.000    -
USER-DEFINED       -        0.30    0.30    1.000    -

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```

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 15.02
EFFECTIVE AREA(ACRES) = 25.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 40.54

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10508.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 755.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 40.54
FLOW VELOCITY(FEET/SEC.) = 8.59 FLOW DEPTH(FEET) = 1.25
TRAVEL TIME(MIN.) = 2.17 Tc(MIN.) = 20.11
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10508.00 = 3673.00 FEET.

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10508.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 20.11
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.945
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap      SCS
LAND USE           GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED       -        0.80    0.30    1.000    -
USER-DEFINED       -       11.10    0.30    1.000    -
USER-DEFINED       -        3.10    0.30    1.000    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 22.21
EFFECTIVE AREA(ACRES) = 40.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 59.37

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10509.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 755.00 DOWNSTREAM(FEET) = 533.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1578.00 CHANNEL SLOPE = 0.1407
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 59.37
FLOW VELOCITY(FEET/SEC.) = 10.45 FLOW DEPTH(FEET) = 1.38
TRAVEL TIME(MIN.) = 2.52 Tc(MIN.) = 22.62
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10509.00 = 5251.00 FEET.

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FLOW PROCESS FROM NODE 10509.00 TO NODE 10509.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.62

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.829

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.80	0.30	1.000	-
USER-DEFINED	-	11.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	8.30	0.30	1.000	-
USER-DEFINED	-	38.10	0.30	1.000	-
USER-DEFINED	-	8.70	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 77.40 SUBAREA RUNOFF (CFS) = 106.53

EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 161.73

\*\*\*\*\*

FLOW PROCESS FROM NODE 10509.00 TO NODE 10510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 415.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1236.00 CHANNEL SLOPE = 0.0955  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 161.73  
 FLOW VELOCITY (FEET/SEC.) = 11.62 FLOW DEPTH (FEET) = 2.15  
 TRAVEL TIME (MIN.) = 1.77 Tc (MIN.) = 24.40  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10510.00 = 6487.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 24.40

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.748

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	30.10	0.30	1.000	-
USER-DEFINED	-	15.30	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	11.30	0.30	1.000	-
USER-DEFINED	-	5.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 64.90 SUBAREA RUNOFF (CFS) = 84.56

EFFECTIVE AREA (ACRES) = 182.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 182.4 PEAK FLOW RATE (CFS) = 237.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10511.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1161.00 CHANNEL SLOPE = 0.0973  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 237.66  
 FLOW VELOCITY (FEET/SEC.) = 12.91 FLOW DEPTH (FEET) = 2.48  
 TRAVEL TIME (MIN.) = 1.50 Tc (MIN.) = 25.90  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10511.00 = 7648.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10511.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 25.90

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.690

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.50	0.30	1.000	-
USER-DEFINED	-	10.80	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	22.10	0.30	1.000	-
USER-DEFINED	-	4.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 54.80 SUBAREA RUNOFF (CFS) = 68.53

EFFECTIVE AREA (ACRES) = 237.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 237.2 PEAK FLOW RATE (CFS) = 296.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 302.00 DOWNSTREAM (FEET) = 190.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1644.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 296.65  
 FLOW VELOCITY (FEET/SEC.) = 11.93 FLOW DEPTH (FEET) = 2.88  
 TRAVEL TIME (MIN.) = 2.30 Tc (MIN.) = 28.19  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10512.00 = 9292.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10512.00 TO NODE 10512.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 28.19
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.611
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
    LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.50     0.30     1.000     -
USER-DEFINED            -        0.20     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     1.000     -
USER-DEFINED            -        0.10     0.30     1.000     -
USER-DEFINED            -       14.20     0.30     1.000     -
USER-DEFINED            -        2.80     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 19.50      SUBAREA RUNOFF(CFS) = 23.02
EFFECTIVE AREA(ACRES) = 256.70   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 256.7        PEAK FLOW RATE(CFS) = 302.99

*****
FLOW PROCESS FROM NODE 10512.00 TO NODE 10513.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 190.00  DOWNSTREAM(FEET) = 183.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 86.00  CHANNEL SLOPE = 0.0814
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 4.00
CHANNEL FLOW THRU SUBAREA(CFS) = 302.99
FLOW VELOCITY(FEET/SEC.) = 12.84  FLOW DEPTH(FEET) = 2.80
TRAVEL TIME(MIN.) = 0.11  Tc(MIN.) = 28.31
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10513.00 = 9378.00 FEET.

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 28.31
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.608
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
    LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.10     0.30     0.100     -
USER-DEFINED            -        1.30     0.30     1.000     -
USER-DEFINED            -       29.90     0.30     1.000     -
USER-DEFINED            -       11.90     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     1.000     -
USER-DEFINED            -        0.60     0.30     0.100     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 45.50      SUBAREA RUNOFF(CFS) = 53.72
EFFECTIVE AREA(ACRES) = 302.20   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 302.2        PEAK FLOW RATE(CFS) = 355.84

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FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 28.31
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.608
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
    LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        9.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30      SUBAREA RUNOFF(CFS) = 10.95
EFFECTIVE AREA(ACRES) = 311.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 311.5        PEAK FLOW RATE(CFS) = 366.78

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10514.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 183.00  DOWNSTREAM(FEET) = 171.00
FLOW LENGTH(FEET) = 1209.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.05
ESTIMATED PIPE DIAMETER(INCH) = 72.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 366.78
PIPE TRAVEL TIME(MIN.) = 1.26  Tc(MIN.) = 29.56
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10514.00 = 10587.00 FEET.

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10514.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 29.56
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.565
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
    LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.20     0.30     0.100     -
USER-DEFINED            -        0.40     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     0.100     -
USER-DEFINED            -       31.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 33.60      SUBAREA RUNOFF(CFS) = 38.72
EFFECTIVE AREA(ACRES) = 345.10   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 345.1        PEAK FLOW RATE(CFS) = 393.53

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10515.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

ELEVATION DATA: UPSTREAM(FEET) = 171.00 DOWNSTREAM(FEET) = 165.00  
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 72.0 INCH PIPE IS 56.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.66  
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 393.53  
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 30.13  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10515.00 = 11152.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10515.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 30.13  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.547  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 1.30 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 15.30 0.30 0.100 -  
USER-DEFINED - 1.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.202  
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 25.68  
EFFECTIVE AREA(ACRES) = 364.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 364.3 PEAK FLOW RATE(CFS) = 413.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10525.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 709.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 75.0 INCH PIPE IS 57.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.48  
ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 413.64  
PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 30.84  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 30.84  
RAINFALL INTENSITY(INCH/HR) = 1.53  
AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.95  
EFFECTIVE STREAM AREA(ACRES) = 364.30  
TOTAL STREAM AREA(ACRES) = 364.30  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 413.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10520.00 TO NODE 10521.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 289.00  
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 180.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.311  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.479  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL - 0.30 0.30 0.100 95 7.31  
PUBLIC PARK - 1.20 0.30 0.850 95 11.62  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.700  
SUBAREA RUNOFF(CFS) = 4.41  
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 4.41

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10521.00 TO NODE 10522.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 180.00 DOWNSTREAM ELEVATION(FEET) = 176.00  
STREET LENGTH(FEET) = 408.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.50  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.52  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.47  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.96  
STREET FLOW TRAVEL TIME(MIN.) = 2.75 Tc(MIN.) = 10.06  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.890

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS



LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.60	0.30	0.100	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520  
SUBAREA AREA (ACRES) = 2.50 SUBAREA RUNOFF (CFS) = 6.15  
EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 9.77

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 12.93  
FLOW VELOCITY (FEET/SEC.) = 2.62 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.09  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10522.00 = 697.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10522.00 TO NODE 10523.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 176.00 DOWNSTREAM ELEVATION (FEET) = 173.00  
STREET LENGTH (FEET) = 333.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 16.04  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.48  
HALFSTREET FLOOD WIDTH (FEET) = 16.13  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.87  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.38  
STREET FLOW TRAVEL TIME (MIN.) = 1.93 Tc (MIN.) = 12.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.611

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	4.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.109  
SUBAREA AREA (ACRES) = 5.40 SUBAREA RUNOFF (CFS) = 12.53  
EFFECTIVE AREA (ACRES) = 9.40 AREA-AVERAGED Fm (INCH/HR) = 0.09  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
TOTAL AREA (ACRES) = 9.4 PEAK FLOW RATE (CFS) = 21.29

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.52 HALFSTREET FLOOD WIDTH (FEET) = 18.16  
FLOW VELOCITY (FEET/SEC.) = 3.05 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.59  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10523.00 = 1030.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10523.00 TO NODE 10523.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 12.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.611  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.90	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	0.100	-
USER-DEFINED	-	4.80	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	4.90	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.785  
SUBAREA AREA (ACRES) = 12.70 SUBAREA RUNOFF (CFS) = 27.15  
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 48.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10523.00 TO NODE 10524.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 173.00 DOWNSTREAM (FEET) = 165.00  
FLOW LENGTH (FEET) = 736.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.1 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.00  
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 48.44  
PIPE TRAVEL TIME (MIN.) = 1.23 Tc (MIN.) = 13.22  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10524.00 = 1766.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10524.00 TO NODE 10524.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 13.22  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.475  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.308  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 3.86  
EFFECTIVE AREA(ACRES) = 23.90 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 23.9 PEAK FLOW RATE(CFS) = 49.61

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10524.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 623.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.17  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 49.61  
PIPE TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 14.24  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10525.00 = 2389.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.24  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.368  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	6.80	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 17.30  
EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64  
TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 64.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.24  
RAINFALL INTENSITY(INCH/HR) = 2.37  
AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.64  
EFFECTIVE STREAM AREA(ACRES) = 33.00

TOTAL STREAM AREA(ACRES) = 33.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 64.60

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	413.64	30.84	1.530	0.30( 0.29)	0.95	364.3	10500.00
2	64.60	14.24	2.368	0.30( 0.19)	0.64	33.0	10520.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	384.31	14.24	2.368	0.30( 0.27)	0.90	201.2	10520.00
2	453.34	30.84	1.530	0.30( 0.28)	0.93	397.3	10500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 453.34 Tc(MIN.) = 30.84  
EFFECTIVE AREA(ACRES) = 397.30 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
TOTAL AREA(ACRES) = 397.3  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10526.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 158.00 DOWNSTREAM(FEET) = 148.00  
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 63.95  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 453.34  
PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 30.85  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10526.00 = 11891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10526.00 TO NODE 10527.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 148.00 DOWNSTREAM(FEET) = 135.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 296.00 CHANNEL SLOPE = 0.0439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 453.34  
FLOW VELOCITY(FEET/SEC.) = 13.95 FLOW DEPTH(FEET) = 3.29  
TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 31.20  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10527.00 = 12187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN.) = 31.20
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.521
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap      SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -        0.30      0.30      1.000      -
USER-DEFINED        -        0.80      0.30      1.000      -
USER-DEFINED        -        0.20      0.30      1.000      -
USER-DEFINED        -        0.10      0.30      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.40      SUBAREA RUNOFF(CFS) = 1.54
EFFECTIVE AREA(ACRES) = 398.70  AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.93
TOTAL AREA(ACRES) = 398.7      PEAK FLOW RATE(CFS) = 453.34
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN.) = 31.20
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.521
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap      SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -        0.10      0.30      0.100      -
USER-DEFINED        -        1.10      0.30      1.000      -
USER-DEFINED        -        0.40      0.30      1.000      -
USER-DEFINED        -        1.10      0.30      1.000      -
USER-DEFINED        -        2.20      0.30      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982
SUBAREA AREA(ACRES) = 4.90      SUBAREA RUNOFF(CFS) = 5.41
EFFECTIVE AREA(ACRES) = 403.60  AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.93
TOTAL AREA(ACRES) = 403.6      PEAK FLOW RATE(CFS) = 453.34
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF STUDY SUMMARY:

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TOTAL AREA(ACRES) = 403.6 TC(MIN.) = 31.20
EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.927
PEAK FLOW RATE(CFS) = 453.34

```

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	385.37	14.62	2.334	0.30 ( 0.27)	0.90	207.5	10520.00
2	453.34	31.20	1.521	0.30 ( 0.28)	0.93	403.6	10500.00

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506106C.DAT  
TIME/DATE OF STUDY: 12:51 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.310
- 2) 6.00; 3.880
- 3) 7.00; 3.560
- 4) 8.00; 3.300
- 5) 9.00; 3.080
- 6) 10.00; 2.900
- 7) 11.00; 2.750
- 8) 12.00; 2.610
- 9) 13.00; 2.500
- 10) 14.00; 2.390
- 11) 15.00; 2.300
- 12) 20.00; 1.950
- 13) 25.00; 1.720
- 14) 30.00; 1.550
- 15) 40.00; 1.310
- 16) 50.00; 1.160
- 17) 60.00; 1.040
- 18) 90.00; 0.830
- 19) 120.00; 0.700
- 20) 180.00; 0.560

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10600.00 TO NODE 10601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 311.00  
ELEVATION DATA: UPSTREAM(FEET) = 166.00 DOWNSTREAM(FEET) = 164.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.602  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.810  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	-	0.50	0.30	0.500	95	10.60
PUBLIC PARK	-	0.60	0.30	0.850	95	13.16

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.691  
 SUBAREA RUNOFF(CFS) = 2.58  
 TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 2.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 10601.00 TO NODE 10602.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 164.00 DOWNSTREAM ELEVATION(FEET) = 162.00  
STREET LENGTH(FEET) = 220.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.87  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 9.59  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.19

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.77  
 STREET FLOW TRAVEL TIME (MIN.) = 1.67 Tc (MIN.) = 12.27  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.580  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.517  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 4.58  
 EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.17  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 6.93

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.38 HALFSTREET FLOOD WIDTH (FEET) = 11.29  
 FLOW VELOCITY (FEET/SEC.) = 2.37 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.91  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10602.00 = 531.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10602.00 TO NODE 10603.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 162.00 DOWNSTREAM ELEVATION (FEET) = 159.00  
 STREET LENGTH (FEET) = 328.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.79  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.43  
 HALFSTREET FLOOD WIDTH (FEET) = 13.71  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.61  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.13  
 STREET FLOW TRAVEL TIME (MIN.) = 2.10 Tc (MIN.) = 14.37  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.357

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.500	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	2.40	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.527  
 SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 7.72

EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 14.01

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.46 HALFSTREET FLOOD WIDTH (FEET) = 15.27  
 FLOW VELOCITY (FEET/SEC.) = 2.78 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.29  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10603.00 = 859.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10603.00 TO NODE 10604.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 159.00 DOWNSTREAM ELEVATION (FEET) = 155.00  
 STREET LENGTH (FEET) = 465.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 20.79  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.52  
 HALFSTREET FLOOD WIDTH (FEET) = 18.09  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.00  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.56  
 STREET FLOW TRAVEL TIME (MIN.) = 2.58 Tc (MIN.) = 16.95  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.163

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.30	0.500	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.513  
 SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 13.57  
 EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 26.34

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.56 HALFSTREET FLOOD WIDTH (FEET) = 19.88  
 FLOW VELOCITY (FEET/SEC.) = 3.18 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.77  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10604.00 = 1324.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10604.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.95
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.163
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.30    0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.10    SUBAREA RUNOFF(CFS) = 0.17
EFFECTIVE AREA(ACRES) = 14.70  AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 14.7    PEAK FLOW RATE(CFS) = 26.51

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10605.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 155.00  DOWNSTREAM(FEET) = 140.00
FLOW LENGTH(FEET) = 214.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.71
ESTIMATED PIPE DIAMETER(INCH) = 21.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 26.51
PIPE TRAVEL TIME(MIN.) = 0.20  Tc(MIN.) = 17.15
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10605.00 = 1538.00 FEET.

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10605.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.15
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.149
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20    0.30    0.100    -
USER-DEFINED        -         1.70    0.30    0.100    -
USER-DEFINED        -        10.20    0.30    0.800    -
USER-DEFINED        -         2.90    0.30    0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.682
SUBAREA AREA(ACRES) = 16.00  SUBAREA RUNOFF(CFS) = 28.00
EFFECTIVE AREA(ACRES) = 30.70  AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 30.7    PEAK FLOW RATE(CFS) = 54.33

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10606.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 140.00  DOWNSTREAM(FEET) = 133.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00  CHANNEL SLOPE = 0.0400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 54.33
FLOW VELOCITY(FEET/SEC.) = 7.91  FLOW DEPTH(FEET) = 1.51
TRAVEL TIME(MIN.) = 0.37  Tc(MIN.) = 17.52
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10606.00 = 1713.00 FEET.

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.52
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.124
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.30    0.500    -
USER-DEFINED        -         0.30    0.30    0.850    -
USER-DEFINED        -         0.10    0.30    1.000    -
USER-DEFINED        -         1.10    0.30    1.000    -
USER-DEFINED        -         0.10    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 1.80  SUBAREA RUNOFF(CFS) = 2.99
EFFECTIVE AREA(ACRES) = 32.50  AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 32.5    PEAK FLOW RATE(CFS) = 56.61

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.52
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.124
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.30    0.850    -
USER-DEFINED        -         1.20    0.30    1.000    -
USER-DEFINED        -         0.10    0.30    1.000    -
USER-DEFINED        -         1.80    0.30    1.000    -
USER-DEFINED        -         0.10    0.30    0.850    -
USER-DEFINED        -         0.20    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980
SUBAREA AREA(ACRES) = 3.80  SUBAREA RUNOFF(CFS) = 6.26
EFFECTIVE AREA(ACRES) = 36.30  AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.66
TOTAL AREA(ACRES) = 36.3    PEAK FLOW RATE(CFS) = 62.86

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81

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-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.52

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.124

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.98

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.67

TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 63.85  
=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 36.9 TC(MIN.) = 17.52

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.670

PEAK FLOW RATE(CFS) = 63.85  
=====

END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 50 Yr \*  
\* From Node: 50100 To Node: 50167 \*  
\*\*\*\*\*

FILE NAME: 0610501X.DAT  
TIME/DATE OF STUDY: 09:34 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.479
- 2) 10.00; 3.503
- 3) 15.00; 2.677
- 4) 20.00; 2.235
- 5) 25.00; 1.930
- 6) 30.00; 1.737
- 7) 40.00; 1.469
- 8) 50.00; 1.307
- 9) 60.00; 1.206
- 10) 90.00; 1.003
- 11) 120.00; 0.872
- 12) 180.00; 0.751
- 13) 360.00; 0.558
- 14) 1440.00; 0.246

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50100.00 TO NODE 50101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<<<<<<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00  
ELEVATION DATA: UPSTREAM(FEET) = 1072.00 DOWNSTREAM(FEET) = 1063.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.598  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.744  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.60	0.30	1.000	0	14.60

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.33  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50101.00 TO NODE 50102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1063.00 DOWNSTREAM(FEET) = 975.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 273.00 CHANNEL SLOPE = 0.3223  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.643  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.29	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.64  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.76  
AVERAGE FLOW DEPTH(FEET) = 0.31 TRAVEL TIME(MIN.) = 0.79  
Tc(MIN.) = 15.39  
SUBAREA AREA(ACRES) = 0.29 SUBAREA RUNOFF(CFS) = 0.62  
EFFECTIVE AREA(ACRES) = 0.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 1.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:



DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 6.05  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50102.00 = 597.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50102.00 TO NODE 50103.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 948.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 111.00 CHANNEL SLOPE = 0.2432  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.614

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.22	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.13

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.60

AVERAGE FLOW DEPTH(FEET) = 0.36 TRAVEL TIME(MIN.) = 0.33

Tc(MIN.) = 15.72

SUBAREA AREA(ACRES) = 0.22 SUBAREA RUNOFF(CFS) = 0.46

EFFECTIVE AREA(ACRES) = 1.12 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 2.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 FLOW VELOCITY(FEET/SEC.) = 5.71

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50103.00 = 708.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50103.00 TO NODE 50104.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 948.00 DOWNSTREAM(FEET) = 914.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 136.00 CHANNEL SLOPE = 0.2500  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.581

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.94

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.14

AVERAGE FLOW DEPTH(FEET) = 0.40 TRAVEL TIME(MIN.) = 0.37

Tc(MIN.) = 16.09

SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 1.22

EFFECTIVE AREA(ACRES) = 1.71 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 3.51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.43 FLOW VELOCITY(FEET/SEC.) = 6.33

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50104.00 = 844.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50104.00 TO NODE 50105.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 914.00 DOWNSTREAM(FEET) = 895.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 52.00 CHANNEL SLOPE = 0.3654  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.572

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.73	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.28

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.23

AVERAGE FLOW DEPTH(FEET) = 0.46 TRAVEL TIME(MIN.) = 0.11

Tc(MIN.) = 16.19

SUBAREA AREA(ACRES) = 1.73 SUBAREA RUNOFF(CFS) = 3.53

EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 7.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.52 FLOW VELOCITY(FEET/SEC.) = 8.81

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50105.00 = 896.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50106.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 835.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00 CHANNEL SLOPE = 0.2143  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.521

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.84

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.08

AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 0.58

Tc(MIN.) = 16.77

SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 7.60

EFFECTIVE AREA(ACRES) = 7.24 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 7.2 PEAK FLOW RATE (CFS) = 14.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.75 FLOW VELOCITY (FEET/SEC.) = 8.57  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50106.00 = 1176.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50106.00 TO NODE 50107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 835.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 413.00 CHANNEL SLOPE = 0.2179  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.455

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.53	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.87  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.33  
AVERAGE FLOW DEPTH (FEET) = 0.82 TRAVEL TIME (MIN.) = 0.74  
Tc (MIN.) = 17.51  
SUBAREA AREA (ACRES) = 4.53 SUBAREA RUNOFF (CFS) = 8.79  
EFFECTIVE AREA (ACRES) = 11.77 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.8 PEAK FLOW RATE (CFS) = 22.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.88 FLOW VELOCITY (FEET/SEC.) = 9.78  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50107.00 = 1589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50107.00 TO NODE 50108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 302.00 CHANNEL SLOPE = 0.2318  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.413

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.76	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 28.32  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.49  
AVERAGE FLOW DEPTH (FEET) = 0.95 TRAVEL TIME (MIN.) = 0.48  
Tc (MIN.) = 17.99

SUBAREA AREA (ACRES) = 5.76 SUBAREA RUNOFF (CFS) = 10.96  
EFFECTIVE AREA (ACRES) = 17.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.5 PEAK FLOW RATE (CFS) = 33.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.01 FLOW VELOCITY (FEET/SEC.) = 10.90  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50108.00 = 1891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50108.00 TO NODE 50109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 655.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 81.00 CHANNEL SLOPE = 0.2469  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.403

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.77	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 48.28  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.23  
AVERAGE FLOW DEPTH (FEET) = 1.15 TRAVEL TIME (MIN.) = 0.11  
Tc (MIN.) = 18.10  
SUBAREA AREA (ACRES) = 15.77 SUBAREA RUNOFF (CFS) = 29.85  
EFFECTIVE AREA (ACRES) = 33.31 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 33.3 PEAK FLOW RATE (CFS) = 63.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.26 FLOW VELOCITY (FEET/SEC.) = 13.16  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50109.00 = 1972.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 655.00 DOWNSTREAM (FEET) = 590.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 379.00 CHANNEL SLOPE = 0.1715  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.356

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.53	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 73.72  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.90

AVERAGE FLOW DEPTH (FEET) = 1.44 TRAVEL TIME (MIN.) = 0.53  
Tc (MIN.) = 18.63  
SUBAREA AREA (ACRES) = 11.53 SUBAREA RUNOFF (CFS) = 21.35  
EFFECTIVE AREA (ACRES) = 44.84 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 44.8 PEAK FLOW RATE (CFS) = 82.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.50 FLOW VELOCITY (FEET/SEC.) = 12.29  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50110.00 = 2351.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50110.00 TO NODE 50111.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 590.00 DOWNSTREAM (FEET) = 570.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 340.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.299

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 27.15 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 107.41  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.78  
AVERAGE FLOW DEPTH (FEET) = 2.02 TRAVEL TIME (MIN.) = 0.65  
Tc (MIN.) = 19.27  
SUBAREA AREA (ACRES) = 27.15 SUBAREA RUNOFF (CFS) = 48.85  
EFFECTIVE AREA (ACRES) = 71.99 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 72.0 PEAK FLOW RATE (CFS) = 129.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.17 FLOW VELOCITY (FEET/SEC.) = 9.17  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50111.00 = 2691.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50111.00 TO NODE 50112.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 570.00 DOWNSTREAM (FEET) = 567.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 403.00 CHANNEL SLOPE = 0.0074  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.191

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 66.68 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 186.28  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.64  
AVERAGE FLOW DEPTH (FEET) = 3.66 TRAVEL TIME (MIN.) = 1.45  
Tc (MIN.) = 20.72  
SUBAREA AREA (ACRES) = 66.68 SUBAREA RUNOFF (CFS) = 113.48  
EFFECTIVE AREA (ACRES) = 138.68 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 138.7 PEAK FLOW RATE (CFS) = 236.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 4.00 FLOW VELOCITY (FEET/SEC.) = 4.91  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50112.00 = 3094.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50112.00 TO NODE 50140.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 20.72  
RAINFALL INTENSITY (INCH/HR) = 2.19  
AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA (ACRES) = 138.68  
TOTAL STREAM AREA (ACRES) = 138.68  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 236.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50120.00 TO NODE 50121.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH (FEET) = 324.00  
ELEVATION DATA: UPSTREAM (FEET) = 1068.00 DOWNSTREAM (FEET) = 968.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.018  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.891

SUBAREA Tc AND LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER  
"CHAPARRAL, BROADLEAF" - 0.29 0.30 1.000 0 9.02  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF (CFS) = 0.93  
TOTAL AREA (ACRES) = 0.29 PEAK FLOW RATE (CFS) = 0.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50121.00 TO NODE 50122.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 968.00 DOWNSTREAM (FEET) = 916.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 242.00 CHANNEL SLOPE = 0.2149  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.575  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.55 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.74  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.06  
AVERAGE FLOW DEPTH (FEET) = 0.34 TRAVEL TIME (MIN.) = 0.80  
Tc (MIN.) = 9.82  
SUBAREA AREA (ACRES) = 0.55 SUBAREA RUNOFF (CFS) = 1.61  
EFFECTIVE AREA (ACRES) = 0.83 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 0.8 PEAK FLOW RATE (CFS) = 2.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.38 FLOW VELOCITY (FEET/SEC.) = 5.55  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50122.00 = 566.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50122.00 TO NODE 50123.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 916.00 DOWNSTREAM (FEET) = 906.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 111.00 CHANNEL SLOPE = 0.0901  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.462  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.68 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.43  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.32  
AVERAGE FLOW DEPTH (FEET) = 0.51 TRAVEL TIME (MIN.) = 0.43  
Tc (MIN.) = 10.24  
SUBAREA AREA (ACRES) = 0.68 SUBAREA RUNOFF (CFS) = 1.93  
EFFECTIVE AREA (ACRES) = 1.51 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 1.5 PEAK FLOW RATE (CFS) = 4.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.56 FLOW VELOCITY (FEET/SEC.) = 4.58  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50123.00 = 677.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50123.00 TO NODE 50124.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 906.00 DOWNSTREAM (FEET) = 903.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 60.00 CHANNEL SLOPE = 0.0500  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.419  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.59 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.13  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.85  
AVERAGE FLOW DEPTH (FEET) = 0.67 TRAVEL TIME (MIN.) = 0.26  
Tc (MIN.) = 10.50  
SUBAREA AREA (ACRES) = 0.59 SUBAREA RUNOFF (CFS) = 1.65  
EFFECTIVE AREA (ACRES) = 2.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 2.1 PEAK FLOW RATE (CFS) = 5.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.70 FLOW VELOCITY (FEET/SEC.) = 3.96  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50124.00 = 737.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50124.00 TO NODE 50125.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 903.00 DOWNSTREAM (FEET) = 901.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 29.00 CHANNEL SLOPE = 0.0690  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.403  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.44 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.91  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.85  
AVERAGE FLOW DEPTH (FEET) = 0.74 TRAVEL TIME (MIN.) = 0.10  
Tc (MIN.) = 10.60  
SUBAREA AREA (ACRES) = 1.44 SUBAREA RUNOFF (CFS) = 4.02  
EFFECTIVE AREA (ACRES) = 3.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 3.5 PEAK FLOW RATE (CFS) = 9.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.80 FLOW VELOCITY (FEET/SEC.) = 5.10  
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50125.00 = 766.00 FEET.

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FLOW PROCESS FROM NODE 50125.00 TO NODE 50126.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 901.00 DOWNSTREAM(FEET) = 889.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 130.00 CHANNEL SLOPE = 0.0923
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.345
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.69 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.58
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.16
AVERAGE FLOW DEPTH(FEET) = 0.86 TRAVEL TIME(MIN.) = 0.35
Tc(MIN.) = 10.96
SUBAREA AREA(ACRES) = 2.69 SUBAREA RUNOFF(CFS) = 7.38
EFFECTIVE AREA(ACRES) = 6.23 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.2 PEAK FLOW RATE(CFS) = 17.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.93 FLOW VELOCITY(FEET/SEC.) = 6.53
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50126.00 = 896.00 FEET.

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FLOW PROCESS FROM NODE 50126.00 TO NODE 50127.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 889.00 DOWNSTREAM(FEET) = 855.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 231.00 CHANNEL SLOPE = 0.1472
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.267
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.18 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.00
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.14
AVERAGE FLOW DEPTH(FEET) = 0.91 TRAVEL TIME(MIN.) = 0.47
Tc(MIN.) = 11.43
SUBAREA AREA(ACRES) = 2.18 SUBAREA RUNOFF(CFS) = 5.82
EFFECTIVE AREA(ACRES) = 8.41 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 22.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.95 FLOW VELOCITY(FEET/SEC.) = 8.32
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50127.00 = 1127.00 FEET.

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FLOW PROCESS FROM NODE 50127.00 TO NODE 50128.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 855.00 DOWNSTREAM(FEET) = 793.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 211.00 CHANNEL SLOPE = 0.2938
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.217
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 5.70 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.95
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.64
AVERAGE FLOW DEPTH(FEET) = 0.93 TRAVEL TIME(MIN.) = 0.30
Tc(MIN.) = 11.73
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 14.95
EFFECTIVE AREA(ACRES) = 14.11 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.1 PEAK FLOW RATE(CFS) = 37.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.00 FLOW VELOCITY(FEET/SEC.) = 12.29
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50128.00 = 1338.00 FEET.

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FLOW PROCESS FROM NODE 50128.00 TO NODE 50129.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 793.00 DOWNSTREAM(FEET) = 708.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 353.00 CHANNEL SLOPE = 0.2408
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.138
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 9.99 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 49.81
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.28
AVERAGE FLOW DEPTH(FEET) = 1.16 TRAVEL TIME(MIN.) = 0.48
Tc(MIN.) = 12.21
SUBAREA AREA(ACRES) = 9.99 SUBAREA RUNOFF(CFS) = 25.52
EFFECTIVE AREA(ACRES) = 24.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 61.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.26 FLOW VELOCITY(FEET/SEC.) = 12.89
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50129.00 = 1691.00 FEET.

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FLOW PROCESS FROM NODE 50129.00 TO NODE 50130.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 708.00 DOWNSTREAM(FEET) = 571.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 735.00 CHANNEL SLOPE = 0.1864

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.976

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 13.71 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 78.08

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.47

AVERAGE FLOW DEPTH(FEET) = 1.44 TRAVEL TIME(MIN.) = 0.98

Tc(MIN.) = 13.19

SUBAREA AREA(ACRES) = 13.71 SUBAREA RUNOFF(CFS) = 33.02

EFFECTIVE AREA(ACRES) = 37.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 91.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.53 FLOW VELOCITY(FEET/SEC.) = 12.96

LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50130.00 = 2426.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50130.00 TO NODE 50131.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 571.00 DOWNSTREAM(FEET) = 566.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 709.00 CHANNEL SLOPE = 0.0071

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.575

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 20.71 0.30 0.986 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.986

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 112.34

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.99

AVERAGE FLOW DEPTH(FEET) = 3.06 TRAVEL TIME(MIN.) = 2.96

Tc(MIN.) = 16.15

SUBAREA AREA(ACRES) = 20.71 SUBAREA RUNOFF(CFS) = 42.48

EFFECTIVE AREA(ACRES) = 58.52 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 119.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.14 FLOW VELOCITY(FEET/SEC.) = 4.06

LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50131.00 = 3135.00 FEET.

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FLOW PROCESS FROM NODE 50132.00 TO NODE 50131.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.15

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.575

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 154.02 0.30 0.949 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.949

SUBAREA AREA(ACRES) = 154.02 SUBAREA RUNOFF(CFS) = 317.55

EFFECTIVE AREA(ACRES) = 212.54 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96

TOTAL AREA(ACRES) = 212.5 PEAK FLOW RATE(CFS) = 437.48

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FLOW PROCESS FROM NODE 50131.00 TO NODE 50140.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 16.15

RAINFALL INTENSITY(INCH/HR) = 2.58

AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.96

EFFECTIVE STREAM AREA(ACRES) = 212.54

TOTAL STREAM AREA(ACRES) = 212.54

PEAK FLOW RATE(CFS) AT CONFLUENCE = 437.48

\*\* CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER

NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE

1 236.00 20.72 2.191 0.30( 0.30) 1.00 138.7 50100.00

2 437.48 16.15 2.575 0.30( 0.29) 0.96 212.5 50120.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER

NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE

1 658.84 16.15 2.575 0.30( 0.29) 0.97 320.6 50120.00

2 599.88 20.72 2.191 0.30( 0.29) 0.98 351.2 50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 658.84 Tc(MIN.) = 16.15

EFFECTIVE AREA(ACRES) = 320.63 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97

TOTAL AREA(ACRES) = 351.2

LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50140.00 = 3135.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 566.00 DOWNSTREAM(FEET) = 416.00
FLOW LENGTH(FEET) = 376.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 74.34
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 658.84
PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 16.24
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50141.00 = 3511.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.24
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.568
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 48.73 0.30 0.922 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.922
SUBAREA AREA(ACRES) = 48.73 SUBAREA RUNOFF(CFS) = 100.50
EFFECTIVE AREA(ACRES) = 369.36 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 400.0 PEAK FLOW RATE(CFS) = 757.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 50141.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 416.00 DOWNSTREAM(FEET) = 404.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 972.00 CHANNEL SLOPE = 0.0123
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.388
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.56 0.30 0.610 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.610
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 764.69
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.97
AVERAGE FLOW DEPTH(FEET) = 5.66 TRAVEL TIME(MIN.) = 2.03
Tc(MIN.) = 18.27
SUBAREA AREA(ACRES) = 7.56 SUBAREA RUNOFF(CFS) = 15.01
EFFECTIVE AREA(ACRES) = 376.92 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 407.5 PEAK FLOW RATE(CFS) = 757.19
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 5.64 FLOW VELOCITY(FEET/SEC.) = 7.95
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50162.00 = 4483.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 757.19 18.27 2.388 0.30( 0.29) 0.96 376.9 50120.00
2 681.91 22.90 2.058 0.30( 0.29) 0.96 407.5 50100.00

NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 757.19 Tc(MIN.) = 18.27
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 376.92

\*\*\*\*\*

FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 18.27
RAINFALL INTENSITY(INCH/HR) = 2.39
AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 376.92
TOTAL STREAM AREA(ACRES) = 407.52
PEAK FLOW RATE(CFS) AT CONFLUENCE = 757.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 50150.00 TO NODE 50151.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00
ELEVATION DATA: UPSTREAM(FEET) = 1076.00 DOWNSTREAM(FEET) = 988.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.235
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.805

SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" - 0.46 0.30 1.000 0 9.23
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.44
TOTAL AREA(ACRES) = 0.46 PEAK FLOW RATE(CFS) = 1.44

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FLOW PROCESS FROM NODE 50151.00 TO NODE 50152.00 IS CODE = 51

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-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 988.00 DOWNSTREAM(FEET) = 938.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 220.00 CHANNEL SLOPE = 0.2273
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.545
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.59 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.30
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.56
AVERAGE FLOW DEPTH(FEET) = 0.37 TRAVEL TIME(MIN.) = 0.66
Tc(MIN.) = 9.89
SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 1.72
EFFECTIVE AREA(ACRES) = 1.04 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 3.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.41 FLOW VELOCITY(FEET/SEC.) = 5.90
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50152.00 = 543.00 FEET.

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FLOW PROCESS FROM NODE 50152.00 TO NODE 50153.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 938.00 DOWNSTREAM(FEET) = 904.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 218.00 CHANNEL SLOPE = 0.1560
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.417
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.13 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.64
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.81
AVERAGE FLOW DEPTH(FEET) = 0.52 TRAVEL TIME(MIN.) = 0.63
Tc(MIN.) = 10.52
SUBAREA AREA(ACRES) = 1.13 SUBAREA RUNOFF(CFS) = 3.18
EFFECTIVE AREA(ACRES) = 2.18 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.2 PEAK FLOW RATE(CFS) = 6.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.58 FLOW VELOCITY(FEET/SEC.) = 6.16
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50153.00 = 761.00 FEET.

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FLOW PROCESS FROM NODE 50153.00 TO NODE 50154.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 904.00 DOWNSTREAM(FEET) = 881.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 212.00 CHANNEL SLOPE = 0.1085
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.322
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.00 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.18
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.12
AVERAGE FLOW DEPTH(FEET) = 0.74 TRAVEL TIME(MIN.) = 0.58
Tc(MIN.) = 11.10
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 8.16
EFFECTIVE AREA(ACRES) = 5.18 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 5.2 PEAK FLOW RATE(CFS) = 14.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.84 FLOW VELOCITY(FEET/SEC.) = 6.62
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50154.00 = 973.00 FEET.

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FLOW PROCESS FROM NODE 50154.00 TO NODE 50155.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 881.00 DOWNSTREAM(FEET) = 877.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0253
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.217
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.81 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.08
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.14
AVERAGE FLOW DEPTH(FEET) = 1.24 TRAVEL TIME(MIN.) = 0.64
Tc(MIN.) = 11.73
SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 10.01
EFFECTIVE AREA(ACRES) = 8.99 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 9.0 PEAK FLOW RATE(CFS) = 23.60

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.34 FLOW VELOCITY(FEET/SEC.) = 4.38

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LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50155.00 = 1131.00 FEET.

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FLOW PROCESS FROM NODE 50155.00 TO NODE 50156.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 877.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 195.00 CHANNEL SLOPE = 0.0103
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.051

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.32 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.71
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.24
AVERAGE FLOW DEPTH(FEET) = 1.69 TRAVEL TIME(MIN.) = 1.00
Tc(MIN.) = 12.74
SUBAREA AREA(ACRES) = 3.32 SUBAREA RUNOFF(CFS) = 8.22
EFFECTIVE AREA(ACRES) = 12.31 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 30.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.75 FLOW VELOCITY(FEET/SEC.) = 3.32
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50156.00 = 1326.00 FEET.

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FLOW PROCESS FROM NODE 50156.00 TO NODE 50157.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 850.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 424.00 CHANNEL SLOPE = 0.0590
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.875

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.78 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.86
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.62
AVERAGE FLOW DEPTH(FEET) = 1.32 TRAVEL TIME(MIN.) = 1.07
Tc(MIN.) = 13.80
SUBAREA AREA(ACRES) = 3.78 SUBAREA RUNOFF(CFS) = 8.76
EFFECTIVE AREA(ACRES) = 16.09 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 37.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.36 FLOW VELOCITY(FEET/SEC.) = 6.71
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50157.00 = 1750.00 FEET.

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FLOW PROCESS FROM NODE 50157.00 TO NODE 50158.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 835.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0949
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.825

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 11.22 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 50.03
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.69
AVERAGE FLOW DEPTH(FEET) = 1.39 TRAVEL TIME(MIN.) = 0.30
Tc(MIN.) = 14.11
SUBAREA AREA(ACRES) = 11.22 SUBAREA RUNOFF(CFS) = 25.49
EFFECTIVE AREA(ACRES) = 27.31 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 27.3 PEAK FLOW RATE(CFS) = 62.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.51 FLOW VELOCITY(FEET/SEC.) = 9.12
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50158.00 = 1908.00 FEET.

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FLOW PROCESS FROM NODE 50158.00 TO NODE 50159.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 835.00 DOWNSTREAM(FEET) = 680.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 721.00 CHANNEL SLOPE = 0.2150
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.677

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.87 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 84.39
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.44
AVERAGE FLOW DEPTH(FEET) = 1.45 TRAVEL TIME(MIN.) = 0.89
Tc(MIN.) = 15.00
SUBAREA AREA(ACRES) = 20.87 SUBAREA RUNOFF(CFS) = 44.66
EFFECTIVE AREA(ACRES) = 48.18 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 48.2 PEAK FLOW RATE (CFS) = 103.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.56 FLOW VELOCITY (FEET/SEC.) = 14.10  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50159.00 = 2629.00 FEET.

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FLOW PROCESS FROM NODE 50159.00 TO NODE 50160.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 680.00 DOWNSTREAM (FEET) = 558.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 874.00 CHANNEL SLOPE = 0.1396

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.577

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	32.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 135.89

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.82

AVERAGE FLOW DEPTH (FEET) = 1.88 TRAVEL TIME (MIN.) = 1.14

Tc (MIN.) = 16.14

SUBAREA AREA (ACRES) = 32.02 SUBAREA RUNOFF (CFS) = 65.61

EFFECTIVE AREA (ACRES) = 80.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 80.2 PEAK FLOW RATE (CFS) = 164.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.02 FLOW VELOCITY (FEET/SEC.) = 13.46

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50160.00 = 3503.00 FEET.

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FLOW PROCESS FROM NODE 50160.00 TO NODE 50161.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 558.00 DOWNSTREAM (FEET) = 463.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 1013.00 CHANNEL SLOPE = 0.0938

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.450

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	13.52	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 177.42

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.80

AVERAGE FLOW DEPTH (FEET) = 2.24 TRAVEL TIME (MIN.) = 1.43

Tc (MIN.) = 17.57

SUBAREA AREA (ACRES) = 13.52 SUBAREA RUNOFF (CFS) = 26.17

EFFECTIVE AREA (ACRES) = 93.72 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 93.7 PEAK FLOW RATE (CFS) = 181.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.25 FLOW VELOCITY (FEET/SEC.) = 11.90

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50161.00 = 4516.00 FEET.

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FLOW PROCESS FROM NODE 50161.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 463.00 DOWNSTREAM (FEET) = 404.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 1126.00 CHANNEL SLOPE = 0.0524

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.281

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	19.35	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 198.61

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.80

AVERAGE FLOW DEPTH (FEET) = 2.60 TRAVEL TIME (MIN.) = 1.91

Tc (MIN.) = 19.48

SUBAREA AREA (ACRES) = 19.35 SUBAREA RUNOFF (CFS) = 34.49

EFFECTIVE AREA (ACRES) = 113.07 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 113.1 PEAK FLOW RATE (CFS) = 201.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.61 FLOW VELOCITY (FEET/SEC.) = 9.83

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

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FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION (MIN.) = 19.48

RAINFALL INTENSITY (INCH/HR) = 2.28

AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00

EFFECTIVE STREAM AREA (ACRES) = 113.07

TOTAL STREAM AREA (ACRES) = 113.07

PEAK FLOW RATE (CFS) AT CONFLUENCE = 201.56

\*\*\* CONFLUENCE DATA \*\*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	757.19	18.27	2.388	0.30 ( 0.29)	0.96	376.9	50120.00
1	681.91	22.90	2.058	0.30 ( 0.29)	0.96	407.5	50100.00
2	201.56	19.48	2.281	0.30 ( 0.30)	1.00	113.1	50150.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	956.45	18.27	2.388	0.30 ( 0.29)	0.97	483.0	50120.00
2	939.03	19.48	2.281	0.30 ( 0.29)	0.97	498.0	50150.00
3	860.82	22.90	2.058	0.30 ( 0.29)	0.97	520.6	50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 956.45 Tc(MIN.) = 18.27  
EFFECTIVE AREA(ACRES) = 482.95 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 520.6  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50162.00 TO NODE 50163.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 378.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1158.00 CHANNEL SLOPE = 0.0225  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.232

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	151.93	0.30	0.990	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1088.79  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.89  
AVERAGE FLOW DEPTH(FEET) = 5.77 TRAVEL TIME(MIN.) = 1.77  
Tc(MIN.) = 20.04  
SUBAREA AREA(ACRES) = 151.93 SUBAREA RUNOFF(CFS) = 264.63  
EFFECTIVE AREA(ACRES) = 634.88 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 672.5 PEAK FLOW RATE(CFS) = 1108.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 5.81 FLOW VELOCITY(FEET/SEC.) = 10.94  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50163.00 = 6800.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1108.57	20.04	2.232	0.30 ( 0.29)	0.97	634.9	50120.00
2	1091.19	21.26	2.158	0.30 ( 0.29)	0.97	649.9	50150.00
3	1001.36	24.72	1.947	0.30 ( 0.29)	0.98	672.5	50100.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1108.57 Tc(MIN.) = 20.04  
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.97 EFFECTIVE AREA(ACRES) = 634.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50163.00 TO NODE 50164.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 378.00 DOWNSTREAM(FEET) = 356.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 886.00 CHANNEL SLOPE = 0.0248  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.156

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	177.01	0.30	0.989	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.989  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1256.65  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.73  
AVERAGE FLOW DEPTH(FEET) = 5.98 TRAVEL TIME(MIN.) = 1.26  
Tc(MIN.) = 21.30  
SUBAREA AREA(ACRES) = 177.01 SUBAREA RUNOFF(CFS) = 296.14  
EFFECTIVE AREA(ACRES) = 811.89 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 849.5 PEAK FLOW RATE(CFS) = 1360.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 6.16 FLOW VELOCITY(FEET/SEC.) = 11.96  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50164.00 = 7686.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1360.83	21.30	2.156	0.30 ( 0.29)	0.98	811.9	50120.00
2	1330.32	22.53	2.081	0.30 ( 0.29)	0.98	826.9	50150.00
3	1221.27	26.01	1.891	0.30 ( 0.29)	0.98	849.5	50100.00

NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 1360.83 Tc(MIN.) = 21.30  
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 811.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50164.00 TO NODE 50165.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 356.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1762.00 CHANNEL SLOPE = 0.0233  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.005

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	177.01	0.30	0.989	-

LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -       155.27     0.30       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1480.02  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.92  
 AVERAGE FLOW DEPTH(FEET) = 6.43    TRAVEL TIME(MIN.) = 2.46  
 Tc(MIN.) = 23.76  
 SUBAREA AREA(ACRES) = 155.27        SUBAREA RUNOFF(CFS) = 238.31  
 EFFECTIVE AREA(ACRES) = 967.16      AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1004.8        PEAK FLOW RATE(CFS) = 1489.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 6.45    FLOW VELOCITY(FEET/SEC.) = 11.93  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50165.00 = 9448.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1489.33	23.76	2.005	0.30( 0.29)	0.98	967.2	50120.00
2	1445.69	25.00	1.930	0.30( 0.29)	0.98	982.2	50150.00
3	1355.05	28.55	1.793	0.30( 0.29)	0.98	1004.8	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1489.33    Tc(MIN.) = 23.76  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.98    EFFECTIVE AREA(ACRES) = 967.16

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50165.00 TO NODE 50166.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00    DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 893.00    CHANNEL SLOPE = 0.0347  
 CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040    MAXIMUM DEPTH(FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.940

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	50.24	0.30	0.997	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1526.43  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.96  
 AVERAGE FLOW DEPTH(FEET) = 6.04    TRAVEL TIME(MIN.) = 1.07  
 Tc(MIN.) = 24.83  
 SUBAREA AREA(ACRES) = 50.24        SUBAREA RUNOFF(CFS) = 74.20  
 EFFECTIVE AREA(ACRES) = 1017.39    AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1055.0        PEAK FLOW RATE(CFS) = 1506.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 6.01    FLOW VELOCITY(FEET/SEC.) = 13.91  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50166.00 = 10341.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1506.93	24.83	1.940	0.30( 0.29)	0.98	1017.4	50120.00
2	1480.85	26.08	1.888	0.30( 0.29)	0.98	1032.4	50150.00
3	1382.53	29.64	1.751	0.30( 0.29)	0.98	1055.0	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1506.93    Tc(MIN.) = 24.83  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.98    EFFECTIVE AREA(ACRES) = 1017.39

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50166.00 TO NODE 50167.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 284.00    DOWNSTREAM(FEET) = 240.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00    CHANNEL SLOPE = 0.0437  
 CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040    MAXIMUM DEPTH(FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.894

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.36	0.30	0.892	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.892  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1513.05  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 15.18  
 AVERAGE FLOW DEPTH(FEET) = 5.76    TRAVEL TIME(MIN.) = 1.11  
 Tc(MIN.) = 25.94  
 SUBAREA AREA(ACRES) = 8.36        SUBAREA RUNOFF(CFS) = 12.24  
 EFFECTIVE AREA(ACRES) = 1025.75    AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1063.4        PEAK FLOW RATE(CFS) = 1506.93  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 5.76    FLOW VELOCITY(FEET/SEC.) = 15.16  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50167.00 = 11349.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1506.93	25.94	1.894	0.30( 0.29)	0.98	1025.8	50120.00
2	1480.85	27.19	1.845	0.30( 0.29)	0.98	1040.8	50150.00
3	1382.53	30.77	1.716	0.30( 0.29)	0.98	1063.4	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1506.93    Tc(MIN.) = 25.94  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.98    EFFECTIVE AREA(ACRES) = 1025.75

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1063.4    TC(MIN.) = 25.94  
 EFFECTIVE AREA(ACRES) = 1025.75    AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.981  
 PEAK FLOW RATE(CFS) = 1506.93

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1506.93	25.94	1.894	0.30 ( 0.29)	0.98	1025.8	50120.00
2	1480.85	27.19	1.845	0.30 ( 0.29)	0.98	1040.8	50150.00
3	1382.53	30.77	1.716	0.30 ( 0.29)	0.98	1063.4	50100.00

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=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
 RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
 (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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 Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
 \* Rancho Mission Viejo ROMP Study \*  
 \* Storm Event: 50 Yr \*  
 \* From Node: 50500 To Node: 50513 \*  
 \*\*\*\*\*

FILE NAME: 0610505X.DAT  
 TIME/DATE OF STUDY: 09:35 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
 \*USER-DEFINED TABLED RAINFALL USED\*  
 NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.307
- 2) 10.00; 3.421
- 3) 15.00; 2.630
- 4) 20.00; 2.201
- 5) 25.00; 1.906
- 6) 30.00; 1.714
- 7) 40.00; 1.452
- 8) 50.00; 1.291
- 9) 60.00; 1.182
- 10) 90.00; 0.979
- 11) 120.00; 0.849
- 12) 180.00; 0.725
- 13) 360.00; 0.534
- 14) 1440.00; 0.233

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
- \*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 50500.00 TO NODE 50501.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 1122.00 DOWNSTREAM(FEET) = 980.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.501  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.987  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.67	0.30	1.000	0	8.50

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
 SUBAREA RUNOFF(CFS) = 2.22  
 TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 2.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 50501.00 TO NODE 50502.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 832.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 500.00 CHANNEL SLOPE = 0.2960  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.527  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.83	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.43  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.83  
 AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 1.22  
 $T_c$ (MIN.) = 9.72  
 SUBAREA AREA(ACRES) = 0.83 SUBAREA RUNOFF(CFS) = 2.43  
 EFFECTIVE AREA(ACRES) = 1.50 AREA-AVERAGED  $F_m$ (INCH/HR) = 0.30  
 AREA-AVERAGED  $F_p$ (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 1.00  
 TOTAL AREA(ACRES) = 1.5 PEAK FLOW RATE(CFS) = 4.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 7.27  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50502.00 = 830.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50502.00 TO NODE 50503.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 832.00 DOWNSTREAM(FEET) = 779.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 255.00 CHANNEL SLOPE = 0.2078  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.378  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.76	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.70  
AVERAGE FLOW DEPTH(FEET) = 0.64 TRAVEL TIME(MIN.) = 0.55  
Tc(MIN.) = 10.27  
SUBAREA AREA(ACRES) = 3.76 SUBAREA RUNOFF(CFS) = 10.41  
EFFECTIVE AREA(ACRES) = 5.26 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.3 PEAK FLOW RATE(CFS) = 14.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.75 FLOW VELOCITY(FEET/SEC.) = 8.58  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50503.00 = 1085.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50503.00 TO NODE 50504.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 779.00 DOWNSTREAM(FEET) = 765.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 382.00 CHANNEL SLOPE = 0.0366  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.171  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.56	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.46  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.85  
AVERAGE FLOW DEPTH(FEET) = 1.19 TRAVEL TIME(MIN.) = 1.31  
Tc(MIN.) = 11.58  
SUBAREA AREA(ACRES) = 4.56 SUBAREA RUNOFF(CFS) = 11.78  
EFFECTIVE AREA(ACRES) = 9.82 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 25.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.29 FLOW VELOCITY(FEET/SEC.) = 5.11  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50504.00 = 1467.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50504.00 TO NODE 50505.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 355.00 CHANNEL SLOPE = 0.0423  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.004  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.79	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.98  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.63  
AVERAGE FLOW DEPTH(FEET) = 1.33 TRAVEL TIME(MIN.) = 1.05  
Tc(MIN.) = 12.64  
SUBAREA AREA(ACRES) = 3.79 SUBAREA RUNOFF(CFS) = 9.22  
EFFECTIVE AREA(ACRES) = 13.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 13.6 PEAK FLOW RATE(CFS) = 33.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.38 FLOW VELOCITY(FEET/SEC.) = 5.77  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50505.00 = 1822.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50505.00 TO NODE 50506.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 712.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 261.00 CHANNEL SLOPE = 0.1456  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.933  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.43	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 40.74  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.66  
AVERAGE FLOW DEPTH(FEET) = 1.19 TRAVEL TIME(MIN.) = 0.45  
Tc(MIN.) = 13.09  
SUBAREA AREA(ACRES) = 6.43 SUBAREA RUNOFF(CFS) = 15.23  
EFFECTIVE AREA(ACRES) = 20.03 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.0 PEAK FLOW RATE (CFS) = 47.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.26 FLOW VELOCITY (FEET/SEC.) = 10.03  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50506.00 = 2083.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50506.00 TO NODE 50507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 464.00 CHANNEL SLOPE = 0.2414  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.833

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.57	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 50.41  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.27  
AVERAGE FLOW DEPTH (FEET) = 1.17 TRAVEL TIME (MIN.) = 0.63  
Tc (MIN.) = 13.72

SUBAREA AREA (ACRES) = 2.57 SUBAREA RUNOFF (CFS) = 5.85  
EFFECTIVE AREA (ACRES) = 22.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.6 PEAK FLOW RATE (CFS) = 51.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.18 FLOW VELOCITY (FEET/SEC.) = 12.38  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50507.00 = 2547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50507.00 TO NODE 50508.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 535.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 310.00 CHANNEL SLOPE = 0.2097  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.765

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.09	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 58.29  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.06  
AVERAGE FLOW DEPTH (FEET) = 1.27 TRAVEL TIME (MIN.) = 0.43  
Tc (MIN.) = 14.14

SUBAREA AREA (ACRES) = 6.09 SUBAREA RUNOFF (CFS) = 13.52  
EFFECTIVE AREA (ACRES) = 28.69 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 28.7 PEAK FLOW RATE (CFS) = 63.67

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.31 FLOW VELOCITY (FEET/SEC.) = 12.38  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50508.00 = 2857.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50508.00 TO NODE 50509.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 405.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.2658  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.674

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 74.38  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 14.13  
AVERAGE FLOW DEPTH (FEET) = 1.32 TRAVEL TIME (MIN.) = 0.58  
Tc (MIN.) = 14.72

SUBAREA AREA (ACRES) = 10.02 SUBAREA RUNOFF (CFS) = 21.42  
EFFECTIVE AREA (ACRES) = 38.72 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.7 PEAK FLOW RATE (CFS) = 82.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.38 FLOW VELOCITY (FEET/SEC.) = 14.40  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50509.00 = 3346.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50509.00 TO NODE 50510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 285.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 706.00 CHANNEL SLOPE = 0.1700  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.573

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 89.48  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.48



AVERAGE FLOW DEPTH(FEET) = 1.55 TRAVEL TIME(MIN.) = 0.94  
Tc(MIN.) = 15.66  
SUBAREA AREA(ACRES) = 6.60 SUBAREA RUNOFF(CFS) = 13.49  
EFFECTIVE AREA(ACRES) = 45.32 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 45.3 PEAK FLOW RATE(CFS) = 92.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.57 FLOW VELOCITY(FEET/SEC.) = 12.59  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50510.00 = 4052.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50510.00 TO NODE 50511.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 238.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1169.00 CHANNEL SLOPE = 0.0402  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.398  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 22.45 0.30 0.991 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 113.94  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.55  
AVERAGE FLOW DEPTH(FEET) = 1.99 TRAVEL TIME(MIN.) = 2.04  
Tc(MIN.) = 17.70  
SUBAREA AREA(ACRES) = 22.45 SUBAREA RUNOFF(CFS) = 42.45  
EFFECTIVE AREA(ACRES) = 67.77 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 67.8 PEAK FLOW RATE(CFS) = 128.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.08 FLOW VELOCITY(FEET/SEC.) = 9.86  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50511.00 = 5221.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50511.00 TO NODE 50512.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 238.00 DOWNSTREAM(FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 489.00 CHANNEL SLOPE = 0.0102  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.286  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 39.83 0.30 0.990 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 163.67  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.27  
AVERAGE FLOW DEPTH(FEET) = 2.95 TRAVEL TIME(MIN.) = 1.30  
Tc(MIN.) = 19.00  
SUBAREA AREA(ACRES) = 39.83 SUBAREA RUNOFF(CFS) = 71.31  
EFFECTIVE AREA(ACRES) = 107.59 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 107.6 PEAK FLOW RATE(CFS) = 192.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.14 FLOW VELOCITY(FEET/SEC.) = 6.51  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50512.00 = 5710.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50512.00 TO NODE 50513.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 233.00 DOWNSTREAM(FEET) = 209.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 537.00 CHANNEL SLOPE = 0.0447  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.219  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 198.91  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.43  
AVERAGE FLOW DEPTH(FEET) = 2.41 TRAVEL TIME(MIN.) = 0.78  
Tc(MIN.) = 19.79  
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 12.78  
EFFECTIVE AREA(ACRES) = 114.99 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 115.0 PEAK FLOW RATE(CFS) = 198.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.41 FLOW VELOCITY(FEET/SEC.) = 11.45  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50513.00 = 6247.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50513.00 TO NODE 50513.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 19.79  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.219  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.19 0.30 0.961 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.961  
SUBAREA AREA(ACRES) = 38.19 SUBAREA RUNOFF(CFS) = 66.37  
EFFECTIVE AREA(ACRES) = 153.18 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.99  
TOTAL AREA (ACRES) = 153.2 PEAK FLOW RATE (CFS) = 265.16

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 153.2 TC (MIN.) = 19.79  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.986  
PEAK FLOW RATE (CFS) = 265.16  
=====

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 50 Yr \*  
\* From Node: 50600 To Node: 50610 \*  
\*\*\*\*\*

FILE NAME: 0610506X.DAT  
TIME/DATE OF STUDY: 09:35 01/21/2013

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.307
- 2) 10.00; 3.421
- 3) 15.00; 2.630
- 4) 20.00; 2.201
- 5) 25.00; 1.906
- 6) 30.00; 1.714
- 7) 40.00; 1.452
- 8) 50.00; 1.291
- 9) 60.00; 1.182
- 10) 90.00; 0.979
- 11) 120.00; 0.849
- 12) 180.00; 0.725
- 13) 360.00; 0.534
- 14) 1440.00; 0.233

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50600.00 TO NODE 50601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00  
ELEVATION DATA: UPSTREAM(FEET) = 780.00 DOWNSTREAM(FEET) = 730.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.166  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.395  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	1.44	0.30	1.000	0	10.17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 4.00  
TOTAL AREA(ACRES) = 1.44 PEAK FLOW RATE(CFS) = 4.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50601.00 TO NODE 50602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.1541  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.239  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.27	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.68  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.05  
AVERAGE FLOW DEPTH(FEET) = 0.56 TRAVEL TIME(MIN.) = 0.98  
Tc(MIN.) = 11.15  
SUBAREA AREA(ACRES) = 1.27 SUBAREA RUNOFF(CFS) = 3.36  
EFFECTIVE AREA(ACRES) = 2.71 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 7.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.61 FLOW VELOCITY(FEET/SEC.) = 6.35  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50602.00 = 671.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50602.00 TO NODE 50603.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 258.00 CHANNEL SLOPE = 0.2907  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.159

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.31	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.85

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.47

AVERAGE FLOW DEPTH(FEET) = 0.59 TRAVEL TIME(MIN.) = 0.51

Tc(MIN.) = 11.66

SUBAREA AREA(ACRES) = 1.31 SUBAREA RUNOFF(CFS) = 3.37

EFFECTIVE AREA(ACRES) = 4.02 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 10.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 8.89

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50603.00 = 929.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50603.00 TO NODE 50604.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 585.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.1293  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.114

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.58	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.34

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.84

AVERAGE FLOW DEPTH(FEET) = 0.78 TRAVEL TIME(MIN.) = 0.28

Tc(MIN.) = 11.94

SUBAREA AREA(ACRES) = 1.58 SUBAREA RUNOFF(CFS) = 4.01

EFFECTIVE AREA(ACRES) = 5.60 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.6 PEAK FLOW RATE(CFS) = 14.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.81 FLOW VELOCITY(FEET/SEC.) = 7.15

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50604.00 = 1045.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50604.00 TO NODE 50605.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 584.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 16.00 CHANNEL SLOPE = 0.0625  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.107

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.98	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.48

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.93

AVERAGE FLOW DEPTH(FEET) = 1.07 TRAVEL TIME(MIN.) = 0.04

Tc(MIN.) = 11.99

SUBAREA AREA(ACRES) = 4.98 SUBAREA RUNOFF(CFS) = 12.58

EFFECTIVE AREA(ACRES) = 10.58 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 10.6 PEAK FLOW RATE(CFS) = 26.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.19 FLOW VELOCITY(FEET/SEC.) = 6.32

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50605.00 = 1061.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50605.00 TO NODE 50606.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 584.00 DOWNSTREAM(FEET) = 579.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 122.00 CHANNEL SLOPE = 0.0410  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.051

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.18	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.15

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.71

AVERAGE FLOW DEPTH(FEET) = 1.39 TRAVEL TIME(MIN.) = 0.36

Tc(MIN.) = 12.34

SUBAREA AREA(ACRES) = 5.18 SUBAREA RUNOFF(CFS) = 12.83

EFFECTIVE AREA(ACRES) = 15.76 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 15.8 PEAK FLOW RATE (CFS) = 39.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.48 FLOW VELOCITY (FEET/SEC.) = 5.96  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50606.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50606.00 TO NODE 50607.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 579.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 637.00 CHANNEL SLOPE = 0.0801  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.840

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.34	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 47.42  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.99  
AVERAGE FLOW DEPTH (FEET) = 1.41 TRAVEL TIME (MIN.) = 1.33  
Tc (MIN.) = 13.67

SUBAREA AREA (ACRES) = 7.34 SUBAREA RUNOFF (CFS) = 16.79  
EFFECTIVE AREA (ACRES) = 23.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 23.1 PEAK FLOW RATE (CFS) = 52.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.46 FLOW VELOCITY (FEET/SEC.) = 8.24  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50607.00 = 1820.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50607.00 TO NODE 50608.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 422.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 529.00 CHANNEL SLOPE = 0.2004  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.721

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.99	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 56.09  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.74  
AVERAGE FLOW DEPTH (FEET) = 1.26 TRAVEL TIME (MIN.) = 0.75  
Tc (MIN.) = 14.42

SUBAREA AREA (ACRES) = 2.99 SUBAREA RUNOFF (CFS) = 6.52  
EFFECTIVE AREA (ACRES) = 26.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.1 PEAK FLOW RATE (CFS) = 56.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.26 FLOW VELOCITY (FEET/SEC.) = 11.87  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50608.00 = 2349.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50608.00 TO NODE 50609.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 422.00 DOWNSTREAM (FEET) = 297.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 708.00 CHANNEL SLOPE = 0.1766  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.594

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.94	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 69.21  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.88  
AVERAGE FLOW DEPTH (FEET) = 1.39 TRAVEL TIME (MIN.) = 0.99  
Tc (MIN.) = 15.41

SUBAREA AREA (ACRES) = 11.94 SUBAREA RUNOFF (CFS) = 24.66  
EFFECTIVE AREA (ACRES) = 38.04 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.0 PEAK FLOW RATE (CFS) = 78.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.46 FLOW VELOCITY (FEET/SEC.) = 12.25  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50609.00 = 3057.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50609.00 TO NODE 50610.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 297.00 DOWNSTREAM (FEET) = 207.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1321.00 CHANNEL SLOPE = 0.0681  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.421

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.38	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 88.47  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.92

AVERAGE FLOW DEPTH (FEET) = 1.64 TRAVEL TIME (MIN.) = 2.02  
Tc (MIN.) = 17.43  
SUBAREA AREA (ACRES) = 10.38 SUBAREA RUNOFF (CFS) = 19.82  
EFFECTIVE AREA (ACRES) = 48.42 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 92.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.67 FLOW VELOCITY (FEET/SEC.) = 11.08  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50610.00 = 4378.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 17.43  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.421  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.17 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.17 SUBAREA RUNOFF (CFS) = 2.24  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 49.6 PEAK FLOW RATE (CFS) = 94.69

=====

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 49.6 TC (MIN.) = 17.43  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.000  
PEAK FLOW RATE (CFS) = 94.69

=====

=====

END OF RATIONAL METHOD ANALYSIS

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 50 Yr \*  
\* From Node: 50700 To Node: 50716 \*  
\*\*\*\*\*

FILE NAME: 0610507X.DAT  
TIME/DATE OF STUDY: 09:35 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.307
- 2) 10.00; 3.421
- 3) 15.00; 2.630
- 4) 20.00; 2.201
- 5) 25.00; 1.906
- 6) 30.00; 1.714
- 7) 40.00; 1.452
- 8) 50.00; 1.291
- 9) 60.00; 1.182
- 10) 90.00; 0.979
- 11) 120.00; 0.849
- 12) 180.00; 0.725
- 13) 360.00; 0.534
- 14) 1440.00; 0.233

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50700.00 TO NODE 50701.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00  
ELEVATION DATA: UPSTREAM(FEET) = 1121.00 DOWNSTREAM(FEET) = 870.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.572  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.337  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.18	0.30	1.000	0	7.57

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.67  
TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 0.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50701.00 TO NODE 50702.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 827.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.3386  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.197  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.41  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.70  
AVERAGE FLOW DEPTH(FEET) = 0.29 TRAVEL TIME(MIN.) = 0.37  
Tc(MIN.) = 7.94  
SUBAREA AREA(ACRES) = 0.42 SUBAREA RUNOFF(CFS) = 1.48  
EFFECTIVE AREA(ACRES) = 0.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 2.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.33 FLOW VELOCITY(FEET/SEC.) = 6.40  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50702.00 = 456.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50703.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	827.00	DOWNSTREAM(FEET) =	815.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	94.00	CHANNEL SLOPE =	0.1277
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	4.070		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.34	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.70

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.66

AVERAGE FLOW DEPTH(FEET) = 0.44 TRAVEL TIME(MIN.) = 0.34

Tc(MIN.) = 8.28

SUBAREA AREA(ACRES) = 0.34 SUBAREA RUNOFF(CFS) = 1.15

EFFECTIVE AREA(ACRES) = 0.94 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 3.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.47 FLOW VELOCITY(FEET/SEC.) = 4.88

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50703.00 = 550.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50704.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	815.00	DOWNSTREAM(FEET) =	800.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	169.00	CHANNEL SLOPE =	0.0888
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	3.858		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.72	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.96

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.00

AVERAGE FLOW DEPTH(FEET) = 0.63 TRAVEL TIME(MIN.) = 0.56

Tc(MIN.) = 8.84

SUBAREA AREA(ACRES) = 1.72 SUBAREA RUNOFF(CFS) = 5.51

EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 8.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.72 FLOW VELOCITY(FEET/SEC.) = 5.46

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50704.00 = 719.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50705.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	800.00	DOWNSTREAM(FEET) =	785.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	128.00	CHANNEL SLOPE =	0.1172
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	3.735		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.12	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.82

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.55

AVERAGE FLOW DEPTH(FEET) = 0.78 TRAVEL TIME(MIN.) = 0.33

Tc(MIN.) = 9.17

SUBAREA AREA(ACRES) = 2.12 SUBAREA RUNOFF(CFS) = 6.56

EFFECTIVE AREA(ACRES) = 4.79 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 14.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.84 FLOW VELOCITY(FEET/SEC.) = 6.93

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50705.00 = 847.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50705.00 TO NODE 50706.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	785.00	DOWNSTREAM(FEET) =	775.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	170.00	CHANNEL SLOPE =	0.0588
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	3.550		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.64	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.12

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.77

AVERAGE FLOW DEPTH(FEET) = 1.08 TRAVEL TIME(MIN.) = 0.49

Tc(MIN.) = 9.66

SUBAREA AREA(ACRES) = 3.64 SUBAREA RUNOFF(CFS) = 10.63

EFFECTIVE AREA(ACRES) = 8.42 AREA-AVERAGED Fm(INCH/HR) = 0.30



AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.4 PEAK FLOW RATE (CFS) = 24.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.16 FLOW VELOCITY (FEET/SEC.) = 6.06  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50706.00 = 1017.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50706.00 TO NODE 50707.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 775.00 DOWNSTREAM (FEET) = 772.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 162.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.373

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.65	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.07  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.17  
AVERAGE FLOW DEPTH (FEET) = 1.58 TRAVEL TIME (MIN.) = 0.65  
Tc (MIN.) = 10.31

SUBAREA AREA (ACRES) = 4.65 SUBAREA RUNOFF (CFS) = 12.85  
EFFECTIVE AREA (ACRES) = 13.07 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 13.1 PEAK FLOW RATE (CFS) = 36.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.67 FLOW VELOCITY (FEET/SEC.) = 4.33  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50707.00 = 1179.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50707.00 TO NODE 50708.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 772.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 357.00 CHANNEL SLOPE = 0.0756  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.249

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.55	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 40.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.59  
AVERAGE FLOW DEPTH (FEET) = 1.34 TRAVEL TIME (MIN.) = 0.78  
Tc (MIN.) = 11.09

SUBAREA AREA (ACRES) = 3.55 SUBAREA RUNOFF (CFS) = 9.42  
EFFECTIVE AREA (ACRES) = 16.62 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 16.6 PEAK FLOW RATE (CFS) = 44.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.38 FLOW VELOCITY (FEET/SEC.) = 7.68  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50708.00 = 1536.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50708.00 TO NODE 50709.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 733.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 444.00 CHANNEL SLOPE = 0.0270  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.033

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.58	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 50.98  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.44  
AVERAGE FLOW DEPTH (FEET) = 1.77 TRAVEL TIME (MIN.) = 1.36  
Tc (MIN.) = 12.45

SUBAREA AREA (ACRES) = 5.58 SUBAREA RUNOFF (CFS) = 13.73  
EFFECTIVE AREA (ACRES) = 22.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.2 PEAK FLOW RATE (CFS) = 54.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.81 FLOW VELOCITY (FEET/SEC.) = 5.54  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50709.00 = 1980.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50709.00 TO NODE 50710.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 733.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 467.00 CHANNEL SLOPE = 0.1242  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.910

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.17	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 59.52  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.00

AVERAGE FLOW DEPTH (FEET) = 1.41 TRAVEL TIME (MIN.) = 0.78  
Tc (MIN.) = 13.23  
SUBAREA AREA (ACRES) = 4.17 SUBAREA RUNOFF (CFS) = 9.80  
EFFECTIVE AREA (ACRES) = 26.38 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.4 PEAK FLOW RATE (CFS) = 61.96

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.43 FLOW VELOCITY (FEET/SEC.) = 10.11  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50710.00 = 2447.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50710.00 TO NODE 50711.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 619.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 516.00 CHANNEL SLOPE = 0.1085  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.779  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 21.41 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 85.85  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.40  
AVERAGE FLOW DEPTH (FEET) = 1.66 TRAVEL TIME (MIN.) = 0.83  
Tc (MIN.) = 14.06  
SUBAREA AREA (ACRES) = 21.41 SUBAREA RUNOFF (CFS) = 47.77  
EFFECTIVE AREA (ACRES) = 47.78 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 106.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.80 FLOW VELOCITY (FEET/SEC.) = 11.00  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50711.00 = 2963.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50711.00 TO NODE 50712.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 619.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 650.00 CHANNEL SLOPE = 0.0292  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.601  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.43 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 114.32  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.49  
AVERAGE FLOW DEPTH (FEET) = 2.12 TRAVEL TIME (MIN.) = 1.28  
Tc (MIN.) = 15.33  
SUBAREA AREA (ACRES) = 7.43 SUBAREA RUNOFF (CFS) = 15.38  
EFFECTIVE AREA (ACRES) = 55.21 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.2 PEAK FLOW RATE (CFS) = 114.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.12 FLOW VELOCITY (FEET/SEC.) = 8.50  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50712.00 = 3613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50713.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 794.00 CHANNEL SLOPE = 0.0907  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.520  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 36.47 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 150.80  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.89  
AVERAGE FLOW DEPTH (FEET) = 1.90 TRAVEL TIME (MIN.) = 0.95  
Tc (MIN.) = 16.28  
SUBAREA AREA (ACRES) = 36.47 SUBAREA RUNOFF (CFS) = 72.87  
EFFECTIVE AREA (ACRES) = 91.68 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 183.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.04 FLOW VELOCITY (FEET/SEC.) = 14.65  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50713.00 = 4407.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50713.00 TO NODE 50714.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 423.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1215.00 CHANNEL SLOPE = 0.0864  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.401  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.52 0.30 0.998 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.998  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 200.69  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 14.70  
AVERAGE FLOW DEPTH(FEET) = 2.13 TRAVEL TIME(MIN.) = 1.38  
Tc(MIN.) = 17.66  
SUBAREA AREA(ACRES) = 18.52 SUBAREA RUNOFF(CFS) = 35.04  
EFFECTIVE AREA(ACRES) = 110.21 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 110.2 PEAK FLOW RATE(CFS) = 208.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.16 FLOW VELOCITY(FEET/SEC.) = 14.84  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50714.00 = 5622.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50714.00 TO NODE 50715.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 319.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 768.00 CHANNEL SLOPE = 0.1354  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.339  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 5.31 0.30 0.993 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 213.33  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 17.61  
AVERAGE FLOW DEPTH(FEET) = 2.01 TRAVEL TIME(MIN.) = 0.73  
Tc(MIN.) = 18.39  
SUBAREA AREA(ACRES) = 5.31 SUBAREA RUNOFF(CFS) = 9.76  
EFFECTIVE AREA(ACRES) = 115.52 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 115.5 PEAK FLOW RATE(CFS) = 212.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.00 FLOW VELOCITY(FEET/SEC.) = 17.60  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50715.00 = 6390.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50715.00 TO NODE 50716.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 319.00 DOWNSTREAM(FEET) = 182.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1513.00 CHANNEL SLOPE = 0.0905  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.206  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 79.09 0.30 0.979 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 280.09  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 16.23  
AVERAGE FLOW DEPTH(FEET) = 2.40 TRAVEL TIME(MIN.) = 1.55  
Tc(MIN.) = 19.94  
SUBAREA AREA(ACRES) = 79.09 SUBAREA RUNOFF(CFS) = 136.10  
EFFECTIVE AREA(ACRES) = 194.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 194.6 PEAK FLOW RATE(CFS) = 334.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.56 FLOW VELOCITY(FEET/SEC.) = 16.99  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50716.00 = 7903.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50716.00 TO NODE 50716.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.94  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.206  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 42.18 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 42.18 SUBAREA RUNOFF(CFS) = 72.35  
EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 236.8 PEAK FLOW RATE(CFS) = 406.61

END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 236.8 TC(MIN.) = 19.94  
EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.993  
PEAK FLOW RATE(CFS) = 406.61

END OF RATIONAL METHOD ANALYSIS



Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 50 Yr \*  
\* From Node: 50800 To Node: 50811 \*  
\*\*\*\*\*

FILE NAME: 0610508X.DAT  
TIME/DATE OF STUDY: 09:35 01/21/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.307
- 2) 10.00; 3.421
- 3) 15.00; 2.630
- 4) 20.00; 2.201
- 5) 25.00; 1.906
- 6) 30.00; 1.714
- 7) 40.00; 1.452
- 8) 50.00; 1.291
- 9) 60.00; 1.182
- 10) 90.00; 0.979
- 11) 120.00; 0.849
- 12) 180.00; 0.725
- 13) 360.00; 0.534
- 14) 1440.00; 0.233

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50800.00 TO NODE 50801.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00  
ELEVATION DATA: UPSTREAM(FEET) = 795.00 DOWNSTREAM(FEET) = 745.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.302  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.374  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.60	0.30	1.000	0	10.30

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.65  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50801.00 TO NODE 50802.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 725.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 245.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.241  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.35	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.08  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.86  
AVERAGE FLOW DEPTH(FEET) = 0.65 TRAVEL TIME(MIN.) = 0.84  
Tc(MIN.) = 11.14  
SUBAREA AREA(ACRES) = 3.35 SUBAREA RUNOFF(CFS) = 8.86  
EFFECTIVE AREA(ACRES) = 3.94 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 3.9 PEAK FLOW RATE(CFS) = 10.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.79 FLOW VELOCITY(FEET/SEC.) = 5.57  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50802.00 = 566.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50802.00 TO NODE 50803.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 725.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 325.00 CHANNEL SLOPE = 0.0769  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.090

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.52	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.35

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.68

AVERAGE FLOW DEPTH(FEET) = 0.85 TRAVEL TIME(MIN.) = 0.95

Tc(MIN.) = 12.10

SUBAREA AREA(ACRES) = 1.52 SUBAREA RUNOFF(CFS) = 3.83

EFFECTIVE AREA(ACRES) = 5.47 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 13.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.89 FLOW VELOCITY(FEET/SEC.) = 5.78

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50803.00 = 891.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50803.00 TO NODE 50804.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 652.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 594.00 CHANNEL SLOPE = 0.0808  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.851

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.12	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.76

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.56

AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 1.51

Tc(MIN.) = 13.60

SUBAREA AREA(ACRES) = 6.12 SUBAREA RUNOFF(CFS) = 14.06

EFFECTIVE AREA(ACRES) = 11.59 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 11.6 PEAK FLOW RATE(CFS) = 26.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.13 FLOW VELOCITY(FEET/SEC.) = 6.99

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50804.00 = 1485.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50804.00 TO NODE 50805.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 652.00 DOWNSTREAM(FEET) = 542.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 499.00 CHANNEL SLOPE = 0.2204  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.727

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.17	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 32.26

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.66

AVERAGE FLOW DEPTH(FEET) = 1.00 TRAVEL TIME(MIN.) = 0.78

Tc(MIN.) = 14.38

SUBAREA AREA(ACRES) = 5.17 SUBAREA RUNOFF(CFS) = 11.30

EFFECTIVE AREA(ACRES) = 16.76 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 36.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.06 FLOW VELOCITY(FEET/SEC.) = 10.95

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50805.00 = 1984.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50805.00 TO NODE 50806.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 542.00 DOWNSTREAM(FEET) = 450.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 650.00 CHANNEL SLOPE = 0.1415  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.586

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.22	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.00

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.59

AVERAGE FLOW DEPTH(FEET) = 1.21 TRAVEL TIME(MIN.) = 1.13

Tc(MIN.) = 15.51

SUBAREA AREA(ACRES) = 5.22 SUBAREA RUNOFF(CFS) = 10.75

EFFECTIVE AREA(ACRES) = 21.99 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 45.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.24 FLOW VELOCITY (FEET/SEC.) = 9.82  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50806.00 = 2634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50806.00 TO NODE 50807.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 450.00 DOWNSTREAM (FEET) = 400.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 639.00 CHANNEL SLOPE = 0.0782  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.478

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.83	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 60.76  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.47  
AVERAGE FLOW DEPTH (FEET) = 1.55 TRAVEL TIME (MIN.) = 1.26  
Tc (MIN.) = 16.77  
SUBAREA AREA (ACRES) = 15.83 SUBAREA RUNOFF (CFS) = 31.04  
EFFECTIVE AREA (ACRES) = 37.82 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 37.8 PEAK FLOW RATE (CFS) = 74.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.67 FLOW VELOCITY (FEET/SEC.) = 8.88  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50807.00 = 3273.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50807.00 TO NODE 50808.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 400.00 DOWNSTREAM (FEET) = 350.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 448.00 CHANNEL SLOPE = 0.1116  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.416

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 81.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.39  
AVERAGE FLOW DEPTH (FEET) = 1.61 TRAVEL TIME (MIN.) = 0.72  
Tc (MIN.) = 17.49

SUBAREA AREA (ACRES) = 7.46 SUBAREA RUNOFF (CFS) = 14.20  
EFFECTIVE AREA (ACRES) = 45.28 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 86.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.65 FLOW VELOCITY (FEET/SEC.) = 10.55  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50808.00 = 3721.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50808.00 TO NODE 50809.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 350.00 DOWNSTREAM (FEET) = 283.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 438.00 CHANNEL SLOPE = 0.1530  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.365

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.20	0.30	0.972	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 92.96  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.11  
AVERAGE FLOW DEPTH (FEET) = 1.60 TRAVEL TIME (MIN.) = 0.60  
Tc (MIN.) = 18.09  
SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 13.43  
EFFECTIVE AREA (ACRES) = 52.48 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 52.5 PEAK FLOW RATE (CFS) = 97.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.63 FLOW VELOCITY (FEET/SEC.) = 12.24  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50809.00 = 4159.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50809.00 TO NODE 50810.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 283.00 DOWNSTREAM (FEET) = 243.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 665.00 CHANNEL SLOPE = 0.0602  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.285

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	63.52	0.30	0.983	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.983  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 154.47  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.01

AVERAGE FLOW DEPTH(FEET) = 2.07 TRAVEL TIME(MIN.) = 0.92  
Tc(MIN.) = 19.01  
SUBAREA AREA(ACRES) = 63.52 SUBAREA RUNOFF(CFS) = 113.79  
EFFECTIVE AREA(ACRES) = 116.00 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 116.0 PEAK FLOW RATE(CFS) = 207.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.31 FLOW VELOCITY(FEET/SEC.) = 12.92  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50810.00 = 4824.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50810.00 TO NODE 50811.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 243.00 DOWNSTREAM(FEET) = 173.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1122.00 CHANNEL SLOPE = 0.0624  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.156  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 11.57 0.30 0.980 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 217.32  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.68  
AVERAGE FLOW DEPTH(FEET) = 2.60 TRAVEL TIME(MIN.) = 1.75  
Tc(MIN.) = 20.77  
SUBAREA AREA(ACRES) = 11.57 SUBAREA RUNOFF(CFS) = 19.39  
EFFECTIVE AREA(ACRES) = 127.57 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 127.6 PEAK FLOW RATE(CFS) = 213.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.59 FLOW VELOCITY(FEET/SEC.) = 10.61  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50811.00 = 5946.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc(MIN.) = 20.77  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.156  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 6.18  
EFFECTIVE AREA(ACRES) = 131.27 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 131.3 PEAK FLOW RATE(CFS) = 219.66

=====

END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 131.3 TC(MIN.) = 20.77  
EFFECTIVE AREA(ACRES) = 131.27 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.988  
PEAK FLOW RATE(CFS) = 219.66

=====

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*  
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(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 2 \*  
\* HYDROLOGIC ANALYSIS - 50-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E502XX50.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.470
2)	6.000;	4.030
3)	7.000;	3.690
4)	8.000;	3.420
5)	9.000;	3.200
6)	10.000;	3.010
7)	11.000;	2.850
8)	12.000;	2.710
9)	13.000;	2.590
10)	14.000;	2.490
11)	15.000;	2.390
12)	20.000;	2.030
13)	25.000;	1.790
14)	30.000;	1.610
15)	40.000;	1.370
16)	50.000;	1.200
17)	60.000;	1.090
18)	90.000;	0.860
19)	120.000;	0.730
20)	180.000;	0.580

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50200.00 TO NODE 50201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 497.00 DOWNSTREAM(FEET) = 365.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.563  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.296  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.60	0.30	1.000	95	8.56
NATURAL FAIR COVER						
"OPEN BRUSH"	-	0.60	0.30	1.000	95	8.56
NATURAL FAIR COVER						
"WOODLAND,GRASS"	-	0.20	0.30	1.000	95	8.56

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 3.78  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 3.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50201.00 TO NODE 50202.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 365.00 DOWNSTREAM(FEET) = 335.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 259.00 CHANNEL SLOPE = 0.1158  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.78  
FLOW VELOCITY(FEET/SEC.) = 4.91 FLOW DEPTH(FEET) = 0.51  
TRAVEL TIME(MIN.) = 0.88  $T_c$ (MIN.) = 9.44  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50202.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50202.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.44  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.116  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 6.84  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 10.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50203.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 335.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.1020  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.39  
FLOW VELOCITY(FEET/SEC.) = 6.00 FLOW DEPTH(FEET) = 0.76  
TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 9.99  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50203.00 = 781.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50203.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.99  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.012  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 10.25  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 20.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50204.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 304.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0696  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 20.26  
FLOW VELOCITY(FEET/SEC.) = 6.15 FLOW DEPTH(FEET) = 1.05  
TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 10.42  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50204.00 = 939.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50204.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.42  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.943  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 10.40  
EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 30.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50205.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 304.00 DOWNSTREAM(FEET) = 234.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 487.00 CHANNEL SLOPE = 0.1437  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 30.15  
FLOW VELOCITY(FEET/SEC.) = 11.12 FLOW DEPTH(FEET) = 0.95  
TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 11.15  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50205.00 = 1426.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 11.15  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.830  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.100 -

USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.90 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 8.09  
 EFFECTIVE AREA(ACRES) = 16.10 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 36.95

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN) = 11.15  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.830  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	4.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.850	-
USER-DEFINED	-	3.70	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.882  
 SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 29.09  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
 TOTAL AREA(ACRES) = 28.7 PEAK FLOW RATE(CFS) = 66.04

=====  
 END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 28.7 TC(MIN.) = 11.15  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.910  
 PEAK FLOW RATE(CFS) = 66.04  
 =====

=====  
 END OF RATIONAL METHOD ANALYSIS  
 =====

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 3 \*  
\* HYDROLOGIC ANALYSIS - 50-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E503XX50.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.470
2)	6.000;	4.030
3)	7.000;	3.690
4)	8.000;	3.420
5)	9.000;	3.200
6)	10.000;	3.010
7)	11.000;	2.850
8)	12.000;	2.710
9)	13.000;	2.590
10)	14.000;	2.490
11)	15.000;	2.390
12)	20.000;	2.030
13)	25.000;	1.790
14)	30.000;	1.610
15)	40.000;	1.370
16)	50.000;	1.200
17)	60.000;	1.090
18)	90.000;	0.860
19)	120.000;	0.730
20)	180.000;	0.580

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	(FT)	(FT)	SIDE / SIDE/ WAY	(FT)	(FT)	(FT)	(FT)	(n)

HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50300.00 TO NODE 50301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00  
ELEVATION DATA: UPSTREAM(FEET) = 1110.00 DOWNSTREAM(FEET) = 1035.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.517  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.102  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.60	0.30	1.000	95	9.52
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.52

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 2.27  
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 2.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50301.00 TO NODE 50302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 960.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 225.00 CHANNEL SLOPE = 0.3333  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.27  
FLOW VELOCITY(FEET/SEC.) = 6.31 FLOW DEPTH(FEET) = 0.35  
TRAVEL TIME(MIN.) = 0.59  $T_c$ (MIN.) = 10.11  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50302.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50302.00 TO NODE 50302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN) = 10.11
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.992
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.30    1.000   -
USER-DEFINED        -         1.00    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.10    SUBAREA RUNOFF(CFS) = 2.67
EFFECTIVE AREA(ACRES) = 2.00    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.0        PEAK FLOW RATE(CFS) = 4.85

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*****
FLOW PROCESS FROM NODE 50302.00 TO NODE 50303.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 84.00 CHANNEL SLOPE = 0.1190
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.85
FLOW VELOCITY(FEET/SEC.) = 5.26 FLOW DEPTH(FEET) = 0.55
TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 10.38
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50303.00 = 631.00 FEET.

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*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50303.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.38
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.950
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.30    1.000   -
USER-DEFINED        -         0.30    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.70    SUBAREA RUNOFF(CFS) = 1.67
EFFECTIVE AREA(ACRES) = 2.70    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.7        PEAK FLOW RATE(CFS) = 6.44

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*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50304.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 940.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 72.00 CHANNEL SLOPE = 0.1389
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

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MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 6.44
FLOW VELOCITY(FEET/SEC.) = 5.96 FLOW DEPTH(FEET) = 0.60
TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 10.58
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50304.00 = 703.00 FEET.

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*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50304.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.58
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.917
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.30    0.30    1.000   -
USER-DEFINED        -         0.90    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.20    SUBAREA RUNOFF(CFS) = 5.18
EFFECTIVE AREA(ACRES) = 4.90    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.9        PEAK FLOW RATE(CFS) = 11.54

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*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50305.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 940.00 DOWNSTREAM(FEET) = 890.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.2941
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 11.54
FLOW VELOCITY(FEET/SEC.) = 9.23 FLOW DEPTH(FEET) = 0.65
TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 10.89
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50305.00 = 873.00 FEET.

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*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.89
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.868
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00    0.30    1.000   -
USER-DEFINED        -         0.80    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.80    SUBAREA RUNOFF(CFS) = 6.47
EFFECTIVE AREA(ACRES) = 7.70    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 7.7        PEAK FLOW RATE(CFS) = 17.80

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*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50306.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 890.00 DOWNSTREAM(FEET) = 785.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 439.00 CHANNEL SLOPE = 0.2392
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 17.80
FLOW VELOCITY(FEET/SEC.) = 9.49 FLOW DEPTH(FEET) = 0.79
TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 11.66
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50306.00 = 1312.00 FEET.

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*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 11.66
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.758
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         3.80   0.30  1.000  -
USER-DEFINED       -         3.30   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 15.71
EFFECTIVE AREA(ACRES) = 14.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.8 PEAK FLOW RATE(CFS) = 32.74

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*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50307.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 737.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 213.00 CHANNEL SLOPE = 0.2254
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 32.74
FLOW VELOCITY(FEET/SEC.) = 10.82 FLOW DEPTH(FEET) = 1.00
TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 11.98
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50307.00 = 1525.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 11.98
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.712
SUBAREA LOSS RATE DATA(AMC II):

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```

DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         2.00   0.30  1.000  -
USER-DEFINED       -         0.90   0.30  1.000  -
USER-DEFINED       -         0.20   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 6.73
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 38.86

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*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50308.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 737.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 527.00 CHANNEL SLOPE = 0.2600
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 38.86
FLOW VELOCITY(FEET/SEC.) = 11.92 FLOW DEPTH(FEET) = 1.04
TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 12.72
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50308.00 = 2052.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.72
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.623
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         5.70   0.30  1.000  -
USER-DEFINED       -         1.00   0.30  1.000  -
USER-DEFINED       -         3.30   0.30  1.000  -
USER-DEFINED       -         0.40   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 21.75
EFFECTIVE AREA(ACRES) = 28.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 28.3 PEAK FLOW RATE(CFS) = 59.18

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*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50309.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 555.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 561.00 CHANNEL SLOPE = 0.0802
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00

```

CHANNEL FLOW THRU SUBAREA(CFS) = 59.18  
FLOW VELOCITY(FEET/SEC.) = 8.50 FLOW DEPTH(FEET) = 1.52  
TRAVEL TIME(MIN.) = 1.10 Tc(MIN.) = 13.82  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 2613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 13.82  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.508  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 6.16  
EFFECTIVE AREA(ACRES) = 31.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.4 PEAK FLOW RATE(CFS) = 62.40

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50310.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 555.00 DOWNSTREAM(FEET) = 509.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 401.00 CHANNEL SLOPE = 0.1147  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 62.40  
FLOW VELOCITY(FEET/SEC.) = 9.83 FLOW DEPTH(FEET) = 1.45  
TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 14.50  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50310.00 = 3014.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 14.50  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.440  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	7.60	0.30	1.000	-
USER-DEFINED	-	6.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 33.32

EFFECTIVE AREA(ACRES) = 48.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 48.7 PEAK FLOW RATE(CFS) = 93.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50311.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 509.00 DOWNSTREAM(FEET) = 395.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 685.00 CHANNEL SLOPE = 0.1664  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 93.80  
FLOW VELOCITY(FEET/SEC.) = 12.49 FLOW DEPTH(FEET) = 1.58  
TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 15.41  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50311.00 = 3699.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50311.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 15.41  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 17.43  
EFFECTIVE AREA(ACRES) = 58.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 58.1 PEAK FLOW RATE(CFS) = 107.73

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50312.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 383.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 216.00 CHANNEL SLOPE = 0.0556  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 107.73  
FLOW VELOCITY(FEET/SEC.) = 8.57 FLOW DEPTH(FEET) = 2.05  
TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 15.83  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50312.00 = 3915.00 FEET.

\*\*\*\*\*



FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.83

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.330

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	18.40	0.30	1.000	-
USER-DEFINED	-	11.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 37.70 SUBAREA RUNOFF(CFS) = 68.88

EFFECTIVE AREA(ACRES) = 95.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 95.8 PEAK FLOW RATE(CFS) = 175.03

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.83

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.330

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 6.21  
EFFECTIVE AREA(ACRES) = 99.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 99.2 PEAK FLOW RATE(CFS) = 181.24

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FLOW PROCESS FROM NODE 50312.00 TO NODE 50313.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 383.00 DOWNSTREAM(FEET) = 350.00  
CHANNEL LENGTH THRU SUBAREA( FEET) = 762.00 CHANNEL SLOPE = 0.0433  
CHANNEL BASE( FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH( FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 181.24  
FLOW VELOCITY( FEET/SEC.) = 8.91 FLOW DEPTH( FEET) = 2.60  
TRAVEL TIME( MIN.) = 1.43 Tc( MIN.) = 17.26  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50313.00 = 4677.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.26

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.227

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 10.93

EFFECTIVE AREA(ACRES) = 105.50 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 105.5 PEAK FLOW RATE(CFS) = 183.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.26

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.227

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 10.90 SUBAREA RUNOFF(CFS) = 18.91  
EFFECTIVE AREA(ACRES) = 116.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 116.4 PEAK FLOW RATE(CFS) = 201.91

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50314.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM( FEET) = 350.00 DOWNSTREAM( FEET) = 318.00  
CHANNEL LENGTH THRU SUBAREA( FEET) = 957.00 CHANNEL SLOPE = 0.0334  
CHANNEL BASE( FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH( FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 201.91  
FLOW VELOCITY( FEET/SEC.) = 8.29 FLOW DEPTH( FEET) = 2.85  
TRAVEL TIME( MIN.) = 1.92 Tc( MIN.) = 19.18  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50314.00 = 5634.00 FEET.

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FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.18  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.089  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	3.70	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	10.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 21.80 SUBAREA RUNOFF(CFS) = 35.10  
 EFFECTIVE AREA(ACRES) = 138.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 138.2 PEAK FLOW RATE(CFS) = 222.50

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.18  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.089  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.80	0.30	1.000	-
USER-DEFINED	-	15.20	0.30	1.000	-
USER-DEFINED	-	5.90	0.30	1.000	-
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 34.70 SUBAREA RUNOFF(CFS) = 55.87  
 EFFECTIVE AREA(ACRES) = 172.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 172.9 PEAK FLOW RATE(CFS) = 278.37

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.18  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.089  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 1.29  
 EFFECTIVE AREA(ACRES) = 173.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 173.7 PEAK FLOW RATE(CFS) = 279.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50315.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

=====

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 318.00 DOWNSTREAM(FEET) = 313.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00 CHANNEL SLOPE = 0.0179  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 279.65  
 FLOW VELOCITY(FEET/SEC.) = 7.12 FLOW DEPTH(FEET) = 3.62  
 TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 19.84  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50315.00 = 5914.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50315.00 TO NODE 50315.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.84  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.042  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	2.40	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 10.50  
 EFFECTIVE AREA(ACRES) = 180.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 180.4 PEAK FLOW RATE(CFS) = 282.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 50315.00 TO NODE 50316.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

=====

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 313.00 DOWNSTREAM(FEET) = 285.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 642.00 CHANNEL SLOPE = 0.0436  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 282.77  
 FLOW VELOCITY(FEET/SEC.) = 9.99 FLOW DEPTH(FEET) = 3.07  
 TRAVEL TIME(MIN.) = 1.07 Tc(MIN.) = 20.91  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50316.00 = 6556.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 20.91  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.986  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 11.08  
EFFECTIVE AREA(ACRES) = 187.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 187.7 PEAK FLOW RATE(CFS) = 284.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 20.91  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.986  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 3.34  
EFFECTIVE AREA(ACRES) = 189.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 189.9 PEAK FLOW RATE(CFS) = 288.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50316.00 TO NODE 50317.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 282.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 448.00 CHANNEL SLOPE = 0.0067  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 288.22  
FLOW VELOCITY(FEET/SEC.) = 4.96 FLOW DEPTH(FEET) = 4.40  
TRAVEL TIME(MIN.) = 1.50 Tc(MIN.) = 22.41  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50317.00 = 7004.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.41  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.914  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	2.60	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	10.20	0.30	1.000	-
USER-DEFINED	-	42.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.997  
SUBAREA AREA(ACRES) = 59.70 SUBAREA RUNOFF(CFS) = 86.78  
EFFECTIVE AREA(ACRES) = 249.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 249.6 PEAK FLOW RATE(CFS) = 362.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.41  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.914  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.30	1.000	-
USER-DEFINED	-	17.50	0.30	1.000	-
USER-DEFINED	-	22.00	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 65.80 SUBAREA RUNOFF(CFS) = 95.59  
EFFECTIVE AREA(ACRES) = 315.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 315.4 PEAK FLOW RATE(CFS) = 458.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50317.00 TO NODE 50318.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 600.00 CHANNEL SLOPE = 0.0817  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 458.25  
FLOW VELOCITY(FEET/SEC.) = 14.23 FLOW DEPTH(FEET) = 3.28  
TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 23.12  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50318.00 = 7604.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81  
-----

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.12

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.880

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	0.100	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.839

SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 9.82

EFFECTIVE AREA(ACRES) = 322.10 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 322.1 PEAK FLOW RATE(CFS) = 458.50

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.12

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.880

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	5.00	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.935

SUBAREA AREA(ACRES) = 7.60 SUBAREA RUNOFF(CFS) = 10.94

EFFECTIVE AREA(ACRES) = 329.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 329.7 PEAK FLOW RATE(CFS) = 469.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50318.00 TO NODE 50319.00 IS CODE = 51  
=====

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 233.00 DOWNSTREAM(FEET) = 228.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 201.00 CHANNEL SLOPE = 0.0249

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00

CHANNEL FLOW THRU SUBAREA(CFS) = 469.44

FLOW VELOCITY(FEET/SEC.) = 11.40 FLOW DEPTH(FEET) = 3.71

TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 23.41

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50319.00 = 7805.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.41

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.866

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 9.20

EFFECTIVE AREA(ACRES) = 336.00 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 336.0 PEAK FLOW RATE(CFS) = 474.45

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.41

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.866

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.994

SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 11.01

EFFECTIVE AREA(ACRES) = 343.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 343.8 PEAK FLOW RATE(CFS) = 485.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50319.00 TO NODE 50320.00 IS CODE = 51  
=====

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 228.00 DOWNSTREAM(FEET) = 214.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 809.00 CHANNEL SLOPE = 0.0173

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00

CHANNEL FLOW THRU SUBAREA(CFS) = 485.46

FLOW VELOCITY(FEET/SEC.) = 10.02 FLOW DEPTH(FEET) = 4.02

TRAVEL TIME (MIN.) = 1.35 Tc (MIN.) = 24.76  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50320.00 = 8614.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 24.76

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.802

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	4.80	0.30	0.850	-
USER-DEFINED	-	5.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.929

SUBAREA AREA (ACRES) = 11.40 SUBAREA RUNOFF (CFS) = 15.63

EFFECTIVE AREA (ACRES) = 355.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 355.2 PEAK FLOW RATE (CFS) = 485.46

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 24.76

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.802

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.90	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.854

SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 15.58

EFFECTIVE AREA (ACRES) = 366.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 366.4 PEAK FLOW RATE (CFS) = 496.69

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 366.4 TC (MIN.) = 24.76

EFFECTIVE AREA (ACRES) = 366.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.985

PEAK FLOW RATE (CFS) = 496.69

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 4 \*  
\* HYDROLOGIC ANALYSIS - 50-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E504XX50.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.000; 4.470
- 2) 6.000; 4.030
- 3) 7.000; 3.690
- 4) 8.000; 3.420
- 5) 9.000; 3.200
- 6) 10.000; 3.010
- 7) 11.000; 2.850
- 8) 12.000; 2.710
- 9) 13.000; 2.590
- 10) 14.000; 2.490
- 11) 15.000; 2.390
- 12) 20.000; 2.030
- 13) 25.000; 1.790
- 14) 30.000; 1.610
- 15) 40.000; 1.370
- 16) 50.000; 1.200
- 17) 60.000; 1.090
- 18) 90.000; 0.860
- 19) 120.000; 0.730
- 20) 180.000; 0.580

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.482  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.933  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.50	0.30	1.000	95	10.48

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.18  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.18  
FLOW VELOCITY(FEET/SEC.) = 4.86 FLOW DEPTH(FEET) = 0.29  
TRAVEL TIME(MIN.) = 0.90  $T_c$ (MIN.) = 11.38  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.38

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.797  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.90  
 EFFECTIVE AREA (ACRES) = 0.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 2.02

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 239.00 CHANNEL SLOPE = 0.4184  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 2.02  
 FLOW VELOCITY (FEET/SEC.) = 6.77 FLOW DEPTH (FEET) = 0.32  
 TRAVEL TIME (MIN.) = 0.59 Tc (MIN.) = 11.97  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50403.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 11.97  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.714  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.87  
 EFFECTIVE AREA (ACRES) = 1.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.3 PEAK FLOW RATE (CFS) = 2.82

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00 CHANNEL SLOPE = 0.7042  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 2.82

FLOW VELOCITY (FEET/SEC.) = 8.90 FLOW DEPTH (FEET) = 0.33  
 TRAVEL TIME (MIN.) = 0.13 Tc (MIN.) = 12.10  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50404.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.10  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.698  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 2.59  
 EFFECTIVE AREA (ACRES) = 2.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.5 PEAK FLOW RATE (CFS) = 5.39

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 145.00 CHANNEL SLOPE = 0.3448  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 5.39  
 FLOW VELOCITY (FEET/SEC.) = 8.14 FLOW DEPTH (FEET) = 0.47  
 TRAVEL TIME (MIN.) = 0.30 Tc (MIN.) = 12.40  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50405.00 TO NODE 50405.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.40  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.662  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.34  
 EFFECTIVE AREA (ACRES) = 3.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.6 PEAK FLOW RATE (CFS) = 7.65

```

*****
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.65
FLOW VELOCITY(FEET/SEC.) = 8.54 FLOW DEPTH(FEET) = 0.55
TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 12.71
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50406.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.71
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.625
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.30  1.000  -
USER-DEFINED        -         0.20   0.30  1.000  -
USER-DEFINED        -         0.80   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 2.51
EFFECTIVE AREA(ACRES) = 4.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 10.04

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.2193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.04
FLOW VELOCITY(FEET/SEC.) = 7.89 FLOW DEPTH(FEET) = 0.65
TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 13.19
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50407.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 13.19
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.571
SUBAREA LOSS RATE DATA(AMC II):

```

```

DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.50   0.30  1.000  -
USER-DEFINED        -         1.20   0.30  1.000  -
USER-DEFINED        -         1.70   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 13.08
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 22.89

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 325.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 490.00 CHANNEL SLOPE = 0.1531
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 22.89
FLOW VELOCITY(FEET/SEC.) = 8.47 FLOW DEPTH(FEET) = 0.95
TRAVEL TIME(MIN.) = 0.96 Tc(MIN.) = 14.15
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.15
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.475
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.30  1.000  -
USER-DEFINED        -         0.10   0.30  1.000  -
USER-DEFINED        -         0.60   0.30  1.000  -
USER-DEFINED        -         1.30   0.30  1.000  -
USER-DEFINED        -         0.50   0.30  1.000  -
USER-DEFINED        -         1.20   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 7.44
EFFECTIVE AREA(ACRES) = 15.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.0 PEAK FLOW RATE(CFS) = 29.36

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.15
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.475
SUBAREA LOSS RATE DATA(AMC II):

```



DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.76  
EFFECTIVE AREA(ACRES) = 15.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.9 PEAK FLOW RATE(CFS) = 31.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 31.12  
FLOW VELOCITY(FEET/SEC.) = 6.82 FLOW DEPTH(FEET) = 1.23  
TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 14.33  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.33  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.457  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	6.40	0.30	1.000	-
USER-DEFINED	-	6.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 14.80 SUBAREA RUNOFF(CFS) = 28.73  
EFFECTIVE AREA(ACRES) = 30.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.7 PEAK FLOW RATE(CFS) = 59.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.33  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.457  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.16  
EFFECTIVE AREA(ACRES) = 31.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.3 PEAK FLOW RATE(CFS) = 60.76

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 60.76  
FLOW VELOCITY(FEET/SEC.) = 8.47 FLOW DEPTH(FEET) = 1.55  
TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 14.53  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.53  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.437  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 12.31  
EFFECTIVE AREA(ACRES) = 37.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 37.7 PEAK FLOW RATE(CFS) = 72.50

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.53  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.437  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 1.15  
 EFFECTIVE AREA (ACRES) = 38.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 38.3 PEAK FLOW RATE (CFS) = 73.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 312.00 DOWNSTREAM (FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 566.00 CHANNEL SLOPE = 0.0530  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 73.66  
 FLOW VELOCITY (FEET/SEC.) = 7.66 FLOW DEPTH (FEET) = 1.79  
 TRAVEL TIME (MIN.) = 1.23 Tc (MIN.) = 15.76  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 15.76  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.335  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658  
 SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 9.62  
 EFFECTIVE AREA (ACRES) = 43.30 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 43.3 PEAK FLOW RATE (CFS) = 79.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 15.76  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.335  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

USER-DEFINED - 5.80 0.30 1.000 -  
 USER-DEFINED - 0.50 0.30 1.000 -  
 USER-DEFINED - 3.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 10.50 SUBAREA RUNOFF (CFS) = 19.23  
 EFFECTIVE AREA (ACRES) = 53.80 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 53.8 PEAK FLOW RATE (CFS) = 99.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 216.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 954.00 CHANNEL SLOPE = 0.0692  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 99.00  
 FLOW VELOCITY (FEET/SEC.) = 11.34 FLOW DEPTH (FEET) = 1.71  
 TRAVEL TIME (MIN.) = 1.40 Tc (MIN.) = 17.17  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 17.17  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.234  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875  
 SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 6.39  
 EFFECTIVE AREA (ACRES) = 57.40 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 57.4 PEAK FLOW RATE (CFS) = 100.50

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 17.17  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.234  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.30 0.30 1.000 -  
 USER-DEFINED - 9.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 18.46  
 EFFECTIVE AREA(ACRES) = 68.00 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 68.0 PEAK FLOW RATE(CFS) = 118.96

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.17  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.234  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.934  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 4.40  
 EFFECTIVE AREA(ACRES) = 70.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 70.5 PEAK FLOW RATE(CFS) = 123.35

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 70.5 TC(MIN.) = 17.17  
 EFFECTIVE AREA(ACRES) = 70.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.967  
 PEAK FLOW RATE(CFS) = 123.35

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 2 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 50-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P201XX50.DAT  
TIME/DATE OF STUDY: 10:20 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.470
2)	6.000;	4.030
3)	7.000;	3.690
4)	8.000;	3.420
5)	9.000;	3.200
6)	10.000;	3.010
7)	11.000;	2.850
8)	12.000;	2.710
9)	13.000;	2.590
10)	14.000;	2.490
11)	15.000;	2.390
12)	20.000;	2.030
13)	25.000;	1.790
14)	30.000;	1.610
15)	40.000;	1.370
16)	50.000;	1.200
17)	60.000;	1.090
18)	90.000;	0.860
19)	120.000;	0.730
20)	180.000;	0.580

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	(FT)	(FT)	SIDE /	HEIGHT	WIDTH	LIP	HIKE	FACTOR
			SIDE /	(FT)	(FT)	(FT)	(FT)	(n)
			WAY					

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20100.00 TO NODE 20101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 830.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.230  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.156  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.30	1.000	95	9.23
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.23

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.54  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.54

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20101.00 TO NODE 20102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 276.00 CHANNEL SLOPE = 0.2899  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.54  
FLOW VELOCITY(FEET/SEC.) = 5.42 FLOW DEPTH(FEET) = 0.31  
TRAVEL TIME(MIN.) = 0.85  $T_c$ (MIN.) = 10.08  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20102.00 = 595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20102.00 TO NODE 20102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN) = 10.08
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.997
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.80     0.30     1.000    -
USER-DEFINED        -         0.20     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.00    SUBAREA RUNOFF(CFS) = 2.43
EFFECTIVE AREA(ACRES) = 1.60   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6      PEAK FLOW RATE(CFS) = 3.88

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*****
FLOW PROCESS FROM NODE 20102.00 TO NODE 20103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.1863
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.88
FLOW VELOCITY(FEET/SEC.) = 5.91 FLOW DEPTH(FEET) = 0.47
TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 10.53
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20103.00 = 756.00 FEET.

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.53
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.925
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     1.000    -
USER-DEFINED        -         0.30     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90    SUBAREA RUNOFF(CFS) = 2.13
EFFECTIVE AREA(ACRES) = 2.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.5      PEAK FLOW RATE(CFS) = 5.91

```

```

*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20104.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 690.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 64.00 CHANNEL SLOPE = 0.4688

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```

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.91
FLOW VELOCITY(FEET/SEC.) = 9.20 FLOW DEPTH(FEET) = 0.48
TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 10.65
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20104.00 = 820.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20104.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 10.65
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.906
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40     0.30     1.000    -
USER-DEFINED        -         3.30     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 8.91
EFFECTIVE AREA(ACRES) = 6.30   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.3      PEAK FLOW RATE(CFS) = 14.78

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20105.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 690.00 DOWNSTREAM(FEET) = 670.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 159.00 CHANNEL SLOPE = 0.1258
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 14.78
FLOW VELOCITY(FEET/SEC.) = 7.07 FLOW DEPTH(FEET) = 0.83
TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 11.02
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20105.00 = 979.00 FEET.

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*****
FLOW PROCESS FROM NODE 20105.00 TO NODE 20105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.02
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.847
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     1.000    -
USER-DEFINED        -         1.50     0.30     1.000    -
USER-DEFINED        -         2.20     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90    SUBAREA RUNOFF(CFS) = 8.94

```

EFFECTIVE AREA (ACRES) = 10.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 10.2 PEAK FLOW RATE (CFS) = 23.38

\*\*\*\*\*

FLOW PROCESS FROM NODE 20105.00 TO NODE 20106.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 670.00 DOWNSTREAM (FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 192.00 CHANNEL SLOPE = 0.1042  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 23.38  
FLOW VELOCITY (FEET/SEC.) = 7.41 FLOW DEPTH (FEET) = 1.03  
TRAVEL TIME (MIN.) = 0.43 Tc (MIN.) = 11.46  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20106.00 = 1171.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20106.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN) = 11.46  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.786  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.10 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 3.80 SUBAREA RUNOFF (CFS) = 8.50  
EFFECTIVE AREA (ACRES) = 14.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 14.0 PEAK FLOW RATE (CFS) = 31.33

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FLOW PROCESS FROM NODE 20106.00 TO NODE 20107.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 650.00 DOWNSTREAM (FEET) = 640.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 156.00 CHANNEL SLOPE = 0.0641  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.33  
FLOW VELOCITY (FEET/SEC.) = 6.64 FLOW DEPTH (FEET) = 1.25  
TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 11.85  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20107.00 = 1327.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20107.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 11.85  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.731

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.20 0.30 1.000 -  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 8.75  
EFFECTIVE AREA (ACRES) = 18.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 18.0 PEAK FLOW RATE (CFS) = 39.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20108.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 640.00 DOWNSTREAM (FEET) = 609.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 512.00 CHANNEL SLOPE = 0.0605  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 39.39  
FLOW VELOCITY (FEET/SEC.) = 6.91 FLOW DEPTH (FEET) = 1.38  
TRAVEL TIME (MIN.) = 1.23 Tc (MIN.) = 13.08  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20108.00 = 1839.00 FEET.

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20108.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN) = 13.08  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.582  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.200 -  
USER-DEFINED - 1.50 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970  
SUBAREA AREA (ACRES) = 2.70 SUBAREA RUNOFF (CFS) = 5.57  
EFFECTIVE AREA (ACRES) = 20.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.7 PEAK FLOW RATE (CFS) = 42.53

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 600.00
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.69
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 42.53
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 13.27
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20109.00 = 2033.00 FEET.

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*****
FLOW PROCESS FROM NODE 20109.00 TO NODE 20109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 13.27
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.563
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -      0.70    0.30    0.200  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.58
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 43.75

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*****
FLOW PROCESS FROM NODE 20109.00 TO NODE 20110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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```

ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 594.00
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.53
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 43.75
PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 13.80
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20110.00 = 2393.00 FEET.

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*****
FLOW PROCESS FROM NODE 20110.00 TO NODE 20110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 13.80
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.510
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -      0.30    0.30    0.100  -
USER-DEFINED         -      3.50    0.30    0.200  -
USER-DEFINED         -      2.70    0.30    1.000  -
USER-DEFINED         -      0.20    0.30    1.000  -
USER-DEFINED         -      1.20    0.30    1.000  -

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```

USER-DEFINED         -      0.30    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 17.14
EFFECTIVE AREA(ACRES) = 29.60 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 29.6 PEAK FLOW RATE(CFS) = 59.89

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*****
FLOW PROCESS FROM NODE 20110.00 TO NODE 20111.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 594.00 DOWNSTREAM(FEET) = 590.00
FLOW LENGTH(FEET) = 246.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.24
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 59.89
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 14.13
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20111.00 = 2639.00 FEET.

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*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 14.13
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.477
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN

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```

USER-DEFINED         -      0.70    0.30    0.100  -
USER-DEFINED         -      2.10    0.30    0.200  -
USER-DEFINED         -      2.10    0.30    1.000  -
USER-DEFINED         -      0.60    0.30    1.000  -
USER-DEFINED         -      4.70    0.30    1.000  -
USER-DEFINED         -      0.90    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.792
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 22.37
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 81.37

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```

*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20112.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 580.00
FLOW LENGTH(FEET) = 628.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.30
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 81.37

```

PIPE TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 14.92  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20112.00 = 3267.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 14.92

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.398

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.200	-
USER-DEFINED	-	4.40	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	7.50	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.797

SUBAREA AREA(ACRES) = 15.20 SUBAREA RUNOFF(CFS) = 29.54

EFFECTIVE AREA(ACRES) = 55.90 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 55.9 PEAK FLOW RATE(CFS) = 108.03

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 14.92

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.398

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.950

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.56

EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 112.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20113.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 580.00 DOWNSTREAM(FEET) = 570.00

FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.46

ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 112.59  
PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 15.48  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20113.00 = 3786.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.48

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.356

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.100	-
USER-DEFINED	-	4.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.877

SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 23.73

EFFECTIVE AREA(ACRES) = 70.90 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 134.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.48

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.356

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	1.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.787

SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 6.87

EFFECTIVE AREA(ACRES) = 74.50 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 74.5 PEAK FLOW RATE(CFS) = 140.95

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20114.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00

FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.68



ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 140.95  
PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 16.34  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20114.00 = 4393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.34  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.293  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.30 0.100 -  
USER-DEFINED - 4.00 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 0.50 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.747  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 14.71  
EFFECTIVE AREA(ACRES) = 82.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 82.4 PEAK FLOW RATE(CFS) = 151.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.34  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.293  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 1.000 -  
USER-DEFINED - 8.20 0.30 1.000 -  
USER-DEFINED - 3.20 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 3.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.932  
SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 31.72  
EFFECTIVE AREA(ACRES) = 99.90 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 99.9 PEAK FLOW RATE(CFS) = 183.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20115.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 560.00  
FLOW LENGTH(FEET) = 461.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 54.0 INCH PIPE IS 41.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.89  
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 183.20  
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 16.90  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20115.00 = 4854.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.90  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.253  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.60 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 0.100 -  
USER-DEFINED - 6.20 0.30 0.850 -  
USER-DEFINED - 2.20 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798  
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 23.20  
EFFECTIVE AREA(ACRES) = 112.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 112.7 PEAK FLOW RATE(CFS) = 202.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.90  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.253  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.23  
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 204.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20116.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 560.00 DOWNSTREAM(FEET) = 528.00  
FLOW LENGTH(FEET) = 219.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 38.36

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 204.05  
 PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 16.99  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20116.00 = 5073.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20116.00 TO NODE 20117.00 IS CODE = 51

=====  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====  
 ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 489.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 174.00 CHANNEL SLOPE = 0.2241  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 204.05  
 FLOW VELOCITY(FEET/SEC.) = 21.09 FLOW DEPTH(FEET) = 1.80  
 TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 17.13  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20117.00 = 5247.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

=====  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====  
 MAINLINE Tc(MIN) = 17.13  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.237  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.910  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 4.42  
 EFFECTIVE AREA(ACRES) = 115.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 115.9 PEAK FLOW RATE(CFS) = 206.76

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

=====  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====  
 MAINLINE Tc(MIN) = 17.13  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.237  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.200	-
USER-DEFINED	-	3.30	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	6.50	0.30	1.000	-

USER-DEFINED - 0.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.855  
 SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 22.81  
 EFFECTIVE AREA(ACRES) = 128.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 128.7 PEAK FLOW RATE(CFS) = 229.57

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

=====  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====  
 MAINLINE Tc(MIN) = 17.13  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.237  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 8.92  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 133.8 PEAK FLOW RATE(CFS) = 238.49

=====  
 END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 133.8 TC(MIN.) = 17.13  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.854  
 PEAK FLOW RATE(CFS) = 238.49

=====  
 END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S31 \*  
\* Rational Method Hydrology Analysis - 50-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S31.DAT  
TIME/DATE OF STUDY: 15:49 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.440
- 2) 10.00; 3.011
- 3) 15.00; 2.390
- 4) 20.00; 2.029
- 5) 25.00; 1.787
- 6) 30.00; 1.600
- 7) 40.00; 1.368
- 8) 50.00; 1.205
- 9) 60.00; 1.060
- 10) 90.00; 0.862
- 11) 120.00; 0.732
- 12) 180.00; 0.593
- 13) 360.00; 0.412
- 14) 1440.00; 0.172

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13100.00 TO NODE 13101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.58  
ELEVATION DATA: UPSTREAM(FEET) = 1069.66 DOWNSTREAM(FEET) = 969.92

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.312  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.493  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.94	0.30	1.000	0	8.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.70  
TOTAL AREA(ACRES) = 0.94 PEAK FLOW RATE(CFS) = 2.70

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13101.00 TO NODE 13102.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 969.92 DOWNSTREAM(FEET) = 807.20  
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.89 CHANNEL SLOPE = 0.2444  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.27  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.925  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.67	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.80  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.66  
AVERAGE FLOW DEPTH(FEET) = 0.24 TRAVEL TIME(MIN.) = 2.38  
Tc(MIN.) = 10.69  
SUBAREA AREA(ACRES) = 7.67 SUBAREA RUNOFF(CFS) = 18.12  
EFFECTIVE AREA(ACRES) = 8.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 20.34  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.34 FLOW VELOCITY(FEET/SEC.) = 5.63  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13102.00 = 948.47 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13102.00 TO NODE 13103.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 807.20 DOWNSTREAM(FEET) = 769.94  
CHANNEL LENGTH THRU SUBAREA(FEET) = 691.01 CHANNEL SLOPE = 0.0539  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.84

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.606

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	20.65	0.30	0.999	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.999

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.84

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.48

AVERAGE FLOW DEPTH(FEET) = 0.80 TRAVEL TIME(MIN.) = 2.57

Tc(MIN.) = 13.26

SUBAREA AREA(ACRES) = 20.65 SUBAREA RUNOFF(CFS) = 42.87

EFFECTIVE AREA(ACRES) = 29.26 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 29.3 PEAK FLOW RATE(CFS) = 60.74

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.00 FLOW VELOCITY(FEET/SEC.) = 5.08

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13103.00 = 1639.48 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 769.94 DOWNSTREAM(FEET) = 693.88

FLOW LENGTH(FEET) = 1563.10 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000

DEPTH OF FLOW IN 36.0 INCH PIPE IS 16.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 19.06

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 60.74

PIPE TRAVEL TIME(MIN.) = 1.37 Tc(MIN.) = 14.63

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13104.00 = 3202.58 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.63

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.437

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	28.00	0.30	0.750	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.750

SUBAREA AREA(ACRES) = 28.00 SUBAREA RUNOFF(CFS) = 55.73

EFFECTIVE AREA(ACRES) = 57.26 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88

TOTAL AREA(ACRES) = 57.3 PEAK FLOW RATE(CFS) = 112.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 693.88 DOWNSTREAM(FEET) = 645.69

FLOW LENGTH(FEET) = 1068.98 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.27

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 112.01

PIPE TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 15.47

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13105.00 = 4271.56 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.47

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.357

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	35.28	0.30	0.867	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.867

SUBAREA AREA(ACRES) = 35.28 SUBAREA RUNOFF(CFS) = 66.58

EFFECTIVE AREA(ACRES) = 92.54 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87

TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 174.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 645.69 DOWNSTREAM(FEET) = 608.48

FLOW LENGTH(FEET) = 1127.55 MANNING'S N = 0.013

DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.13

ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 174.47

PIPE TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 16.35  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.35  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.293  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 37.68 0.30 0.889 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.889  
SUBAREA AREA(ACRES) = 37.68 SUBAREA RUNOFF(CFS) = 68.70  
EFFECTIVE AREA(ACRES) = 130.22 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 130.2 PEAK FLOW RATE(CFS) = 237.83

\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 15.1

>>>>DEFINE MEMORY BANK # 2 <<<<

PEAK FLOWRATE TABLE FILE NAME: S30.DNA  
MEMORY BANK # 2 DEFINED AS FOLLOWS:  
STREAM Q Tc Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (ACRES) NODE  
1 2145.57 37.08 0.30( 0.24) 0.81 1996.4 13000.00  
2 2081.84 39.11 0.30( 0.24) 0.81 2016.1 13010.00  
TOTAL AREA(ACRES) = 2016.1

\*\*\*\*\*

FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 14.0

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:  
STREAM Q Tc Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (ACRES) NODE  
1 2145.57 37.08 0.30( 0.24) 0.81 1996.4 13000.00  
2 2081.84 39.11 0.30( 0.24) 0.81 2016.1 13010.00  
TOTAL AREA(ACRES) = 2016.1

\*\*\*\*\*

FLOW PROCESS FROM NODE 13026.00 TO NODE 13106.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 662.66 DOWNSTREAM(FEET) = 608.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 3098.88 CHANNEL SLOPE = 0.0175  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.01  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.347  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 75.28 0.30 0.755 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.755  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2183.53  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.29  
AVERAGE FLOW DEPTH(FEET) = 3.01 TRAVEL TIME(MIN.) = 4.20  
Tc(MIN.) = 41.28  
SUBAREA AREA(ACRES) = 75.28 SUBAREA RUNOFF(CFS) = 75.93  
EFFECTIVE AREA(ACRES) = 2071.69 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 2091.4 PEAK FLOW RATE(CFS) = 2145.57  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.98 FLOW VELOCITY(FEET/SEC.) = 12.22  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 2145.57 41.28 1.347 0.30( 0.24) 0.80 2071.7 13000.00  
2 2081.84 43.35 1.313 0.30( 0.24) 0.80 2091.4 13010.00  
NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 2145.57 Tc(MIN.) = 41.28  
AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA(ACRES) = 2071.69

\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 2145.57 41.28 1.347 0.30( 0.24) 0.80 2071.7 13000.00  
2 2081.84 43.35 1.313 0.30( 0.24) 0.80 2091.4 13010.00  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 237.83 16.35 2.293 0.30( 0.26) 0.88 130.2 13100.00  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1814.42	16.35	2.293	0.30 ( 0.24)	0.81	950.9	13100.00
2	2272.58	41.28	1.347	0.30 ( 0.24)	0.81	2201.9	13000.00
3	2204.91	43.35	1.313	0.30 ( 0.24)	0.81	2221.6	13010.00
TOTAL AREA (ACRES) =		2221.6					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 2272.58 Tc (MIN.) = 41.283  
EFFECTIVE AREA (ACRES) = 2201.91 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA (ACRES) = 2221.6  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13106.00 TO NODE 13107.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 608.48 DOWNSTREAM (FEET) = 584.29  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1650.20 CHANNEL SLOPE = 0.0147  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.32

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.309

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	190.45	0.30	0.755	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2365.40

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.91

AVERAGE FLOW DEPTH (FEET) = 3.31 TRAVEL TIME (MIN.) = 2.31

Tc (MIN.) = 43.59

SUBAREA AREA (ACRES) = 190.45 SUBAREA RUNOFF (CFS) = 185.62

EFFECTIVE AREA (ACRES) = 2392.36 AREA-AVERAGED Fm (INCH/HR) = 0.24

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80

TOTAL AREA (ACRES) = 2412.1 PEAK FLOW RATE (CFS) = 2300.24

GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 3.26 FLOW VELOCITY (FEET/SEC.) = 11.80

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13107.00 = 20924.84 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1925.55	18.81	2.116	0.30 ( 0.24)	0.80	1141.4	13100.00
2	2300.24	43.59	1.309	0.30 ( 0.24)	0.80	2392.4	13000.00
3	2245.49	45.68	1.275	0.30 ( 0.24)	0.80	2412.1	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 2300.24 Tc (MIN.) = 43.59

AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA (ACRES) = 2392.36

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13107.00 TO NODE 13108.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 584.29 DOWNSTREAM (FEET) = 563.78  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1061.67 CHANNEL SLOPE = 0.0193  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.13

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.288

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	314.12	0.30	0.939	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.939

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2442.44

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.20

AVERAGE FLOW DEPTH (FEET) = 3.12 TRAVEL TIME (MIN.) = 1.34

Tc (MIN.) = 44.93

SUBAREA AREA (ACRES) = 314.12 SUBAREA RUNOFF (CFS) = 284.38

EFFECTIVE AREA (ACRES) = 2706.48 AREA-AVERAGED Fm (INCH/HR) = 0.25

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82

TOTAL AREA (ACRES) = 2726.2 PEAK FLOW RATE (CFS) = 2537.54

GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 3.19 FLOW VELOCITY (FEET/SEC.) = 13.37

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13108.00 = 21986.51 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2318.48	20.20	2.020	0.30 ( 0.25)	0.83	1455.5	13100.00
2	2537.54	44.93	1.288	0.30 ( 0.25)	0.82	2706.5	13000.00
3	2472.36	47.03	1.253	0.30 ( 0.25)	0.82	2726.2	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 2537.54 Tc (MIN.) = 44.93

AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2706.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13108.00 TO NODE 13109.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 563.78 DOWNSTREAM (FEET) = 541.61  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1657.28 CHANNEL SLOPE = 0.0134  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.61  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.250  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 203.63 0.30 0.785 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.785  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2630.50  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.97  
 AVERAGE FLOW DEPTH (FEET) = 3.61 TRAVEL TIME (MIN.) = 2.31  
 Tc (MIN.) = 47.24  
 SUBAREA AREA (ACRES) = 203.63 SUBAREA RUNOFF (CFS) = 185.91  
 EFFECTIVE AREA (ACRES) = 2910.11 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 2929.8 PEAK FLOW RATE (CFS) = 2631.73  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.61 FLOW VELOCITY (FEET/SEC.) = 11.97  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13109.00 = 23643.79 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 2475.07 22.56 1.906 0.30 ( 0.25) 0.83 1659.1 13100.00  
 2 2631.73 47.24 1.250 0.30 ( 0.25) 0.82 2910.1 13000.00  
 3 2558.73 49.36 1.215 0.30 ( 0.24) 0.82 2929.8 13010.00  
 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 2631.73 Tc (MIN.) = 47.24  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2910.11

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13109.00 TO NODE 13110.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 541.61 DOWNSTREAM (FEET) = 509.94  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 2016.96 CHANNEL SLOPE = 0.0157  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.55  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.207  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 283.06 0.30 0.791 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.791  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2755.27  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.82  
 AVERAGE FLOW DEPTH (FEET) = 3.54 TRAVEL TIME (MIN.) = 2.62  
 Tc (MIN.) = 49.86  
 SUBAREA AREA (ACRES) = 283.06 SUBAREA RUNOFF (CFS) = 247.08

EFFECTIVE AREA (ACRES) = 3193.17 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3212.9 PEAK FLOW RATE (CFS) = 2766.77  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.55 FLOW VELOCITY (FEET/SEC.) = 12.84  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13110.00 = 25660.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 2679.89 25.21 1.780 0.30 ( 0.25) 0.82 1942.2 13100.00  
 2 2766.77 49.86 1.207 0.30 ( 0.24) 0.81 3193.2 13000.00  
 3 2693.57 52.01 1.176 0.30 ( 0.24) 0.81 3212.9 13010.00  
 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 2766.77 Tc (MIN.) = 49.86  
 AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA (ACRES) = 3193.17

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13110.00 TO NODE 13111.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 509.94 DOWNSTREAM (FEET) = 461.07  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 3058.95 CHANNEL SLOPE = 0.0160  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.61  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.150  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 248.05 0.30 0.783 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2868.96  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.06  
 AVERAGE FLOW DEPTH (FEET) = 3.61 TRAVEL TIME (MIN.) = 3.90  
 Tc (MIN.) = 53.77  
 SUBAREA AREA (ACRES) = 248.05 SUBAREA RUNOFF (CFS) = 204.37  
 EFFECTIVE AREA (ACRES) = 3441.22 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3460.9 PEAK FLOW RATE (CFS) = 2807.85  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.57 FLOW VELOCITY (FEET/SEC.) = 12.97  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13111.00 = 28719.70 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER



NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	2735.03	29.13	1.633	0.30 ( 0.25)	0.82	2190.2 13100.00
2	2807.85	53.77	1.150	0.30 ( 0.24)	0.81	3441.2 13000.00
3	2726.06	55.94	1.119	0.30 ( 0.24)	0.81	3460.9 13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 2807.85 Tc(MIN.) = 53.77  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3441.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 13111.00 TO NODE 13112.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 461.07 DOWNSTREAM(FEET) = 452.77  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1781.78 CHANNEL SLOPE = 0.0047  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 5.12  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.100

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	179.91	0.30	0.694	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.694  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2880.08  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.60  
 AVERAGE FLOW DEPTH(FEET) = 5.12 TRAVEL TIME(MIN.) = 3.45  
 Tc(MIN.) = 57.22

SUBAREA AREA(ACRES) = 179.91 SUBAREA RUNOFF(CFS) = 144.45  
 EFFECTIVE AREA(ACRES) = 3621.13 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3640.9 PEAK FLOW RATE(CFS) = 2807.85

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 5.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 5.05 FLOW VELOCITY(FEET/SEC.) = 8.54  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13112.00 = 30501.48 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2767.63	32.59	1.540	0.30 ( 0.24)	0.81	2370.2	13100.00
2	2807.85	57.22	1.100	0.30 ( 0.24)	0.81	3621.1	13000.00
3	2726.06	59.43	1.068	0.30 ( 0.24)	0.81	3640.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 2807.85 Tc(MIN.) = 57.22  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3621.13

\*\*\*\*\*

FLOW PROCESS FROM NODE 13112.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 452.77 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1625.01 CHANNEL SLOPE = 0.0155  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.64  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.070

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	155.96	0.30	0.836	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.836  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2865.34  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.94  
 AVERAGE FLOW DEPTH(FEET) = 3.63 TRAVEL TIME(MIN.) = 2.09  
 Tc(MIN.) = 59.31

SUBAREA AREA(ACRES) = 155.96 SUBAREA RUNOFF(CFS) = 114.99  
 EFFECTIVE AREA(ACRES) = 3777.09 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3796.8 PEAK FLOW RATE(CFS) = 2813.56  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.60

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.60 FLOW VELOCITY(FEET/SEC.) = 12.86  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13222.00 = 32126.49 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2838.09	34.69	1.491	0.30 ( 0.24)	0.81	2526.1	13100.00
2	2813.56	59.31	1.070	0.30 ( 0.24)	0.81	3777.1	13000.00
3	2759.78	61.54	1.050	0.30 ( 0.24)	0.81	3796.8	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 2838.09 Tc(MIN.) = 34.69  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 2526.12

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 3796.8 TC(MIN.) = 34.69  
 EFFECTIVE AREA(ACRES) = 2526.12 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.810  
 PEAK FLOW RATE(CFS) = 2838.09

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2838.09	34.69	1.491	0.30 ( 0.24)	0.81	2526.1	13100.00
2	2813.56	59.31	1.070	0.30 ( 0.24)	0.81	3777.1	13000.00
3	2759.78	61.54	1.050	0.30 ( 0.24)	0.81	3796.8	13010.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S32 \*  
\* Rational Method Hydrology Analysis - 50-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S32.DAT  
TIME/DATE OF STUDY: 15:49 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.440
- 2) 10.00; 3.011
- 3) 15.00; 2.390
- 4) 20.00; 2.029
- 5) 25.00; 1.787
- 6) 30.00; 1.600
- 7) 40.00; 1.368
- 8) 50.00; 1.205
- 9) 60.00; 1.060
- 10) 90.00; 0.862
- 11) 120.00; 0.732
- 12) 180.00; 0.593
- 13) 360.00; 0.412
- 14) 1440.00; 0.172

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13200.00 TO NODE 13201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 298.57  
ELEVATION DATA: UPSTREAM(FEET) = 1069.04 DOWNSTREAM(FEET) = 1005.76

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.179  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.67	0.30	1.000	0	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.74  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 1.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13201.00 TO NODE 13202.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.76 DOWNSTREAM(FEET) = 896.98  
CHANNEL LENGTH THRU SUBAREA(FEET) = 747.55 CHANNEL SLOPE = 0.1455  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.28  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.657  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.70  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.62  
AVERAGE FLOW DEPTH(FEET) = 0.25 TRAVEL TIME(MIN.) = 3.44  
Tc(MIN.) = 12.85  
SUBAREA AREA(ACRES) = 7.42 SUBAREA RUNOFF(CFS) = 15.74  
EFFECTIVE AREA(ACRES) = 8.09 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.1 PEAK FLOW RATE(CFS) = 17.17  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 FLOW VELOCITY(FEET/SEC.) = 4.51  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13202.00 = 1046.12 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 896.98 DOWNSTREAM(FEET) = 840.27  
FLOW LENGTH(FEET) = 1789.59 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 9.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.52  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 17.17  
PIPE TRAVEL TIME(MIN.) = 2.59 Tc(MIN.) = 15.44  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13203.00 = 2835.71 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.44  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.359  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.89 0.30 0.731 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.731  
SUBAREA AREA(ACRES) = 38.89 SUBAREA RUNOFF(CFS) = 74.89  
EFFECTIVE AREA(ACRES) = 46.98 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
TOTAL AREA(ACRES) = 47.0 PEAK FLOW RATE(CFS) = 89.88

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 840.27 DOWNSTREAM(FEET) = 782.97  
FLOW LENGTH(FEET) = 992.54 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 19.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.40  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 89.88  
PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 16.18  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13204.00 = 3828.25 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.18  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.306  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 83.09 0.30 0.645 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645  
SUBAREA AREA(ACRES) = 83.09 SUBAREA RUNOFF(CFS) = 157.94  
EFFECTIVE AREA(ACRES) = 130.07 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 130.1 PEAK FLOW RATE(CFS) = 245.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 782.97 DOWNSTREAM(FEET) = 692.52  
FLOW LENGTH(FEET) = 2046.57 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.62  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 245.57  
PIPE TRAVEL TIME(MIN.) = 1.33 Tc(MIN.) = 17.51  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13205.00 = 5874.82 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.51  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.209  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 88.51 0.30 0.679 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.679  
SUBAREA AREA(ACRES) = 88.51 SUBAREA RUNOFF(CFS) = 159.78  
EFFECTIVE AREA(ACRES) = 218.58 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 218.6 PEAK FLOW RATE(CFS) = 394.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 13205.00 TO NODE 13206.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 692.52 DOWNSTREAM(FEET) = 605.24  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2704.69 CHANNEL SLOPE = 0.0323  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.07  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.948

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	163.73	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 518.84  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.79  
AVERAGE FLOW DEPTH(FEET) = 3.00 TRAVEL TIME(MIN.) = 4.18  
Tc(MIN.) = 21.68  
SUBAREA AREA(ACRES) = 163.73 SUBAREA RUNOFF(CFS) = 249.13  
EFFECTIVE AREA(ACRES) = 382.31 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 382.3 PEAK FLOW RATE(CFS) = 591.80  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.22 FLOW VELOCITY(FEET/SEC.) = 11.20  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13206.00 = 8579.51 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13206.00 TO NODE 13207.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 687.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.81  
AVERAGE FLOW DEPTH(FEET) = 3.93 TRAVEL TIME(MIN.) = 4.21  
Tc(MIN.) = 25.89  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 192.01  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 717.04  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.01

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 687.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.81  
AVERAGE FLOW DEPTH(FEET) = 3.93 TRAVEL TIME(MIN.) = 4.21  
Tc(MIN.) = 25.89  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 192.01  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 717.04  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 4.01 FLOW VELOCITY(FEET/SEC.) = 9.92  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13207.00 = 11058.66 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 795.08  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.61  
AVERAGE FLOW DEPTH(FEET) = 3.86 TRAVEL TIME(MIN.) = 2.49  
Tc(MIN.) = 28.38  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 156.05  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 828.92  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.94

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 795.08  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.61  
AVERAGE FLOW DEPTH(FEET) = 3.86 TRAVEL TIME(MIN.) = 2.49  
Tc(MIN.) = 28.38  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 156.05  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 828.92  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.94 FLOW VELOCITY(FEET/SEC.) = 11.76  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 28.38  
RAINFALL INTENSITY(INCH/HR) = 1.66  
AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.81  
EFFECTIVE STREAM AREA(ACRES) = 649.28  
TOTAL STREAM AREA(ACRES) = 649.28  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 828.92

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13210.00 TO NODE 13211.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.51  
ELEVATION DATA: UPSTREAM(FEET) = 949.80 DOWNSTREAM(FEET) = 828.64

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.525  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.432  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 NATURAL FAIR COVER  
 "OPEN BRUSH" - 1.96 0.30 1.000 0 8.53  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 5.53  
 TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 5.53

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13211.00 TO NODE 13212.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 828.64 DOWNSTREAM(FEET) = 767.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 652.49 CHANNEL SLOPE = 0.0930  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.48

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.862

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 11.95 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.40  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.07  
 AVERAGE FLOW DEPTH(FEET) = 0.44 TRAVEL TIME(MIN.) = 2.67  
 Tc(MIN.) = 11.19

SUBAREA AREA(ACRES) = 11.95 SUBAREA RUNOFF(CFS) = 27.56  
 EFFECTIVE AREA(ACRES) = 13.91 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 32.08  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 FLOW VELOCITY(FEET/SEC.) = 4.86  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13212.00 = 967.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13212.00 TO NODE 13213.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 767.94 DOWNSTREAM(FEET) = 706.43  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 967.91 CHANNEL SLOPE = 0.0635  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.97

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.485

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 27.07 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 58.82  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.30  
 AVERAGE FLOW DEPTH(FEET) = 0.94 TRAVEL TIME(MIN.) = 3.05  
 Tc(MIN.) = 14.24  
 SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 53.22  
 EFFECTIVE AREA(ACRES) = 40.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 41.0 PEAK FLOW RATE(CFS) = 80.57  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.12 FLOW VELOCITY(FEET/SEC.) = 5.89  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13213.00 = 1934.91 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13213.00 TO NODE 13214.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 706.43 DOWNSTREAM(FEET) = 659.31  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 948.11 CHANNEL SLOPE = 0.0497  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.35

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.246

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 18.09 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 96.43  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.72  
 AVERAGE FLOW DEPTH(FEET) = 1.33 TRAVEL TIME(MIN.) = 2.76  
 Tc(MIN.) = 17.00

SUBAREA AREA(ACRES) = 18.09 SUBAREA RUNOFF(CFS) = 31.68  
 EFFECTIVE AREA(ACRES) = 59.07 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 103.46  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.38 FLOW VELOCITY(FEET/SEC.) = 5.86  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13214.00 = 2883.02 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13214.00 TO NODE 13215.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 659.31 DOWNSTREAM(FEET) = 628.91  
CHANNEL LENGTH THRU SUBAREA(FEET) = 970.24 CHANNEL SLOPE = 0.0313  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.05

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.041

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	71.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 159.48

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.69

AVERAGE FLOW DEPTH(FEET) = 2.00 TRAVEL TIME(MIN.) = 2.84

Tc(MIN.) = 19.84

SUBAREA AREA(ACRES) = 71.42 SUBAREA RUNOFF(CFS) = 111.90

EFFECTIVE AREA(ACRES) = 130.49 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 130.5 PEAK FLOW RATE(CFS) = 204.44

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.29 FLOW VELOCITY(FEET/SEC.) = 6.12

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13215.00 = 3853.26 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13215.00 TO NODE 13216.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 628.91 DOWNSTREAM(FEET) = 598.39  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.63 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.42

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.922

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	36.33	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 230.97

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.47

AVERAGE FLOW DEPTH(FEET) = 2.41 TRAVEL TIME(MIN.) = 2.38

Tc(MIN.) = 22.22

SUBAREA AREA(ACRES) = 36.33 SUBAREA RUNOFF(CFS) = 53.04

EFFECTIVE AREA(ACRES) = 166.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 166.8 PEAK FLOW RATE(CFS) = 243.55

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.48 FLOW VELOCITY(FEET/SEC.) = 6.56

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13216.00 = 4775.89 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13216.00 TO NODE 13217.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 598.39 DOWNSTREAM(FEET) = 568.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.40 CHANNEL SLOPE = 0.0470  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.41

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.855

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	42.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 273.30

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.69

AVERAGE FLOW DEPTH(FEET) = 2.40 TRAVEL TIME(MIN.) = 1.38

Tc(MIN.) = 23.60

SUBAREA AREA(ACRES) = 42.51 SUBAREA RUNOFF(CFS) = 59.51

EFFECTIVE AREA(ACRES) = 209.33 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 209.3 PEAK FLOW RATE(CFS) = 293.03

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.49 FLOW VELOCITY(FEET/SEC.) = 7.85

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13217.00 = 5412.29 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 568.48 DOWNSTREAM(FEET) = 505.65  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1896.50 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.98

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.676

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	73.24	0.30	0.951	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.951  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 338.89  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.21  
 AVERAGE FLOW DEPTH(FEET) = 2.96 TRAVEL TIME(MIN.) = 4.39  
 Tc(MIN.) = 27.98  
 SUBAREA AREA(ACRES) = 73.24 SUBAREA RUNOFF(CFS) = 91.65  
 EFFECTIVE AREA(ACRES) = 282.57 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 282.6 PEAK FLOW RATE(CFS) = 350.82  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.01 FLOW VELOCITY(FEET/SEC.) = 7.28  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13220.00 = 7308.79 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 27.98  
 RAINFALL INTENSITY(INCH/HR) = 1.68  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.99  
 EFFECTIVE STREAM AREA(ACRES) = 282.57  
 TOTAL STREAM AREA(ACRES) = 282.57  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 350.82

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	828.92	28.38	1.661	0.30( 0.24)	0.81	649.3	13200.00
2	350.82	27.98	1.676	0.30( 0.30)	0.99	282.6	13210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1176.70	27.98	1.676	0.30( 0.26)	0.86	922.7	13210.00
2	1175.92	28.38	1.661	0.30( 0.26)	0.86	931.8	13200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1176.70 Tc(MIN.) = 27.98  
 EFFECTIVE AREA(ACRES) = 922.70 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA(ACRES) = 931.8  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13220.00 TO NODE 13221.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 505.65 DOWNSTREAM(FEET) = 478.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1949.14 CHANNEL SLOPE = 0.0137  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 5.03  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.586

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 108.50 0.30 0.637 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.637  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1244.79  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.33  
 AVERAGE FLOW DEPTH(FEET) = 5.03 TRAVEL TIME(MIN.) = 2.63  
 Tc(MIN.) = 30.62

SUBAREA AREA(ACRES) = 108.50 SUBAREA RUNOFF(CFS) = 136.19  
 EFFECTIVE AREA(ACRES) = 1031.20 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA(ACRES) = 1040.3 PEAK FLOW RATE(CFS) = 1238.21  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 5.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 5.02 FLOW VELOCITY(FEET/SEC.) = 12.33  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13221.00 = 14742.35 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1238.21	30.62	1.586	0.30( 0.25)	0.84	1031.2	13210.00
2	1240.62	31.02	1.576	0.30( 0.25)	0.84	1040.3	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1240.62 Tc(MIN.) = 31.02  
 AREA-AVERAGED Fm(INCH/HR) = 0.25 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.84 EFFECTIVE AREA(ACRES) = 1040.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13221.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 478.94 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2078.70 CHANNEL SLOPE = 0.0247  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 4.43  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.525

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN



USER-DEFINED - 87.26 0.30 0.699 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$  (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.699  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1292.26  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 15.48  
 AVERAGE FLOW DEPTH (FEET) = 4.43 TRAVEL TIME (MIN.) = 2.24  
 $T_c$  (MIN.) = 33.25  
 SUBAREA AREA (ACRES) = 87.26 SUBAREA RUNOFF (CFS) = 103.26  
 EFFECTIVE AREA (ACRES) = 1127.61 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.25  
 AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.83  
 TOTAL AREA (ACRES) = 1127.6 PEAK FLOW RATE (CFS) = 1295.27  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 4.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 4.43 FLOW VELOCITY (FEET/SEC.) = 15.50  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13222.00 = 16821.05 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	$T_c$ (MIN.)	Intensity (INCH/HR)	$F_p$ ( $F_m$ ) (INCH/HR)	$A_p$	$A_e$ (ACRES)	HEADWATER NODE
1	1294.02	32.85	1.534	0.30 (0.25)	0.83	1118.5	13210.00
2	1295.27	33.25	1.525	0.30 (0.25)	0.83	1127.6	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1295.27  $T_c$  (MIN.) = 33.25  
 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.25 AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30  
 AREA-AVERAGED  $A_p$  = 0.83 EFFECTIVE AREA (ACRES) = 1127.61

=====  
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1127.6  $T_c$  (MIN.) = 33.25  
 EFFECTIVE AREA (ACRES) = 1127.61 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.25  
 AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.828  
 PEAK FLOW RATE (CFS) = 1295.27

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	$T_c$ (MIN.)	Intensity (INCH/HR)	$F_p$ ( $F_m$ ) (INCH/HR)	$A_p$	$A_e$ (ACRES)	HEADWATER NODE
1	1294.02	32.85	1.534	0.30 (0.25)	0.83	1118.5	13210.00
2	1295.27	33.25	1.525	0.30 (0.25)	0.83	1127.6	13200.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S35 \*  
\* Rational Method Hydrology Analysis - 50-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S35.DAT  
TIME/DATE OF STUDY: 15:49 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.440
- 2) 10.00; 3.011
- 3) 15.00; 2.390
- 4) 20.00; 2.029
- 5) 25.00; 1.787
- 6) 30.00; 1.600
- 7) 40.00; 1.368
- 8) 50.00; 1.205
- 9) 60.00; 1.060
- 10) 90.00; 0.862
- 11) 120.00; 0.732
- 12) 180.00; 0.593
- 13) 360.00; 0.412
- 14) 1440.00; 0.172

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.00 TO NODE 13500.50 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 548.43  
ELEVATION DATA: UPSTREAM(FEET) = 1183.47 DOWNSTREAM(FEET) = 1065.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.768  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	5.11	0.30	1.000	0	11.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 11.35  
TOTAL AREA(ACRES) = 5.11 PEAK FLOW RATE(CFS) = 11.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.50 TO NODE 13501.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1033.15  
CHANNEL LENGTH THRU SUBAREA(FEET) = 431.71 CHANNEL SLOPE = 0.0738  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.49  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.538  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.87	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.29  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.88  
AVERAGE FLOW DEPTH(FEET) = 0.48 TRAVEL TIME(MIN.) = 1.86  
Tc(MIN.) = 13.81  
SUBAREA AREA(ACRES) = 8.87 SUBAREA RUNOFF(CFS) = 17.87  
EFFECTIVE AREA(ACRES) = 13.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 28.16  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.58 FLOW VELOCITY(FEET/SEC.) = 4.33  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13501.00 = 980.14 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13501.00 TO NODE 13502.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1033.15 DOWNSTREAM(FEET) = 990.26  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.63 CHANNEL SLOPE = 0.0452  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.88

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.207

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.82	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.64

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.25

AVERAGE FLOW DEPTH(FEET) = 0.86 TRAVEL TIME(MIN.) = 3.72

Tc(MIN.) = 17.54

SUBAREA AREA(ACRES) = 16.82 SUBAREA RUNOFF(CFS) = 28.88

EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 52.87

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.97 FLOW VELOCITY(FEET/SEC.) = 4.56

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13502.00 = 1928.77 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13502.00 TO NODE 13503.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.26 DOWNSTREAM(FEET) = 956.06  
CHANNEL LENGTH THRU SUBAREA(FEET) = 940.98 CHANNEL SLOPE = 0.0363  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.42

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.997

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	46.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 88.07

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.01

AVERAGE FLOW DEPTH(FEET) = 1.38 TRAVEL TIME(MIN.) = 3.13

Tc(MIN.) = 20.67

SUBAREA AREA(ACRES) = 46.02 SUBAREA RUNOFF(CFS) = 70.30

EFFECTIVE AREA(ACRES) = 76.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 76.8 PEAK FLOW RATE(CFS) = 117.35

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.62 FLOW VELOCITY(FEET/SEC.) = 5.46

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13503.00 = 2869.75 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13503.00 TO NODE 13504.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 956.06 DOWNSTREAM(FEET) = 889.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2131.31 CHANNEL SLOPE = 0.0312  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.02

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.713

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	58.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 154.63

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.63

AVERAGE FLOW DEPTH(FEET) = 1.97 TRAVEL TIME(MIN.) = 6.31

Tc(MIN.) = 26.98

SUBAREA AREA(ACRES) = 58.46 SUBAREA RUNOFF(CFS) = 74.36

EFFECTIVE AREA(ACRES) = 135.28 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 135.3 PEAK FLOW RATE(CFS) = 172.08

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.09 FLOW VELOCITY(FEET/SEC.) = 5.81

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13504.00 = 5001.06 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13504.00 TO NODE 13505.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 889.48 DOWNSTREAM(FEET) = 848.10  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1661.97 CHANNEL SLOPE = 0.0249  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.43

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.555  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 49.30 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 199.94  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.60  
 AVERAGE FLOW DEPTH (FEET) = 2.41 TRAVEL TIME (MIN.) = 4.94  
 Tc (MIN.) = 31.92  
 SUBAREA AREA (ACRES) = 49.30 SUBAREA RUNOFF (CFS) = 55.71  
 EFFECTIVE AREA (ACRES) = 184.58 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 184.6 PEAK FLOW RATE (CFS) = 208.56  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.46  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.46 FLOW VELOCITY (FEET/SEC.) = 5.68  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.00 = 6663.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13505.00 TO NODE 13505.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 848.10 DOWNSTREAM (FEET) = 811.10  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1234.61 CHANNEL SLOPE = 0.0300  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.47  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.479  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 39.35 0.30 0.811 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.811  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 230.44  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.23  
 AVERAGE FLOW DEPTH (FEET) = 2.47 TRAVEL TIME (MIN.) = 3.30  
 Tc (MIN.) = 35.23  
 SUBAREA AREA (ACRES) = 39.35 SUBAREA RUNOFF (CFS) = 43.76  
 EFFECTIVE AREA (ACRES) = 223.93 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 223.9 PEAK FLOW RATE (CFS) = 239.59  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.52  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.52 FLOW VELOCITY (FEET/SEC.) = 6.31  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.50 = 7897.64 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13505.50 TO NODE 13506.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 811.10 DOWNSTREAM (FEET) = 781.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1415.98 CHANNEL SLOPE = 0.0213  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.93  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.384  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 54.33 0.30 0.738 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.738  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 268.01  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.76  
 AVERAGE FLOW DEPTH (FEET) = 2.93 TRAVEL TIME (MIN.) = 4.10  
 Tc (MIN.) = 39.33  
 SUBAREA AREA (ACRES) = 54.33 SUBAREA RUNOFF (CFS) = 56.83  
 EFFECTIVE AREA (ACRES) = 278.26 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
 TOTAL AREA (ACRES) = 278.3 PEAK FLOW RATE (CFS) = 277.25  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.99  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.99 FLOW VELOCITY (FEET/SEC.) = 5.81  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.00 = 9313.62 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13506.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 781.00 DOWNSTREAM (FEET) = 743.17  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1542.62 CHANNEL SLOPE = 0.0245  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.04  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.312  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 61.33 0.30 0.783 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 306.99  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.30  
 AVERAGE FLOW DEPTH (FEET) = 3.03 TRAVEL TIME (MIN.) = 4.08  
 Tc (MIN.) = 43.41  
 SUBAREA AREA (ACRES) = 61.33 SUBAREA RUNOFF (CFS) = 59.48  
 EFFECTIVE AREA (ACRES) = 339.59 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90

TOTAL AREA (ACRES) = 339.6 PEAK FLOW RATE (CFS) = 318.89  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.09  
  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.09 FLOW VELOCITY (FEET/SEC.) = 6.37  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.50 = 10856.24 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.50 TO NODE 13520.00 IS CODE = 56  
 -----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 743.17 DOWNSTREAM (FEET) = 717.04  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1370.93 CHANNEL SLOPE = 0.0191  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.41  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.249  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.86	0.30	0.848	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.848  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 336.74  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.90  
 AVERAGE FLOW DEPTH (FEET) = 3.40 TRAVEL TIME (MIN.) = 3.87  
 Tc (MIN.) = 47.28  
 SUBAREA AREA (ACRES) = 39.86 SUBAREA RUNOFF (CFS) = 35.69  
 EFFECTIVE AREA (ACRES) = 379.45 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
 TOTAL AREA (ACRES) = 379.5 PEAK FLOW RATE (CFS) = 335.28  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.39 FLOW VELOCITY (FEET/SEC.) = 5.89  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13520.00 IS CODE = 1  
 -----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 -----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 47.28  
 RAINFALL INTENSITY (INCH/HR) = 1.25  
 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.89  
 EFFECTIVE STREAM AREA (ACRES) = 379.45  
 TOTAL STREAM AREA (ACRES) = 379.45  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 335.28

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13510.00 TO NODE 13511.00 IS CODE = 21  
 -----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 -----  
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 903.68  
 ELEVATION DATA: UPSTREAM (FEET) = 1216.90 DOWNSTREAM (FEET) = 1022.78

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.615  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.438  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	6.66	0.30	1.000	0	14.62

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 12.82  
 TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 12.82

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13511.00 TO NODE 13512.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 1022.78 DOWNSTREAM (FEET) = 954.27  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1027.63 CHANNEL SLOPE = 0.0667  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.71  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.142  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.30	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 33.97  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.48  
 AVERAGE FLOW DEPTH (FEET) = 0.67 TRAVEL TIME (MIN.) = 3.82  
 Tc (MIN.) = 18.44  
 SUBAREA AREA (ACRES) = 25.40 SUBAREA RUNOFF (CFS) = 42.12  
 EFFECTIVE AREA (ACRES) = 32.06 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 53.16  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.87 FLOW VELOCITY (FEET/SEC.) = 5.23  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13512.00 = 1931.31 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13512.00 TO NODE 13513.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 954.27 DOWNSTREAM(FEET) = 872.45
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.42 CHANNEL SLOPE = 0.0425
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.63
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.834

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 90.23 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 115.80
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.73
AVERAGE FLOW DEPTH(FEET) = 1.54 TRAVEL TIME(MIN.) = 5.60
Tc(MIN.) = 24.04

SUBAREA AREA(ACRES) = 90.23 SUBAREA RUNOFF(CFS) = 124.57
EFFECTIVE AREA(ACRES) = 122.29 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 122.3 PEAK FLOW RATE(CFS) = 168.84
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.90 FLOW VELOCITY(FEET/SEC.) = 6.43
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13513.00 = 3857.73 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13513.00 TO NODE 13514.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 872.45 DOWNSTREAM(FEET) = 813.12
CHANNEL LENGTH THRU SUBAREA(FEET) = 1895.66 CHANNEL SLOPE = 0.0313
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.62
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.641

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 135.65 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 250.84
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.48
AVERAGE FLOW DEPTH(FEET) = 2.56 TRAVEL TIME(MIN.) = 4.87
Tc(MIN.) = 28.91

SUBAREA AREA(ACRES) = 135.65 SUBAREA RUNOFF(CFS) = 163.70
EFFECTIVE AREA(ACRES) = 257.94 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 257.9 PEAK FLOW RATE(CFS) = 311.28
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.87 FLOW VELOCITY(FEET/SEC.) = 6.90
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13514.00 = 5753.39 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13514.00 TO NODE 13515.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 813.12 DOWNSTREAM(FEET) = 773.74
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.15 CHANNEL SLOPE = 0.0204
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.54
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.505

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 109.30 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 370.60
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.21
AVERAGE FLOW DEPTH(FEET) = 3.51 TRAVEL TIME(MIN.) = 5.17
Tc(MIN.) = 34.08

SUBAREA AREA(ACRES) = 109.30 SUBAREA RUNOFF(CFS) = 118.58
EFFECTIVE AREA(ACRES) = 367.24 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 367.2 PEAK FLOW RATE(CFS) = 398.42
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.64 FLOW VELOCITY(FEET/SEC.) = 6.33
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13515.00 = 7679.54 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 773.74 DOWNSTREAM(FEET) = 717.04
CHANNEL LENGTH THRU SUBAREA(FEET) = 2279.49 CHANNEL SLOPE = 0.0249
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.98
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.384

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 231.44 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 511.44  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.28  
 AVERAGE FLOW DEPTH (FEET) = 3.93 TRAVEL TIME (MIN.) = 5.22  
 Tc (MIN.) = 39.30  
 SUBAREA AREA (ACRES) = 231.44 SUBAREA RUNOFF (CFS) = 225.88  
 EFFECTIVE AREA (ACRES) = 598.68 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 598.7 PEAK FLOW RATE (CFS) = 584.29  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 4.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 4.21 FLOW VELOCITY (FEET/SEC.) = 7.54  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13520.00 = 9959.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 39.30  
 RAINFALL INTENSITY (INCH/HR) = 1.38  
 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 598.68  
 TOTAL STREAM AREA (ACRES) = 598.68  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 584.29

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	335.28	47.28	1.249	0.30 (0.27)	0.89	379.5	13500.00
2	584.29	39.30	1.384	0.30 (0.30)	1.00	598.7	13510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	901.29	39.30	1.384	0.30 (0.29)	0.96	914.1	13510.00
2	846.79	47.28	1.249	0.30 (0.29)	0.96	978.1	13500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 901.29 Tc (MIN.) = 39.30  
 EFFECTIVE AREA (ACRES) = 914.06 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 978.1  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.00 TO NODE 13520.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 717.04 DOWNSTREAM (FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 2019.22 CHANNEL SLOPE = 0.0084  
 GIVEN CHANNEL BASE (FEET) = 30.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.61  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.298

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 989.05  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.74  
 AVERAGE FLOW DEPTH (FEET) = 3.60 TRAVEL TIME (MIN.) = 4.99  
 Tc (MIN.) = 44.29  
 SUBAREA AREA (ACRES) = 193.31 SUBAREA RUNOFF (CFS) = 175.48  
 EFFECTIVE AREA (ACRES) = 1107.37 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 1171.4 PEAK FLOW RATE (CFS) = 1005.81  
 GIVEN CHANNEL BASE (FEET) = 30.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.63 FLOW VELOCITY (FEET/SEC.) = 6.78  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.50 = 14246.39 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1005.81	44.29	1.298	0.30 (0.29)	0.96	1107.4	13510.00
2	930.74	52.37	1.171	0.30 (0.29)	0.96	1171.4	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 1005.81 Tc (MIN.) = 44.29  
 AREA-AVERAGED Fm (INCH/HR) = 0.29 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA (ACRES) = 1107.37

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.50 TO NODE 13521.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 661.95  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1622.36 CHANNEL SLOPE = 0.0235  
 GIVEN CHANNEL BASE (FEET) = 30.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.82  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.253

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -        129.79      0.30        0.897       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1063.29  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.81  
 AVERAGE FLOW DEPTH(FEET) = 2.82    TRAVEL TIME(MIN.) = 2.76  
 Tc(MIN.) = 47.04  
 SUBAREA AREA(ACRES) = 129.79        SUBAREA RUNOFF(CFS) = 114.95  
 EFFECTIVE AREA(ACRES) = 1237.16    AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 1301.2        PEAK FLOW RATE(CFS) = 1075.96  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.84    FLOW VELOCITY(FEET/SEC.) = 9.86  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13521.00 = 15868.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1075.96	47.04	1.253	0.30( 0.29)	0.96	1237.2	13510.00
2	988.14	55.20	1.130	0.30( 0.29)	0.95	1301.2	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1075.96    Tc(MIN.) = 47.04  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96    EFFECTIVE AREA(ACRES) = 1237.16

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13521.00 TO NODE 13522.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 661.95    DOWNSTREAM(FEET) = 632.19  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2746.01    CHANNEL SLOPE = 0.0108  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.73  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.163  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	278.60	0.30	0.905	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1187.70  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.78  
 AVERAGE FLOW DEPTH(FEET) = 3.71    TRAVEL TIME(MIN.) = 5.88  
 Tc(MIN.) = 52.93  
 SUBAREA AREA(ACRES) = 278.60        SUBAREA RUNOFF(CFS) = 223.43  
 EFFECTIVE AREA(ACRES) = 1515.76    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.95  
 TOTAL AREA(ACRES) = 1579.8        PEAK FLOW RATE(CFS) = 1198.50  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.73  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.73    FLOW VELOCITY(FEET/SEC.) = 7.81  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13522.00 = 18614.76 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1198.50	52.93	1.163	0.30( 0.28)	0.95	1515.8	13510.00
2	1092.68	61.25	1.052	0.30( 0.28)	0.94	1579.8	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1198.50    Tc(MIN.) = 52.93  
 AREA-AVERAGED Fm(INCH/HR) = 0.28    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.95    EFFECTIVE AREA(ACRES) = 1515.76

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1579.8    TC(MIN.) = 52.93  
 EFFECTIVE AREA(ACRES) = 1515.76    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.947  
 PEAK FLOW RATE(CFS) = 1198.50

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1198.50	52.93	1.163	0.30( 0.28)	0.95	1515.8	13510.00
2	1092.68	61.25	1.052	0.30( 0.28)	0.94	1579.8	13500.00

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2011 Advanced Engineering Software (aes)  
Ver. 18.0 Release Date: 07/01/2011 License ID 1264

Analysis prepared by:

RBF Consulting

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 100-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P00EVAA.DAT  
TIME/DATE OF STUDY: 15:06 11/13/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.785
- 2) 10.00; 3.745
- 3) 15.00; 2.904
- 4) 20.00; 2.401
- 5) 25.00; 2.083
- 6) 30.00; 1.861
- 7) 40.00; 1.606
- 8) 50.00; 1.392
- 9) 60.00; 1.279
- 10) 90.00; 1.075
- 11) 120.00; 0.938
- 12) 180.00; 0.782
- 13) 360.00; 0.577
- 14) 1200.00; 0.251

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 571.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.305  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.844  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56	7.31

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 3.44  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 3.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.844  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.170  
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 14.24  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 17.68

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.844  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.60 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 11.20  
 EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19  
 TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 28.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 -----

UPSTREAM ELEVATION(FEET) = 571.00 DOWNSTREAM ELEVATION(FEET) = 530.50  
 STREET LENGTH(FEET) = 1215.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.79  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.49  
 HALFSTREET FLOOD WIDTH(FEET) = 18.24  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.49  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.68  
 STREET FLOW TRAVEL TIME(MIN.) = 3.69 Tc(MIN.) = 10.99

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.578  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.20	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	2.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.135  
 SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 11.78  
 EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 33.02

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 17.85  
 FLOW VELOCITY(FEET/SEC.) = 5.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.61  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1542.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 10.99  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.578  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 APARTMENTS B 4.40 0.30 0.200 56  
 COMMERCIAL B 18.20 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.119  
 SUBAREA AREA(ACRES) = 22.60 SUBAREA RUNOFF(CFS) = 72.05  
 EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.13  
 TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 105.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 10.99  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.578  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 APARTMENTS B 6.20 0.30 0.200 56  
 COMMERCIAL B 0.10 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198  
 SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 19.95  
 EFFECTIVE AREA(ACRES) = 39.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA(ACRES) = 39.3 PEAK FLOW RATE(CFS) = 125.03

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 530.50 DOWNSTREAM(FEET) = 522.00  
 FLOW LENGTH(FEET) = 837.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.38  
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 125.03  
 PIPE TRAVEL TIME(MIN.) = 1.13 Tc(MIN.) = 12.12  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2379.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 12.12  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.389  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 15.30 0.30 0.100 56  
PUBLIC PARK B 0.70 0.30 0.850 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.133  
SUBAREA AREA(ACRES) = 16.00 SUBAREA RUNOFF(CFS) = 48.23  
EFFECTIVE AREA(ACRES) = 55.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
TOTAL AREA(ACRES) = 55.3 PEAK FLOW RATE(CFS) = 166.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 522.00 DOWNSTREAM(FEET) = 473.00  
FLOW LENGTH(FEET) = 568.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.74  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 166.55  
PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 12.44  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2947.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.44  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.335  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	2.10	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
COMMERCIAL	B	0.50	0.30	0.100	56
PUBLIC PARK	B	13.00	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.820  
SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 44.21  
EFFECTIVE AREA(ACRES) = 71.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
TOTAL AREA(ACRES) = 71.2 PEAK FLOW RATE(CFS) = 208.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 104.00 TO NODE 127.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 435.00  
FLOW LENGTH(FEET) = 588.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 28.35

ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 208.10  
PIPE TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 12.78  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 10  
-----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 121.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 574.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.382  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56	8.44

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 2.33  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 2.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 574.00 DOWNSTREAM ELEVATION(FEET) = 557.00  
STREET LENGTH(FEET) = 221.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 28.72  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.42  
HALFSTREET FLOOD WIDTH(FEET) = 14.18  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.22  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.00

STREET FLOW TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 8.95  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.174  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 7.90 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.10 0.30 0.400 56  
 APARTMENTS B 2.20 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.257  
 SUBAREA AREA(ACRES) = 14.30 SUBAREA RUNOFF(CFS) = 52.73  
 EFFECTIVE AREA(ACRES) = 14.90 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.26  
 TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 54.95

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 18.48  
 FLOW VELOCITY(FEET/SEC.) = 8.47 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.17  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 551.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 557.00 DOWNSTREAM ELEVATION(FEET) = 527.00  
 STREET LENGTH(FEET) = 317.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 71.05  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.51  
 HALFSTREET FLOOD WIDTH(FEET) = 19.65  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.76  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 5.01  
 STREET FLOW TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 9.49  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.953  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.50 0.30 0.400 56  
 APARTMENTS B 0.70 0.30 0.200 56

COMMERCIAL B 0.40 0.30 0.100 56  
 CONDOMINIUMS B 3.50 0.30 0.350 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.352  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 32.20  
 EFFECTIVE AREA(ACRES) = 24.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 24.2 PEAK FLOW RATE(CFS) = 84.19

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 21.05  
 FLOW VELOCITY(FEET/SEC.) = 10.14 DEPTH\*VELOCITY(FT\*FT/SEC.) = 5.46  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 123.00 = 868.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 527.00 DOWNSTREAM ELEVATION(FEET) = 496.00  
 STREET LENGTH(FEET) = 315.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 102.86  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.57  
 HALFSTREET FLOOD WIDTH(FEET) = 22.62  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.80  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.12  
 STREET FLOW TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 9.98  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.755

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 2.90 0.30 0.400 56  
 CONDOMINIUMS B 1.40 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.00 0.30 0.400 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 CONDOMINIUMS B 2.70 0.30 0.350 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387  
 SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 37.33  
 EFFECTIVE AREA(ACRES) = 35.60 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32

TOTAL AREA (ACRES) = 35.6 PEAK FLOW RATE (CFS) = 117.21

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.59 HALFSTREET FLOOD WIDTH (FEET) = 23.79
FLOW VELOCITY (FEET/SEC.) = 11.17 DEPTH\*VELOCITY (FT\*FT/SEC.) = 6.56
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 124.00 = 1183.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 9.98
RAINFALL INTENSITY (INCH/HR) = 3.75
AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA (ACRES) = 35.60
TOTAL STREAM AREA (ACRES) = 35.60
PEAK FLOW RATE (CFS) AT CONFLUENCE = 117.21

\*\*\*\*\*

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 317.00
ELEVATION DATA: UPSTREAM (FEET) = 699.00 DOWNSTREAM (FEET) = 610.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.111

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.108

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER
"OPEN BRUSH" B 1.50 0.30 1.000 66 9.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 5.14

TOTAL AREA (ACRES) = 1.50 PEAK FLOW RATE (CFS) = 5.14

\*\*\*\*\*

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 610.00 DOWNSTREAM (FEET) = 575.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 206.00 CHANNEL SLOPE = 0.1699

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.911

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 2.80 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.69

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.11

AVERAGE FLOW DEPTH (FEET) = 0.67 TRAVEL TIME (MIN.) = 0.48

Tc (MIN.) = 9.59

SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 9.10

EFFECTIVE AREA (ACRES) = 4.30 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 4.3 PEAK FLOW RATE (CFS) = 13.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.77 FLOW VELOCITY (FEET/SEC.) = 7.79

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 523.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 575.00 DOWNSTREAM (FEET) = 548.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.1350

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.741

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 3.30 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 19.08

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.77

AVERAGE FLOW DEPTH (FEET) = 0.91 TRAVEL TIME (MIN.) = 0.43

Tc (MIN.) = 10.02

SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 10.22

EFFECTIVE AREA (ACRES) = 7.60 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 7.6 PEAK FLOW RATE (CFS) = 23.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.98 FLOW VELOCITY (FEET/SEC.) = 8.18

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 723.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 548.00 DOWNSTREAM (FEET) = 524.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 318.00 CHANNEL SLOPE = 0.0755

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.610  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	2.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 26.96  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.81  
 AVERAGE FLOW DEPTH (FEET) = 1.15 TRAVEL TIME (MIN.) = 0.78  
 Tc (MIN.) = 10.80  
 SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 6.85  
 EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 29.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.19 FLOW VELOCITY (FEET/SEC.) = 6.97  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 1041.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	3.70	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 34.95  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.95  
 AVERAGE FLOW DEPTH (FEET) = 1.21 TRAVEL TIME (MIN.) = 0.20  
 Tc (MIN.) = 11.00  
 SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 10.91  
 EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 40.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.28 FLOW VELOCITY (FEET/SEC.) = 8.20  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 1135.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	8.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 52.00  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.25  
 AVERAGE FLOW DEPTH (FEET) = 1.67 TRAVEL TIME (MIN.) = 0.55  
 Tc (MIN.) = 11.55  
 SUBAREA AREA (ACRES) = 8.30 SUBAREA RUNOFF (CFS) = 23.79  
 EFFECTIVE AREA (ACRES) = 21.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 21.9 PEAK FLOW RATE (CFS) = 62.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.79 FLOW VELOCITY (FEET/SEC.) = 6.54  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 1342.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	0.60	0.30	1.000	66
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
NATURAL FAIR COVER "OPEN BRUSH"	B	13.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 81.90  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.52  
 AVERAGE FLOW DEPTH (FEET) = 2.22 TRAVEL TIME (MIN.) = 1.02  
 Tc (MIN.) = 12.57  
 SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 38.28  
 EFFECTIVE AREA (ACRES) = 36.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 36.0 PEAK FLOW RATE (CFS) = 97.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.37 FLOW VELOCITY(FEET/SEC.) = 5.80  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 1680.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 137.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 496.00  
FLOW LENGTH(FEET) = 726.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.17  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 97.66  
PIPE TRAVEL TIME(MIN.) = 1.32 Tc(MIN.) = 13.89  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 13.89  
RAINFALL INTENSITY(INCH/HR) = 3.09  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 36.00  
TOTAL STREAM AREA(ACRES) = 36.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 97.66

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	117.21	9.98	3.755	0.30( 0.10)	0.32	35.6	100.00
2	97.66	13.89	3.091	0.30( 0.30)	1.00	36.0	130.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	204.03	9.98	3.755	0.30( 0.18)	0.61	61.5	100.00
2	193.58	13.89	3.091	0.30( 0.20)	0.66	71.6	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 204.03 Tc(MIN.) = 9.98  
EFFECTIVE AREA(ACRES) = 61.45 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 71.6  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 444.00  
FLOW LENGTH(FEET) = 888.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.10  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 204.03  
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 10.52  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 125.00 = 3294.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.52  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.657  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCs SOIL AREA Fp Ap SCs  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 7.50 0.30 0.400 56  
NATURAL FAIR COVER  
"OPEN BRUSH" B 0.10 0.30 1.000 66  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.407  
SUBAREA AREA(ACRES) = 8.60 SUBAREA RUNOFF(CFS) = 27.36  
EFFECTIVE AREA(ACRES) = 70.05 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 219.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 444.00 DOWNSTREAM(FEET) = 438.00  
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 60.0 INCH PIPE IS 45.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.63  
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 219.59  
PIPE TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 11.33  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.33



\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.522  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	4.30	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.70	0.30	0.400	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.20	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 7.10 SUBAREA RUNOFF (CFS) = 22.07  
 EFFECTIVE AREA (ACRES) = 77.15 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 87.3 PEAK FLOW RATE (CFS) = 233.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 11.33  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.522  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.62  
 EFFECTIVE AREA (ACRES) = 77.35 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 87.5 PEAK FLOW RATE (CFS) = 233.72

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 11.33  
 RAINFALL INTENSITY (INCH/HR) = 3.52  
 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.55  
 EFFECTIVE STREAM AREA (ACRES) = 77.35  
 TOTAL STREAM AREA (ACRES) = 87.50  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 233.72

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21  
 -----

-----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 557.00 DOWNSTREAM (FEET) = 546.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.105  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 5.334  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.50	0.30	0.100	56	6.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 2.39  
 TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 2.39

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION (FEET) = 546.00 DOWNSTREAM ELEVATION (FEET) = 488.00  
 STREET LENGTH (FEET) = 671.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 13.23  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.34  
 HALfstREET FLOOD WIDTH (FEET) = 9.72  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.38  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.14  
 STREET FLOW TRAVEL TIME (MIN.) = 1.75 Tc (MIN.) = 7.86  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.619

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.50	0.30	0.200	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	3.90	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293  
 SUBAREA AREA (ACRES) = 5.30 SUBAREA RUNOFF (CFS) = 21.61  
 EFFECTIVE AREA (ACRES) = 5.80 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA (ACRES) = 5.8 PEAK FLOW RATE (CFS) = 23.68

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 12.70  
 FLOW VELOCITY(FEET/SEC.) = 7.25 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.82  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1001.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 7.86  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.619  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	14.60	0.30	0.200	56
COMMERCIAL	B	1.10	0.30	0.100	56
CONDOMINIUMS	B	4.30	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.227  
 SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 81.91  
 EFFECTIVE AREA(ACRES) = 25.80 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 25.8 PEAK FLOW RATE(CFS) = 105.59

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

-----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

-----  
 UPSTREAM ELEVATION(FEET) = 488.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
 STREET LENGTH(FEET) = 371.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 132.19  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.63  
 HALFSTREET FLOOD WIDTH(FEET) = 26.29  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.38  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.56  
 STREET FLOW TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 8.45  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.376

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.50	0.30	0.200	56

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 10.00 0.30 0.200 56  
 APARTMENTS B 1.70 0.30 0.200 56  
 COMMERCIAL B 0.50 0.30 0.100 56  
 CONDOMINIUMS B 1.00 0.30 0.350 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.207  
 SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 53.19  
 EFFECTIVE AREA(ACRES) = 39.50 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA(ACRES) = 39.5 PEAK FLOW RATE(CFS) = 153.13

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 27.85  
 FLOW VELOCITY(FEET/SEC.) = 10.75 DEPTH\*VELOCITY(FT\*FT/SEC.) = 7.10  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1372.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 113.00 TO NODE 126.00 IS CODE = 31

-----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
 ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 438.00  
 FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.50  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 153.13  
 PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 8.82  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 1872.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

-----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 8.82  
 RAINFALL INTENSITY(INCH/HR) = 4.22  
 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.23  
 EFFECTIVE STREAM AREA(ACRES) = 39.50  
 TOTAL STREAM AREA(ACRES) = 39.50  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 153.13

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	233.72	11.33	3.522	0.30( 0.16)	0.55	77.4	100.00
1	212.36	15.27	2.877	0.30( 0.18)	0.60	87.5	130.00
2	153.13	8.82	4.225	0.30( 0.07)	0.23	39.5	110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	373.32	8.82	4.225	0.30 ( 0.13)	0.42	99.8	110.00
2	360.95	11.33	3.522	0.30 ( 0.13)	0.44	116.9	100.00
3	315.83	15.27	2.877	0.30 ( 0.15)	0.48	127.0	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 373.32 Tc(MIN.) = 8.82  
EFFECTIVE AREA(ACRES) = 99.75 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 127.0  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 435.00  
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.24  
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 373.32  
PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 9.13  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.13

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.101

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	5.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.366

SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 28.02

EFFECTIVE AREA(ACRES) = 107.55 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 134.8 PEAK FLOW RATE(CFS) = 384.84

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.13

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.101

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	1.50	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519

SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 17.40

EFFECTIVE AREA(ACRES) = 112.45 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 139.7 PEAK FLOW RATE(CFS) = 402.23

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	402.23	9.13	4.101	0.30 ( 0.13)	0.42	112.5	110.00
2	389.18	11.64	3.469	0.30 ( 0.13)	0.44	129.6	100.00
3	339.56	15.59	2.844	0.30 ( 0.14)	0.48	139.7	130.00

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	208.10	12.78	3.277	0.30 ( 0.09)	0.29	71.2	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	589.23	9.13	4.101	0.30 ( 0.11)	0.38	163.3	110.00
2	590.10	11.64	3.469	0.30 ( 0.12)	0.39	194.4	100.00
3	582.95	12.78	3.277	0.30 ( 0.12)	0.39	203.7	100.00
4	519.41	15.59	2.844	0.30 ( 0.12)	0.42	210.9	130.00

TOTAL AREA(ACRES) = 210.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 590.10 Tc(MIN.) = 11.640

EFFECTIVE AREA(ACRES) = 194.39 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39

TOTAL AREA(ACRES) = 210.9

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.10 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 500.20 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 47.69
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 590.10
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 11.81
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.10 = 4750.20 FEET.

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FLOW PROCESS FROM NODE 127.10 TO NODE 127.20 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 353.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 595.30 CHANNEL SLOPE = 0.0218
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.243
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B       3.50    0.30    0.100   56
COMMERCIAL          B       0.10    0.30    0.100   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 595.31
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.50
AVERAGE FLOW DEPTH(FEET) = 1.33 TRAVEL TIME(MIN.) = 1.17
Tc(MIN.) = 12.98
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 10.41
EFFECTIVE AREA(ACRES) = 197.99 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 214.5 PEAK FLOW RATE(CFS) = 590.10
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.32 FLOW VELOCITY(FEET/SEC.) = 8.47
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.20 = 5345.50 FEET.

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FLOW PROCESS FROM NODE 127.20 TO NODE 127.30 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 340.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 476.00 CHANNEL SLOPE = 0.0273
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.097
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS

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LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B       3.10    0.30    0.100   56
COMMERCIAL          B       0.10    0.30    0.100   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 594.52
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.13
AVERAGE FLOW DEPTH(FEET) = 1.24 TRAVEL TIME(MIN.) = 0.87
Tc(MIN.) = 13.85
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 8.83
EFFECTIVE AREA(ACRES) = 201.19 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 217.7 PEAK FLOW RATE(CFS) = 590.10
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.24 FLOW VELOCITY(FEET/SEC.) = 9.08
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.30 = 5821.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.30 TO NODE 13569.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 338.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 506.00 CHANNEL SLOPE = 0.0040
CHANNEL BASE(FEET) = 150.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.768
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B       2.80    0.30    0.100   56
COMMERCIAL          B       0.60    0.30    0.100   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 594.29
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.38
AVERAGE FLOW DEPTH(FEET) = 1.15 TRAVEL TIME(MIN.) = 2.50
Tc(MIN.) = 16.35
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 8.38
EFFECTIVE AREA(ACRES) = 204.59 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 221.1 PEAK FLOW RATE(CFS) = 590.10
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.15 FLOW VELOCITY(FEET/SEC.) = 3.37
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 13569.00 = 6327.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 12
-----

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>>>>CLEAR MEMORY BANK # 1 <<<<
=====
END OF STUDY SUMMARY:

```

TOTAL AREA (ACRES) = 221.1 TC (MIN.) = 16.35  
 EFFECTIVE AREA (ACRES) = 204.59 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.375  
 PEAK FLOW RATE (CFS) = 590.10

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	589.23	13.84	3.099	0.30 ( 0.11)	0.36	173.5	110.00
2	590.10	16.35	2.768	0.30 ( 0.11)	0.38	204.6	100.00
3	582.95	17.51	2.651	0.30 ( 0.11)	0.38	213.9	100.00
4	519.41	20.54	2.367	0.30 ( 0.12)	0.40	221.1	130.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2012 Advanced Engineering Software (aes)  
Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 100-YR ULTIMATE EV DECEMBER 2013 MCHANDOO/TMULI \*  
\*\*\*\*\*

FILE NAME: 2P00EVBB.DAT  
TIME/DATE OF STUDY: 16:36 12/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.847
- 2) 10.00; 3.775
- 3) 15.00; 2.924
- 4) 20.00; 2.413
- 5) 25.00; 2.092
- 6) 30.00; 1.869
- 7) 40.00; 1.613
- 8) 50.00; 1.397
- 9) 60.00; 1.287
- 10) 90.00; 1.084
- 11) 120.00; 0.947
- 12) 180.00; 0.791
- 13) 360.00; 0.584
- 14) 1200.00; 0.255

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0313 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0313 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00  
ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 543.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.596  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.771  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.80	0.30	0.100	56	7.60

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 3.41  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 3.41

\*\*\*\*\*  
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 543.00 DOWNSTREAM ELEVATION(FEET) = 523.00  
STREET LENGTH(FEET) = 502.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.56  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.71  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.18  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.31  
STREET FLOW TRAVEL TIME(MIN.) = 2.00 Tc(MIN.) = 9.60  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.942

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.20	0.30	0.200	56
COMMERCIAL	B	1.30	0.30	0.100	56

NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.261  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 6.26  
 EFFECTIVE AREA(ACRES) = 2.60 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 9.08

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 9.12  
 FLOW VELOCITY(FEET/SEC.) = 4.44 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.51  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 810.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.60  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.942  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 1.40 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 4.93  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 14.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 523.00 DOWNSTREAM ELEVATION(FEET) = 468.00  
 STREET LENGTH(FEET) = 987.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.16  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.40  
 HALFSTREET FLOOD WIDTH(FEET) = 12.11  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.09  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.44  
 STREET FLOW TRAVEL TIME(MIN.) = 2.70 Tc(MIN.) = 12.30  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.384  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56  
 COMMERCIAL B 2.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.426  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 12.31  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 24.30

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 13.16  
 FLOW VELOCITY(FEET/SEC.) = 6.32 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.66  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 1797.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 468.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 28.34  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.43  
 HALFSTREET FLOOD WIDTH(FEET) = 14.88  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.52  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.79  
 STREET FLOW TRAVEL TIME(MIN.) = 2.50 Tc(MIN.) = 14.79  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.959  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.10 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 COMMERCIAL B 1.90 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.232  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 8.06  
EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 29.23

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 15.04  
FLOW VELOCITY(FEET/SEC.) = 6.60 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.85  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2774.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 14.79  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.959  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
NATURAL FAIR COVER  
"OPEN BRUSH" B 1.30 0.30 1.000 66  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 3.11  
EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 32.34

\*\*\*\*\*  
FLOW PROCESS FROM NODE 204.00 TO NODE 218.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

-----  
UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 343.00  
STREET LENGTH(FEET) = 1228.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 36.84  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.46  
HALFSTREET FLOOD WIDTH(FEET) = 16.84  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.76  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.13  
STREET FLOW TRAVEL TIME(MIN.) = 3.03 Tc(MIN.) = 17.82  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.636

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
COMMERCIAL B 0.50 0.30 0.100 56  
NATURAL FAIR COVER  
"OPEN BRUSH" B 0.40 0.30 1.000 66  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.70 0.30 0.500 56  
COMMERCIAL B 1.50 0.30 0.100 56  
NATURAL FAIR COVER  
"OPEN BRUSH" B 0.80 0.30 1.000 66  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.450  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 9.00  
EFFECTIVE AREA(ACRES) = 16.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA(ACRES) = 16.6 PEAK FLOW RATE(CFS) = 37.67

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 16.99  
FLOW VELOCITY(FEET/SEC.) = 6.80 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.17  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 17.82  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.636  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 1.20 0.30 0.500 56  
COMMERCIAL B 0.10 0.30 0.100 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
COMMERCIAL B 0.10 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.450  
SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 3.60  
EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 41.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 17.82  
RAINFALL INTENSITY(INCH/HR) = 2.64  
AREA-AVERAGED Fm(INCH/HR) = 0.12



AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.39  
EFFECTIVE STREAM AREA (ACRES) = 18.20  
TOTAL STREAM AREA (ACRES) = 18.20  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 41.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----

INITIAL SUBAREA FLOW-LENGTH (FEET) = 268.00  
ELEVATION DATA: UPSTREAM (FEET) = 514.00 DOWNSTREAM (FEET) = 511.50

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.724  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.718

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	B	2.30	0.30	0.500	56	9.27
APARTMENTS	B	0.40	0.30	0.200	56	7.72

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456

SUBAREA RUNOFF (CFS) = 11.13

TOTAL AREA (ACRES) = 2.70 PEAK FLOW RATE (CFS) = 11.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 511.50 DOWNSTREAM ELEVATION (FEET) = 503.00  
STREET LENGTH (FEET) = 503.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.13  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.48  
HALFSTREET FLOOD WIDTH (FEET) = 17.70  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.87  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.85  
STREET FLOW TRAVEL TIME (MIN.) = 2.17 Tc (MIN.) = 9.89  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.820

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL	AREA	Fp	Ap	SCS
-------------------------------	------	----	----	-----

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.20	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.475  
SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 23.83  
EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.14  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47  
TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 32.78

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.53 HALFSTREET FLOOD WIDTH (FEET) = 20.35  
FLOW VELOCITY (FEET/SEC.) = 4.21 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.21  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 771.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc (MIN.) = 9.89

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.820

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.281

SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 4.37

EFFECTIVE AREA (ACRES) = 11.20 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45

TOTAL AREA (ACRES) = 11.2 PEAK FLOW RATE (CFS) = 37.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 503.00 DOWNSTREAM ELEVATION (FEET) = 476.00  
STREET LENGTH (FEET) = 423.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 39.04  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.46  
HALFSTREET FLOOD WIDTH(FEET) = 16.68  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.29  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.36  
STREET FLOW TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 10.86  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.629

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 1.00 0.30 0.500 56  
COMMERCIAL B 0.10 0.30 0.100 56  
CONDOMINIUMS B 0.10 0.30 0.350 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.454  
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 3.77  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 39.00

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.68  
FLOW VELOCITY(FEET/SEC.) = 7.28 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.35  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 10.86  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.629  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.50 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
COMMERCIAL B 0.30 0.30 0.100 56  
CONDOMINIUMS B 3.30 0.30 0.350 56  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.332  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 15.56  
EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 54.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 10.86  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.629  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 3.40 0.30 0.100 56  
CONDOMINIUMS B 8.10 0.30 0.350 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.276  
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 36.70  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 91.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 476.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
STREET LENGTH(FEET) = 789.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 91.26  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.69  
HALFSTREET FLOOD WIDTH(FEET) = 30.33  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.78  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.97  
STREET FLOW TRAVEL TIME(MIN.) = 2.27 Tc(MIN.) = 13.13  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.242  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 91.26  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.69 HALFSTREET FLOOD WIDTH(FEET) = 30.33  
FLOW VELOCITY(FEET/SEC.) = 5.78 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.97  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1983.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.13  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.242  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	8.00	0.30	0.500	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	6.40	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 40.07  
 EFFECTIVE AREA(ACRES) = 43.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
 TOTAL AREA(ACRES) = 43.2 PEAK FLOW RATE(CFS) = 121.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 460.00 DOWNSTREAM ELEVATION(FEET) = 419.00  
STREET LENGTH(FEET) = 529.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 126.61  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.62  
 HALFSTREET FLOOD WIDTH(FEET) = 25.74  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.36  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.45  
 STREET FLOW TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 13.98  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.097  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	1.20	0.30	0.500	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	2.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 10.61  
 EFFECTIVE AREA(ACRES) = 47.20 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 47.2 PEAK FLOW RATE(CFS) = 126.28

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 25.66  
FLOW VELOCITY(FEET/SEC.) = 10.39 DEPTH\*VELOCITY(FT\*FT/SEC.) = 6.45  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 2512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.98  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.097  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	0.70	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 14.85  
 EFFECTIVE AREA(ACRES) = 52.80 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
 TOTAL AREA(ACRES) = 52.8 PEAK FLOW RATE(CFS) = 141.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.98  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.097  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	0.90	0.30	0.500	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	2.50	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 19.89  
 EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 161.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 419.00 DOWNSTREAM ELEVATION(FEET) = 405.00  
STREET LENGTH(FEET) = 174.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 161.02  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.66  
HALFSTREET FLOOD WIDTH(FEET) = 28.01  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 11.18  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 7.41  
STREET FLOW TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 14.24  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.053  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 161.02  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 28.01  
FLOW VELOCITY(FEET/SEC.) = 11.18 DEPTH\*VELOCITY(FT\*FT/SEC.) = 7.41  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 2686.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 372.00  
FLOW LENGTH(FEET) = 395.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.20  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 161.02  
PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 14.47  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 3081.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.47  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.014  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500					
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 5.67					
EFFECTIVE AREA(ACRES) = 62.50 AREA-AVERAGED Fm(INCH/HR) = 0.13					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44					
TOTAL AREA(ACRES) = 62.5 PEAK FLOW RATE(CFS) = 162.22					

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.47  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.014  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 3.50 0.30 0.500 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 6.90 0.30 0.500 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 27.33  
EFFECTIVE AREA(ACRES) = 73.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 73.1 PEAK FLOW RATE(CFS) = 189.54

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 343.00  
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.57  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 189.54  
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 14.88  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 3688.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.88

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.944  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.443  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.77  
 EFFECTIVE AREA (ACRES) = 73.80 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 73.8 PEAK FLOW RATE (CFS) = 189.54  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
 -----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 14.88  
 RAINFALL INTENSITY (INCH/HR) = 2.94  
 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.44  
 EFFECTIVE STREAM AREA (ACRES) = 73.80  
 TOTAL STREAM AREA (ACRES) = 73.80  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 189.54

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	41.28	17.82	2.636	0.30 ( 0.12)	0.39	18.2	200.00
2	189.54	14.88	2.944	0.30 ( 0.13)	0.44	73.8	210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	228.23	14.88	2.944	0.30 ( 0.13)	0.43	89.0	210.00
2	210.00	17.82	2.636	0.30 ( 0.13)	0.43	92.0	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 228.23 Tc (MIN.) = 14.88  
 EFFECTIVE AREA (ACRES) = 89.00 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA (ACRES) = 92.0  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 343.00 DOWNSTREAM (FEET) = 326.50  
 FLOW LENGTH (FEET) = 734.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 39.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 19.26  
 ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 228.23  
 PIPE TRAVEL TIME (MIN.) = 0.64 Tc (MIN.) = 15.52  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 219.00 = 4736.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 15.52  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.871  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56  
 COMMERCIAL  
 B 0.60 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.70 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.90 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 7.06  
 EFFECTIVE AREA (ACRES) = 91.90 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 94.9 PEAK FLOW RATE (CFS) = 228.23  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 15.52  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.871  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL  
 B 0.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 1.49  
 EFFECTIVE AREA (ACRES) = 92.50 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA (ACRES) = 95.5 PEAK FLOW RATE (CFS) = 228.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 326.50 DOWNSTREAM(FEET) = 325.00  
FLOW LENGTH(FEET) = 161.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 60.0 INCH PIPE IS 47.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.83  
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 228.23  
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 15.71  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 220.00 = 4897.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.71  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.852  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 4.90 0.30 0.500 56  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 3.60 0.30 0.400 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 18.40 0.30 0.500 56  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 4.30 0.30 0.400 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 6.90 0.30 0.400 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462  
SUBAREA AREA(ACRES) = 38.60 SUBAREA RUNOFF(CFS) = 94.25  
EFFECTIVE AREA(ACRES) = 131.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 134.1 PEAK FLOW RATE(CFS) = 320.69

\*\*\*\*\*  
FLOW PROCESS FROM NODE 220.00 TO NODE 245.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 315.00  
FLOW LENGTH(FEET) = 1019.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 69.0 INCH PIPE IS 51.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.49

ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 320.69  
PIPE TRAVEL TIME(MIN.) = 1.10 Tc(MIN.) = 16.81  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.81  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.739  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56  
COMMERCIAL B 0.40 0.30 0.100 56  
NATURAL FAIR COVER  
"OPEN BRUSH" B 0.30 0.30 1.000 66  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56  
COMMERCIAL B 0.40 0.30 0.100 56  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379  
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 6.85  
EFFECTIVE AREA(ACRES) = 134.00 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 137.0 PEAK FLOW RATE(CFS) = 320.69  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.81  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.739  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.90 0.30 0.100 56  
NATURAL FAIR COVER  
"OPEN BRUSH" B 0.20 0.30 1.000 66  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.264  
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 2.63  
EFFECTIVE AREA(ACRES) = 135.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 138.1 PEAK FLOW RATE(CFS) = 320.69  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN.) = 16.81
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.739
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"   B       1.10     0.30     0.500     56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B       0.30     0.30     0.400     56
COMMERCIAL             B       0.10     0.30     0.100     56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"   B       0.30     0.30     0.500     56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B       1.40     0.30     0.400     56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.434
SUBAREA AREA(ACRES) = 3.20      SUBAREA RUNOFF(CFS) = 7.51
EFFECTIVE AREA(ACRES) = 138.30  AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 141.3      PEAK FLOW RATE(CFS) = 324.47

*****
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<
=====
*****
FLOW PROCESS FROM NODE 220.50 TO NODE 221.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 251.00
ELEVATION DATA: UPSTREAM(FEET) = 551.00 DOWNSTREAM(FEET) = 547.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.785
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.864
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS  Tc
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE"     B       3.10     0.30     0.800     56   9.79
RESIDENTIAL
"1 DWELLING/ACRE"     B       3.10     0.30     0.800     56   9.79
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800
SUBAREA RUNOFF(CFS) = 20.22
TOTAL AREA(ACRES) = 6.20      PEAK FLOW RATE(CFS) = 20.22

*****
FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

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```

ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 542.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0130
CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.630
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B       0.60     0.30     0.200     56
APARTMENTS            B       0.10     0.30     0.200     56
COMMERCIAL             B       3.70     0.30     0.100     56
PUBLIC PARK            B       0.30     0.30     0.850     56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.163
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.79
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.04
AVERAGE FLOW DEPTH(FEET) = 0.42 TRAVEL TIME(MIN.) = 1.07
Tc(MIN.) = 10.85
SUBAREA AREA(ACRES) = 4.70      SUBAREA RUNOFF(CFS) = 15.15
EFFECTIVE AREA(ACRES) = 10.90  AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 10.9      PEAK FLOW RATE(CFS) = 34.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.48 FLOW VELOCITY(FEET/SEC.) = 6.42
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 222.00 = 637.00 FEET.

*****
FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 542.00 DOWNSTREAM ELEVATION(FEET) = 531.00
STREET LENGTH(FEET) = 1146.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 56.11
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.66
HALFSTREET FLOOD WIDTH(FEET) = 28.09
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.88
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.57
STREET FLOW TRAVEL TIME(MIN.) = 4.93 Tc(MIN.) = 15.78
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.844
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN

```

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 11.50 0.30 0.200 56  
 APARTMENTS B 2.90 0.30 0.200 56  
 COMMERCIAL B 0.70 0.30 0.100 56  
 PUBLIC PARK B 2.60 0.30 0.850 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.292  
 SUBAREA AREA(ACRES) = 17.70 SUBAREA RUNOFF(CFS) = 43.92  
 EFFECTIVE AREA(ACRES) = 28.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 28.6 PEAK FLOW RATE(CFS) = 70.28

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.71 HALFSTREET FLOOD WIDTH(FEET) = 32.04  
 FLOW VELOCITY(FEET/SEC.) = 4.11 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.91  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 223.00 = 1783.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 531.00 DOWNSTREAM ELEVATION(FEET) = 520.00  
 STREET LENGTH(FEET) = 702.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 84.09  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.70  
 HALFSTREET FLOOD WIDTH(FEET) = 31.36  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.13  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.57  
 STREET FLOW TRAVEL TIME(MIN.) = 2.28 Tc(MIN.) = 18.06  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.611

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.40	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
CONDOMINIUMS	B	0.70	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175  
 SUBAREA AREA(ACRES) = 12.00 SUBAREA RUNOFF(CFS) = 27.64  
 EFFECTIVE AREA(ACRES) = 40.60 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32  
 TOTAL AREA(ACRES) = 40.6 PEAK FLOW RATE(CFS) = 91.92

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.71 HALFSTREET FLOOD WIDTH(FEET) = 32.22  
 FLOW VELOCITY(FEET/SEC.) = 5.30 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.77  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 224.00 = 2485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 463.00  
 FLOW LENGTH(FEET) = 1760.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.93  
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 91.92  
 PIPE TRAVEL TIME(MIN.) = 1.64 Tc(MIN.) = 19.69  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 225.00 = 4245.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 19.69  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.444  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.20	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	0.30	0.30	0.350	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	2.00	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.235  
 SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 24.57  
 EFFECTIVE AREA(ACRES) = 52.10 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 52.1 PEAK FLOW RATE(CFS) = 110.37

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 19.69  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.444  
 SUBAREA LOSS RATE DATA(AMC II):



DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.40	0.30	0.500	56
CONDOMINIUMS	B	0.90	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	5.20	0.30	0.500	56
CONDOMINIUMS	B	0.80	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.481  
SUBAREA AREA (ACRES) = 13.30 SUBAREA RUNOFF (CFS) = 27.53  
EFFECTIVE AREA (ACRES) = 65.40 AREA-AVERAGED Fm (INCH/HR) = 0.10  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34  
TOTAL AREA (ACRES) = 65.4 PEAK FLOW RATE (CFS) = 137.90

\*\*\*\*\*  
FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 425.00  
FLOW LENGTH(FEET) = 639.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.68  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 137.90  
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 20.13  
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 226.00 = 4884.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 226.00 TO NODE 226.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 20.13  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.405  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.90	0.30	0.500	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.30	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.00	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
SUBAREA AREA (ACRES) = 18.10 SUBAREA RUNOFF (CFS) = 37.48  
EFFECTIVE AREA (ACRES) = 83.50 AREA-AVERAGED Fm (INCH/HR) = 0.10  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34  
TOTAL AREA (ACRES) = 83.5 PEAK FLOW RATE (CFS) = 173.07

\*\*\*\*\*  
FLOW PROCESS FROM NODE 226.00 TO NODE 243.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 394.00  
FLOW LENGTH(FEET) = 653.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.18  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 173.07  
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 20.58  
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 243.00 = 5537.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 20.58  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.376  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.60	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
SUBAREA AREA (ACRES) = 4.50 SUBAREA RUNOFF (CFS) = 9.25  
EFFECTIVE AREA (ACRES) = 88.00 AREA-AVERAGED Fm (INCH/HR) = 0.10  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34  
TOTAL AREA (ACRES) = 88.0 PEAK FLOW RATE (CFS) = 180.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 20.58  
RAINFALL INTENSITY(INCH/HR) = 2.38  
AREA-AVERAGED Fm (INCH/HR) = 0.10  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.34  
EFFECTIVE STREAM AREA (ACRES) = 88.00  
TOTAL STREAM AREA (ACRES) = 88.00  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 180.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 547.50

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.751  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.293  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
APARTMENTS	B	0.60	0.30	0.200	56	8.75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 2.29  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 2.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 547.50 DOWNSTREAM(FEET) = 541.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 802.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 3.00  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.566  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.20	0.30	0.200	56
COMMERCIAL	B	5.90	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.04  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.40  
 AVERAGE FLOW DEPTH(FEET) = 1.06 TRAVEL TIME(MIN.) = 2.48  
 Tc(MIN.) = 11.23  
 SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 19.41  
 EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 21.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.31 FLOW VELOCITY(FEET/SEC.) = 6.23  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1132.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 541.00 DOWNSTREAM(FEET) = 533.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 849.00 CHANNEL SLOPE = 0.0094  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	14.90	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.98  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.87  
 AVERAGE FLOW DEPTH(FEET) = 1.65 TRAVEL TIME(MIN.) = 1.80  
 Tc(MIN.) = 13.02  
 SUBAREA AREA(ACRES) = 14.90 SUBAREA RUNOFF(CFS) = 43.32  
 EFFECTIVE AREA(ACRES) = 21.60 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 21.6 PEAK FLOW RATE(CFS) = 62.77

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.90 FLOW VELOCITY(FEET/SEC.) = 8.65  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1981.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 13.02  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.10	0.30	0.400	56
APARTMENTS	B	0.20	0.30	0.200	56
COMMERCIAL	B	1.80	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124  
 SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 6.09  
 EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 68.86

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 13.02  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.10	0.30	0.400	56
COMMERCIAL	B	1.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.117  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.22  
 EFFECTIVE AREA(ACRES) = 25.50 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 25.5 PEAK FLOW RATE(CFS) = 74.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 537.00 DOWNSTREAM(FEET) = 510.00
FLOW LENGTH(FEET) = 513.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.33
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 74.09
PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 13.45
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2494.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.45
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.189
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 9.40 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 25.96
EFFECTIVE AREA(ACRES) = 34.90 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 34.9 PEAK FLOW RATE(CFS) = 98.41

\*\*\*\*\*
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.45
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.189
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.70 0.30 0.200 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 2.50 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 8.88
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 107.28

\*\*\*\*\*
FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 478.00
FLOW LENGTH(FEET) = 474.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.51
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 107.28
PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 13.77
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 2968.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.77
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.134
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.70 0.30 0.200 -
USER-DEFINED - 1.60 0.30 0.400 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 9.04
EFFECTIVE AREA(ACRES) = 41.40 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21
TOTAL AREA(ACRES) = 41.4 PEAK FLOW RATE(CFS) = 114.44

\*\*\*\*\*
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 478.00 DOWNSTREAM(FEET) = 471.00
FLOW LENGTH(FEET) = 473.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.76
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 114.44
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 14.34
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 3441.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.34
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.036
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.40 0.30 0.200 56
RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 7.10 0.30 0.400 56  
 APARTMENTS B 2.70 0.30 0.200 56  
 COMMERCIAL B 1.10 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
 SUBAREA AREA (ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 32.59  
 EFFECTIVE AREA(ACRES) = 53.70 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA (ACRES) = 53.7 PEAK FLOW RATE(CFS) = 143.40

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.34  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.036  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.90 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 5.40 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
 COMMERCIAL B 0.60 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.378  
 SUBAREA AREA (ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 26.04  
 EFFECTIVE AREA(ACRES) = 63.60 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA (ACRES) = 63.6 PEAK FLOW RATE(CFS) = 169.45

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 471.00 DOWNSTREAM(FEET) = 468.00  
 FLOW LENGTH(FEET) = 283.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.63  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 169.45  
 PIPE TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 14.69  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 237.00 = 3724.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.69  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.977  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 6.10 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.60 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.218  
 SUBAREA AREA (ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 17.56  
 EFFECTIVE AREA(ACRES) = 70.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA (ACRES) = 70.3 PEAK FLOW RATE(CFS) = 183.63

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 468.00 DOWNSTREAM(FEET) = 461.00  
 FLOW LENGTH(FEET) = 698.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.39  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 183.63  
 PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 15.56  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 238.00 = 4422.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.56  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.867  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 8.40 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.220  
 SUBAREA AREA (ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 22.69  
 EFFECTIVE AREA(ACRES) = 79.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA (ACRES) = 79.3 PEAK FLOW RATE(CFS) = 199.36

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.56  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.867  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.10 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 5.31  
 EFFECTIVE AREA (ACRES) = 81.40 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA (ACRES) = 81.4 PEAK FLOW RATE (CFS) = 204.66

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 461.00 DOWNSTREAM(FEET) = 440.00  
 FLOW LENGTH(FEET) = 582.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.6 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 22.43  
 ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 204.66  
 PIPE TRAVEL TIME (MIN.) = 0.43 Tc (MIN.) = 15.99  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 5004.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc (MIN.) = 15.99  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.823  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 5.00 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 12.43  
 EFFECTIVE AREA (ACRES) = 86.40 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 86.4 PEAK FLOW RATE (CFS) = 213.86

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 418.00  
 FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.1 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 22.41  
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 213.86  
 PIPE TRAVEL TIME (MIN.) = 0.48 Tc (MIN.) = 16.47  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 5654.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc (MIN.) = 16.47  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.774  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 5.30 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA (ACRES) = 5.30 SUBAREA RUNOFF (CFS) = 12.94  
 EFFECTIVE AREA (ACRES) = 91.70 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 222.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.47  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.774  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 1.20 0.30 0.200 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186  
 SUBAREA AREA (ACRES) = 1.40 SUBAREA RUNOFF (CFS) = 3.42  
 EFFECTIVE AREA (ACRES) = 93.10 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 93.1 PEAK FLOW RATE (CFS) = 226.39

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.47  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.774  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 1.20 0.30 0.200 56  
 SCHOOL B 0.70 0.30 0.600 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347  
 SUBAREA AREA (ACRES) = 1.90 SUBAREA RUNOFF (CFS) = 4.56  
 EFFECTIVE AREA (ACRES) = 95.00 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 95.0 PEAK FLOW RATE (CFS) = 230.95

\*\*\*\*\*

FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 418.00 DOWNSTREAM(FEET) = 404.00
FLOW LENGTH(FEET) = 1279.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 44.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.88
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 230.95
PIPE TRAVEL TIME(MIN.) = 1.43 Tc(MIN.) = 17.90
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 241.00 = 6933.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.90

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.627

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Residential, Commercial, Public Park, School, and another Residential entry.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 18.80 SUBAREA RUNOFF(CFS) = 41.98
EFFECTIVE AREA(ACRES) = 113.80 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 113.8 PEAK FLOW RATE(CFS) = 260.41

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.90

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.627

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Public Park and School.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.666
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 32.11
EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33

TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 292.53

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 403.00
FLOW LENGTH(FEET) = 66.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 47.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.64
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 292.53
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 17.97
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 6999.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.97

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.621

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Residential, Commercial, and another Residential entry.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.193
SUBAREA AREA(ACRES) = 19.10 SUBAREA RUNOFF(CFS) = 44.06
EFFECTIVE AREA(ACRES) = 147.60 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 147.6 PEAK FLOW RATE(CFS) = 335.85

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 1270.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 72.0 INCH PIPE IS 58.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.64
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 335.85
PIPE TRAVEL TIME(MIN.) = 1.55 Tc(MIN.) = 19.52
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

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FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 19.52
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.462
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B        1.00   0.30   0.200  56
PUBLIC PARK          B        2.00   0.30   0.850  56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B        2.80   0.30   0.200  56
COMMERCIAL           B        1.50   0.30   0.100  56
CONDOMINIUMS        B        0.10   0.30   0.350  56
PUBLIC PARK          B        1.10   0.30   0.850  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.421
SUBAREA AREA(ACRES) = 8.50   SUBAREA RUNOFF(CFS) = 17.87
EFFECTIVE AREA(ACRES) = 156.10   AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 156.1   PEAK FLOW RATE(CFS) = 335.85
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 19.52
RAINFALL INTENSITY(INCH/HR) = 2.46
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA(ACRES) = 156.10
TOTAL STREAM AREA(ACRES) = 156.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 335.85

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\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	180.15	20.58	2.376	0.30( 0.10)	0.34	88.0	220.50
2	335.85	19.52	2.462	0.30( 0.09)	0.32	156.1	230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	513.21	19.52	2.462	0.30( 0.10)	0.32	239.6	230.00
2	503.76	20.58	2.376	0.30( 0.10)	0.32	244.1	220.50

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

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PEAK FLOW RATE(CFS) = 513.21   Tc(MIN.) = 19.52
EFFECTIVE AREA(ACRES) = 239.58   AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.32

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TOTAL AREA(ACRES) = 244.1
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 244.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 394.00   DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 849.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 44.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 34.88
ESTIMATED PIPE DIAMETER(INCH) = 57.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 513.21
PIPE TRAVEL TIME(MIN.) = 0.41   Tc(MIN.) = 19.92
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 244.00 = 9118.00 FEET.

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FLOW PROCESS FROM NODE 244.00 TO NODE 244.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 19.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.421
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B        0.10   0.30   0.200  56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B        1.70   0.30   0.500  56
PUBLIC PARK          B        0.30   0.30   0.850  56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B        0.80   0.30   0.500  56
PUBLIC PARK          B        0.10   0.30   0.850  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.537
SUBAREA AREA(ACRES) = 3.00   SUBAREA RUNOFF(CFS) = 6.10
EFFECTIVE AREA(ACRES) = 242.58   AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 247.1   PEAK FLOW RATE(CFS) = 513.21
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 244.00 TO NODE 245.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 340.00   DOWNSTREAM(FEET) = 315.00
FLOW LENGTH(FEET) = 777.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 48.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.21
ESTIMATED PIPE DIAMETER(INCH) = 66.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 513.21
PIPE TRAVEL TIME(MIN.) = 0.48   Tc(MIN.) = 20.40
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

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FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.40

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.387

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56

PUBLIC PARK B 0.20 0.30 0.850 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56

PUBLIC PARK B 0.10 0.30 0.850 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631

SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 1.58

EFFECTIVE AREA(ACRES) = 243.38 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33

TOTAL AREA(ACRES) = 247.9 PEAK FLOW RATE(CFS) = 513.21

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1 513.21 20.40 2.387 0.30( 0.10) 0.33 243.4 230.00

2 503.76 21.47 2.319 0.30( 0.10) 0.33 247.9 220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1 324.47 16.81 2.739 0.30( 0.13) 0.44 138.3 210.00

2 292.84 19.79 2.435 0.30( 0.13) 0.44 141.3 200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1 812.29 16.81 2.739 0.30( 0.11) 0.37 338.8 210.00

2 800.94 19.79 2.435 0.30( 0.11) 0.37 377.3 200.00

3 800.00 20.40 2.387 0.30( 0.11) 0.37 384.7 230.00

4 781.81 21.47 2.319 0.30( 0.11) 0.37 389.2 220.50

TOTAL AREA(ACRES) = 389.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 812.29 Tc(MIN.) = 16.806

EFFECTIVE AREA(ACRES) = 338.80 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 389.2

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

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FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 3 <<<<

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FLOW PROCESS FROM NODE 245.00 TO NODE 246.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 306.00

FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 90.0 INCH PIPE IS 68.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 22.57

ESTIMATED PIPE DIAMETER(INCH) = 90.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 812.29

PIPE TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 17.26

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 246.00 = 10514.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.26

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.693

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.90 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.50 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56

CONDOMINIUMS B 9.10 0.30 0.350 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.80 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.410

SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 37.70

EFFECTIVE AREA(ACRES) = 355.10 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38

TOTAL AREA(ACRES) = 405.5 PEAK FLOW RATE(CFS) = 824.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.26



\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.693  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.60 0.30 0.400 56  
 CONDOMINIUMS B 7.40 0.30 0.350 56  
 PUBLIC PARK B 0.30 0.30 0.850 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.375  
 SUBAREA AREA (ACRES) = 9.30 SUBAREA RUNOFF (CFS) = 21.60  
 EFFECTIVE AREA (ACRES) = 364.40 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 414.8 PEAK FLOW RATE (CFS) = 846.16

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 FLOW PROCESS FROM NODE 246.00 TO NODE 247.00 IS CODE = 31  
 -----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 306.00 DOWNSTREAM (FEET) = 300.00  
 FLOW LENGTH (FEET) = 185.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 78.0 INCH PIPE IS 60.4 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 30.70  
 ESTIMATED PIPE DIAMETER (INCH) = 78.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 846.16  
 PIPE TRAVEL TIME (MIN.) = 0.10 Tc (MIN.) = 17.36  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 247.00 = 10699.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81  
 -----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 17.36  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.682  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 COMMERCIAL B 0.30 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 PUBLIC PARK B 0.10 0.30 0.850 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.30 0.30 0.400 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.413  
 SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 4.61  
 EFFECTIVE AREA (ACRES) = 366.40 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 416.8 PEAK FLOW RATE (CFS) = 847.40

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FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81  
 -----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 17.36  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.682  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.90 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.40 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.80 0.30 0.400 56  
 COMMERCIAL B 0.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.365  
 SUBAREA AREA (ACRES) = 2.60 SUBAREA RUNOFF (CFS) = 6.02  
 EFFECTIVE AREA (ACRES) = 369.00 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 419.4 PEAK FLOW RATE (CFS) = 853.43

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 FLOW PROCESS FROM NODE 247.00 TO NODE 248.00 IS CODE = 31  
 -----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 300.00 DOWNSTREAM (FEET) = 271.00  
 FLOW LENGTH (FEET) = 859.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 78.0 INCH PIPE IS 59.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 31.29  
 ESTIMATED PIPE DIAMETER (INCH) = 78.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 853.43  
 PIPE TRAVEL TIME (MIN.) = 0.46 Tc (MIN.) = 17.82  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

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 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 17.82  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.636  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.60 0.30 0.400 56  
 COMMERCIAL B 0.30 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 2.60 0.30 0.400 56  
 COMMERCIAL B 1.00 0.30 0.100 56  
 NATURAL FAIR COVER

"OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356  
 SUBAREA AREA (ACRES) = 4.80 SUBAREA RUNOFF (CFS) = 10.92  
 EFFECTIVE AREA (ACRES) = 373.80 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 424.2 PEAK FLOW RATE (CFS) = 853.43  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.82

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.636

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					

"8-10 DWELLINGS/ACRE"	B	0.50	0.30	0.400	56
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COMMERCIAL	B	0.30	0.30	0.100	56
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NATURAL FAIR COVER					
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"OPEN BRUSH"	B	0.10	0.30	1.000	66
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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367

SUBAREA AREA (ACRES) = 0.90 SUBAREA RUNOFF (CFS) = 2.05

EFFECTIVE AREA (ACRES) = 374.70 AREA-AVERAGED Fm (INCH/HR) = 0.11

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38

TOTAL AREA (ACRES) = 425.1 PEAK FLOW RATE (CFS) = 853.43

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.82

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.636

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					

"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
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RESIDENTIAL					
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"8-10 DWELLINGS/ACRE"	B	0.70	0.30	0.400	56
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RESIDENTIAL					
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"5-7 DWELLINGS/ACRE"	B	2.20	0.30	0.500	56
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RESIDENTIAL					
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"8-10 DWELLINGS/ACRE"	B	1.80	0.30	0.400	56
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CONDOMINIUMS	B	0.20	0.30	0.350	56
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RESIDENTIAL					
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"5-7 DWELLINGS/ACRE"	B	3.20	0.30	0.500	56
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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.466

SUBAREA AREA (ACRES) = 8.20 SUBAREA RUNOFF (CFS) = 18.42

EFFECTIVE AREA (ACRES) = 382.90 AREA-AVERAGED Fm (INCH/HR) = 0.11

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38

TOTAL AREA (ACRES) = 433.3 PEAK FLOW RATE (CFS) = 869.29

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FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.82

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.636

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					

"8-10 DWELLINGS/ACRE"	B	5.70	0.30	0.400	56
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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400

SUBAREA AREA (ACRES) = 5.70 SUBAREA RUNOFF (CFS) = 12.91

EFFECTIVE AREA (ACRES) = 388.60 AREA-AVERAGED Fm (INCH/HR) = 0.11

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38

TOTAL AREA (ACRES) = 439.0 PEAK FLOW RATE (CFS) = 882.19

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FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.82

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.636

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					

"OPEN BRUSH"	B	6.40	0.30	1.000	66
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NATURAL FAIR COVER					
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"OPEN BRUSH"	B	1.40	0.30	1.000	66
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NATURAL FAIR COVER					
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"OPEN BRUSH"	B	0.60	0.30	1.000	66
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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 17.66

EFFECTIVE AREA (ACRES) = 397.00 AREA-AVERAGED Fm (INCH/HR) = 0.12

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39

TOTAL AREA (ACRES) = 447.4 PEAK FLOW RATE (CFS) = 899.85

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FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

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FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00

ELEVATION DATA: UPSTREAM (FEET) = 413.04 DOWNSTREAM (FEET) = 405.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.928  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 5.048  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
CONDOMINIUMS RESIDENTIAL	B	0.20	0.30	0.350	56	7.70
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56	6.93
CONDOMINIUMS	B	0.10	0.30	0.350	56	7.70

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.312  
 SUBAREA RUNOFF(CFS) = 1.78  
 TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.78

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62  
 -----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 -----  
 UPSTREAM ELEVATION(FEET) = 405.00 DOWNSTREAM ELEVATION(FEET) = 385.00  
 STREET LENGTH(FEET) = 587.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.59  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.32  
 HALFSTREET FLOOD WIDTH(FEET) = 8.66  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.82  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.21  
 STREET FLOW TRAVEL TIME(MIN.) = 2.56 Tc(MIN.) = 9.49  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.987  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.20	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.224  
 SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 9.52  
 EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24

TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 10.93

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.05  
 FLOW VELOCITY(FEET/SEC.) = 4.25 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.53  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 917.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31  
 -----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 385.00 DOWNSTREAM(FEET) = 378.50  
 FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.55  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 10.93  
 PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 9.72  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1079.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----  
 MAINLINE Tc(MIN.) = 9.72  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.890  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56
COMMERCIAL	B	1.30	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 8.34  
 EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
 TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 18.99

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 378.50 DOWNSTREAM(FEET) = 348.50  
 FLOW LENGTH(FEET) = 637.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.81  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 18.99  
 PIPE TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 10.49  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 1716.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.49  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.691  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.60	0.30	0.500	56
COMMERCIAL	B	1.70	0.30	0.100	56
CONDOMINIUMS	B	1.00	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
COMMERCIAL	B	0.70	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.240  
 SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 14.66  
 EFFECTIVE AREA(ACRES) = 10.00 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 10.0 PEAK FLOW RATE(CFS) = 32.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 304.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 348.50 DOWNSTREAM(FEET) = 306.00  
 FLOW LENGTH(FEET) = 944.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.76  
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 32.67  
 PIPE TRAVEL TIME(MIN.) = 1.00 Tc(MIN.) = 11.49  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.49  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.521  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.20	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.50	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.90	0.30	0.400	56

COMMERCIAL B 2.00 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
 SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 22.45  
 EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.27  
 TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 53.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.49  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.521  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	4.40	0.30	0.200	56
COMMERCIAL	B	0.10	0.30	0.100	56
APARTMENTS	B	6.70	0.30	0.200	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.199  
 SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 34.89  
 EFFECTIVE AREA(ACRES) = 28.50 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 28.5 PEAK FLOW RATE(CFS) = 88.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.49  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.521  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 8.99  
 EFFECTIVE AREA(ACRES) = 31.60 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 97.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 11.49  
 RAINFALL INTENSITY(INCH/HR) = 3.52  
 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.31  
EFFECTIVE STREAM AREA (ACRES) = 31.60  
TOTAL STREAM AREA (ACRES) = 31.60  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 97.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 400.00 TO NODE 420.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 300.40  
ELEVATION DATA: UPSTREAM (FEET) = 312.80 DOWNSTREAM (FEET) = 310.80

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.115  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.556  
SUBAREA Tc AND LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL B 0.50 0.30 0.100 56 8.11  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF (CFS) = 2.04  
TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 2.04

\*\*\*\*\*  
FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 310.80 DOWNSTREAM ELEVATION (FEET) = 307.00  
STREET LENGTH (FEET) = 266.50 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 67.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 62.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.07  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.35  
HALFSTREET FLOOD WIDTH (FEET) = 10.66  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.65  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.91  
STREET FLOW TRAVEL TIME (MIN.) = 1.68 Tc (MIN.) = 9.79  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.860

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.60 0.30 0.100 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 2.07  
EFFECTIVE AREA (ACRES) = 1.10 AREA-AVERAGED Fm (INCH/HR) = 0.03  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 3.79

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.36 HALFSTREET FLOOD WIDTH (FEET) = 11.75  
FLOW VELOCITY (FEET/SEC.) = 2.77 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.01  
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.00 = 566.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.00 TO NODE 421.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 307.00 DOWNSTREAM (FEET) = 305.50  
FLOW LENGTH (FEET) = 105.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.0 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.99  
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 3.79  
PIPE TRAVEL TIME (MIN.) = 0.29 Tc (MIN.) = 10.09  
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.10 = 671.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION (MIN.) = 10.09  
RAINFALL INTENSITY (INCH/HR) = 3.76  
AREA-AVERAGED Fm (INCH/HR) = 0.03  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA (ACRES) = 1.10  
TOTAL STREAM AREA (ACRES) = 1.10  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 3.79

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	97.47	11.49	3.521	0.30 (0.09)	0.31	31.6	300.00
2	3.79	10.09	3.760	0.30 (0.03)	0.10	1.1	400.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	95.32	10.09	3.760	0.30 (0.09)	0.31	28.8	400.00
2	101.02	11.49	3.521	0.30 (0.09)	0.31	32.7	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 101.02 Tc(MIN.) = 11.49
EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.7
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 421.10 TO NODE 426.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 305.50 DOWNSTREAM(FEET) = 301.00
FLOW LENGTH(FEET) = 261.40 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.12
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 101.02
PIPE TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 11.80
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.10 = 2921.40 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 426.10 TO NODE 426.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.80
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.469
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.60
EFFECTIVE AREA(ACRES) = 32.90 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.9 PEAK FLOW RATE(CFS) = 101.02
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 426.10 TO NODE 426.20 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 289.00
FLOW LENGTH(FEET) = 448.56 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.69
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 101.02
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 12.25
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.20 = 3369.96 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 426.20 TO NODE 426.20 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.25
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.393
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.47
EFFECTIVE AREA(ACRES) = 33.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 33.4 PEAK FLOW RATE(CFS) = 101.02
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 426.20 TO NODE 426.30 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 289.00 DOWNSTREAM(FEET) = 282.00
FLOW LENGTH(FEET) = 260.45 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.72
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 101.02
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 12.51
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.30 = 3630.41 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 426.30 TO NODE 426.30 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.51
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.349
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.80 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 3.20
EFFECTIVE AREA(ACRES) = 34.50 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 34.5 PEAK FLOW RATE(CFS) = 101.07

```

*****
FLOW PROCESS FROM NODE 426.30 TO NODE 248.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 271.00
FLOW LENGTH(FEET) = 411.44 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.68
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 101.07
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 12.92
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.
*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.92
RAINFALL INTENSITY(INCH/HR) = 3.28
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 34.50
TOTAL STREAM AREA(ACRES) = 34.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 101.07
*****
FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 233.60
ELEVATION DATA: UPSTREAM(FEET) = 306.50 DOWNSTREAM(FEET) = 301.80

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.882
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 5.481
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.20 0.30 0.100 56 5.88
COMMERCIAL B 0.20 0.30 0.100 56 5.88
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 1.96
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.96
*****
FLOW PROCESS FROM NODE 426.00 TO NODE 427.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====

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=====
UPSTREAM ELEVATION(FEET) = 301.80 DOWNSTREAM ELEVATION(FEET) = 294.00
STREET LENGTH(FEET) = 478.70 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.32
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.35
HALFSTREET FLOOD WIDTH(FEET) = 10.73
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.83
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.98
STREET FLOW TRAVEL TIME(MIN.) = 2.82 Tc(MIN.) = 8.70
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.313
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.20 0.30 0.100 56
COMMERCIAL B 0.50 0.30 0.100 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 2.70
EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 4.24

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 12.02
FLOW VELOCITY(FEET/SEC.) = 2.98 DEPTH*VELOCITY(FT*FT/SEC.) = 1.10
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 427.00 = 712.30 FEET.
*****
FLOW PROCESS FROM NODE 427.00 TO NODE 428.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 294.00 DOWNSTREAM ELEVATION(FEET) = 286.00
STREET LENGTH(FEET) = 300.80 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      5.08
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.36
HALFSTREET FLOOD WIDTH(FEET) = 11.71
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.73
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.36
STREET FLOW TRAVEL TIME(MIN.) = 1.34  Tc(MIN.) = 10.05
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.767
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
COMMERCIAL          B      0.10     0.30     0.100   56
COMMERCIAL          B      0.40     0.30     0.100   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.50  SUBAREA RUNOFF(CFS) = 1.68
EFFECTIVE AREA(ACRES) = 1.60  AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.6  PEAK FLOW RATE(CFS) = 5.38

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37  HALFSTREET FLOOD WIDTH(FEET) = 11.93
FLOW VELOCITY(FEET/SEC.) = 3.83  DEPTH*VELOCITY(FT*FT/SEC.) = 1.41
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 428.00 = 1013.10 FEET.

*****
FLOW PROCESS FROM NODE 428.00 TO NODE 429.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 286.00  DOWNSTREAM ELEVATION(FEET) = 276.00
STREET LENGTH(FEET) = 242.40  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      6.03
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.36
HALFSTREET FLOOD WIDTH(FEET) = 11.39
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.64
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.66
STREET FLOW TRAVEL TIME(MIN.) = 0.87  Tc(MIN.) = 10.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.619
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
COMMERCIAL          B      0.40     0.30     0.100   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

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SUBAREA AREA(ACRES) = 0.40  SUBAREA RUNOFF(CFS) = 1.29
EFFECTIVE AREA(ACRES) = 2.00  AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 2.0  PEAK FLOW RATE(CFS) = 6.46

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37  HALFSTREET FLOOD WIDTH(FEET) = 11.82
FLOW VELOCITY(FEET/SEC.) = 4.67  DEPTH*VELOCITY(FT*FT/SEC.) = 1.71
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 429.00 = 1255.50 FEET.

*****
FLOW PROCESS FROM NODE 429.00 TO NODE 429.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 10.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.619
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE            GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B      0.50     0.30     0.400   56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B      1.50     0.30     0.400   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 2.00  SUBAREA RUNOFF(CFS) = 6.30
EFFECTIVE AREA(ACRES) = 4.00  AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 4.0  PEAK FLOW RATE(CFS) = 12.76

*****
FLOW PROCESS FROM NODE 429.00 TO NODE 248.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 276.00  DOWNSTREAM(FEET) = 273.00
FLOW LENGTH(FEET) = 100.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.69
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 12.76
PIPE TRAVEL TIME(MIN.) = 0.16  Tc(MIN.) = 11.07
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 248.00 = 1355.50 FEET.

*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 11.07
RAINFALL INTENSITY(INCH/HR) = 3.59
AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30

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AREA-AVERAGED Ap = 0.25  
 EFFECTIVE STREAM AREA(ACRES) = 4.00  
 TOTAL STREAM AREA(ACRES) = 4.00  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.76

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	96.33	11.52	3.516	0.30( 0.09)	0.31	30.6	400.00
1	101.07	12.92	3.279	0.30( 0.09)	0.31	34.5	300.00
2	12.76	11.07	3.593	0.30( 0.08)	0.25	4.0	425.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	107.41	11.07	3.593	0.30( 0.09)	0.30	33.4	425.00
2	108.81	11.52	3.516	0.30( 0.09)	0.30	34.6	400.00
3	112.69	12.92	3.279	0.30( 0.09)	0.31	38.5	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 112.69 Tc(MIN.) = 12.92  
 EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 38.5  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 11  
 -----  
 >>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
 =====

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	107.41	11.07	3.593	0.30( 0.09)	0.30	33.4	425.00
2	108.81	11.52	3.516	0.30( 0.09)	0.30	34.6	400.00
3	112.69	12.92	3.279	0.30( 0.09)	0.31	38.5	300.00

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	899.85	17.82	2.636	0.30( 0.12)	0.39	397.0	210.00
2	880.16	20.81	2.361	0.30( 0.12)	0.39	435.5	200.00
3	879.37	21.42	2.322	0.30( 0.12)	0.38	442.9	230.00
4	860.50	22.50	2.252	0.30( 0.12)	0.38	447.4	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	878.87	11.07	3.593	0.30( 0.11)	0.38	280.1	425.00
2	893.87	11.52	3.516	0.30( 0.11)	0.38	291.2	400.00
3	931.40	12.92	3.279	0.30( 0.11)	0.38	326.3	300.00

4	989.81	17.82	2.636	0.30( 0.11)	0.38	435.5	210.00
5	960.41	20.81	2.361	0.30( 0.11)	0.38	474.0	200.00
6	958.22	21.42	2.322	0.30( 0.11)	0.38	481.4	230.00
7	936.90	22.50	2.252	0.30( 0.11)	0.38	485.9	220.50

TOTAL AREA(ACRES) = 485.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 989.81 Tc(MIN.) = 17.821  
 EFFECTIVE AREA(ACRES) = 435.50 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 485.9  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 12  
 -----  
 >>>>CLEAR MEMORY BANK # 1<<<<<  
 =====

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 249.00 IS CODE = 31  
 -----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 261.00  
 FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 66.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 30.53  
 ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 989.81  
 PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 18.01  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 10  
 -----  
 >>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<  
 =====

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 429.00 TO NODE 430.00 IS CODE = 21  
 -----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 262.70

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.459  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 5.242  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.20	0.30	0.100	56	6.46
COMMERCIAL	B	0.40	0.30	0.100	56	6.46

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 2.81  
TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 2.81

\*\*\*\*\*  
FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 262.70 DOWNSTREAM ELEVATION(FEET) = 258.98  
STREET LENGTH(FEET) = 345.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.97

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 12.82  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.49  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.95  
STREET FLOW TRAVEL TIME(MIN.) = 2.31 Tc(MIN.) = 8.77

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.285

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 2.30  
EFFECTIVE AREA(ACRES) = 1.20 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 4.60

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 13.62  
FLOW VELOCITY(FEET/SEC.) = 2.59 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.03  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.00 = 675.60 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.00 TO NODE 431.10 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 258.98 DOWNSTREAM(FEET) = 258.00  
FLOW LENGTH(FEET) = 91.03 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 5.68  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 4.60  
PIPE TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 9.04  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.10 = 766.63 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 9.04  
RAINFALL INTENSITY(INCH/HR) = 4.17  
AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 1.20  
TOTAL STREAM AREA(ACRES) = 1.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 410.00 TO NODE 440.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 299.70  
ELEVATION DATA: UPSTREAM(FEET) = 312.69 DOWNSTREAM(FEET) = 310.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.196  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.523

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.40	0.30	0.100	56	8.20

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 1.62  
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.62

\*\*\*\*\*  
FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 306.50  
STREET LENGTH(FEET) = 299.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.29  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 9.24  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.48  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.80  
STREET FLOW TRAVEL TIME(MIN.) = 2.01 Tc(MIN.) = 10.20  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.740

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.10 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.34  
EFFECTIVE AREA(ACRES) = 0.80 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 2.67

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 10.00  
FLOW VELOCITY(FEET/SEC.) = 2.56 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.85  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 441.00 = 598.70 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 61  
-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 306.50 DOWNSTREAM ELEVATION(FEET) = 299.00  
STREET LENGTH(FEET) = 341.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.59  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 10.43  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.21  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.10  
STREET FLOW TRAVEL TIME(MIN.) = 1.78 Tc(MIN.) = 11.98  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.438  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.20 0.30 0.100 56  
COMMERCIAL B 0.40 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.84  
EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 4.29

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.33  
FLOW VELOCITY(FEET/SEC.) = 3.34 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.19  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 442.00 = 940.30 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 61  
-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 299.00 DOWNSTREAM ELEVATION(FEET) = 288.50  
STREET LENGTH(FEET) = 390.10 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.14  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 11.72  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.77  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.37  
STREET FLOW TRAVEL TIME(MIN.) = 1.73 Tc(MIN.) = 13.71  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.144  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.30 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.68  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 5.61

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 12.12  
FLOW VELOCITY(FEET/SEC.) = 3.88 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.44  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 443.00 = 1330.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 443.00 TO NODE 444.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 288.50 DOWNSTREAM ELEVATION(FEET) = 281.00
STREET LENGTH(FEET) = 272.60 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.13

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.38
HALFSTREET FLOOD WIDTH(FEET) = 12.62
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.96
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.50
STREET FLOW TRAVEL TIME(MIN.) = 1.15 Tc(MIN.) = 14.85
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.949

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.40 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.05
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 6.30

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.72
FLOW VELOCITY(FEET/SEC.) = 4.01 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.53
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 444.00 = 1603.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 444.00 TO NODE 445.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 281.00 DOWNSTREAM ELEVATION(FEET) = 268.10
STREET LENGTH(FEET) = 462.90 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.16

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.39
HALFSTREET FLOOD WIDTH(FEET) = 13.42
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.15
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.63
STREET FLOW TRAVEL TIME(MIN.) = 1.86 Tc(MIN.) = 16.71
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.749

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.70 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.71
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 7.59

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 13.82
FLOW VELOCITY(FEET/SEC.) = 4.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.67
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 445.00 = 2065.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 445.00 TO NODE 446.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 268.10 DOWNSTREAM ELEVATION(FEET) = 257.00
STREET LENGTH(FEET) = 532.90 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.70

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.43
HALFSTREET FLOOD WIDTH(FEET) = 15.58
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.85
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.65
STREET FLOW TRAVEL TIME(MIN.) = 2.31 Tc(MIN.) = 19.02
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.513

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.60	0.30	0.100	56
COMMERCIAL	B	0.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 2.23  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 9.16

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 15.90  
FLOW VELOCITY(FEET/SEC.) = 3.91 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.70  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 446.00 = 2598.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 446.00 TO NODE 431.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 257.00 DOWNSTREAM(FEET) = 256.50  
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.97  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 9.16  
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 19.35  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 19.35  
RAINFALL INTENSITY(INCH/HR) = 2.48  
AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 4.10  
TOTAL STREAM AREA(ACRES) = 4.10  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.16

\*\* CONFLUENCE DATA \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	4.60	9.04	4.174	0.30( 0.03)	0.10	1.2	429.00
2	9.16	19.35	2.479	0.30( 0.03)	0.10	4.1	410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	11.84	9.04	4.174	0.30( 0.03)	0.10	3.1	429.00
2	11.88	19.35	2.479	0.30( 0.03)	0.10	5.3	410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 11.88 Tc(MIN.) = 19.35  
EFFECTIVE AREA(ACRES) = 5.30 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 5.3  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 249.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 258.00 DOWNSTREAM(FEET) = 257.00  
FLOW LENGTH(FEET) = 230.42 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.04  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 11.88  
PIPE TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 20.12  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
=====

\*\* MAIN STREAM CONFLUENCE DATA \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	11.84	9.80	3.858	0.30( 0.03)	0.10	3.1	429.00
2	11.88	20.12	2.406	0.30( 0.03)	0.10	5.3	410.00

LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	878.87	11.26	3.560	0.30( 0.11)	0.38	280.1	425.00
2	893.87	11.71	3.484	0.30( 0.11)	0.38	291.2	400.00
3	931.40	13.11	3.246	0.30( 0.11)	0.38	326.3	300.00
4	989.81	18.01	2.616	0.30( 0.11)	0.38	435.5	210.00
5	960.41	21.00	2.349	0.30( 0.11)	0.38	474.0	200.00
6	958.22	21.61	2.309	0.30( 0.11)	0.38	481.4	230.00
7	936.90	22.69	2.240	0.30( 0.11)	0.38	485.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	842.59	9.80	3.858	0.30( 0.11)	0.38	246.8	429.00
2	890.71	11.26	3.560	0.30( 0.11)	0.38	283.5	425.00
3	905.71	11.71	3.484	0.30( 0.11)	0.38	294.8	400.00

4	943.25	13.11	3.246	0.30 ( 0.11)	0.38	330.1	300.00
5	1001.68	18.01	2.616	0.30 ( 0.11)	0.38	440.3	210.00
6	980.97	20.12	2.406	0.30 ( 0.11)	0.38	468.0	410.00
7	972.01	21.00	2.349	0.30 ( 0.11)	0.38	479.3	200.00
8	969.62	21.61	2.309	0.30 ( 0.11)	0.38	486.7	230.00
9	947.95	22.69	2.240	0.30 ( 0.11)	0.37	491.2	220.50
TOTAL AREA (ACRES) =							491.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1001.68 Tc (MIN.) = 18.009  
EFFECTIVE AREA (ACRES) = 440.35 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA (ACRES) = 491.2  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 491.2 TC (MIN.) = 18.01  
EFFECTIVE AREA (ACRES) = 440.35 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.380  
PEAK FLOW RATE (CFS) = 1001.68

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	842.59	9.80	3.858	0.30 ( 0.11)	0.38	246.8	429.00
2	890.71	11.26	3.560	0.30 ( 0.11)	0.38	283.5	425.00
3	905.71	11.71	3.484	0.30 ( 0.11)	0.38	294.8	400.00
4	943.25	13.11	3.246	0.30 ( 0.11)	0.38	330.1	300.00
5	1001.68	18.01	2.616	0.30 ( 0.11)	0.38	440.3	210.00
6	980.97	20.12	2.406	0.30 ( 0.11)	0.38	468.0	410.00
7	972.01	21.00	2.349	0.30 ( 0.11)	0.38	479.3	200.00
8	969.62	21.61	2.309	0.30 ( 0.11)	0.38	486.7	230.00
9	947.95	22.69	2.240	0.30 ( 0.11)	0.37	491.2	220.50

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

FILE NAME: 0506101B.DAT  
TIME/DATE OF STUDY: 12:41 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.820
- 2) 6.00; 4.350
- 3) 7.00; 3.990
- 4) 8.00; 3.700
- 5) 9.00; 3.460
- 6) 10.00; 3.260
- 7) 11.00; 3.090
- 8) 12.00; 2.940
- 9) 13.00; 2.810
- 10) 14.00; 2.690
- 11) 15.00; 2.590
- 12) 20.00; 2.200
- 13) 25.00; 1.940
- 14) 30.00; 1.750
- 15) 40.00; 1.490
- 16) 50.00; 1.310
- 17) 60.00; 1.180
- 18) 90.00; 0.940
- 19) 120.00; 0.800
- 20) 180.00; 0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10100.00 TO NODE 10101.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 820.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.606  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.339  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.10	0.30	1.000	98	9.61
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.30	1.000	98	9.61

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.09  
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.09

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FLOW PROCESS FROM NODE 10101.00 TO NODE 10102.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 790.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 152.00 CHANNEL SLOPE = 0.1974  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.09  
FLOW VELOCITY(FEET/SEC.) = 4.43 FLOW DEPTH(FEET) = 0.29  
TRAVEL TIME(MIN.) = 0.57  $T_c$ (MIN.) = 10.18  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10102.00 = 479.00 FEET.

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FLOW PROCESS FROM NODE 10102.00 TO NODE 10102.00 IS CODE = 81

-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE  $T_c$ (MIN.) = 10.18  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.230  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.50      0.30       1.000      -
USER-DEFINED  -        0.30      0.30       1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.80  SUBAREA RUNOFF (CFS) = 2.11
EFFECTIVE AREA (ACRES) = 1.20  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.2  PEAK FLOW RATE (CFS) = 3.16

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*****
FLOW PROCESS FROM NODE 10102.00 TO NODE 10103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 790.00  DOWNSTREAM(FEET) = 762.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00  CHANNEL SLOPE = 0.1400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.16
FLOW VELOCITY(FEET/SEC.) = 4.97  FLOW DEPTH(FEET) = 0.46
TRAVEL TIME(MIN.) = 0.67  Tc(MIN.) = 10.85
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10103.00 = 679.00 FEET.

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 10.85
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.116
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.40    0.30    1.000  -
USER-DEFINED        -        0.80    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.20  SUBAREA RUNOFF (CFS) = 3.04
EFFECTIVE AREA (ACRES) = 2.40  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 2.4  PEAK FLOW RATE (CFS) = 6.08

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 762.00  DOWNSTREAM(FEET) = 754.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 124.00  CHANNEL SLOPE = 0.0645
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 6.08
FLOW VELOCITY(FEET/SEC.) = 4.43  FLOW DEPTH(FEET) = 0.68
TRAVEL TIME(MIN.) = 0.47  Tc(MIN.) = 11.31
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10104.00 = 803.00 FEET.

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FLOW PROCESS FROM NODE 10104.00 TO NODE 10104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.31
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.043
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.70    0.30    1.000  -
USER-DEFINED        -        1.10    0.30    1.000  -
USER-DEFINED        -        0.10    0.30    1.000  -
USER-DEFINED        -        0.40    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 5.68
EFFECTIVE AREA (ACRES) = 4.70  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.7  PEAK FLOW RATE (CFS) = 11.60

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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ELEVATION DATA: UPSTREAM(FEET) = 754.00  DOWNSTREAM(FEET) = 740.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00  CHANNEL SLOPE = 0.0255
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 11.60
FLOW VELOCITY(FEET/SEC.) = 3.67  FLOW DEPTH(FEET) = 1.03
TRAVEL TIME(MIN.) = 2.50  Tc(MIN.) = 13.81
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10105.00 = 1353.00 FEET.

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.81
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.712
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        3.40    0.30    1.000  -
USER-DEFINED        -        0.60    0.30    1.000  -
USER-DEFINED        -        6.00    0.30    1.000  -
USER-DEFINED        -        0.60    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 10.60  SUBAREA RUNOFF (CFS) = 23.01
EFFECTIVE AREA (ACRES) = 15.30  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 15.3  PEAK FLOW RATE (CFS) = 33.22

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10106.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 740.00 DOWNSTREAM(FEET) = 623.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 929.00 CHANNEL SLOPE = 0.1259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 33.22
FLOW VELOCITY(FEET/SEC.) = 8.73 FLOW DEPTH(FEET) = 1.13
TRAVEL TIME(MIN.) = 1.77 Tc(MIN.) = 15.59
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10106.00 = 2282.00 FEET.
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10106.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.59
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.544
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 10.40 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 4.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 31.31
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 62.21
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 592.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 417.00 CHANNEL SLOPE = 0.0743
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 62.21
FLOW VELOCITY(FEET/SEC.) = 8.34 FLOW DEPTH(FEET) = 1.58
TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 16.42
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10107.00 = 2699.00 FEET.
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10107.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.42

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* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.479
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 5.10 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 2.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 18.63
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 79.04
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 592.00 DOWNSTREAM(FEET) = 590.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0333
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.000
CHANNEL FLOW THRU SUBAREA(CFS) = 79.04
FLOW VELOCITY(FEET/SEC.) = 6.56 FLOW DEPTH(FEET) = 2.00
TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 16.57
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10108.00 = 2759.00 FEET.
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.57
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.467
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 7.00 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 7.50 0.30 1.000 -
USER-DEFINED - 1.80 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 35.31
EFFECTIVE AREA(ACRES) = 58.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.4 PEAK FLOW RATE(CFS) = 113.91
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.57
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.467
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.39
EFFECTIVE AREA(ACRES) = 58.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.6 PEAK FLOW RATE(CFS) = 114.30

\*\*\*\*\*
FLOW PROCESS FROM NODE 10108.00 TO NODE 10109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 526.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 973.00 CHANNEL SLOPE = 0.0658
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 114.30
FLOW VELOCITY(FEET/SEC.) = 9.28 FLOW DEPTH(FEET) = 2.03
TRAVEL TIME(MIN.) = 1.75 Tc(MIN.) = 18.32
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10109.00 = 3732.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10109.00 TO NODE 10109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.32
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.331
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 16.40 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 3.00 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 36.56
EFFECTIVE AREA(ACRES) = 78.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.6 PEAK FLOW RATE(CFS) = 143.67

\*\*\*\*\*
FLOW PROCESS FROM NODE 10109.00 TO NODE 10110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 526.00 DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1045.00 CHANNEL SLOPE = 0.0679

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 143.67
FLOW VELOCITY(FEET/SEC.) = 9.95 FLOW DEPTH(FEET) = 2.19
TRAVEL TIME(MIN.) = 1.75 Tc(MIN.) = 20.07
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10110.00 = 4777.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10110.00 TO NODE 10110.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.07
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.196
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.30 1.000 -
USER-DEFINED - 0.50 0.30 1.000 -
USER-DEFINED - 31.60 0.30 1.000 -
USER-DEFINED - 1.60 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.10 SUBAREA RUNOFF(CFS) = 59.90
EFFECTIVE AREA(ACRES) = 113.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.7 PEAK FLOW RATE(CFS) = 194.04

\*\*\*\*\*
FLOW PROCESS FROM NODE 10110.00 TO NODE 10111.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 675.00 CHANNEL SLOPE = 0.0667
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 194.04
FLOW VELOCITY(FEET/SEC.) = 10.63 FLOW DEPTH(FEET) = 2.47
TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 21.13
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10111.00 = 5452.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10111.00 TO NODE 10111.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.13
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.141
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.40 0.30 1.000 -
USER-DEFINED - 6.00 0.30 1.000 -
USER-DEFINED - 24.80 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -

USER-DEFINED - 4.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 43.20 SUBAREA RUNOFF (CFS) = 71.59  
EFFECTIVE AREA (ACRES) = 156.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 156.9 PEAK FLOW RATE (CFS) = 260.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10111.00 TO NODE 10112.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	410.00	DOWNSTREAM (FEET) =	405.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	143.00	CHANNEL SLOPE =	0.0350
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	4.00
CHANNEL FLOW THRU SUBAREA (CFS) =	260.00		
FLOW VELOCITY (FEET/SEC.) =	9.00	FLOW DEPTH (FEET) =	3.10
TRAVEL TIME (MIN.) =	0.26	Tc (MIN.) =	21.40
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10112.00 =	5595.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 21.40  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.127

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	7.90	0.30	1.000	-
USER-DEFINED	-	25.90	0.30	1.000	-
USER-DEFINED	-	19.30	0.30	1.000	-
USER-DEFINED	-	2.10	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 56.20 SUBAREA RUNOFF (CFS) = 92.43  
EFFECTIVE AREA (ACRES) = 213.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 213.1 PEAK FLOW RATE (CFS) = 350.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10113.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	405.00	DOWNSTREAM (FEET) =	363.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	1642.00	CHANNEL SLOPE =	0.0256
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	350.48		
FLOW VELOCITY (FEET/SEC.) =	8.62	FLOW DEPTH (FEET) =	3.68

TRAVEL TIME (MIN.) = 3.18 Tc (MIN.) = 24.57  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10113.00 = 7237.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 24.57  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.962

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	33.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 35.40 SUBAREA RUNOFF (CFS) = 52.96  
EFFECTIVE AREA (ACRES) = 248.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 248.5 PEAK FLOW RATE (CFS) = 371.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10114.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	363.00	DOWNSTREAM (FEET) =	340.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	918.00	CHANNEL SLOPE =	0.0251
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	371.77		
FLOW VELOCITY (FEET/SEC.) =	8.68	FLOW DEPTH (FEET) =	3.78
TRAVEL TIME (MIN.) =	1.76	Tc (MIN.) =	26.34
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10114.00 =	8155.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 26.34  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.889

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	10.10	0.30	1.000	-
USER-DEFINED	-	17.70	0.30	1.000	-
USER-DEFINED	-	52.90	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 83.10 SUBAREA RUNOFF (CFS) = 118.86

EFFECTIVE AREA(ACRES) = 331.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 331.6 PEAK FLOW RATE(CFS) = 474.31

\*\*\*\*\*

FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 26.34  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.889  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 2.15  
EFFECTIVE AREA(ACRES) = 333.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 333.1 PEAK FLOW RATE(CFS) = 476.45

\*\*\*\*\*

FLOW PROCESS FROM NODE 10114.00 TO NODE 10115.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 301.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1467.00 CHANNEL SLOPE = 0.0266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 476.45  
FLOW VELOCITY(FEET/SEC.) = 9.44 FLOW DEPTH(FEET) = 4.10  
TRAVEL TIME(MIN.) = 2.59 Tc(MIN.) = 28.93  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10115.00 = 9622.00 FEET.

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FLOW PROCESS FROM NODE 10115.00 TO NODE 10115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 28.93  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.791  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.60 0.30 1.000 -  
USER-DEFINED - 24.30 0.30 1.000 -  
USER-DEFINED - 47.70 0.30 1.000 -  
USER-DEFINED - 9.80 0.30 1.000 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 94.00 SUBAREA RUNOFF(CFS) = 126.13  
EFFECTIVE AREA(ACRES) = 427.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 427.1 PEAK FLOW RATE(CFS) = 573.07

\*\*\*\*\*

FLOW PROCESS FROM NODE 10115.00 TO NODE 10116.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 272.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1696.00 CHANNEL SLOPE = 0.0171  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 573.07  
FLOW VELOCITY(FEET/SEC.) = 8.38 FLOW DEPTH(FEET) = 4.77  
TRAVEL TIME(MIN.) = 3.37 Tc(MIN.) = 32.30  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10116.00 = 11318.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 32.30  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.690  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.90 0.30 1.000 -  
USER-DEFINED - 4.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 32.00 0.30 1.000 -  
USER-DEFINED - 3.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 45.60 SUBAREA RUNOFF(CFS) = 57.06  
EFFECTIVE AREA(ACRES) = 472.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 472.7 PEAK FLOW RATE(CFS) = 591.49

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FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 32.30  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.690  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 1.000 -  
USER-DEFINED - 7.70 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.70 SUBAREA RUNOFF(CFS) = 12.14  
EFFECTIVE AREA(ACRES) = 482.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 482.4 PEAK FLOW RATE(CFS) = 603.62

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*****
FLOW PROCESS FROM NODE 10116.00 TO NODE 10117.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 272.00 DOWNSTREAM(FEET) = 252.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 878.00 CHANNEL SLOPE = 0.0228
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 603.62
FLOW VELOCITY(FEET/SEC.) = 9.46 FLOW DEPTH(FEET) = 4.61
TRAVEL TIME(MIN.) = 1.55 Tc(MIN.) = 33.85
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10117.00 = 12196.00 FEET.
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 33.85
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.650
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 8.20 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 14.97
EFFECTIVE AREA(ACRES) = 494.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 494.7 PEAK FLOW RATE(CFS) = 603.62
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 33.85
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.650
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 14.60 0.30 1.000 -
USER-DEFINED - 6.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 3.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996
SUBAREA AREA(ACRES) = 25.00 SUBAREA RUNOFF(CFS) = 30.40
EFFECTIVE AREA(ACRES) = 519.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

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AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 519.7 PEAK FLOW RATE(CFS) = 631.53
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10118.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 252.00 DOWNSTREAM(FEET) = 249.00
FLOW LENGTH(FEET) = 280.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 87.0 INCH PIPE IS 65.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.92
ESTIMATED PIPE DIAMETER(INCH) = 87.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 631.53
PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 34.09
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10118.00 = 12476.00 FEET.
*****
FLOW PROCESS FROM NODE 10118.00 TO NODE 10119.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 249.00 DOWNSTREAM(FEET) = 240.00
FLOW LENGTH(FEET) = 892.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 87.0 INCH PIPE IS 67.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.42
ESTIMATED PIPE DIAMETER(INCH) = 87.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 631.53
PIPE TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 34.90
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10119.00 = 13368.00 FEET.
*****
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 34.90
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.623
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.100 -
USER-DEFINED - 1.00 0.30 0.600 -
USER-DEFINED - 0.80 0.30 0.850 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.706
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 4.57
EFFECTIVE AREA(ACRES) = 523.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 523.3 PEAK FLOW RATE(CFS) = 631.53
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
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FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 34.90  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.623  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	9.60	0.30	0.600	-
USER-DEFINED	-	1.00	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.627  
 SUBAREA AREA (ACRES) = 13.60 SUBAREA RUNOFF (CFS) = 17.56  
 EFFECTIVE AREA (ACRES) = 536.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 536.9 PEAK FLOW RATE (CFS) = 640.84

FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 34.90  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.623  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.12  
 EFFECTIVE AREA (ACRES) = 537.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 537.0 PEAK FLOW RATE (CFS) = 640.96

FLOW PROCESS FROM NODE 10119.00 TO NODE 10120.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 240.00 DOWNSTREAM(FEET) = 239.00  
 FLOW LENGTH(FEET) = 120.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 90.0 INCH PIPE IS 71.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.14  
 ESTIMATED PIPE DIAMETER(INCH) = 90.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 640.96  
 PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 35.02  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10120.00 = 13488.00 FEET.

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 35.02  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.620  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.657  
 SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 7.17  
 EFFECTIVE AREA (ACRES) = 542.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA (ACRES) = 542.6 PEAK FLOW RATE (CFS) = 646.66

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 35.02  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.620  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.717  
 SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 6.45  
 EFFECTIVE AREA (ACRES) = 547.70 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA (ACRES) = 547.7 PEAK FLOW RATE (CFS) = 653.11

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 35.02  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.620  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	2.70	0.30	1.000	-
USER-DEFINED	-	11.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 18.77  
EFFECTIVE AREA(ACRES) = 563.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 563.5 PEAK FLOW RATE(CFS) = 671.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10121.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 239.00 DOWNSTREAM(FEET) = 213.00  
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 48.95  
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 671.88  
PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 35.08  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10121.00 = 13682.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10121.00 TO NODE 10122.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 213.00 DOWNSTREAM(FEET) = 176.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 995.00 CHANNEL SLOPE = 0.0372  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 671.88  
FLOW VELOCITY(FEET/SEC.) = 11.66 FLOW DEPTH(FEET) = 4.38  
TRAVEL TIME(MIN.) = 1.42 Tc(MIN.) = 36.50  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10122.00 = 14677.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 36.50  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.581  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.80 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 8.42  
EFFECTIVE AREA(ACRES) = 570.80 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98

TOTAL AREA(ACRES) = 570.8 PEAK FLOW RATE(CFS) = 671.88  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 36.50  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.581  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 3.30 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 3.00 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 12.11  
EFFECTIVE AREA(ACRES) = 581.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 581.3 PEAK FLOW RATE(CFS) = 672.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 36.50  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.581  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 3.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 3.50 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 9.11  
EFFECTIVE AREA(ACRES) = 589.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 589.2 PEAK FLOW RATE(CFS) = 681.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 36.50  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.581  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.80 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$  (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 2.08  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.98  
TOTAL AREA (ACRES) = 591.0 PEAK FLOW RATE (CFS) = 683.96

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 591.0 TC (MIN.) = 36.50  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.984  
PEAK FLOW RATE (CFS) = 683.96  
=====

=====  
END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 100 Yr \*  
\* From Node: 10200 To Node: 10256 \*  
\*\*\*\*\*

FILE NAME: 0506102B.DAT  
TIME/DATE OF STUDY: 16:39 10/18/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.800
- 2) 10.00; 3.258
- 3) 15.00; 2.590
- 4) 20.00; 2.201
- 5) 25.00; 1.940
- 6) 30.00; 1.740
- 7) 40.00; 1.487
- 8) 50.00; 1.310
- 9) 60.00; 1.150
- 10) 90.00; 0.940
- 11) 120.00; 0.798
- 12) 180.00; 0.647
- 13) 360.00; 0.452
- 14) 1440.00; 0.187

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10200.00 TO NODE 10201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 293.00  
ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 617.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.991  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.261  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "3-4 DWELLINGS/ACRE"	-	0.73	0.30	0.600	0	9.99

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA RUNOFF(CFS) = 2.03  
TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 2.03

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10201.00 TO NODE 10202.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 617.00 DOWNSTREAM ELEVATION(FEET) = 613.00  
STREET LENGTH(FEET) = 323.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.15  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 10.07  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.62  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.94  
STREET FLOW TRAVEL TIME(MIN.) = 2.06 Tc(MIN.) = 12.05

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.984  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.88 0.30 0.600 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600  
 SUBAREA AREA (ACRES) = 0.88 SUBAREA RUNOFF (CFS) = 2.23  
 EFFECTIVE AREA (ACRES) = 1.62 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA (ACRES) = 1.6 PEAK FLOW RATE (CFS) = 4.08

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.38 HALFSTREET FLOOD WIDTH (FEET) = 11.32  
 FLOW VELOCITY (FEET/SEC.) = 2.77 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.07  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10202.00 = 616.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10202.00 TO NODE 10203.00 IS CODE = 63  
 -----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<

=====

UPSTREAM ELEVATION (FEET) = 613.00 DOWNSTREAM ELEVATION (FEET) = 594.00  
 STREET LENGTH (FEET) = 613.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 30.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.12  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.38  
 HALFSTREET FLOOD WIDTH (FEET) = 11.05  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.34  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.64  
 STREET FLOW TRAVEL TIME (MIN.) = 2.36 Tc (MIN.) = 14.40

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.670  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.82 0.30 0.614 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.614  
 SUBAREA AREA (ACRES) = 1.82 SUBAREA RUNOFF (CFS) = 4.08  
 EFFECTIVE AREA (ACRES) = 3.44 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
 TOTAL AREA (ACRES) = 3.4 PEAK FLOW RATE (CFS) = 7.70

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.40 HALFSTREET FLOOD WIDTH (FEET) = 12.25

FLOW VELOCITY (FEET/SEC.) = 4.55 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.84  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10203.00 = 1229.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10203.00 TO NODE 10204.00 IS CODE = 63  
 -----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<

=====

UPSTREAM ELEVATION (FEET) = 594.00 DOWNSTREAM ELEVATION (FEET) = 578.00  
 STREET LENGTH (FEET) = 433.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 30.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.96

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.41  
 HALFSTREET FLOOD WIDTH (FEET) = 12.58  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.06  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.07  
 STREET FLOW TRAVEL TIME (MIN.) = 1.43 Tc (MIN.) = 15.83  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.525

SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.21 0.30 0.655 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.655  
 SUBAREA AREA (ACRES) = 1.21 SUBAREA RUNOFF (CFS) = 2.53  
 EFFECTIVE AREA (ACRES) = 4.64 AREA-AVERAGED Fm (INCH/HR) = 0.19  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
 TOTAL AREA (ACRES) = 4.6 PEAK FLOW RATE (CFS) = 9.78

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 13.07  
 FLOW VELOCITY (FEET/SEC.) = 5.15 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.16  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10204.00 = 1662.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 31  
 -----

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 578.00 DOWNSTREAM (FEET) = 575.00  
 FLOW LENGTH (FEET) = 147.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.0 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.68  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 9.78  
PIPE TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 16.11  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10205.00 = 1809.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.11  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.503

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.61	0.30	0.917	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 3.61 SUBAREA RUNOFF(CFS) = 7.23  
EFFECTIVE AREA(ACRES) = 8.25 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 16.92

\*\*\*\*\*

FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 563.00  
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.05  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 16.92  
PIPE TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 17.05  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10206.00 = 2374.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.05  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.430

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.75	0.30	0.669	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.669  
SUBAREA AREA(ACRES) = 4.75 SUBAREA RUNOFF(CFS) = 9.53  
EFFECTIVE AREA(ACRES) = 13.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA(ACRES) = 13.0 PEAK FLOW RATE(CFS) = 25.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 10206.00 TO NODE 10207.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 563.00 DOWNSTREAM(FEET) = 547.00  
FLOW LENGTH(FEET) = 599.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.22  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 25.90  
PIPE TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 17.87  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10207.00 = 2973.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10206.10 TO NODE 10207.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.87  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.367

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.59	0.30	0.664	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.664  
SUBAREA AREA(ACRES) = 4.59 SUBAREA RUNOFF(CFS) = 8.95  
EFFECTIVE AREA(ACRES) = 17.58 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71  
TOTAL AREA(ACRES) = 17.6 PEAK FLOW RATE(CFS) = 34.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 516.00  
FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 17.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.20  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 34.11  
PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 18.49  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10208.00 = 3573.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.49  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.319

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.60	0.30	0.697	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.697

SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 6.84  
EFFECTIVE AREA (ACRES) = 21.18 AREA-AVERAGED Fm (INCH/HR) = 0.21  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA (ACRES) = 21.2 PEAK FLOW RATE (CFS) = 40.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 31  
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 516.00 DOWNSTREAM (FEET) = 480.00  
FLOW LENGTH (FEET) = 604.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 18.38  
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 40.18  
PIPE TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 19.03  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10209.00 = 4177.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 19.03  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.276  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.21 0.30 0.645 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645  
SUBAREA AREA (ACRES) = 8.21 SUBAREA RUNOFF (CFS) = 15.40  
EFFECTIVE AREA (ACRES) = 29.40 AREA-AVERAGED Fm (INCH/HR) = 0.21  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA (ACRES) = 29.4 PEAK FLOW RATE (CFS) = 54.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 31  
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 480.00 DOWNSTREAM (FEET) = 438.00  
FLOW LENGTH (FEET) = 678.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 20.18  
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 54.77  
PIPE TRAVEL TIME (MIN.) = 0.56 Tc (MIN.) = 19.59  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10210.00 = 4855.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 19.59  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.233  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.49 0.30 0.986 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 10.49 SUBAREA RUNOFF (CFS) = 18.29  
EFFECTIVE AREA (ACRES) = 39.89 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
TOTAL AREA (ACRES) = 39.9 PEAK FLOW RATE (CFS) = 71.91

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 438.00 DOWNSTREAM (FEET) = 280.00  
FLOW LENGTH (FEET) = 2662.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.5 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 21.24  
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 71.91  
PIPE TRAVEL TIME (MIN.) = 2.09 Tc (MIN.) = 21.68  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10211.00 = 7517.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc (MIN.) = 21.68  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.113  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.00 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 10.00 SUBAREA RUNOFF (CFS) = 16.32  
EFFECTIVE AREA (ACRES) = 49.89 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA (ACRES) = 49.9 PEAK FLOW RATE (CFS) = 83.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 280.00 DOWNSTREAM (FEET) = 176.00  
FLOW LENGTH (FEET) = 935.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 27.70  
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 83.94

PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 22.24  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10212.00 = 8452.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.24  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.084  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.37 0.30 0.926 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.926  
SUBAREA AREA(ACRES) = 18.37 SUBAREA RUNOFF(CFS) = 29.86  
EFFECTIVE AREA(ACRES) = 68.26 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 68.3 PEAK FLOW RATE(CFS) = 112.48

\*\*\*\*\*

FLOW PROCESS FROM NODE 10212.00 TO NODE 10242.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 176.00 DOWNSTREAM(FEET) = 169.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00 CHANNEL SLOPE = 0.0211  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.97 0.30 0.970 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 114.03  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.06  
AVERAGE FLOW DEPTH(FEET) = 2.51 TRAVEL TIME(MIN.) = 0.91  
Tc(MIN.) = 23.16  
SUBAREA AREA(ACRES) = 1.97 SUBAREA RUNOFF(CFS) = 3.09  
EFFECTIVE AREA(ACRES) = 70.23 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 112.65

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.49 FLOW VELOCITY(FEET/SEC.) = 6.05  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<

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FLOW PROCESS FROM NODE 10220.00 TO NODE 10221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 308.00 DOWNSTREAM(FEET) = 300.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.111  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.581  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"GRASS" - 1.03 0.30 1.000 0 15.11  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.12  
TOTAL AREA(ACRES) = 1.03 PEAK FLOW RATE(CFS) = 2.12

\*\*\*\*\*

FLOW PROCESS FROM NODE 10221.10 TO NODE 10222.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 300.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.72  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.23  
HALFSTREET FLOOD WIDTH(FEET) = 3.80  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.57  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.31  
STREET FLOW TRAVEL TIME(MIN.) = 1.30 Tc(MIN.) = 16.41  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.480

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.64 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 3.21  
EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 2.7 PEAK FLOW RATE (CFS) = 5.24

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.26 HALFSTREET FLOOD WIDTH (FEET) = 5.22  
FLOW VELOCITY (FEET/SEC.) = 5.66 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.49  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10222.00 = 764.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10221.20 TO NODE 10222.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 16.41

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.480

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.12	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 3.12 SUBAREA RUNOFF (CFS) = 6.11

EFFECTIVE AREA (ACRES) = 5.78 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 5.8 PEAK FLOW RATE (CFS) = 11.35

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.10 TO NODE 10223.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION (FEET) = 261.00 DOWNSTREAM ELEVATION (FEET) = 208.00

STREET LENGTH (FEET) = 622.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.97

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.34

HALFSTREET FLOOD WIDTH (FEET) = 8.98

AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.51

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.20

STREET FLOW TRAVEL TIME (MIN.) = 1.59 Tc (MIN.) = 18.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.357

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.75	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 1.75 SUBAREA RUNOFF (CFS) = 3.25

EFFECTIVE AREA (ACRES) = 7.54 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 7.5 PEAK FLOW RATE (CFS) = 13.95

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.35 HALFSTREET FLOOD WIDTH (FEET) = 9.34

FLOW VELOCITY (FEET/SEC.) = 6.57 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.27

LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10223.00 = 1386.00 FEET.

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FLOW PROCESS FROM NODE 10222.20 TO NODE 10223.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 18.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.357

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.91	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 7.91 SUBAREA RUNOFF (CFS) = 14.64

EFFECTIVE AREA (ACRES) = 15.45 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 15.4 PEAK FLOW RATE (CFS) = 28.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 10223.10 TO NODE 10224.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION (FEET) = 208.00 DOWNSTREAM ELEVATION (FEET) = 204.00

STREET LENGTH (FEET) = 758.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 32.33

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.63

HALFSTREET FLOOD WIDTH (FEET) = 23.76

AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.77

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.76

STREET FLOW TRAVEL TIME (MIN.) = 4.56 Tc (MIN.) = 22.56

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.067

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.70 SUBAREA RUNOFF (CFS) = 7.47  
EFFECTIVE AREA (ACRES) = 20.15 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.1 PEAK FLOW RATE (CFS) = 32.05

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.63 HALFSTREET FLOOD WIDTH (FEET) = 23.70  
FLOW VELOCITY (FEET/SEC.) = 2.76 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.74  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10224.00 = 2144.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.20 TO NODE 10224.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 22.56  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.067  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.21 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.21 SUBAREA RUNOFF (CFS) = 1.92  
EFFECTIVE AREA (ACRES) = 21.35 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 21.4 PEAK FLOW RATE (CFS) = 33.97

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 204.00 DOWNSTREAM (FEET) = 201.00  
FLOW LENGTH (FEET) = 422.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 7.92  
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 33.97  
PIPE TRAVEL TIME (MIN.) = 0.89 Tc (MIN.) = 23.45  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10225.00 = 2566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 23.45  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.021  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.81	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.81 SUBAREA RUNOFF (CFS) = 7.46  
EFFECTIVE AREA (ACRES) = 26.17 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.2 PEAK FLOW RATE (CFS) = 40.53

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 201.00 DOWNSTREAM (FEET) = 197.00  
FLOW LENGTH (FEET) = 799.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 7.17  
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 40.53  
PIPE TRAVEL TIME (MIN.) = 1.86 Tc (MIN.) = 25.31  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10238.00 = 3365.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 25.31  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.928  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.24 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.24 SUBAREA RUNOFF (CFS) = 6.21  
EFFECTIVE AREA (ACRES) = 30.41 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 30.4 PEAK FLOW RATE (CFS) = 44.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 25.31  
RAINFALL INTENSITY (INCH/HR) = 1.93  
AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA (ACRES) = 30.41  
TOTAL STREAM AREA (ACRES) = 30.41  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 44.55

\*\*\*\*\*

FLOW PROCESS FROM NODE 10230.00 TO NODE 10231.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 276.00
ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 390.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.944
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.509

SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
AGRICULTURAL POOR COVER
"FALLOW" - 0.95 0.30 1.000 0 5.94
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 3.60
TOTAL AREA(ACRES) = 0.95 PEAK FLOW RATE(CFS) = 3.60

FLOW PROCESS FROM NODE 10231.10 TO NODE 10232.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 390.00 DOWNSTREAM(FEET) = 301.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 394.00 CHANNEL SLOPE = 0.2259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.281

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.68 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.62
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.87
AVERAGE FLOW DEPTH(FEET) = 0.50 TRAVEL TIME(MIN.) = 0.74
Tc(MIN.) = 6.68
SUBAREA AREA(ACRES) = 1.68 SUBAREA RUNOFF(CFS) = 6.03
EFFECTIVE AREA(ACRES) = 2.63 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 9.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.57 FLOW VELOCITY(FEET/SEC.) = 9.77
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10232.00 = 670.00 FEET.

FLOW PROCESS FROM NODE 10231.20 TO NODE 10232.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 6.68
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.281

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.38 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.38 SUBAREA RUNOFF(CFS) = 22.85
EFFECTIVE AREA(ACRES) = 9.01 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 9.0 PEAK FLOW RATE(CFS) = 32.29

FLOW PROCESS FROM NODE 10232.00 TO NODE 10233.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 301.00 DOWNSTREAM ELEVATION(FEET) = 277.00
STREET LENGTH(FEET) = 341.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.61

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.20
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.46
HALFSTREET FLOOD WIDTH(FEET) = 15.15
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.69
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.55
STREET FLOW TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 7.42
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.053

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 11.83
EFFECTIVE AREA(ACRES) = 12.52 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 12.5 PEAK FLOW RATE(CFS) = 42.27

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 15.79
FLOW VELOCITY(FEET/SEC.) = 7.88 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.73
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10233.00 = 1011.00 FEET.

FLOW PROCESS FROM NODE 10233.10 TO NODE 10234.00 IS CODE = 63



>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 277.00 DOWNSTREAM ELEVATION(FEET) = 226.00
STREET LENGTH(FEET) = 682.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 48.68

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.49
HALFSTREET FLOOD WIDTH(FEET) = 16.49
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.36
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.08
STREET FLOW TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 8.78

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.634

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.27 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 4.27 SUBAREA RUNOFF(CFS) = 12.81

EFFECTIVE AREA(ACRES) = 16.78 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 50.36

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 16.73
FLOW VELOCITY(FEET/SEC.) = 8.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.15
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10234.00 = 1693.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10233.20 TO NODE 10234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 8.78

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.634

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 15.60 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 46.80

EFFECTIVE AREA(ACRES) = 32.38 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 97.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.10 TO NODE 10235.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 3 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 226.00 DOWNSTREAM ELEVATION(FEET) = 205.00
STREET LENGTH(FEET) = 759.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 103.30

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.70
HALFSTREET FLOOD WIDTH(FEET) = 28.56
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.89
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.81
STREET FLOW TRAVEL TIME(MIN.) = 1.84 Tc(MIN.) = 10.62

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.175

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.74 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 12.28

EFFECTIVE AREA(ACRES) = 37.13 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 97.16

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.69 HALFSTREET FLOOD WIDTH(FEET) = 27.31
FLOW VELOCITY(FEET/SEC.) = 6.79 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.66

\*NOTE: ESTIMATED STREET FLOW DEPTH IS GREATER THAN
THE MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

SIZE PIPE(S) TO SATISFY THE STREET CONSTRAINT AS FOLLOWS:

\*\* PIPE SIZED TO MAXIMIZE STREETFLOW AT DOWNSTREAM NODE \*\*

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

ASSUME FULL-FLOWING PIPELINE

PIPE-FLOW VELOCITY(FEET/SEC.) = 9.37

PIPE-FLOW(CFS) = 16.57

PIPEFLOW TRAVEL TIME(MIN.) = 1.35 Tc(MIN.) = 10.13

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.240

SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 12.56

TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 98.25

STREETFLOW HYDRAULICS BASED ON MAINLINE Tc :

STREET HYDRAULICS COMPUTED USING ESTIMATED FLOW(CFS) = 81.68  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.65  
HALFSTREET FLOOD WIDTH(FEET) = 24.73  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.48  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.23  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10235.00 = 2452.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10234.20 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.13  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.240  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.02 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.02 SUBAREA RUNOFF(CFS) = 21.22  
EFFECTIVE AREA(ACRES) = 45.15 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 45.1 PEAK FLOW RATE(CFS) = 119.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10234.30 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.13  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.240  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.62 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.62 SUBAREA RUNOFF(CFS) = 6.92  
EFFECTIVE AREA(ACRES) = 47.76 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 47.8 PEAK FLOW RATE(CFS) = 126.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10235.00 TO NODE 10236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 205.00 DOWNSTREAM(FEET) = 201.00  
FLOW LENGTH(FEET) = 489.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 36.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.51  
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 126.39  
PIPE TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 10.84  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10236.00 = 2941.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10235.10 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.84  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.146  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.89 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.89 SUBAREA RUNOFF(CFS) = 7.41  
EFFECTIVE AREA(ACRES) = 50.65 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 50.7 PEAK FLOW RATE(CFS) = 129.73

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10235.20 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.84  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.146  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.84 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.84 SUBAREA RUNOFF(CFS) = 12.39  
EFFECTIVE AREA(ACRES) = 55.49 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 55.5 PEAK FLOW RATE(CFS) = 142.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 201.00 DOWNSTREAM(FEET) = 199.00  
FLOW LENGTH(FEET) = 278.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.26  
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 142.13  
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 11.25  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10237.00 = 3219.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.25

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.091  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.62 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.62 SUBAREA RUNOFF (CFS) = 4.07  
 EFFECTIVE AREA (ACRES) = 57.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 57.1 PEAK FLOW RATE (CFS) = 143.45

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 199.00 DOWNSTREAM (FEET) = 197.00  
 FLOW LENGTH (FEET) = 345.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.44  
 ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 143.45  
 PIPE TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 11.80  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 11.80  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.017  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.38 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.38 SUBAREA RUNOFF (CFS) = 3.37  
 EFFECTIVE AREA (ACRES) = 58.49 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 58.5 PEAK FLOW RATE (CFS) = 143.45  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
 =====  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 11.80  
 RAINFALL INTENSITY (INCH/HR) = 3.02  
 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 58.49  
 TOTAL STREAM AREA (ACRES) = 58.49  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 143.45

\*\* CONFLUENCE DATA \*\*  
 STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 44.55 25.31 1.928 0.30 ( 0.30) 1.00 30.4 10220.00  
 2 143.45 11.80 3.017 0.30 ( 0.30) 1.00 58.5 10230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 178.13 11.80 3.017 0.30 ( 0.30) 1.00 72.7 10230.00  
 2 130.49 25.31 1.928 0.30 ( 0.30) 1.00 88.9 10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 178.13 Tc (MIN.) = 11.80  
 EFFECTIVE AREA (ACRES) = 72.67 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 88.9  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.00 TO NODE 10239.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 197.00 DOWNSTREAM (FEET) = 193.00  
 FLOW LENGTH (FEET) = 753.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 60.0 INCH PIPE IS 48.6 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.45  
 ESTIMATED PIPE DIAMETER (INCH) = 60.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 178.13  
 PIPE TRAVEL TIME (MIN.) = 1.20 Tc (MIN.) = 13.00  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10239.00 = 4317.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.10 TO NODE 10239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 13.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.857  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.72 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.72 SUBAREA RUNOFF (CFS) = 6.26  
 EFFECTIVE AREA (ACRES) = 75.39 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 91.6 PEAK FLOW RATE (CFS) = 178.13  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10238.20 TO NODE 10239.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 13.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.857  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 34.37 0.30 0.991 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.991  
SUBAREA AREA (ACRES) = 34.37 SUBAREA RUNOFF (CFS) = 79.17  
EFFECTIVE AREA (ACRES) = 109.76 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 126.0 PEAK FLOW RATE (CFS) = 252.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 193.00 DOWNSTREAM (FEET) = 191.00  
FLOW LENGTH (FEET) = 301.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 66.0 INCH PIPE IS 52.6 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 12.46  
ESTIMATED PIPE DIAMETER (INCH) = 66.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 252.66  
PIPE TRAVEL TIME (MIN.) = 0.40 Tc (MIN.) = 13.41  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10240.00 = 4618.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 13.41  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.803  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.22 0.30 0.916 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.916  
SUBAREA AREA (ACRES) = 2.22 SUBAREA RUNOFF (CFS) = 5.06  
EFFECTIVE AREA (ACRES) = 111.99 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 128.2 PEAK FLOW RATE (CFS) = 252.66  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10240.00 TO NODE 10241.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 191.00 DOWNSTREAM (FEET) = 180.00  
FLOW LENGTH (FEET) = 150.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.6 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 30.62  
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 252.66  
PIPE TRAVEL TIME (MIN.) = 0.08 Tc (MIN.) = 13.49  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10241.00 = 4768.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10241.00 TO NODE 10242.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 180.00 DOWNSTREAM (FEET) = 169.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 267.00 CHANNEL SLOPE = 0.0412  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.742  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.16 0.30 0.958 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.958  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 255.05  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.81  
AVERAGE FLOW DEPTH (FEET) = 2.68 TRAVEL TIME (MIN.) = 0.38  
Tc (MIN.) = 13.86  
SUBAREA AREA (ACRES) = 2.16 SUBAREA RUNOFF (CFS) = 4.77  
EFFECTIVE AREA (ACRES) = 114.15 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 130.4 PEAK FLOW RATE (CFS) = 252.66  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.67 FLOW VELOCITY (FEET/SEC.) = 11.79  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\*\*\*\*  
\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	252.66	13.86	2.742	0.30 (0.30)	0.99	114.1	10230.00
2	180.75	27.52	1.839	0.30 (0.30)	1.00	130.4	10220.00

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\*\*\*\*  
\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM	Q	Tc	Intensity	Fp (Fm)	Ap	Ae	HEADWATER
--------	---	----	-----------	---------	----	----	-----------

NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 112.65 23.16 2.036 0.30( 0.25) 0.85 70.2 10200.00  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	346.80	13.86	2.742	0.30( 0.29)	0.96	156.2	10230.00
2	316.38	23.16	2.036	0.30( 0.28)	0.94	195.4	10200.00
3	280.93	27.52	1.839	0.30( 0.28)	0.94	200.6	10220.00
TOTAL AREA (ACRES) =		200.6					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 346.80 Tc(MIN.) = 13.865  
EFFECTIVE AREA(ACRES) = 156.19 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
TOTAL AREA(ACRES) = 200.6  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 12  
-----  
>>>>CLEAR MEMORY BANK # 1 <<<<<<  
-----  
\*\*\*\*\*

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10256.00 IS CODE = 51  
-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
-----  
ELEVATION DATA: UPSTREAM(FEET) = 169.00 DOWNSTREAM(FEET) = 163.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 315.00 CHANNEL SLOPE = 0.0190  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.669  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.10 0.30 0.995 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.995  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 356.51  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.62  
AVERAGE FLOW DEPTH(FEET) = 3.51 TRAVEL TIME(MIN.) = 0.55  
Tc(MIN.) = 14.41  
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 19.42  
EFFECTIVE AREA(ACRES) = 165.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
TOTAL AREA(ACRES) = 209.7 PEAK FLOW RATE(CFS) = 354.32  
  
END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.51 FLOW VELOCITY(FEET/SEC.) = 9.60  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.  
  
\*\*\*\*\*  
FLOW PROCESS FROM NODE 10243.00 TO NODE 10256.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc(MIN.) = 14.41  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.669  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.01 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.01 SUBAREA RUNOFF(CFS) = 14.93  
EFFECTIVE AREA(ACRES) = 172.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
TOTAL AREA(ACRES) = 216.7 PEAK FLOW RATE(CFS) = 369.26  
  
\*\*\*\*\*  
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1  
-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.41  
RAINFALL INTENSITY(INCH/HR) = 2.67  
AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.96  
EFFECTIVE STREAM AREA(ACRES) = 172.30  
TOTAL STREAM AREA(ACRES) = 216.71  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 369.26  
  
\*\*\*\*\*  
FLOW PROCESS FROM NODE 10250.00 TO NODE 10251.00 IS CODE = 21  
-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 284.00  
ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 243.00  
  
Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.802  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.450  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"WOODLAND,GRASS" - 1.04 0.30 1.000 0 16.80  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.01  
TOTAL AREA(ACRES) = 1.04 PEAK FLOW RATE(CFS) = 2.01  
  
\*\*\*\*\*  
FLOW PROCESS FROM NODE 10251.00 TO NODE 10252.00 IS CODE = 63  
-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 243.00 DOWNSTREAM ELEVATION(FEET) = 240.00  
STREET LENGTH(FEET) = 301.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.31  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.78  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.08  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.65  
STREET FLOW TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 19.21  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.263

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.47 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 2.60  
EFFECTIVE AREA(ACRES) = 2.51 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 4.44

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 8.97  
FLOW VELOCITY(FEET/SEC.) = 2.23 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.75  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10252.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10252.00 TO NODE 10253.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 240.00 DOWNSTREAM ELEVATION(FEET) = 234.00  
STREET LENGTH(FEET) = 544.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.09  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.60  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.64  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.03  
STREET FLOW TRAVEL TIME(MIN.) = 3.44 Tc(MIN.) = 22.65  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.063

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.60 SUBAREA RUNOFF(CFS) = 7.30  
EFFECTIVE AREA(ACRES) = 7.12 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 11.29

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 13.40  
FLOW VELOCITY(FEET/SEC.) = 2.84 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.21  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10253.00 = 1129.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 234.00 DOWNSTREAM(FEET) = 219.00  
FLOW LENGTH(FEET) = 362.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.78  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 11.29  
PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 23.16  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10254.00 = 1491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
-----

MAINLINE Tc(MIN.) = 23.16  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.55 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 13.35  
EFFECTIVE AREA(ACRES) = 15.66 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.7 PEAK FLOW RATE(CFS) = 24.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 10254.00 TO NODE 10255.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 219.00 DOWNSTREAM(FEET) = 182.00
FLOW LENGTH(FEET) = 716.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.45
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 24.47
PIPE TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 23.93
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10255.00 = 2207.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10255.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 182.00 DOWNSTREAM(FEET) = 163.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.0833
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.974
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 13.88 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.93
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.34
AVERAGE FLOW DEPTH(FEET) = 1.12 TRAVEL TIME(MIN.) = 0.41
Tc(MIN.) = 24.34
SUBAREA AREA(ACRES) = 13.88 SUBAREA RUNOFF(CFS) = 20.92
EFFECTIVE AREA(ACRES) = 29.54 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 29.5 PEAK FLOW RATE(CFS) = 44.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.22 FLOW VELOCITY(FEET/SEC.) = 9.91
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10256.00 = 2435.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 24.34
RAINFALL INTENSITY(INCH/HR) = 1.97
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00

EFFECTIVE STREAM AREA(ACRES) = 29.54

TOTAL STREAM AREA(ACRES) = 29.54

PEAK FLOW RATE(CFS) AT CONFLUENCE = 44.52

\*\* CONFLUENCE DATA \*\*

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 4 rows of data.

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 4 rows of data.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 406.54 Tc(MIN.) = 14.41
EFFECTIVE AREA(ACRES) = 189.79 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 246.3
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 246.3 TC(MIN.) = 14.41
EFFECTIVE AREA(ACRES) = 189.79 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.963
PEAK FLOW RATE(CFS) = 406.54

\*\* PEAK FLOW RATE TABLE \*\*

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 4 rows of data.

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506103B.DAT  
TIME/DATE OF STUDY: 12:44 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.820
- 2) 6.00; 4.350
- 3) 7.00; 3.990
- 4) 8.00; 3.700
- 5) 9.00; 3.460
- 6) 10.00; 3.260
- 7) 11.00; 3.090
- 8) 12.00; 2.940
- 9) 13.00; 2.810
- 10) 14.00; 2.690
- 11) 15.00; 2.590
- 12) 20.00; 2.200
- 13) 25.00; 1.940
- 14) 30.00; 1.750
- 15) 40.00; 1.490
- 16) 50.00; 1.310
- 17) 60.00; 1.180
- 18) 90.00; 0.940
- 19) 120.00; 0.800
- 20) 180.00; 0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10300.00 TO NODE 10301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 627.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 5.147  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.751  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "5-7 DWELLINGS/ACRE"	-	1.20	0.30	0.500	95	5.15

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.500  
 SUBAREA RUNOFF(CFS) = 4.97  
 TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 4.97

\*\*\*\*\*

FLOW PROCESS FROM NODE 10301.00 TO NODE 10302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 510.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.2609  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.97  
 FLOW VELOCITY(FEET/SEC.) = 7.08 FLOW DEPTH(FEET) = 0.48  
 TRAVEL TIME(MIN.) = 0.27  $T_c$ (MIN.) = 5.42  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10302.00 = 443.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10302.00 TO NODE 10302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 5.42  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.624  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 6.04  
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 10.87

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10302.00 TO NODE 10303.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 467.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.2575  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.87  
FLOW VELOCITY(FEET/SEC.) = 8.54 FLOW DEPTH(FEET) = 0.65  
TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 5.74  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10303.00 = 610.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10303.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.74  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.471  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 8.55  
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 19.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10304.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 467.00 DOWNSTREAM(FEET) = 446.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 19.05  
FLOW VELOCITY(FEET/SEC.) = 8.64 FLOW DEPTH(FEET) = 0.86  
TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 5.97  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10304.00 = 725.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10304.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.97  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.366  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.500 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 9.05  
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 27.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10305.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 446.00 DOWNSTREAM(FEET) = 366.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 423.00 CHANNEL SLOPE = 0.1891  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 27.65  
FLOW VELOCITY(FEET/SEC.) = 9.72 FLOW DEPTH(FEET) = 0.97  
TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 6.69  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10305.00 = 1148.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10305.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.69  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.101  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.912  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 11.71  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.65  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 37.62

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10306.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 300.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 574.00 CHANNEL SLOPE = 0.1150  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 37.62  
FLOW VELOCITY (FEET/SEC.) = 8.67 FLOW DEPTH (FEET) = 1.20  
TRAVEL TIME (MIN.) = 1.10 Tc (MIN.) = 7.79  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10306.00 = 1722.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10306.00 TO NODE 10306.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 7.79  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.760  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 11.22  
EFFECTIVE AREA (ACRES) = 14.30 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA (ACRES) = 14.3 PEAK FLOW RATE (CFS) = 45.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10306.00 TO NODE 10307.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 300.00 DOWNSTREAM (FEET) = 293.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0350  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 45.55  
FLOW VELOCITY (FEET/SEC.) = 5.82 FLOW DEPTH (FEET) = 1.61  
TRAVEL TIME (MIN.) = 0.57 Tc (MIN.) = 8.37  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10307.00 = 1922.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10307.00 TO NODE 10307.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 8.37  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.612  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 2.09  
EFFECTIVE AREA (ACRES) = 15.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 15.0 PEAK FLOW RATE (CFS) = 45.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10307.00 TO NODE 10308.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 293.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0850  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 45.74  
FLOW VELOCITY (FEET/SEC.) = 10.06 FLOW DEPTH (FEET) = 1.23  
TRAVEL TIME (MIN.) = 0.33 Tc (MIN.) = 8.70  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10308.00 = 2122.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10308.00 TO NODE 10308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 8.70  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.533  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	8.50	0.30	0.500	-
USER-DEFINED	-	3.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.696  
SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 41.88  
EFFECTIVE AREA (ACRES) = 29.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA (ACRES) = 29.0 PEAK FLOW RATE (CFS) = 86.54

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10308.00 TO NODE 10309.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 250.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 600.00 CHANNEL SLOPE = 0.0433  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 86.54  
FLOW VELOCITY (FEET/SEC.) = 9.18 FLOW DEPTH (FEET) = 1.77  
TRAVEL TIME (MIN.) = 1.09 Tc (MIN.) = 9.79  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10309.00 = 2722.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.79  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.303  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.00	0.30	0.600	-
USER-DEFINED	-	1.80	0.30	0.850	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	0.500	-
USER-DEFINED	-	2.10	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.662  
 SUBAREA AREA (ACRES) = 15.40 SUBAREA RUNOFF (CFS) = 43.02  
 EFFECTIVE AREA (ACRES) = 44.40 AREA-AVERAGED Fm (INCH/HR) = 0.21  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
 TOTAL AREA (ACRES) = 44.4 PEAK FLOW RATE (CFS) = 123.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.79  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.303  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.30	0.850	-
USER-DEFINED	-	8.80	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.967  
 SUBAREA AREA (ACRES) = 15.80 SUBAREA RUNOFF (CFS) = 42.84  
 EFFECTIVE AREA (ACRES) = 60.20 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA (ACRES) = 60.2 PEAK FLOW RATE (CFS) = 166.40

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10309.00 TO NODE 10310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 250.00 DOWNSTREAM(FEET) = 208.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1021.00 CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 166.40  
 FLOW VELOCITY(FEET/SEC.) = 10.61 FLOW DEPTH(FEET) = 2.29  
 TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 11.39  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10310.00 = 3743.00 FEET.

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.39  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.031  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	1.80	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.668  
 SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 16.82  
 EFFECTIVE AREA (ACRES) = 66.80 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA (ACRES) = 66.8 PEAK FLOW RATE (CFS) = 168.53

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.39  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.031  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	8.00	0.30	0.600	-
USER-DEFINED	-	7.10	0.30	0.850	-
USER-DEFINED	-	8.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814  
 SUBAREA AREA (ACRES) = 23.50 SUBAREA RUNOFF (CFS) = 58.95  
 EFFECTIVE AREA (ACRES) = 90.30 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA (ACRES) = 90.3 PEAK FLOW RATE (CFS) = 227.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10310.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 208.00 DOWNSTREAM(FEET) = 189.00  
 FLOW LENGTH(FEET) = 1595.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.12  
 ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 227.48  
 PIPE TRAVEL TIME(MIN.) = 1.76 Tc(MIN.) = 13.15  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10335.00 = 5338.00 FEET.

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*****
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.15
RAINFALL INTENSITY(INCH/HR) = 2.79
AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.77
EFFECTIVE STREAM AREA(ACRES) = 90.30
TOTAL STREAM AREA(ACRES) = 90.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 227.48

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*****
FLOW PROCESS FROM NODE 10320.00 TO NODE 10321.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 671.00 DOWNSTREAM(FEET) = 622.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.795
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.447
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.00 0.30 0.500 95 5.79
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 3.87
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 3.87

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*****
FLOW PROCESS FROM NODE 10321.00 TO NODE 10322.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 622.00 DOWNSTREAM(FEET) = 599.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 227.00 CHANNEL SLOPE = 0.1013
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.87
FLOW VELOCITY(FEET/SEC.) = 5.83 FLOW DEPTH(FEET) = 0.47
TRAVEL TIME(MIN.) = 0.65 Tc(MIN.) = 6.44
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10322.00 = 557.00 FEET.

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*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10322.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 6.44
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.190
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.30 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 5.09
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 8.73

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*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10323.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 599.00 DOWNSTREAM(FEET) = 539.00
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.39
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.73
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 6.55
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10323.00 = 719.00 FEET.

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*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10323.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 6.55
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.151
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.30 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.80
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 10.44

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*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10324.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 539.00 DOWNSTREAM(FEET) = 530.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 97.00 CHANNEL SLOPE = 0.0928
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.44

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FLOW VELOCITY(FEET/SEC.) = 5.79 FLOW DEPTH(FEET) = 0.78  
TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 6.83  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10324.00 = 816.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10324.00 TO NODE 10324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.83  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.050

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 6.32  
EFFECTIVE AREA(ACRES) = 4.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.7 PEAK FLOW RATE(CFS) = 16.50

\*\*\*\*\*

FLOW PROCESS FROM NODE 10324.00 TO NODE 10325.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 210.00 CHANNEL SLOPE = 0.1429  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 16.50  
FLOW VELOCITY(FEET/SEC.) = 7.62 FLOW DEPTH(FEET) = 0.85  
TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 7.29  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10325.00 = 1026.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.29  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.905

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 5.75  
EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 21.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10326.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 460.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 345.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 21.63  
FLOW VELOCITY(FEET/SEC.) = 7.60 FLOW DEPTH(FEET) = 0.97  
TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 8.05  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10326.00 = 1371.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10326.00 TO NODE 10326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.05  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.688

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 6.05  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 26.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10326.00 TO NODE 10327.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 430.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 263.00 CHANNEL SLOPE = 0.1141  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 26.43  
FLOW VELOCITY(FEET/SEC.) = 7.90 FLOW DEPTH(FEET) = 1.06  
TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 8.60  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10327.00 = 1634.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10327.00 TO NODE 10327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.60  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.555

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.10	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500

SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 12.57  
EFFECTIVE AREA (ACRES) = 12.40 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 12.4 PEAK FLOW RATE (CFS) = 38.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 10327.00 TO NODE 10328.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 430.00 DOWNSTREAM (FEET) = 375.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 437.00 CHANNEL SLOPE = 0.1259  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 38.00  
FLOW VELOCITY (FEET/SEC.) = 11.16 FLOW DEPTH (FEET) = 1.07  
TRAVEL TIME (MIN.) = 0.65 Tc (MIN.) = 9.26  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10328.00 = 2071.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10328.00 TO NODE 10328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.26  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.409  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.500 -  
USER-DEFINED - 1.20 0.30 0.850 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.772  
SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 9.15  
EFFECTIVE AREA (ACRES) = 15.60 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 15.6 PEAK FLOW RATE (CFS) = 45.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 10328.00 TO NODE 10329.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 375.00 DOWNSTREAM (FEET) = 372.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 224.00 CHANNEL SLOPE = 0.0134  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 45.52  
FLOW VELOCITY (FEET/SEC.) = 5.03 FLOW DEPTH (FEET) = 1.74  
TRAVEL TIME (MIN.) = 0.74 Tc (MIN.) = 10.00  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10329.00 = 2295.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10329.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.260  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.20 0.30 0.500 -  
USER-DEFINED - 1.40 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.571  
SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 31.14  
EFFECTIVE AREA (ACRES) = 26.80 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 26.8 PEAK FLOW RATE (CFS) = 74.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10330.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 372.00 DOWNSTREAM (FEET) = 300.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 452.00 CHANNEL SLOPE = 0.1593  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 74.58  
FLOW VELOCITY (FEET/SEC.) = 14.37 FLOW DEPTH (FEET) = 1.32  
TRAVEL TIME (MIN.) = 0.52 Tc (MIN.) = 10.52  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10330.00 = 2747.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10330.00 TO NODE 10330.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.52  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.171  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 4.20 0.30 0.500 -  
USER-DEFINED - 2.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.673  
SUBAREA AREA (ACRES) = 7.80 SUBAREA RUNOFF (CFS) = 20.84  
EFFECTIVE AREA (ACRES) = 34.60 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 34.6 PEAK FLOW RATE (CFS) = 93.27

\*\*\*\*\*

FLOW PROCESS FROM NODE 10330.00 TO NODE 10331.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 295.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 182.00 CHANNEL SLOPE = 0.0275  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 93.27  
FLOW VELOCITY(FEET/SEC.) = 7.88 FLOW DEPTH(FEET) = 1.99  
TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 10.91  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10331.00 = 2929.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10331.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 10.91  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.106  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 11.30 0.30 0.500 -  
USER-DEFINED - 0.20 0.30 0.600 -  
USER-DEFINED - 4.20 0.30 0.850 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.652  
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 49.77  
EFFECTIVE AREA(ACRES) = 53.60 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 53.6 PEAK FLOW RATE(CFS) = 141.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10332.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 295.00 DOWNSTREAM(FEET) = 245.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.00 CHANNEL SLOPE = 0.0542  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 141.00  
FLOW VELOCITY(FEET/SEC.) = 11.29 FLOW DEPTH(FEET) = 2.04  
TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 12.27  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10332.00 = 3851.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10332.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 12.27  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.905  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.850 -

USER-DEFINED - 1.40 0.30 0.500 -  
USER-DEFINED - 15.40 0.30 0.850 -  
USER-DEFINED - 8.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.881  
SUBAREA AREA(ACRES) = 25.60 SUBAREA RUNOFF(CFS) = 60.85  
EFFECTIVE AREA(ACRES) = 79.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 79.2 PEAK FLOW RATE(CFS) = 192.17

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10333.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 199.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 564.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 192.17  
FLOW VELOCITY(FEET/SEC.) = 14.20 FLOW DEPTH(FEET) = 2.12  
TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 12.93  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10333.00 = 4415.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10333.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 12.93  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.819  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 0.500 -  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 5.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.761  
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 19.35  
EFFECTIVE AREA(ACRES) = 87.50 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 87.5 PEAK FLOW RATE(CFS) = 205.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10334.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 195.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 454.00 CHANNEL SLOPE = 0.0088  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 205.39  
FLOW VELOCITY(FEET/SEC.) = 6.26 FLOW DEPTH(FEET) = 3.31



TRAVEL TIME(MIN.) = 1.21 Tc(MIN.) = 14.14  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10334.00 = 4869.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10334.00 TO NODE 10334.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.14  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.676  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.800 -  
USER-DEFINED - 2.60 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 8.08  
EFFECTIVE AREA(ACRES) = 91.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71  
TOTAL AREA(ACRES) = 91.2 PEAK FLOW RATE(CFS) = 205.39  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10334.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 195.00 DOWNSTREAM(FEET) = 189.00  
FLOW LENGTH(FEET) = 1291.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 66.0 INCH PIPE IS 51.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.40  
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 205.39  
PIPE TRAVEL TIME(MIN.) = 2.07 Tc(MIN.) = 16.21  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 16.21  
RAINFALL INTENSITY(INCH/HR) = 2.50  
AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.71  
EFFECTIVE STREAM AREA(ACRES) = 91.20  
TOTAL STREAM AREA(ACRES) = 91.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 205.39

\*\* CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE

1	227.48	13.15	2.792	0.30( 0.23)	0.77	90.3	10300.00
2	205.39	16.21	2.496	0.30( 0.21)	0.71	91.2	10320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	415.73	13.15	2.792	0.30( 0.22)	0.75	164.3	10300.00
2	406.53	16.21	2.496	0.30( 0.22)	0.74	181.5	10320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 415.73 Tc(MIN.) = 13.15  
EFFECTIVE AREA(ACRES) = 164.29 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA(ACRES) = 181.5  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10335.00 TO NODE 10336.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 189.00 DOWNSTREAM(FEET) = 188.00  
FLOW LENGTH(FEET) = 103.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 75.0 INCH PIPE IS 57.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.36  
ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 415.73  
PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 13.25  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10336.00 = 6263.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10336.00 TO NODE 10337.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 46.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.93  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 415.73  
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 13.38  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10337.00 = 6475.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10337.00 TO NODE 10338.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 161.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0218  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 415.73  
FLOW VELOCITY(FEET/SEC.) = 10.49 FLOW DEPTH(FEET) = 3.63  
TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 14.77  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10338.00 = 7347.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.77  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.613  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.850 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.943  
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 8.81  
EFFECTIVE AREA(ACRES) = 168.49 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA(ACRES) = 185.7 PEAK FLOW RATE(CFS) = 415.73  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.77  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.613  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 10.41  
EFFECTIVE AREA(ACRES) = 173.49 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 190.7 PEAK FLOW RATE(CFS) = 415.73  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10339.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 161.00 DOWNSTREAM(FEET) = 159.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 328.00 CHANNEL SLOPE = 0.0061

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 415.73  
FLOW VELOCITY(FEET/SEC.) = 6.52 FLOW DEPTH(FEET) = 4.61  
TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 15.61  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10339.00 = 7675.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.61  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.543  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 2.30 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.767  
SUBAREA AREA(ACRES) = 6.90 SUBAREA RUNOFF(CFS) = 14.36  
EFFECTIVE AREA(ACRES) = 180.39 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 197.6 PEAK FLOW RATE(CFS) = 415.73  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.61  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.543  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 6.30 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 2.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.876  
SUBAREA AREA(ACRES) = 9.20 SUBAREA RUNOFF(CFS) = 18.88  
EFFECTIVE AREA(ACRES) = 189.59 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 206.8 PEAK FLOW RATE(CFS) = 415.73  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10390.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

```
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 159.00 DOWNSTREAM(FEET) = 155.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 782.00 CHANNEL SLOPE = 0.0051
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 415.73
FLOW VELOCITY(FEET/SEC.) = 6.10 FLOW DEPTH(FEET) = 4.77
TRAVEL TIME(MIN.) = 2.14 Tc(MIN.) = 17.74
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.
```

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
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```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

```
MAINLINE Tc(MIN.) = 17.74
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.376
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 0.800 -
USER-DEFINED - 3.70 0.30 0.850 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 2.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.901
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 11.75
EFFECTIVE AREA(ACRES) = 195.79 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 213.0 PEAK FLOW RATE(CFS) = 415.73
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

```
*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10
-----
```

```
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====
```

```
*****
FLOW PROCESS FROM NODE 10340.00 TO NODE 10341.00 IS CODE = 21
-----
```

```
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
```

```
INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 585.00
```

```
Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.581
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.161
```

```
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE" - 0.10 0.30 0.800 95 10.58
PUBLIC PARK - 0.50 0.30 0.850 95 10.90
AGRICULTURAL GOOD COVER
```

```
"ROW CROPS, STRAIGHT ROW" - 0.40 0.30 1.000 95 21.09
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA RUNOFF(CFS) = 2.60
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.60
```

```
*****
FLOW PROCESS FROM NODE 10341.00 TO NODE 10342.00 IS CODE = 63
-----
```

```
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====
```

```
UPSTREAM ELEVATION(FEET) = 585.00 DOWNSTREAM ELEVATION(FEET) = 570.00
STREET LENGTH(FEET) = 250.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00
```

```
DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020
```

```
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64
```

```
**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.19
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 5.99
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.74
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.32
STREET FLOW TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 11.46
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.021
```

```
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.70 0.30 0.800 -
USER-DEFINED - 1.40 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 5.18
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 7.66
```

```
END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 7.51
FLOW VELOCITY(FEET/SEC.) = 5.08 DEPTH*VELOCITY(FT*FT/SEC.) = 1.57
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10342.00 = 558.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
-----
```

```
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====
```

```
UPSTREAM ELEVATION(FEET) = 570.00 DOWNSTREAM ELEVATION(FEET) = 560.00
```

STREET LENGTH(FEET) = 415.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.39  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 10.91  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.76  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.42  
STREET FLOW TRAVEL TIME(MIN.) = 1.84 Tc(MIN.) = 13.30

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.774  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.20 0.30 0.800 -  
USER-DEFINED - 1.20 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.825  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 5.46  
EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 12.42

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.78  
FLOW VELOCITY(FEET/SEC.) = 3.94 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.55  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10343.00 = 973.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10343.00 TO NODE 10344.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 560.00 DOWNSTREAM ELEVATION(FEET) = 550.00  
STREET LENGTH(FEET) = 616.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.37  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.44  
HALFSTREET FLOOD WIDTH(FEET) = 14.06  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.55  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.56  
STREET FLOW TRAVEL TIME(MIN.) = 2.89 Tc(MIN.) = 16.19

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.497  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.800 -  
USER-DEFINED - 0.80 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814  
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 5.88  
EFFECTIVE AREA(ACRES) = 8.40 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 16.93

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.45 HALFSTREET FLOOD WIDTH(FEET) = 14.62  
FLOW VELOCITY(FEET/SEC.) = 3.64 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.64  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10344.00 = 1589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10344.00 TO NODE 10345.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 550.00 DOWNSTREAM ELEVATION(FEET) = 510.00  
STREET LENGTH(FEET) = 474.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.86  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 11.01  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.08  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.68  
STREET FLOW TRAVEL TIME(MIN.) = 1.12 Tc(MIN.) = 17.31  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.410

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.80 0.30 0.800 -  
USER-DEFINED - 0.20 0.30 0.850 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.86  
EFFECTIVE AREA(ACRES) = 11.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 11.4 PEAK FLOW RATE(CFS) = 22.13

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.52  
FLOW VELOCITY(FEET/SEC.) = 7.29 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.84  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10345.00 = 2063.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10345.00 TO NODE 10346.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 510.00 DOWNSTREAM ELEVATION(FEET) = 484.00  
STREET LENGTH(FEET) = 231.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.54

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.43  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 11.32  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.31  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.20  
STREET FLOW TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 17.77  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.374

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.40 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.61  
EFFECTIVE AREA(ACRES) = 13.80 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 13.8 PEAK FLOW RATE(CFS) = 26.37

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.72  
FLOW VELOCITY(FEET/SEC.) = 8.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.31  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10346.00 = 2294.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10346.00 TO NODE 10347.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 484.00 DOWNSTREAM ELEVATION(FEET) = 378.00  
STREET LENGTH(FEET) = 995.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.55

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.03  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.41  
HALFSTREET FLOOD WIDTH(FEET) = 12.54  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.52  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.49  
STREET FLOW TRAVEL TIME(MIN.) = 1.95 Tc(MIN.) = 19.72  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.222

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 7.31  
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 31.80

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 12.84  
FLOW VELOCITY(FEET/SEC.) = 8.65 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.59  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10347.00 = 3289.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10347.00 TO NODE 10348.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 378.00 DOWNSTREAM ELEVATION(FEET) = 303.00  
STREET LENGTH(FEET) = 751.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.56

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.81  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.44  
HALFSTREET FLOOD WIDTH(FEET) = 14.16  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.84  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.90  
STREET FLOW TRAVEL TIME(MIN.) = 1.42 Tc(MIN.) = 21.13  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.141  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.20	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 14.03  
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 44.52

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 14.97  
FLOW VELOCITY(FEET/SEC.) = 9.15 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.19  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10348.00 = 4040.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10348.00 TO NODE 10349.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 303.00 DOWNSTREAM ELEVATION(FEET) = 252.00  
STREET LENGTH(FEET) = 607.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 53.04  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.49  
HALFSTREET FLOOD WIDTH(FEET) = 16.67  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.93  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.39  
STREET FLOW TRAVEL TIME(MIN.) = 1.13 Tc(MIN.) = 22.27  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.082  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	12.60	0.30	0.800	-
USER-DEFINED	-	0.50	0.30	0.850	-

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	7.30	0.30	0.800	-
USER-DEFINED	-	3.00	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.815  
SUBAREA AREA(ACRES) = 10.30 SUBAREA RUNOFF(CFS) = 17.04  
EFFECTIVE AREA(ACRES) = 36.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 36.4 PEAK FLOW RATE(CFS) = 60.18

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.51 HALFSTREET FLOOD WIDTH(FEET) = 17.55  
FLOW VELOCITY(FEET/SEC.) = 9.20 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.69  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10349.00 = 4647.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10349.00 TO NODE 10350.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 252.00 DOWNSTREAM ELEVATION(FEET) = 246.00  
STREET LENGTH(FEET) = 224.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 70.85  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.63  
HALFSTREET FLOOD WIDTH(FEET) = 23.53  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.19  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.89  
STREET FLOW TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 22.87  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.051  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	12.60	0.30	0.800	-
USER-DEFINED	-	0.50	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.802  
SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 21.34  
EFFECTIVE AREA(ACRES) = 49.50 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 49.5 PEAK FLOW RATE(CFS) = 80.49

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.65 HALFSTREET FLOOD WIDTH(FEET) = 24.70  
FLOW VELOCITY(FEET/SEC.) = 6.40 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.17

LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10350.00 = 4871.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10350.00 TO NODE 10351.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 237.00
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.43
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 80.49
PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 23.51
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10351.00 = 5390.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10351.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.51
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.017
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 0.100 -
USER-DEFINED - 5.60 0.30 0.800 -
USER-DEFINED - 0.70 0.30 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.784
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 10.43
EFFECTIVE AREA(ACRES) = 56.00 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 56.0 PEAK FLOW RATE(CFS) = 89.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10352.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 237.00 DOWNSTREAM(FEET) = 230.00
FLOW LENGTH(FEET) = 675.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.46
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 89.43
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 24.50
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10352.00 = 6065.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.50

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.966

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.30 0.100 -
USER-DEFINED - 0.40 0.30 0.800 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.300
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.36
EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 89.43
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.50
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.966
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.80 0.30 0.100 -
USER-DEFINED - 9.40 0.30 0.800 -
USER-DEFINED - 1.10 0.30 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 17.69
EFFECTIVE AREA(ACRES) = 68.70 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79
TOTAL AREA(ACRES) = 68.7 PEAK FLOW RATE(CFS) = 106.91

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10353.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 230.00 DOWNSTREAM(FEET) = 180.00
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 34.05
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 106.91
PIPE TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 24.64
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10353.00 = 6366.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10353.00 TO NODE 10353.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.64
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.959
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 6.00 0.30 0.800 -  
 USER-DEFINED - 1.30 0.30 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.799  
 SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 11.45  
 EFFECTIVE AREA(ACRES) = 76.10 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 76.1 PEAK FLOW RATE(CFS) = 117.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10353.00 TO NODE 10354.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 172.00  
 FLOW LENGTH(FEET) = 458.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.90  
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 117.88  
 PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 25.16  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10354.00 = 6824.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10354.00 TO NODE 10390.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 172.00 DOWNSTREAM(FEET) = 155.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00 CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 117.88  
 FLOW VELOCITY(FEET/SEC.) = 9.73 FLOW DEPTH(FEET) = 2.01  
 TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 25.86  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 25.86  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.907  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 0.100 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.100 -  
 USER-DEFINED - 0.90 0.30 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.520

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 3.15  
 EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
 TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 117.88  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 25.86  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.907  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 2.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.964  
 SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 5.53  
 EFFECTIVE AREA(ACRES) = 81.90 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 81.9 PEAK FLOW RATE(CFS) = 123.05

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 25.86  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.907  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.50 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 3.62  
 EFFECTIVE AREA(ACRES) = 84.40 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 84.4 PEAK FLOW RATE(CFS) = 126.66

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
 =====  
 \*\* MAIN STREAM CONFLUENCE DATA \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 126.66 25.86 1.907 0.30( 0.24) 0.80 84.4 10340.00  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.



\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	415.73	17.74	2.376	0.30 ( 0.23)	0.77	195.8	10300.00
2	406.53	20.83	2.157	0.30 ( 0.23)	0.76	213.0	10320.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	527.06	17.74	2.376	0.30 ( 0.23)	0.77	253.7	10300.00
2	523.81	20.83	2.157	0.30 ( 0.23)	0.77	281.0	10320.00
3	480.53	25.86	1.907	0.30 ( 0.23)	0.77	297.4	10340.00

TOTAL AREA (ACRES) = 297.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 527.06 Tc (MIN.) = 17.745  
EFFECTIVE AREA (ACRES) = 253.69 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
TOTAL AREA (ACRES) = 297.4  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10360.00 TO NODE 10361.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
ELEVATION DATA: UPSTREAM (FEET) = 337.00 DOWNSTREAM (FEET) = 292.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.697

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.141

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.30	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"GRASS"	-	0.50	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.10	0.30	1.000	95	10.70

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 2.30  
TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 2.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 10361.00 TO NODE 10362.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 292.00 DOWNSTREAM (FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 199.00 CHANNEL SLOPE = 0.0101  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.30  
FLOW VELOCITY (FEET/SEC.) = 2.15 FLOW DEPTH (FEET) = 0.60  
TRAVEL TIME (MIN.) = 1.55 Tc (MIN.) = 12.24  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10362.00 = 529.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.24

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.908

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.59  
EFFECTIVE AREA (ACRES) = 2.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 4.70

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10363.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 290.00 DOWNSTREAM (FEET) = 288.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.70  
FLOW VELOCITY (FEET/SEC.) = 2.88 FLOW DEPTH (FEET) = 0.74  
TRAVEL TIME (MIN.) = 0.85 Tc (MIN.) = 13.09  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10363.00 = 676.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10363.00 TO NODE 10363.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.09  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.799  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.40 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 0.850 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 5.41  
 EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 9.91

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10363.00 TO NODE 10364.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 288.00 DOWNSTREAM(FEET) = 286.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 9.91  
 FLOW VELOCITY(FEET/SEC.) = 3.44 FLOW DEPTH(FEET) = 0.98  
 TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 13.80  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10364.00 = 823.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10364.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.80  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.713  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.40 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
 SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 4.14  
 EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 13.70

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10365.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 286.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 13.70  
 FLOW VELOCITY(FEET/SEC.) = 3.08 FLOW DEPTH(FEET) = 1.22  
 TRAVEL TIME(MIN.) = 1.34 Tc(MIN.) = 15.15  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10365.00 = 1071.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10365.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.15  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.579  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.90 0.30 1.000 -  
 USER-DEFINED - 1.80 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.850 -  
 USER-DEFINED - 0.50 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 7.19  
 EFFECTIVE AREA(ACRES) = 9.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 20.13

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10366.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 20.13  
 FLOW VELOCITY(FEET/SEC.) = 3.39 FLOW DEPTH(FEET) = 1.41  
 TRAVEL TIME(MIN.) = 1.22 Tc(MIN.) = 16.37  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10366.00 = 1319.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10366.00 TO NODE 10366.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.37  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.484  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.20 0.30 1.000 -  
 USER-DEFINED - 2.30 0.30 1.000 -

USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 2.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995  
SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 16.72  
EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 36.01

\*\*\*\*\*

FLOW PROCESS FROM NODE 10366.00 TO NODE 10367.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 279.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 292.00 CHANNEL SLOPE = 0.0103  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 36.01  
FLOW VELOCITY (FEET/SEC.) = 4.31 FLOW DEPTH (FEET) = 1.67  
TRAVEL TIME (MIN.) = 1.13 Tc (MIN.) = 17.49  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10367.00 = 1611.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10367.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.49

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.396

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972

SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 3.03

EFFECTIVE AREA (ACRES) = 19.90 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 19.9 PEAK FLOW RATE (CFS) = 37.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10368.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 279.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 378.00 CHANNEL SLOPE = 0.0079  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 37.59  
FLOW VELOCITY (FEET/SEC.) = 3.94 FLOW DEPTH (FEET) = 1.78

TRAVEL TIME (MIN.) = 1.60 Tc (MIN.) = 19.09  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10368.00 = 1989.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10368.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 19.09

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.271

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.973

SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 3.92

EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 39.28

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10369.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 247.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 229.00 CHANNEL SLOPE = 0.1266  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 39.28  
FLOW VELOCITY (FEET/SEC.) = 11.25 FLOW DEPTH (FEET) = 1.08  
TRAVEL TIME (MIN.) = 0.34 Tc (MIN.) = 19.43  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10369.00 = 2218.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10369.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 19.43

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.244

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	9.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996

SUBAREA AREA (ACRES) = 11.60 SUBAREA RUNOFF (CFS) = 20.31

EFFECTIVE AREA (ACRES) = 33.70 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 33.7 PEAK FLOW RATE (CFS) = 59.06

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10369.00 TO NODE 10370.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	247.00	DOWNSTREAM(FEET) =	226.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	179.00	CHANNEL SLOPE =	0.1173
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH(FEET) =	2.00
CHANNEL FLOW THRU SUBAREA(CFS) =	59.06		
FLOW VELOCITY(FEET/SEC.) =	12.07	FLOW DEPTH(FEET) =	1.28
TRAVEL TIME(MIN.) =	0.25	Tc(MIN.) =	19.68
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10370.00 =	2397.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10370.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) =	19.68				
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	2.225				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	3.60	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	5.60	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.997				
SUBAREA AREA(ACRES) =	11.10	SUBAREA RUNOFF(CFS) =	19.24		
EFFECTIVE AREA(ACRES) =	44.80	AREA-AVERAGED Fm(INCH/HR) =	0.30		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.99		
TOTAL AREA(ACRES) =	44.8	PEAK FLOW RATE(CFS) =	77.72		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10371.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	226.00	DOWNSTREAM(FEET) =	188.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	434.00	CHANNEL SLOPE =	0.0876
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH(FEET) =	2.00
CHANNEL FLOW THRU SUBAREA(CFS) =	77.72		
FLOW VELOCITY(FEET/SEC.) =	11.63	FLOW DEPTH(FEET) =	1.49
TRAVEL TIME(MIN.) =	0.62	Tc(MIN.) =	20.30
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10371.00 =	2831.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10371.00 TO NODE 10371.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.30  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.184  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.20	0.30	0.850	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	7.20	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.958				
SUBAREA AREA(ACRES) =	10.70	SUBAREA RUNOFF(CFS) =	18.27		
EFFECTIVE AREA(ACRES) =	55.50	AREA-AVERAGED Fm(INCH/HR) =	0.30		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.99		
TOTAL AREA(ACRES) =	55.5	PEAK FLOW RATE(CFS) =	94.35		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10371.00 TO NODE 10389.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	188.00	DOWNSTREAM(FEET) =	157.00
FLOW LENGTH(FEET) =	1918.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	39.0 INCH PIPE IS	30.3 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) =	13.66		
ESTIMATED PIPE DIAMETER(INCH) =	39.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	94.35		
PIPE TRAVEL TIME(MIN.) =	2.34	Tc(MIN.) =	22.64
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 =	4749.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS =	2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:	
TIME OF CONCENTRATION(MIN.) =	22.64
RAINFALL INTENSITY(INCH/HR) =	2.06
AREA-AVERAGED Fm(INCH/HR) =	0.30
AREA-AVERAGED Fp(INCH/HR) =	0.30
AREA-AVERAGED Ap =	0.99
EFFECTIVE STREAM AREA(ACRES) =	55.50
TOTAL STREAM AREA(ACRES) =	55.50
PEAK FLOW RATE(CFS) AT CONFLUENCE =	94.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10380.00 TO NODE 10381.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) =	241.00		
ELEVATION DATA: UPSTREAM(FEET) =	275.00	DOWNSTREAM(FEET) =	273.00

Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.110  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.958  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.30	0.100	95	7.11
PUBLIC PARK	-	1.10	0.30	0.850	95	11.30

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.735  
 SUBAREA RUNOFF(CFS) = 4.37  
 TOTAL AREA(ACRES) = 1.30 PEAK FLOW RATE(CFS) = 4.37

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10381.00 TO NODE 10382.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 273.00 DOWNSTREAM ELEVATION(FEET) = 271.00  
 STREET LENGTH(FEET) = 238.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.89  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.39  
 HALfstREET FLOOD WIDTH(FEET) = 11.45  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.30  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.89  
 STREET FLOW TRAVEL TIME(MIN.) = 1.73 Tc(MIN.) = 8.84  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.499  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	1.40	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.718  
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 5.02  
 EFFECTIVE AREA(ACRES) = 3.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 8.86

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.41 HALfstREET FLOOD WIDTH(FEET) = 12.77  
 FLOW VELOCITY(FEET/SEC.) = 2.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.01  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10382.00 = 479.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10382.00 TO NODE 10383.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 271.00 DOWNSTREAM ELEVATION(FEET) = 268.00  
 STREET LENGTH(FEET) = 357.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.83  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.46  
 HALfstREET FLOOD WIDTH(FEET) = 14.96  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.64  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.21  
 STREET FLOW TRAVEL TIME(MIN.) = 2.25 Tc(MIN.) = 11.09  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.077  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	1.30	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.452  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 7.94  
 EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 15.66

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.48 HALfstREET FLOOD WIDTH(FEET) = 16.21  
 FLOW VELOCITY(FEET/SEC.) = 2.78 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.34  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10383.00 = 836.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10383.00 TO NODE 10384.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 268.00 DOWNSTREAM ELEVATION(FEET) = 264.00  
 STREET LENGTH(FEET) = 473.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.61  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.52  
 HALFSTREET FLOOD WIDTH(FEET) = 18.09  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.98  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.55  
 STREET FLOW TRAVEL TIME(MIN.) = 2.65 Tc(MIN.) = 13.74  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.722

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.60	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 9.90  
 EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.57  
 TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 23.64

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 19.18  
 FLOW VELOCITY(FEET/SEC.) = 3.06 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.66  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10384.00 = 1309.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10384.00 TO NODE 10385.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 264.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
 STREET LENGTH(FEET) = 463.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.26  
 \*\*\*STREET FLOWING FULL\*\*\*

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.60  
 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.07  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.83  
 STREET FLOW TRAVEL TIME(MIN.) = 2.52 Tc(MIN.) = 16.25  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.492

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.600	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.650  
 SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 13.23  
 EFFECTIVE AREA(ACRES) = 16.70 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.7 PEAK FLOW RATE(CFS) = 34.75

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
 FLOW VELOCITY(FEET/SEC.) = 3.25 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.00  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10385.00 = 1772.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10385.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
 =====

MAINLINE Tc(MIN.) = 16.25  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.492  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.42  
 EFFECTIVE AREA(ACRES) = 16.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.9 PEAK FLOW RATE(CFS) = 35.17

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10386.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 261.00 DOWNSTREAM(FEET) = 200.00  
 FLOW LENGTH(FEET) = 712.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.32  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 35.17

PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 16.84  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10386.00 = 2484.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.84  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.447  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 0.100 -  
USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 0.100 -  
USER-DEFINED - 0.30 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.561  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.87  
EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 37.35

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.84  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.447  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 0.100 -  
USER-DEFINED - 0.10 0.30 0.600 -  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.30 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.544  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 8.43  
EFFECTIVE AREA(ACRES) = 22.40 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 22.4 PEAK FLOW RATE(CFS) = 45.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.84  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.447  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.100 -  
USER-DEFINED - 0.20 0.30 0.500 -  
USER-DEFINED - 0.10 0.30 0.600 -  
USER-DEFINED - 0.30 0.30 0.850 -  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 0.10 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 7.50  
EFFECTIVE AREA(ACRES) = 25.90 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54  
TOTAL AREA(ACRES) = 25.9 PEAK FLOW RATE(CFS) = 53.27

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.84  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.447  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.70 0.30 0.100 -  
USER-DEFINED - 0.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.228  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 4.28  
EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52  
TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 57.55

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.84  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.447  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 2.10 0.30 0.100 -  
USER-DEFINED - 0.20 0.30 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.225  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 6.42  
EFFECTIVE AREA(ACRES) = 30.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49  
TOTAL AREA(ACRES) = 30.9 PEAK FLOW RATE(CFS) = 63.98

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 16.84  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.447  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.100 -  
USER-DEFINED - 1.50 0.30 0.600 -  
USER-DEFINED - 1.70 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.204  
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 15.46  
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 79.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10387.00 IS CODE = 31  
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 200.00 DOWNSTREAM(FEET) = 163.00  
FLOW LENGTH(FEET) = 1145.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.14  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 79.44  
PIPE TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 17.95  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10387.00 = 3629.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.95  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.100 -  
USER-DEFINED - 23.80 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 0.100 -  
USER-DEFINED - 6.90 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.830  
SUBAREA AREA(ACRES) = 32.90 SUBAREA RUNOFF(CFS) = 62.51  
EFFECTIVE AREA(ACRES) = 71.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 71.0 PEAK FLOW RATE(CFS) = 138.96

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81  
=====

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.95  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 1.20 0.30 0.100 -  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.641  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 7.41  
EFFECTIVE AREA(ACRES) = 74.80 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 74.8 PEAK FLOW RATE(CFS) = 146.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10388.00 IS CODE = 31  
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 163.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.29  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 146.38  
PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 18.07  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10388.00 = 3779.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.07  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.350  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.80 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.400 -  
USER-DEFINED - 0.60 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 12.54  
EFFECTIVE AREA(ACRES) = 80.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 80.9 PEAK FLOW RATE(CFS) = 158.27



```

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.07
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.350
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
    LAND USE         GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.10    0.30    0.100   -
USER-DEFINED         -        10.70    0.30    0.400   -
USER-DEFINED         -         2.30    0.30    0.850   -
USER-DEFINED         -         0.50    0.30    1.000   -
USER-DEFINED         -         0.30    0.30    1.000   -
USER-DEFINED         -         0.70    0.30    0.400   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.502
SUBAREA AREA(ACRES) = 14.60   SUBAREA RUNOFF(CFS) = 28.91
EFFECTIVE AREA(ACRES) = 95.50   AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 95.5     PEAK FLOW RATE(CFS) = 187.17

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.07
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.350
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
    LAND USE         GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.70    0.30    0.850   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.70   SUBAREA RUNOFF(CFS) = 1.32
EFFECTIVE AREA(ACRES) = 96.20   AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 96.2     PEAK FLOW RATE(CFS) = 188.49

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10389.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 158.00   DOWNSTREAM(FEET) = 157.00
FLOW LENGTH(FEET) = 51.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.31
ESTIMATED PIPE DIAMETER(INCH) = 48.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 188.49
PIPE TRAVEL TIME(MIN.) = 0.05   Tc(MIN.) = 18.12
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10389.00 = 3830.00 FEET.

*****

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FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 18.12
RAINFALL INTENSITY(INCH/HR) = 2.35
AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.58
EFFECTIVE STREAM AREA(ACRES) = 96.20
TOTAL STREAM AREA(ACRES) = 96.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 188.49

** CONFLUENCE DATA **
STREAM   Q      Tc   Intensity   Fp(Fm)   Ap   Ae   HEADWATER
NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1        94.35 22.64 2.063 0.30( 0.30) 0.99 55.5 10360.00
2       188.49 18.12 2.346 0.30( 0.17) 0.58 96.2 10380.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM   Q      Tc   Intensity   Fp(Fm)   Ap   Ae   HEADWATER
NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1       276.14 18.12 2.346 0.30( 0.21) 0.71 140.6 10380.00
2       258.23 22.64 2.063 0.30( 0.22) 0.73 151.7 10360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 276.14   Tc(MIN.) = 18.12
EFFECTIVE AREA(ACRES) = 140.63   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 151.7
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

*****
FLOW PROCESS FROM NODE 10389.00 TO NODE 10390.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 157.00   DOWNSTREAM(FEET) = 155.00
FLOW LENGTH(FEET) = 312.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.59
ESTIMATED PIPE DIAMETER(INCH) = 69.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 276.14
PIPE TRAVEL TIME(MIN.) = 0.41   Tc(MIN.) = 18.53
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

MAINLINE Tc(MIN.) = 18.53  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.314  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 5.70 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 17.23  
 EFFECTIVE AREA(ACRES) = 150.13 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA(ACRES) = 161.2 PEAK FLOW RATE(CFS) = 283.31

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.53  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.314  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 3.99  
 EFFECTIVE AREA(ACRES) = 152.33 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 163.4 PEAK FLOW RATE(CFS) = 287.30

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	287.30	18.53	2.314	0.30( 0.22)	0.73	152.3	10380.00
2	267.25	23.06	2.041	0.30( 0.22)	0.75	163.4	10360.00

LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	527.06	17.74	2.376	0.30( 0.23)	0.77	253.7	10300.00
2	523.81	20.83	2.157	0.30( 0.23)	0.77	281.0	10320.00
3	480.53	25.86	1.907	0.30( 0.23)	0.77	297.4	10340.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	810.21	17.74	2.376	0.30( 0.23)	0.76	399.5	10300.00
2	813.53	18.53	2.314	0.30( 0.23)	0.76	413.0	10380.00
3	800.95	20.83	2.157	0.30( 0.23)	0.76	438.9	10320.00
4	771.92	23.06	2.041	0.30( 0.23)	0.76	451.6	10360.00
5	728.08	25.86	1.907	0.30( 0.23)	0.76	460.8	10340.00

TOTAL AREA(ACRES) = 460.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 813.53 Tc(MIN.) = 18.535  
 EFFECTIVE AREA(ACRES) = 413.01 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA(ACRES) = 460.8  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12  
 -----

>>>>CLEAR MEMORY BANK # 1 <<<<<

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 460.8 TC(MIN.) = 18.53  
 EFFECTIVE AREA(ACRES) = 413.01 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.757  
 PEAK FLOW RATE(CFS) = 813.53

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	810.21	17.74	2.376	0.30( 0.23)	0.76	399.5	10300.00
2	813.53	18.53	2.314	0.30( 0.23)	0.76	413.0	10380.00
3	800.95	20.83	2.157	0.30( 0.23)	0.76	438.9	10320.00
4	771.92	23.06	2.041	0.30( 0.23)	0.76	451.6	10360.00
5	728.08	25.86	1.907	0.30( 0.23)	0.76	460.8	10340.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506104B.DAT  
TIME/DATE OF STUDY: 12:46 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.820
- 2) 6.00; 4.350
- 3) 7.00; 3.990
- 4) 8.00; 3.700
- 5) 9.00; 3.460
- 6) 10.00; 3.260
- 7) 11.00; 3.090
- 8) 12.00; 2.940
- 9) 13.00; 2.810
- 10) 14.00; 2.690
- 11) 15.00; 2.590
- 12) 20.00; 2.200
- 13) 25.00; 1.940
- 14) 30.00; 1.750
- 15) 40.00; 1.490
- 16) 50.00; 1.310
- 17) 60.00; 1.180
- 18) 90.00; 0.940
- 19) 120.00; 0.800
- 20) 180.00; 0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10400.00 TO NODE 10401.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00  
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.434  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.194  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
PUBLIC PARK	-	0.50	0.30	0.850	95	6.43

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.850  
 SUBAREA RUNOFF(CFS) = 1.77  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 10401.00 TO NODE 10402.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.3419  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.77  
 FLOW VELOCITY(FEET/SEC.) = 6.15 FLOW DEPTH(FEET) = 0.31  
 TRAVEL TIME(MIN.) = 0.32  $T_c$ (MIN.) = 6.75  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10402.00 = 424.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10402.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 6.75  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.080  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.940  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.71  
EFFECTIVE AREA(ACRES) = 1.00 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 3.43

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10402.00 TO NODE 10403.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.2439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.43  
FLOW VELOCITY(FEET/SEC.) = 6.35 FLOW DEPTH(FEET) = 0.42  
TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 7.07  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10403.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10403.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 7.07  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.969  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 2.99  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 6.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10404.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 420.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 266.00 CHANNEL SLOPE = 0.1880  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 6.32  
FLOW VELOCITY(FEET/SEC.) = 6.68 FLOW DEPTH(FEET) = 0.56  
TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 7.74  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10404.00 = 813.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10404.00 IS CODE = 81  
-----

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc(MIN.) = 7.74  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.776  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.863  
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 7.28  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 13.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10405.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 370.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 289.00 CHANNEL SLOPE = 0.1730  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 13.27  
FLOW VELOCITY(FEET/SEC.) = 7.81 FLOW DEPTH(FEET) = 0.75  
TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 8.35  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10405.00 = 1102.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10405.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 8.35  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.615  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 12.10  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 24.76

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10406.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 367.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 23.00 CHANNEL SLOPE = 0.1304

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 24.76  
FLOW VELOCITY (FEET/SEC.) = 8.18 FLOW DEPTH (FEET) = 1.00  
TRAVEL TIME (MIN.) = 0.05 Tc (MIN.) = 8.40  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10406.00 = 1125.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10406.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 8.40  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.604  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 6.33  
EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 31.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10407.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 367.00 DOWNSTREAM (FEET) = 344.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 214.00 CHANNEL SLOPE = 0.1075  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.01  
FLOW VELOCITY (FEET/SEC.) = 8.04 FLOW DEPTH (FEET) = 1.13  
TRAVEL TIME (MIN.) = 0.44 Tc (MIN.) = 8.84  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10407.00 = 1339.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10407.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 8.84  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.497  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 5.84  
EFFECTIVE AREA (ACRES) = 12.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 35.86

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10408.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 344.00 DOWNSTREAM (FEET) = 327.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 919.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 35.86  
FLOW VELOCITY (FEET/SEC.) = 5.37 FLOW DEPTH (FEET) = 1.49  
TRAVEL TIME (MIN.) = 2.85 Tc (MIN.) = 11.70  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10408.00 = 2258.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10408.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 11.70  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.985  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.800 -  
USER-DEFINED - 7.90 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.849  
SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 19.66  
EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 49.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 327.00 DOWNSTREAM (FEET) = 314.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 807.00 CHANNEL SLOPE = 0.0161  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 49.85  
FLOW VELOCITY (FEET/SEC.) = 5.52 FLOW DEPTH (FEET) = 1.73  
TRAVEL TIME (MIN.) = 2.44 Tc (MIN.) = 14.13  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10409.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10409.00 TO NODE 10409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 14.13  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.677  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.90 0.30 0.800 -  
 USER-DEFINED - 5.70 0.30 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.823  
 SUBAREA AREA (ACRES) = 12.60 SUBAREA RUNOFF (CFS) = 27.55  
 EFFECTIVE AREA (ACRES) = 32.90 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA (ACRES) = 32.9 PEAK FLOW RATE (CFS) = 71.76

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10409.00 TO NODE 10410.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 314.00 DOWNSTREAM(FEET) = 266.00  
 FLOW LENGTH(FEET) = 213.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 14.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 35.13  
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 71.76  
 PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 14.24  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10410.00 = 3278.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10410.00 TO NODE 10411.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 266.00 DOWNSTREAM(FEET) = 170.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1470.00 CHANNEL SLOPE = 0.0653  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 71.76  
 FLOW VELOCITY(FEET/SEC.) = 10.21 FLOW DEPTH(FEET) = 1.53  
 TRAVEL TIME(MIN.) = 2.40 Tc(MIN.) = 16.64  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10411.00 = 4748.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10411.00 TO NODE 10411.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
 =====

MAINLINE Tc(MIN.) = 16.64  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.462  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	6.60	0.30	0.800	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.723  
 SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 17.18

EFFECTIVE AREA (ACRES) = 41.40 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 41.4 PEAK FLOW RATE (CFS) = 82.60

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10411.00 TO NODE 10412.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 170.00 DOWNSTREAM(FEET) = 161.00  
 FLOW LENGTH(FEET) = 1129.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.09  
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 82.60  
 PIPE TRAVEL TIME(MIN.) = 1.86 Tc(MIN.) = 18.50  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10412.00 = 5877.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10412.00 TO NODE 10413.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 161.00 DOWNSTREAM(FEET) = 141.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 360.00 CHANNEL SLOPE = 0.0556  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 82.60  
 FLOW VELOCITY(FEET/SEC.) = 9.99 FLOW DEPTH(FEET) = 1.66  
 TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 19.10  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10413.00 = 6237.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10413.00 TO NODE 10413.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
 =====

MAINLINE Tc(MIN.) = 19.10  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.270  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.509  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 5.53  
 EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA (ACRES) = 44.3 PEAK FLOW RATE (CFS) = 82.60  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 END OF STUDY SUMMARY:  
 =====

TOTAL AREA (ACRES) = 44.3 TC (MIN.) = 19.10  
EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.798  
PEAK FLOW RATE (CFS) = 82.60

=====  
=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506105I.DAT  
TIME/DATE OF STUDY: 12:49 04/15/2013  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
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NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10500.00 TO NODE 10501.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

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FLOW PROCESS FROM NODE 10501.00 TO NODE 10502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

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\*\*\*\*\*

FLOW PROCESS FROM NODE 10502.00 TO NODE 10502.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.10     0.30      1.000     -
USER-DEFINED  -        0.80     0.30      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 2.18
EFFECTIVE AREA (ACRES) = 1.40  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.4    PEAK FLOW RATE (CFS) = 3.39

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*****
FLOW PROCESS FROM NODE 10502.00 TO NODE 10503.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1025.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 193.00  CHANNEL SLOPE = 0.1295
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.39
FLOW VELOCITY(FEET/SEC.) = 4.96  FLOW DEPTH(FEET) = 0.48
TRAVEL TIME(MIN.) = 0.65  Tc(MIN.) = 12.29
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10503.00 = 700.00 FEET.

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10503.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.29
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.902
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.50   0.30  1.000  -
USER-DEFINED      -        1.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 5.39
EFFECTIVE AREA (ACRES) = 3.70  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 3.7    PEAK FLOW RATE (CFS) = 8.67

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10504.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 1025.00  DOWNSTREAM(FEET) = 1020.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00  CHANNEL SLOPE = 0.0151
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 8.67
FLOW VELOCITY(FEET/SEC.) = 3.48  FLOW DEPTH(FEET) = 0.91
TRAVEL TIME(MIN.) = 1.59  Tc(MIN.) = 13.88
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10504.00 = 1032.00 FEET.

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10504.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.88
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.704
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.10   0.30  1.000  -
USER-DEFINED      -        0.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 1.95
EFFECTIVE AREA (ACRES) = 4.60  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.6    PEAK FLOW RATE (CFS) = 9.95

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10505.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 1020.00  DOWNSTREAM(FEET) = 975.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 397.00  CHANNEL SLOPE = 0.1134
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 9.95
FLOW VELOCITY(FEET/SEC.) = 7.64  FLOW DEPTH(FEET) = 0.66
TRAVEL TIME(MIN.) = 0.87  Tc(MIN.) = 14.75
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10505.00 = 1429.00 FEET.

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10505.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.75
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.615
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.20   0.30  1.000  -
USER-DEFINED      -        1.20   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.40  SUBAREA RUNOFF (CFS) = 2.92
EFFECTIVE AREA (ACRES) = 6.00  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.0    PEAK FLOW RATE (CFS) = 12.50

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10506.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 905.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 334.00 CHANNEL SLOPE = 0.2096
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 12.50
FLOW VELOCITY(FEET/SEC.) = 10.24 FLOW DEPTH(FEET) = 0.64
TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 15.29
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10506.00 = 1763.00 FEET.

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10506.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.29
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.567
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE   GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED -      6.10   0.30   1.000  -
USER-DEFINED -      3.70   0.30   1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 20.00
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 32.24

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10507.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 790.00 CHANNEL SLOPE = 0.0380
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 32.24
FLOW VELOCITY(FEET/SEC.) = 5.49 FLOW DEPTH(FEET) = 1.40
TRAVEL TIME(MIN.) = 2.40 Tc(MIN.) = 17.69
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10507.00 = 2553.00 FEET.

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10507.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.69
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.380
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE   GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED -      2.70   0.30   1.000  -
USER-DEFINED -      6.30   0.30   1.000  -
USER-DEFINED -      0.30   0.30   1.000  -

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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 17.41
EFFECTIVE AREA(ACRES) = 25.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 47.00

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10508.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 755.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 47.00
FLOW VELOCITY(FEET/SEC.) = 8.93 FLOW DEPTH(FEET) = 1.32
TRAVEL TIME(MIN.) = 2.09 Tc(MIN.) = 19.78
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10508.00 = 3673.00 FEET.

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10508.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.78
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.217
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE   GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED -      0.80   0.30   1.000  -
USER-DEFINED -     11.10   0.30   1.000  -
USER-DEFINED -      3.10   0.30   1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 25.88
EFFECTIVE AREA(ACRES) = 40.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 69.20

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10509.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 755.00 DOWNSTREAM(FEET) = 533.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1578.00 CHANNEL SLOPE = 0.1407
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 69.20
FLOW VELOCITY(FEET/SEC.) = 10.90 FLOW DEPTH(FEET) = 1.45
TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 22.19
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10509.00 = 5251.00 FEET.

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FLOW PROCESS FROM NODE 10509.00 TO NODE 10509.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.19

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.086

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.80	0.30	1.000	-
USER-DEFINED	-	11.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	8.30	0.30	1.000	-
USER-DEFINED	-	38.10	0.30	1.000	-
USER-DEFINED	-	8.70	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 77.40 SUBAREA RUNOFF (CFS) = 124.42

EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 188.88

FLOW PROCESS FROM NODE 10509.00 TO NODE 10510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 415.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1236.00 CHANNEL SLOPE = 0.0955  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 188.88  
 FLOW VELOCITY (FEET/SEC.) = 12.07 FLOW DEPTH (FEET) = 2.28  
 TRAVEL TIME (MIN.) = 1.71 Tc (MIN.) = 23.90  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10510.00 = 6487.00 FEET.

FLOW PROCESS FROM NODE 10510.00 TO NODE 10510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.90

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.997

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	30.10	0.30	1.000	-
USER-DEFINED	-	15.30	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	11.30	0.30	1.000	-
USER-DEFINED	-	5.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 64.90 SUBAREA RUNOFF (CFS) = 99.14

EFFECTIVE AREA (ACRES) = 182.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 182.4 PEAK FLOW RATE (CFS) = 278.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10510.00 TO NODE 10511.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1161.00 CHANNEL SLOPE = 0.0973  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 278.64  
 FLOW VELOCITY (FEET/SEC.) = 13.44 FLOW DEPTH (FEET) = 2.63  
 TRAVEL TIME (MIN.) = 1.44 Tc (MIN.) = 25.34  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10511.00 = 7648.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10511.00 TO NODE 10511.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 25.34

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.927

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.50	0.30	1.000	-
USER-DEFINED	-	10.80	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	22.10	0.30	1.000	-
USER-DEFINED	-	4.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 54.80 SUBAREA RUNOFF (CFS) = 80.25

EFFECTIVE AREA (ACRES) = 237.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 237.2 PEAK FLOW RATE (CFS) = 347.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10511.00 TO NODE 10512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 302.00 DOWNSTREAM (FEET) = 190.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1644.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 347.38  
 FLOW VELOCITY (FEET/SEC.) = 12.41 FLOW DEPTH (FEET) = 3.05  
 TRAVEL TIME (MIN.) = 2.21 Tc (MIN.) = 27.55  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10512.00 = 9292.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10512.00 TO NODE 10512.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 27.55
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.843
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
    LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -         0.50     0.30     1.000     -
USER-DEFINED            -         0.20     0.30     1.000     -
USER-DEFINED            -         1.70     0.30     1.000     -
USER-DEFINED            -         0.10     0.30     1.000     -
USER-DEFINED            -        14.20     0.30     1.000     -
USER-DEFINED            -         2.80     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 19.50      SUBAREA RUNOFF(CFS) = 27.09
EFFECTIVE AREA(ACRES) = 256.70   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 256.7      PEAK FLOW RATE(CFS) = 356.55

*****
FLOW PROCESS FROM NODE 10512.00 TO NODE 10513.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 190.00  DOWNSTREAM(FEET) = 183.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 86.00  CHANNEL SLOPE = 0.0814
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 4.00
CHANNEL FLOW THRU SUBAREA(CFS) = 356.55
FLOW VELOCITY(FEET/SEC.) = 13.38  FLOW DEPTH(FEET) = 2.98
TRAVEL TIME(MIN.) = 0.11  Tc(MIN.) = 27.65
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10513.00 = 9378.00 FEET.

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 27.65
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.839
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
    LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -         0.10     0.30     0.100     -
USER-DEFINED            -         1.30     0.30     1.000     -
USER-DEFINED            -        29.90     0.30     1.000     -
USER-DEFINED            -        11.90     0.30     1.000     -
USER-DEFINED            -         1.70     0.30     1.000     -
USER-DEFINED            -         0.60     0.30     0.100     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 45.50      SUBAREA RUNOFF(CFS) = 63.20
EFFECTIVE AREA(ACRES) = 302.20   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 302.2      PEAK FLOW RATE(CFS) = 418.82

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FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 27.65
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.839
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
    LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -         9.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30      SUBAREA RUNOFF(CFS) = 12.88
EFFECTIVE AREA(ACRES) = 311.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 311.5      PEAK FLOW RATE(CFS) = 431.70

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10514.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 183.00  DOWNSTREAM(FEET) = 171.00
FLOW LENGTH(FEET) = 1209.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 75.0 INCH PIPE IS 59.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.57
ESTIMATED PIPE DIAMETER(INCH) = 75.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 431.70
PIPE TRAVEL TIME(MIN.) = 1.22  Tc(MIN.) = 28.87
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10514.00 = 10587.00 FEET.

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10514.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 28.87
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.793
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
    LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -         0.20     0.30     0.100     -
USER-DEFINED            -         0.40     0.30     1.000     -
USER-DEFINED            -         1.70     0.30     0.100     -
USER-DEFINED            -        31.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 33.60      SUBAREA RUNOFF(CFS) = 45.61
EFFECTIVE AREA(ACRES) = 345.10   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 345.1      PEAK FLOW RATE(CFS) = 464.36

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10515.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 171.00 DOWNSTREAM(FEET) = 165.00  
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 78.0 INCH PIPE IS 58.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.49  
ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 464.36  
PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 29.41  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10515.00 = 11152.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10515.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 29.41  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.773  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 1.30 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 15.30 0.30 0.100 -  
USER-DEFINED - 1.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.202  
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 29.58  
EFFECTIVE AREA(ACRES) = 364.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 364.3 PEAK FLOW RATE(CFS) = 487.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10525.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 709.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 78.0 INCH PIPE IS 63.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.98  
ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 487.58  
PIPE TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 30.10  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 30.10  
RAINFALL INTENSITY(INCH/HR) = 1.75  
AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.95  
EFFECTIVE STREAM AREA(ACRES) = 364.30  
TOTAL STREAM AREA(ACRES) = 364.30  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 487.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10520.00 TO NODE 10521.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 289.00  
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 180.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.311  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.900  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL - 0.30 0.30 0.100 95 7.31  
PUBLIC PARK - 1.20 0.30 0.850 95 11.62  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.700  
SUBAREA RUNOFF(CFS) = 4.98  
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 4.98

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10521.00 TO NODE 10522.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

\*\*\*\*\*  
UPSTREAM ELEVATION(FEET) = 180.00 DOWNSTREAM ELEVATION(FEET) = 176.00  
STREET LENGTH(FEET) = 408.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.49  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.40  
HALFSTREET FLOOD WIDTH(FEET) = 12.15  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.55  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.02  
STREET FLOW TRAVEL TIME(MIN.) = 2.67 Tc(MIN.) = 9.98  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.264  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -           0.50       0.30       0.100       -  
 USER-DEFINED       -           0.60       0.30       0.850       -  
 USER-DEFINED       -           0.60       0.30       0.100       -  
 USER-DEFINED       -           0.80       0.30       0.850       -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520  
 SUBAREA AREA(ACRES) = 2.50       SUBAREA RUNOFF(CFS) = 6.99  
 EFFECTIVE AREA(ACRES) = 4.00       AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.59  
 TOTAL AREA(ACRES) = 4.0            PEAK FLOW RATE(CFS) = 11.12

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.43    HALFSTREET FLOOD WIDTH(FEET) = 13.63  
 FLOW VELOCITY(FEET/SEC.) = 2.71    DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.17  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10522.00 = 697.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10522.00 TO NODE 10523.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 176.00    DOWNSTREAM ELEVATION(FEET) = 173.00  
 STREET LENGTH(FEET) = 333.00    CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.24  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.50  
 HALFSTREET FLOOD WIDTH(FEET) = 16.99  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.96  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.48  
 STREET FLOW TRAVEL TIME(MIN.) = 1.87    Tc(MIN.) = 11.85  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.962

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS  
 LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -           0.50       0.30       0.100       -  
 USER-DEFINED       -           4.70       0.30       0.100       -  
 USER-DEFINED       -           0.10       0.30       0.600       -  
 USER-DEFINED       -           0.10       0.30       0.100       -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.109  
 SUBAREA AREA(ACRES) = 5.40       SUBAREA RUNOFF(CFS) = 14.24  
 EFFECTIVE AREA(ACRES) = 9.40       AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 9.4            PEAK FLOW RATE(CFS) = 24.27

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.54    HALFSTREET FLOOD WIDTH(FEET) = 19.10  
 FLOW VELOCITY(FEET/SEC.) = 3.16    DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.71  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10523.00 = 1030.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10523.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 11.85  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.962  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.90	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	0.100	-
USER-DEFINED	-	4.80	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	4.90	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.785  
 SUBAREA AREA(ACRES) = 12.70       SUBAREA RUNOFF(CFS) = 31.17  
 EFFECTIVE AREA(ACRES) = 22.10    AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.58  
 TOTAL AREA(ACRES) = 22.1        PEAK FLOW RATE(CFS) = 55.43

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10524.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 173.00    DOWNSTREAM(FEET) = 165.00  
 FLOW LENGTH(FEET) = 736.00    MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.46  
 ESTIMATED PIPE DIAMETER(INCH) = 36.00    NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 55.43  
 PIPE TRAVEL TIME(MIN.) = 1.17    Tc(MIN.) = 13.03  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10524.00 = 1766.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10524.00 TO NODE 10524.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.03  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.807  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.308  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.40  
EFFECTIVE AREA(ACRES) = 23.90 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 23.9 PEAK FLOW RATE(CFS) = 56.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10524.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 623.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.64  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 56.74  
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 14.00  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10525.00 = 2389.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.690  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	6.80	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 19.93  
EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64  
TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 74.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.00  
RAINFALL INTENSITY(INCH/HR) = 2.69  
AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.64  
EFFECTIVE STREAM AREA(ACRES) = 33.00

TOTAL STREAM AREA(ACRES) = 33.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 74.16

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	487.58	30.10	1.747	0.30( 0.29)	0.95	364.3	10500.00
2	74.16	14.00	2.690	0.30( 0.19)	0.64	33.0	10520.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	447.15	14.00	2.690	0.30( 0.27)	0.90	202.4	10520.00
2	533.75	30.10	1.747	0.30( 0.28)	0.93	397.3	10500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 533.75 Tc(MIN.) = 30.10  
EFFECTIVE AREA(ACRES) = 397.30 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
TOTAL AREA(ACRES) = 397.3  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10526.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 158.00 DOWNSTREAM(FEET) = 148.00  
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 65.25  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 533.75  
PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 30.11  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10526.00 = 11891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10526.00 TO NODE 10527.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 148.00 DOWNSTREAM(FEET) = 135.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 296.00 CHANNEL SLOPE = 0.0439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 533.75  
FLOW VELOCITY(FEET/SEC.) = 14.55 FLOW DEPTH(FEET) = 3.50  
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 30.45  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10527.00 = 12187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81



>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 30.45  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.738  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.81  
 EFFECTIVE AREA(ACRES) = 398.70 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 398.7 PEAK FLOW RATE(CFS) = 533.75  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 30.45  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.738  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
 SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 6.37  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 403.6 PEAK FLOW RATE(CFS) = 533.75  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 403.6 TC(MIN.) = 30.45  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.927  
 PEAK FLOW RATE(CFS) = 533.75

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	447.60	14.36	2.654	0.30( 0.27)	0.90	208.7	10520.00
2	533.75	30.45	1.738	0.30( 0.28)	0.93	403.6	10500.00

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506106B.DAT  
TIME/DATE OF STUDY: 12:51 04/15/2013  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.820
- 2) 6.00; 4.350
- 3) 7.00; 3.990
- 4) 8.00; 3.700
- 5) 9.00; 3.460
- 6) 10.00; 3.260
- 7) 11.00; 3.090
- 8) 12.00; 2.940
- 9) 13.00; 2.810
- 10) 14.00; 2.690
- 11) 15.00; 2.590
- 12) 20.00; 2.200
- 13) 25.00; 1.940
- 14) 30.00; 1.750
- 15) 40.00; 1.490
- 16) 50.00; 1.310
- 17) 60.00; 1.180
- 18) 90.00; 0.940
- 19) 120.00; 0.800
- 20) 180.00; 0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10600.00 TO NODE 10601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 311.00  
ELEVATION DATA: UPSTREAM(FEET) = 166.00 DOWNSTREAM(FEET) = 164.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.602  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.158  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	-	0.50	0.30	0.500	95	10.60
PUBLIC PARK	-	0.60	0.30	0.850	95	13.16

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.691  
 SUBAREA RUNOFF(CFS) = 2.92  
 TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 2.92

\*\*\*\*\*

FLOW PROCESS FROM NODE 10601.00 TO NODE 10602.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 164.00 DOWNSTREAM ELEVATION(FEET) = 162.00  
STREET LENGTH(FEET) = 220.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.53  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 10.20  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.25

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.81  
STREET FLOW TRAVEL TIME (MIN.) = 1.63 Tc (MIN.) = 12.23  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.910  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.517  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 5.21  
EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 7.88

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.40 HALFSTREET FLOOD WIDTH (FEET) = 11.99  
FLOW VELOCITY (FEET/SEC.) = 2.42 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.96  
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10602.00 = 531.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10602.00 TO NODE 10603.00 IS CODE = 63  
-----  
>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
>>>> (STREET TABLE SECTION # 5 USED) <<<<<  
-----  
UPSTREAM ELEVATION (FEET) = 162.00 DOWNSTREAM ELEVATION (FEET) = 159.00  
STREET LENGTH (FEET) = 328.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.28  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.45  
HALFSTREET FLOOD WIDTH (FEET) = 14.41  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.71  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.21  
STREET FLOW TRAVEL TIME (MIN.) = 2.02 Tc (MIN.) = 14.25  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.665  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.500	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	2.40	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527  
SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 8.80

EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.16  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 15.98

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.48 HALFSTREET FLOOD WIDTH (FEET) = 16.05  
FLOW VELOCITY (FEET/SEC.) = 2.89 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.38  
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10603.00 = 859.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10603.00 TO NODE 10604.00 IS CODE = 63  
-----  
>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
>>>> (STREET TABLE SECTION # 5 USED) <<<<<  
-----  
UPSTREAM ELEVATION (FEET) = 159.00 DOWNSTREAM ELEVATION (FEET) = 155.00  
STREET LENGTH (FEET) = 465.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.74  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.54  
HALFSTREET FLOOD WIDTH (FEET) = 19.10  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.09  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.67  
STREET FLOW TRAVEL TIME (MIN.) = 2.51 Tc (MIN.) = 16.76  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.453  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.30	0.500	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.513  
SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 15.52  
EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.16  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 30.14

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.57 HALFSTREET FLOOD WIDTH (FEET) = 20.00  
FLOW VELOCITY (FEET/SEC.) = 3.33 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.92  
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10604.00 = 1324.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10604.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.76
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.453
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         0.10     0.30     0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.10   SUBAREA RUNOFF(CFS) = 0.20
EFFECTIVE AREA(ACRES) = 14.70  AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 14.7     PEAK FLOW RATE(CFS) = 30.34

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10605.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 155.00  DOWNSTREAM(FEET) = 140.00
FLOW LENGTH(FEET) = 214.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.22
ESTIMATED PIPE DIAMETER(INCH) = 21.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 30.34
PIPE TRAVEL TIME(MIN.) = 0.20  Tc(MIN.) = 16.95
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10605.00 = 1538.00 FEET.

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10605.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.95
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.438
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         1.20     0.30     0.100    -
USER-DEFINED       -         1.70     0.30     0.100    -
USER-DEFINED       -        10.20     0.30     0.800    -
USER-DEFINED       -         2.90     0.30     0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.682
SUBAREA AREA(ACRES) = 16.00  SUBAREA RUNOFF(CFS) = 32.16
EFFECTIVE AREA(ACRES) = 30.70  AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 30.7     PEAK FLOW RATE(CFS) = 62.29

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10606.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 140.00  DOWNSTREAM(FEET) = 133.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00  CHANNEL SLOPE = 0.0400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 62.29
FLOW VELOCITY(FEET/SEC.) = 8.22  FLOW DEPTH(FEET) = 1.59
TRAVEL TIME(MIN.) = 0.36  Tc(MIN.) = 17.31
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10606.00 = 1713.00 FEET.

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.31
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.410
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         0.20     0.30     0.500    -
USER-DEFINED       -         0.30     0.30     0.850    -
USER-DEFINED       -         0.10     0.30     1.000    -
USER-DEFINED       -         1.10     0.30     1.000    -
USER-DEFINED       -         0.10     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 1.80   SUBAREA RUNOFF(CFS) = 3.46
EFFECTIVE AREA(ACRES) = 32.50  AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 32.5     PEAK FLOW RATE(CFS) = 64.98

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.31
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.410
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         0.40     0.30     0.850    -
USER-DEFINED       -         1.20     0.30     1.000    -
USER-DEFINED       -         0.10     0.30     1.000    -
USER-DEFINED       -         1.80     0.30     1.000    -
USER-DEFINED       -         0.10     0.30     0.850    -
USER-DEFINED       -         0.20     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980
SUBAREA AREA(ACRES) = 3.80   SUBAREA RUNOFF(CFS) = 7.24
EFFECTIVE AREA(ACRES) = 36.30  AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.66
TOTAL AREA(ACRES) = 36.3     PEAK FLOW RATE(CFS) = 72.22

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81

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-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.31

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.410

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.14

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.67

TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 73.36  
=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 36.9 TC(MIN.) = 17.31

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.670

PEAK FLOW RATE(CFS) = 73.36  
=====

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 100 Yr \*  
\* From Node: 50100 To Node: 50167 \*  
\*\*\*\*\*

FILE NAME: 0610501Y.DAT  
TIME/DATE OF STUDY: 16:59 01/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 6.058
- 2) 10.00; 3.879
- 3) 15.00; 2.991
- 4) 20.00; 2.456
- 5) 25.00; 2.122
- 6) 30.00; 1.895
- 7) 40.00; 1.639
- 8) 50.00; 1.415
- 9) 60.00; 1.314
- 10) 90.00; 1.113
- 11) 120.00; 0.977
- 12) 180.00; 0.820
- 13) 360.00; 0.611
- 14) 1440.00; 0.268

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50100.00 TO NODE 50101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00  
ELEVATION DATA: UPSTREAM(FEET) = 1072.00 DOWNSTREAM(FEET) = 1063.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 14.598  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.063  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.30	1.000	0	14.60

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.50  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.50

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50101.00 TO NODE 50102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1063.00 DOWNSTREAM(FEET) = 975.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 273.00 CHANNEL SLOPE = 0.3223  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.952  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.29	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.85  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.91  
AVERAGE FLOW DEPTH(FEET) = 0.32 TRAVEL TIME(MIN.) = 0.77  
Tc(MIN.) = 15.37  
SUBAREA AREA(ACRES) = 0.29 SUBAREA RUNOFF(CFS) = 0.70  
EFFECTIVE AREA(ACRES) = 0.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 2.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.34 FLOW VELOCITY(FEET/SEC.) = 6.24  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50102.00 = 597.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50102.00 TO NODE 50103.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	975.00	DOWNSTREAM(FEET) =	948.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	111.00	CHANNEL SLOPE =	0.2432
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	2.918		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.22	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.41

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.83

AVERAGE FLOW DEPTH(FEET) = 0.37 TRAVEL TIME(MIN.) = 0.32

Tc(MIN.) = 15.68

SUBAREA AREA(ACRES) = 0.22 SUBAREA RUNOFF(CFS) = 0.52

EFFECTIVE AREA(ACRES) = 1.12 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 2.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 FLOW VELOCITY(FEET/SEC.) = 5.90

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50103.00 = 708.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50103.00 TO NODE 50104.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	948.00	DOWNSTREAM(FEET) =	914.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	136.00	CHANNEL SLOPE =	0.2500
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	2.880		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.33

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.38

AVERAGE FLOW DEPTH(FEET) = 0.42 TRAVEL TIME(MIN.) = 0.36

Tc(MIN.) = 16.04

SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 1.37

EFFECTIVE AREA(ACRES) = 1.71 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.7 PEAK FLOW RATE(CFS) = 3.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 6.62

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50104.00 = 844.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50104.00 TO NODE 50105.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	914.00	DOWNSTREAM(FEET) =	895.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	52.00	CHANNEL SLOPE =	0.3654
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	2.869		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.73	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.97

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.45

AVERAGE FLOW DEPTH(FEET) = 0.49 TRAVEL TIME(MIN.) = 0.10

Tc(MIN.) = 16.14

SUBAREA AREA(ACRES) = 1.73 SUBAREA RUNOFF(CFS) = 4.00

EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 7.95

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.54 FLOW VELOCITY(FEET/SEC.) = 9.13

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50105.00 = 896.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50106.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	895.00	DOWNSTREAM(FEET) =	835.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	280.00	CHANNEL SLOPE =	0.2143
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	2.808		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.25

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.22

AVERAGE FLOW DEPTH(FEET) = 0.70 TRAVEL TIME(MIN.) = 0.57

Tc(MIN.) = 16.71

SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 8.59

EFFECTIVE AREA(ACRES) = 7.24 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 7.2 PEAK FLOW RATE (CFS) = 16.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.78 FLOW VELOCITY (FEET/SEC.) = 8.89  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50106.00 = 1176.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50106.00 TO NODE 50107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 835.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 413.00 CHANNEL SLOPE = 0.2179  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.730

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.53	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 21.31  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.49  
AVERAGE FLOW DEPTH (FEET) = 0.86 TRAVEL TIME (MIN.) = 0.73  
Tc (MIN.) = 17.44

SUBAREA AREA (ACRES) = 4.53 SUBAREA RUNOFF (CFS) = 9.91  
EFFECTIVE AREA (ACRES) = 11.77 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 11.8 PEAK FLOW RATE (CFS) = 25.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.93 FLOW VELOCITY (FEET/SEC.) = 10.01  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50107.00 = 1589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50107.00 TO NODE 50108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 302.00 CHANNEL SLOPE = 0.2318  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.680

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.76	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.93  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.76  
AVERAGE FLOW DEPTH (FEET) = 0.99 TRAVEL TIME (MIN.) = 0.47  
Tc (MIN.) = 17.90

SUBAREA AREA (ACRES) = 5.76 SUBAREA RUNOFF (CFS) = 12.35  
EFFECTIVE AREA (ACRES) = 17.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 17.5 PEAK FLOW RATE (CFS) = 37.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.06 FLOW VELOCITY (FEET/SEC.) = 11.24  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50108.00 = 1891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50108.00 TO NODE 50109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 655.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 81.00 CHANNEL SLOPE = 0.2469  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.669

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.77	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 54.39  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.70  
AVERAGE FLOW DEPTH (FEET) = 1.19 TRAVEL TIME (MIN.) = 0.11  
Tc (MIN.) = 18.01

SUBAREA AREA (ACRES) = 15.77 SUBAREA RUNOFF (CFS) = 33.62  
EFFECTIVE AREA (ACRES) = 33.31 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 33.3 PEAK FLOW RATE (CFS) = 71.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.32 FLOW VELOCITY (FEET/SEC.) = 13.53  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50109.00 = 1972.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 655.00 DOWNSTREAM (FEET) = 590.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 379.00 CHANNEL SLOPE = 0.1715  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.614

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.53	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 83.03  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.30



AVERAGE FLOW DEPTH(FEET) = 1.50 TRAVEL TIME(MIN.) = 0.51  
Tc(MIN.) = 18.52  
SUBAREA AREA(ACRES) = 11.53 SUBAREA RUNOFF(CFS) = 24.02  
EFFECTIVE AREA(ACRES) = 44.84 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 44.8 PEAK FLOW RATE(CFS) = 93.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.57 FLOW VELOCITY(FEET/SEC.) = 12.65  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50110.00 = 2351.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50110.00 TO NODE 50111.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 570.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 340.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.547

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 27.15 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 120.85  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.04  
AVERAGE FLOW DEPTH(FEET) = 2.11 TRAVEL TIME(MIN.) = 0.63  
Tc(MIN.) = 19.15  
SUBAREA AREA(ACRES) = 27.15 SUBAREA RUNOFF(CFS) = 54.91  
EFFECTIVE AREA(ACRES) = 71.99 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 72.0 PEAK FLOW RATE(CFS) = 145.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.26 FLOW VELOCITY(FEET/SEC.) = 9.48  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50111.00 = 2691.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50111.00 TO NODE 50112.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 567.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 403.00 CHANNEL SLOPE = 0.0074  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.418

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 66.68 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 209.18  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.77  
AVERAGE FLOW DEPTH(FEET) = 3.83 TRAVEL TIME(MIN.) = 1.41  
Tc(MIN.) = 20.56  
SUBAREA AREA(ACRES) = 66.68 SUBAREA RUNOFF(CFS) = 127.15  
EFFECTIVE AREA(ACRES) = 138.68 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 138.7 PEAK FLOW RATE(CFS) = 264.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 4.18 FLOW VELOCITY(FEET/SEC.) = 5.05  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50112.00 = 3094.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50112.00 TO NODE 50140.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 20.56  
RAINFALL INTENSITY(INCH/HR) = 2.42  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 138.68  
TOTAL STREAM AREA(ACRES) = 138.68  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 264.42

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50120.00 TO NODE 50121.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 324.00  
ELEVATION DATA: UPSTREAM(FEET) = 1068.00 DOWNSTREAM(FEET) = 968.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.018  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.307

SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER  
"CHAPARRAL, BROADLEAF" - 0.29 0.30 1.000 0 9.02  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.04  
TOTAL AREA(ACRES) = 0.29 PEAK FLOW RATE(CFS) = 1.04

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50121.00 TO NODE 50122.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 968.00 DOWNSTREAM(FEET) = 916.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 242.00 CHANNEL SLOPE = 0.2149  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.967  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.55	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.94  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.18  
 AVERAGE FLOW DEPTH (FEET) = 0.35 TRAVEL TIME (MIN.) = 0.78  
 Tc (MIN.) = 9.80  
 SUBAREA AREA (ACRES) = 0.55 SUBAREA RUNOFF (CFS) = 1.81  
 EFFECTIVE AREA (ACRES) = 0.83 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 0.8 PEAK FLOW RATE (CFS) = 2.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.40 FLOW VELOCITY (FEET/SEC.) = 5.70  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50122.00 = 566.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50122.00 TO NODE 50123.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 916.00 DOWNSTREAM (FEET) = 906.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 111.00 CHANNEL SLOPE = 0.0901  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.841  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.68	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.83  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.43  
 AVERAGE FLOW DEPTH (FEET) = 0.54 TRAVEL TIME (MIN.) = 0.42  
 Tc (MIN.) = 10.21  
 SUBAREA AREA (ACRES) = 0.68 SUBAREA RUNOFF (CFS) = 2.16  
 EFFECTIVE AREA (ACRES) = 1.51 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.5 PEAK FLOW RATE (CFS) = 4.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.58 FLOW VELOCITY (FEET/SEC.) = 4.73  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50123.00 = 677.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50123.00 TO NODE 50124.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 906.00 DOWNSTREAM (FEET) = 903.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 60.00 CHANNEL SLOPE = 0.0500  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.796  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.75  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.94  
 AVERAGE FLOW DEPTH (FEET) = 0.70 TRAVEL TIME (MIN.) = 0.25  
 Tc (MIN.) = 10.47  
 SUBAREA AREA (ACRES) = 0.59 SUBAREA RUNOFF (CFS) = 1.85  
 EFFECTIVE AREA (ACRES) = 2.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.1 PEAK FLOW RATE (CFS) = 6.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.74 FLOW VELOCITY (FEET/SEC.) = 4.08  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50124.00 = 737.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50124.00 TO NODE 50125.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 903.00 DOWNSTREAM (FEET) = 901.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 29.00 CHANNEL SLOPE = 0.0690  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.779  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.44	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.86  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.01  
 AVERAGE FLOW DEPTH (FEET) = 0.77 TRAVEL TIME (MIN.) = 0.10  
 Tc (MIN.) = 10.57  
 SUBAREA AREA (ACRES) = 1.44 SUBAREA RUNOFF (CFS) = 4.51  
 EFFECTIVE AREA (ACRES) = 3.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.5 PEAK FLOW RATE (CFS) = 11.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.84 FLOW VELOCITY (FEET/SEC.) = 5.28  
 LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50125.00 = 766.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50125.00 TO NODE 50126.00 IS CODE = 51

-----  
 >>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<<

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 901.00 DOWNSTREAM(FEET) = 889.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 130.00 CHANNEL SLOPE = 0.0923
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.718
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -       2.69     0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.23
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.33
AVERAGE FLOW DEPTH(FEET) = 0.90 TRAVEL TIME(MIN.) = 0.34
Tc(MIN.) = 10.91
SUBAREA AREA(ACRES) = 2.69 SUBAREA RUNOFF(CFS) = 8.28
EFFECTIVE AREA(ACRES) = 6.23 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.2 PEAK FLOW RATE(CFS) = 19.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.97 FLOW VELOCITY(FEET/SEC.) = 6.74
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50126.00 = 896.00 FEET.

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FLOW PROCESS FROM NODE 50126.00 TO NODE 50127.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 889.00 DOWNSTREAM(FEET) = 855.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 231.00 CHANNEL SLOPE = 0.1472
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.636
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -       2.18     0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.45
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.31
AVERAGE FLOW DEPTH(FEET) = 0.95 TRAVEL TIME(MIN.) = 0.46
Tc(MIN.) = 11.37
SUBAREA AREA(ACRES) = 2.18 SUBAREA RUNOFF(CFS) = 6.55
EFFECTIVE AREA(ACRES) = 8.41 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 25.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.99 FLOW VELOCITY(FEET/SEC.) = 8.61
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50127.00 = 1127.00 FEET.

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FLOW PROCESS FROM NODE 50127.00 TO NODE 50128.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 855.00 DOWNSTREAM(FEET) = 793.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 211.00 CHANNEL SLOPE = 0.2938
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.584
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -       5.70     0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.68
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.03
AVERAGE FLOW DEPTH(FEET) = 0.97 TRAVEL TIME(MIN.) = 0.29
Tc(MIN.) = 11.66
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 16.83
EFFECTIVE AREA(ACRES) = 14.11 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.1 PEAK FLOW RATE(CFS) = 41.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.05 FLOW VELOCITY(FEET/SEC.) = 12.65
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50128.00 = 1338.00 FEET.

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FLOW PROCESS FROM NODE 50128.00 TO NODE 50129.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 793.00 DOWNSTREAM(FEET) = 708.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 353.00 CHANNEL SLOPE = 0.2408
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.501
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -       9.99     0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 56.10
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.65
AVERAGE FLOW DEPTH(FEET) = 1.22 TRAVEL TIME(MIN.) = 0.47
Tc(MIN.) = 12.13
SUBAREA AREA(ACRES) = 9.99 SUBAREA RUNOFF(CFS) = 28.79
EFFECTIVE AREA(ACRES) = 24.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 69.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.32 FLOW VELOCITY(FEET/SEC.) = 13.34
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50129.00 = 1691.00 FEET.

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FLOW PROCESS FROM NODE 50129.00 TO NODE 50130.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 708.00 DOWNSTREAM(FEET) = 571.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 735.00 CHANNEL SLOPE = 0.1864
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.332
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 13.71 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 88.15
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.83
AVERAGE FLOW DEPTH(FEET) = 1.51 TRAVEL TIME (MIN.) = 0.95
Tc(MIN.) = 13.08
SUBAREA AREA(ACRES) = 13.71 SUBAREA RUNOFF(CFS) = 37.42
EFFECTIVE AREA(ACRES) = 37.82 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 103.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.61 FLOW VELOCITY(FEET/SEC.) = 13.35
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50130.00 = 2426.00 FEET.

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FLOW PROCESS FROM NODE 50130.00 TO NODE 50131.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 571.00 DOWNSTREAM(FEET) = 566.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 709.00 CHANNEL SLOPE = 0.0071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.890
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.71 0.30 0.986 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 127.37
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.13
AVERAGE FLOW DEPTH(FEET) = 3.21 TRAVEL TIME (MIN.) = 2.86
Tc(MIN.) = 15.95
SUBAREA AREA(ACRES) = 20.71 SUBAREA RUNOFF(CFS) = 48.34
EFFECTIVE AREA(ACRES) = 58.52 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 136.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.29 FLOW VELOCITY(FEET/SEC.) = 4.20
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50131.00 = 3135.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50132.00 TO NODE 50131.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.95
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.890
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 154.02 0.30 0.949 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 154.02 SUBAREA RUNOFF(CFS) = 361.14
EFFECTIVE AREA(ACRES) = 212.54 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 212.5 PEAK FLOW RATE(CFS) = 497.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 50131.00 TO NODE 50140.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 15.95
RAINFALL INTENSITY(INCH/HR) = 2.89
AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 212.54
TOTAL STREAM AREA(ACRES) = 212.54
PEAK FLOW RATE(CFS) AT CONFLUENCE = 497.63

\*\* CONFLUENCE DATA \*\*
Table with 7 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*
Table with 7 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 748.35 Tc(MIN.) = 15.95
EFFECTIVE AREA(ACRES) = 320.11 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 351.2

LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50140.00 = 3135.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 566.00 DOWNSTREAM(FEET) = 416.00
FLOW LENGTH(FEET) = 376.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 77.15
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 748.35
PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 16.03
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50141.00 = 3511.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50140.00 TO NODE 50141.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.03
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.881
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 48.73 0.30 0.922 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.922
SUBAREA AREA(ACRES) = 48.73 SUBAREA RUNOFF(CFS) = 114.24
EFFECTIVE AREA(ACRES) = 368.84 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 400.0 PEAK FLOW RATE(CFS) = 860.08

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FLOW PROCESS FROM NODE 50141.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 416.00 DOWNSTREAM(FEET) = 404.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 972.00 CHANNEL SLOPE = 0.0123
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.670
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.56 0.30 0.610 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.610
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 868.55
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.23
AVERAGE FLOW DEPTH(FEET) = 5.93 TRAVEL TIME(MIN.) = 1.97
Tc(MIN.) = 18.00
SUBAREA AREA(ACRES) = 7.56 SUBAREA RUNOFF(CFS) = 16.93
EFFECTIVE AREA(ACRES) = 376.40 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 407.5 PEAK FLOW RATE(CFS) = 860.08
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 5.91 FLOW VELOCITY(FEET/SEC.) = 8.21
LONGEST FLOWPATH FROM NODE 50120.00 TO NODE 50162.00 = 4483.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 860.08 18.00 2.670 0.30( 0.29) 0.96 376.4 50120.00
2 763.80 22.67 2.278 0.30( 0.29) 0.96 407.5 50100.00

NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 860.08 Tc(MIN.) = 18.00
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 376.40

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FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 18.00
RAINFALL INTENSITY(INCH/HR) = 2.67
AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 376.40
TOTAL STREAM AREA(ACRES) = 407.52
PEAK FLOW RATE(CFS) AT CONFLUENCE = 860.08

\*\*\*\*\*

FLOW PROCESS FROM NODE 50150.00 TO NODE 50151.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00
ELEVATION DATA: UPSTREAM(FEET) = 1076.00 DOWNSTREAM(FEET) = 988.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.235
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.212
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" - 0.46 0.30 1.000 0 9.23
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.61
TOTAL AREA(ACRES) = 0.46 PEAK FLOW RATE(CFS) = 1.61

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FLOW PROCESS FROM NODE 50151.00 TO NODE 50152.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	988.00	DOWNSTREAM(FEET) =	938.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	220.00	CHANNEL SLOPE =	0.2273
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.934		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.59	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.74  
AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 0.64  
Tc(MIN.) = 9.87  
SUBAREA AREA(ACRES) = 0.59 SUBAREA RUNOFF(CFS) = 1.92  
EFFECTIVE AREA(ACRES) = 1.04 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 3.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.43 FLOW VELOCITY(FEET/SEC.) = 6.15  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50152.00 = 543.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50152.00 TO NODE 50153.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	938.00	DOWNSTREAM(FEET) =	904.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	218.00	CHANNEL SLOPE =	0.1560
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.793		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.13	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.20  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.96  
AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 0.61  
Tc(MIN.) = 10.48  
SUBAREA AREA(ACRES) = 1.13 SUBAREA RUNOFF(CFS) = 3.56  
EFFECTIVE AREA(ACRES) = 2.18 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.2 PEAK FLOW RATE(CFS) = 6.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.60 FLOW VELOCITY(FEET/SEC.) = 6.34  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50153.00 = 761.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50153.00 TO NODE 50154.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	904.00	DOWNSTREAM(FEET) =	881.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	212.00	CHANNEL SLOPE =	0.1085
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.694		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.42  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.33  
AVERAGE FLOW DEPTH(FEET) = 0.78 TRAVEL TIME(MIN.) = 0.56  
Tc(MIN.) = 11.04  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 9.16  
EFFECTIVE AREA(ACRES) = 5.18 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.2 PEAK FLOW RATE(CFS) = 15.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.88 FLOW VELOCITY(FEET/SEC.) = 6.80  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50154.00 = 973.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50154.00 TO NODE 50155.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	881.00	DOWNSTREAM(FEET) =	877.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	158.00	CHANNEL SLOPE =	0.0253
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.585		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.81	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.45  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.27  
AVERAGE FLOW DEPTH(FEET) = 1.29 TRAVEL TIME(MIN.) = 0.62  
Tc(MIN.) = 11.66  
SUBAREA AREA(ACRES) = 3.81 SUBAREA RUNOFF(CFS) = 11.27  
EFFECTIVE AREA(ACRES) = 8.99 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 9.0 PEAK FLOW RATE(CFS) = 26.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.40 FLOW VELOCITY(FEET/SEC.) = 4.51

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50155.00 = 1131.00 FEET.

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FLOW PROCESS FROM NODE 50155.00 TO NODE 50156.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 877.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 195.00 CHANNEL SLOPE = 0.0103
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.412

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.32 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.23
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.34
AVERAGE FLOW DEPTH(FEET) = 1.77 TRAVEL TIME(MIN.) = 0.97
Tc(MIN.) = 12.63
SUBAREA AREA(ACRES) = 3.32 SUBAREA RUNOFF(CFS) = 9.30
EFFECTIVE AREA(ACRES) = 12.31 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 34.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.83 FLOW VELOCITY(FEET/SEC.) = 3.42
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50156.00 = 1326.00 FEET.

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FLOW PROCESS FROM NODE 50156.00 TO NODE 50157.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 850.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 424.00 CHANNEL SLOPE = 0.0590
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.229

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.78 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 39.46
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.85
AVERAGE FLOW DEPTH(FEET) = 1.39 TRAVEL TIME(MIN.) = 1.03
Tc(MIN.) = 13.66
SUBAREA AREA(ACRES) = 3.78 SUBAREA RUNOFF(CFS) = 9.96
EFFECTIVE AREA(ACRES) = 16.09 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 42.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.42 FLOW VELOCITY(FEET/SEC.) = 6.97
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50157.00 = 1750.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50157.00 TO NODE 50158.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 835.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0949
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.177

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 11.22 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 56.93
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.97
AVERAGE FLOW DEPTH(FEET) = 1.45 TRAVEL TIME(MIN.) = 0.29
Tc(MIN.) = 13.96
SUBAREA AREA(ACRES) = 11.22 SUBAREA RUNOFF(CFS) = 29.04
EFFECTIVE AREA(ACRES) = 27.31 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 27.3 PEAK FLOW RATE(CFS) = 70.69

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.58 FLOW VELOCITY(FEET/SEC.) = 9.41
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50158.00 = 1908.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50158.00 TO NODE 50159.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 835.00 DOWNSTREAM(FEET) = 680.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 721.00 CHANNEL SLOPE = 0.2150
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.023

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.87 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 96.27
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.87
AVERAGE FLOW DEPTH(FEET) = 1.52 TRAVEL TIME(MIN.) = 0.87
Tc(MIN.) = 14.82
SUBAREA AREA(ACRES) = 20.87 SUBAREA RUNOFF(CFS) = 51.14
EFFECTIVE AREA(ACRES) = 48.18 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 48.2 PEAK FLOW RATE (CFS) = 118.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.64 FLOW VELOCITY (FEET/SEC.) = 14.57  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50159.00 = 2629.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50159.00 TO NODE 50160.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 680.00 DOWNSTREAM (FEET) = 558.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 874.00 CHANNEL SLOPE = 0.1396

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.893

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	32.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 155.43

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.31

AVERAGE FLOW DEPTH (FEET) = 1.97 TRAVEL TIME (MIN.) = 1.09

Tc (MIN.) = 15.92

SUBAREA AREA (ACRES) = 32.02 SUBAREA RUNOFF (CFS) = 74.72

EFFECTIVE AREA (ACRES) = 80.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 80.2 PEAK FLOW RATE (CFS) = 187.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.12 FLOW VELOCITY (FEET/SEC.) = 13.93  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50160.00 = 3503.00 FEET.

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FLOW PROCESS FROM NODE 50160.00 TO NODE 50161.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 558.00 DOWNSTREAM (FEET) = 463.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 1013.00 CHANNEL SLOPE = 0.0938

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.745

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	13.52	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 202.04

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.23

AVERAGE FLOW DEPTH (FEET) = 2.35 TRAVEL TIME (MIN.) = 1.38

Tc (MIN.) = 17.30

SUBAREA AREA (ACRES) = 13.52 SUBAREA RUNOFF (CFS) = 29.76

EFFECTIVE AREA (ACRES) = 93.72 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 93.7 PEAK FLOW RATE (CFS) = 206.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.37 FLOW VELOCITY (FEET/SEC.) = 12.26

LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50161.00 = 4516.00 FEET.

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FLOW PROCESS FROM NODE 50161.00 TO NODE 50162.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 463.00 DOWNSTREAM (FEET) = 404.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 1126.00 CHANNEL SLOPE = 0.0524

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.546

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	19.35	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 225.81

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.11

AVERAGE FLOW DEPTH (FEET) = 2.73 TRAVEL TIME (MIN.) = 1.86

Tc (MIN.) = 19.15

SUBAREA AREA (ACRES) = 19.35 SUBAREA RUNOFF (CFS) = 39.11

EFFECTIVE AREA (ACRES) = 113.07 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 113.1 PEAK FLOW RATE (CFS) = 228.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.74 FLOW VELOCITY (FEET/SEC.) = 10.14  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50162.00 TO NODE 50162.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

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TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION (MIN.) = 19.15

RAINFALL INTENSITY (INCH/HR) = 2.55

AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00

EFFECTIVE STREAM AREA (ACRES) = 113.07

TOTAL STREAM AREA (ACRES) = 113.07

PEAK FLOW RATE (CFS) AT CONFLUENCE = 228.59

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	860.08	18.00	2.670	0.30 ( 0.29)	0.96	376.4	50120.00
1	763.80	22.67	2.278	0.30 ( 0.29)	0.96	407.5	50100.00
2	228.59	19.15	2.546	0.30 ( 0.30)	1.00	113.1	50150.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1086.72	18.00	2.670	0.30 ( 0.29)	0.97	482.6	50120.00
2	1064.84	19.15	2.546	0.30 ( 0.29)	0.97	497.2	50150.00
3	965.04	22.67	2.278	0.30 ( 0.29)	0.97	520.6	50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1086.72 Tc(MIN.) = 18.00  
EFFECTIVE AREA(ACRES) = 482.64 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 520.6  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50162.00 = 5642.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50162.00 TO NODE 50163.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 378.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1158.00 CHANNEL SLOPE = 0.0225  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.487

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 151.93 0.30 0.990 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1236.46  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.25  
AVERAGE FLOW DEPTH(FEET) = 6.05 TRAVEL TIME(MIN.) = 1.72  
Tc(MIN.) = 19.71  
SUBAREA AREA(ACRES) = 151.93 SUBAREA RUNOFF(CFS) = 299.39  
EFFECTIVE AREA(ACRES) = 634.56 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 672.5 PEAK FLOW RATE(CFS) = 1253.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 6.08 FLOW VELOCITY(FEET/SEC.) = 11.29  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50163.00 = 6800.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1253.22	19.71	2.487	0.30 ( 0.29)	0.97	634.6	50120.00
2	1229.56	20.88	2.397	0.30 ( 0.29)	0.97	649.1	50150.00
3	1129.92	24.44	2.159	0.30 ( 0.29)	0.98	672.5	50100.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1253.22 Tc(MIN.) = 19.71  
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.97 EFFECTIVE AREA(ACRES) = 634.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50163.00 TO NODE 50164.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 378.00 DOWNSTREAM(FEET) = 356.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 886.00 CHANNEL SLOPE = 0.0248  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.393

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 177.01 0.30 0.989 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.989  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1420.26  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.08  
AVERAGE FLOW DEPTH(FEET) = 6.26 TRAVEL TIME(MIN.) = 1.22  
Tc(MIN.) = 20.93  
SUBAREA AREA(ACRES) = 177.01 SUBAREA RUNOFF(CFS) = 334.04  
EFFECTIVE AREA(ACRES) = 811.57 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 849.5 PEAK FLOW RATE(CFS) = 1534.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 6.44 FLOW VELOCITY(FEET/SEC.) = 12.32  
LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50164.00 = 7686.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1534.08	20.93	2.393	0.30 ( 0.29)	0.98	811.6	50120.00
2	1503.28	22.11	2.315	0.30 ( 0.29)	0.98	826.1	50150.00
3	1373.97	25.70	2.091	0.30 ( 0.29)	0.98	849.5	50100.00

NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 1534.08 Tc(MIN.) = 20.93  
AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 811.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50164.00 TO NODE 50165.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 356.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1762.00 CHANNEL SLOPE = 0.0233  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.234

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 155.27 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1669.24  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.28  
 AVERAGE FLOW DEPTH(FEET) = 6.73 TRAVEL TIME(MIN.) = 2.39  
 Tc(MIN.) = 23.33  
 SUBAREA AREA(ACRES) = 155.27 SUBAREA RUNOFF(CFS) = 270.26  
 EFFECTIVE AREA(ACRES) = 966.84 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1004.8 PEAK FLOW RATE(CFS) = 1687.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 6.76 FLOW VELOCITY(FEET/SEC.) = 12.32  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50165.00 = 9448.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1687.79	23.33	2.234	0.30( 0.29)	0.98	966.8	50120.00
2	1643.35	24.51	2.155	0.30( 0.29)	0.98	981.4	50150.00
3	1523.12	28.16	1.979	0.30( 0.29)	0.98	1004.8	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1687.79 Tc(MIN.) = 23.33  
 AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 966.84

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50165.00 TO NODE 50166.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 893.00 CHANNEL SLOPE = 0.0347  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.165

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	50.24	0.30	0.997	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1729.97  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 14.40  
 AVERAGE FLOW DEPTH(FEET) = 6.33 TRAVEL TIME(MIN.) = 1.03  
 Tc(MIN.) = 24.36  
 SUBAREA AREA(ACRES) = 50.24 SUBAREA RUNOFF(CFS) = 84.36  
 EFFECTIVE AREA(ACRES) = 1017.08 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1055.0 PEAK FLOW RATE(CFS) = 1712.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 6.30 FLOW VELOCITY(FEET/SEC.) = 14.36  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50166.00 = 10341.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1712.17	24.36	2.165	0.30( 0.29)	0.98	1017.1	50120.00
2	1673.65	25.55	2.097	0.30( 0.29)	0.98	1031.6	50150.00
3	1553.32	29.22	1.931	0.30( 0.29)	0.98	1055.0	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1712.17 Tc(MIN.) = 24.36  
 AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 1017.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50166.00 TO NODE 50167.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 240.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00 CHANNEL SLOPE = 0.0437  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.103

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.36	0.30	0.892	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.892  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1719.07  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 15.67  
 AVERAGE FLOW DEPTH(FEET) = 6.05 TRAVEL TIME(MIN.) = 1.07  
 Tc(MIN.) = 25.43  
 SUBAREA AREA(ACRES) = 8.36 SUBAREA RUNOFF(CFS) = 13.81  
 EFFECTIVE AREA(ACRES) = 1025.44 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 1063.4 PEAK FLOW RATE(CFS) = 1712.17  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 6.04 FLOW VELOCITY(FEET/SEC.) = 15.66  
 LONGEST FLOWPATH FROM NODE 50150.00 TO NODE 50167.00 = 11349.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1712.17	25.43	2.103	0.30( 0.29)	0.98	1025.4	50120.00
2	1673.65	26.63	2.048	0.30( 0.29)	0.98	1040.0	50150.00
3	1553.32	30.32	1.887	0.30( 0.29)	0.98	1063.4	50100.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1712.17 Tc(MIN.) = 25.43  
 AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.98 EFFECTIVE AREA(ACRES) = 1025.44

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1063.4 TC(MIN.) = 25.43  
 EFFECTIVE AREA(ACRES) = 1025.44 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.981  
 PEAK FLOW RATE(CFS) = 1712.17

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1712.17	25.43	2.103	0.30 ( 0.29)	0.98	1025.4	50120.00
2	1673.65	26.63	2.048	0.30 ( 0.29)	0.98	1040.0	50150.00
3	1553.32	30.32	1.887	0.30 ( 0.29)	0.98	1063.4	50100.00

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END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 100 Yr \*  
\* From Node: 50500 To Node: 50513 \*  
\*\*\*\*\*

FILE NAME: 0610505Y.DAT  
TIME/DATE OF STUDY: 17:00 01/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.850
- 2) 10.00; 3.776
- 3) 15.00; 2.925
- 4) 20.00; 2.414
- 5) 25.00; 2.092
- 6) 30.00; 1.869
- 7) 40.00; 1.614
- 8) 50.00; 1.398
- 9) 60.00; 1.287
- 10) 90.00; 1.084
- 11) 120.00; 0.947
- 12) 180.00; 0.791
- 13) 360.00; 0.585
- 14) 1440.00; 0.255

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50500.00 TO NODE 50501.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 1122.00 DOWNSTREAM(FEET) = 980.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.501  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.398  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.67	0.30	1.000	0	8.50

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 2.46  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 2.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50501.00 TO NODE 50502.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 980.00 DOWNSTREAM(FEET) = 832.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 500.00 CHANNEL SLOPE = 0.2960  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.909  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.83	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.07  
AVERAGE FLOW DEPTH(FEET) = 0.42 TRAVEL TIME(MIN.) = 1.18  
 $T_c$ (MIN.) = 9.68  
SUBAREA AREA(ACRES) = 0.83 SUBAREA RUNOFF(CFS) = 2.71  
EFFECTIVE AREA(ACRES) = 1.50 AREA-AVERAGED  $F_m$ (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$ (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 1.00  
TOTAL AREA(ACRES) = 1.5 PEAK FLOW RATE(CFS) = 4.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.47 FLOW VELOCITY(FEET/SEC.) = 7.42  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50502.00 = 830.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50502.00 TO NODE 50503.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) =	832.00	DOWNSTREAM(FEET) =	779.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	255.00	CHANNEL SLOPE =	0.2078
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.739		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.76	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.70

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.84

AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 0.54

Tc(MIN.) = 10.22

SUBAREA AREA(ACRES) = 3.76 SUBAREA RUNOFF(CFS) = 11.62

EFFECTIVE AREA(ACRES) = 5.26 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.3 PEAK FLOW RATE(CFS) = 16.28

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.79 FLOW VELOCITY(FEET/SEC.) = 8.72

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50503.00 = 1085.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50503.00 TO NODE 50504.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	779.00	DOWNSTREAM(FEET) =	765.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	382.00	CHANNEL SLOPE =	0.0366
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.521		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.56	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.89

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.97

AVERAGE FLOW DEPTH(FEET) = 1.24 TRAVEL TIME(MIN.) = 1.28

Tc(MIN.) = 11.50

SUBAREA AREA(ACRES) = 4.56 SUBAREA RUNOFF(CFS) = 13.21

EFFECTIVE AREA(ACRES) = 9.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 28.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.34 FLOW VELOCITY(FEET/SEC.) = 5.28  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50504.00 = 1467.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50504.00 TO NODE 50505.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	765.00	DOWNSTREAM(FEET) =	750.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	355.00	CHANNEL SLOPE =	0.0423
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.347		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.79	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.65

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.79

AVERAGE FLOW DEPTH(FEET) = 1.39 TRAVEL TIME(MIN.) = 1.02

Tc(MIN.) = 12.52

SUBAREA AREA(ACRES) = 3.79 SUBAREA RUNOFF(CFS) = 10.39

EFFECTIVE AREA(ACRES) = 13.61 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 13.6 PEAK FLOW RATE(CFS) = 37.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.45 FLOW VELOCITY(FEET/SEC.) = 5.94

LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50505.00 = 1822.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50505.00 TO NODE 50506.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	750.00	DOWNSTREAM(FEET) =	712.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	261.00	CHANNEL SLOPE =	0.1456
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.272		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.43	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.91

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.94

AVERAGE FLOW DEPTH(FEET) = 1.24 TRAVEL TIME(MIN.) = 0.44

Tc(MIN.) = 12.96

SUBAREA AREA(ACRES) = 6.43 SUBAREA RUNOFF(CFS) = 17.19

EFFECTIVE AREA(ACRES) = 20.03 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.0 PEAK FLOW RATE (CFS) = 53.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.32 FLOW VELOCITY (FEET/SEC.) = 10.33  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50506.00 = 2083.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50506.00 TO NODE 50507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 464.00 CHANNEL SLOPE = 0.2414  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.168

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.57	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 56.91  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.67  
AVERAGE FLOW DEPTH (FEET) = 1.22 TRAVEL TIME (MIN.) = 0.61  
Tc (MIN.) = 13.57

SUBAREA AREA (ACRES) = 2.57 SUBAREA RUNOFF (CFS) = 6.63  
EFFECTIVE AREA (ACRES) = 22.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.6 PEAK FLOW RATE (CFS) = 58.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.23 FLOW VELOCITY (FEET/SEC.) = 12.79  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50507.00 = 2547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50507.00 TO NODE 50508.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 535.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 310.00 CHANNEL SLOPE = 0.2097  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.098

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.09	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 66.02  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.54  
AVERAGE FLOW DEPTH (FEET) = 1.32 TRAVEL TIME (MIN.) = 0.41  
Tc (MIN.) = 13.98

SUBAREA AREA (ACRES) = 6.09 SUBAREA RUNOFF (CFS) = 15.34  
EFFECTIVE AREA (ACRES) = 28.69 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 28.7 PEAK FLOW RATE (CFS) = 72.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.37 FLOW VELOCITY (FEET/SEC.) = 12.83  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50508.00 = 2857.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50508.00 TO NODE 50509.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 405.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.2658  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.003

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 84.45  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 14.54  
AVERAGE FLOW DEPTH (FEET) = 1.39 TRAVEL TIME (MIN.) = 0.56  
Tc (MIN.) = 14.54

SUBAREA AREA (ACRES) = 10.02 SUBAREA RUNOFF (CFS) = 24.38  
EFFECTIVE AREA (ACRES) = 38.72 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.7 PEAK FLOW RATE (CFS) = 94.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.45 FLOW VELOCITY (FEET/SEC.) = 14.88  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50509.00 = 3346.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50509.00 TO NODE 50510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 285.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 706.00 CHANNEL SLOPE = 0.1700  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.878

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 101.83  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.90

AVERAGE FLOW DEPTH (FEET) = 1.62 TRAVEL TIME (MIN.) = 0.91  
Tc (MIN.) = 15.46  
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 15.31  
EFFECTIVE AREA (ACRES) = 45.32 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 105.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.64 FLOW VELOCITY (FEET/SEC.) = 12.98  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50510.00 = 4052.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50510.00 TO NODE 50511.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 285.00 DOWNSTREAM (FEET) = 238.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1169.00 CHANNEL SLOPE = 0.0402  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.677

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 22.45 0.30 0.991 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 129.20  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.88  
AVERAGE FLOW DEPTH (FEET) = 2.09 TRAVEL TIME (MIN.) = 1.97  
Tc (MIN.) = 17.43  
SUBAREA AREA (ACRES) = 22.45 SUBAREA RUNOFF (CFS) = 48.08  
EFFECTIVE AREA (ACRES) = 67.77 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 67.8 PEAK FLOW RATE (CFS) = 145.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.18 FLOW VELOCITY (FEET/SEC.) = 10.18  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50511.00 = 5221.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50511.00 TO NODE 50512.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 238.00 DOWNSTREAM (FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.0102  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.548

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 39.83 0.30 0.990 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 185.35  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.46  
AVERAGE FLOW DEPTH (FEET) = 3.09 TRAVEL TIME (MIN.) = 1.26  
Tc (MIN.) = 18.69  
SUBAREA AREA (ACRES) = 39.83 SUBAREA RUNOFF (CFS) = 80.67  
EFFECTIVE AREA (ACRES) = 107.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 107.6 PEAK FLOW RATE (CFS) = 217.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 3.28 FLOW VELOCITY (FEET/SEC.) = 6.73  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50512.00 = 5710.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50512.00 TO NODE 50513.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 233.00 DOWNSTREAM (FEET) = 209.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 537.00 CHANNEL SLOPE = 0.0447  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.470

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.40 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 225.04  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.81  
AVERAGE FLOW DEPTH (FEET) = 2.52 TRAVEL TIME (MIN.) = 0.76  
Tc (MIN.) = 19.45  
SUBAREA AREA (ACRES) = 7.40 SUBAREA RUNOFF (CFS) = 14.45  
EFFECTIVE AREA (ACRES) = 114.99 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 115.0 PEAK FLOW RATE (CFS) = 224.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.52 FLOW VELOCITY (FEET/SEC.) = 11.79  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50513.00 = 6247.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50513.00 TO NODE 50513.00 IS CODE = 81

-----  
>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 19.45  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.470  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.19 0.30 0.961 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.961  
SUBAREA AREA (ACRES) = 38.19 SUBAREA RUNOFF (CFS) = 74.99  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.99  
TOTAL AREA (ACRES) = 153.2 PEAK FLOW RATE (CFS) = 299.75

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 153.2 TC (MIN.) = 19.45  
EFFECTIVE AREA (ACRES) = 153.18 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.986  
PEAK FLOW RATE (CFS) = 299.75  
=====

=====  
END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 100 Yr \*  
\* From Node: 50600 To Node: 50610 \*  
\*\*\*\*\*

FILE NAME: 0610506Y.DAT  
TIME/DATE OF STUDY: 17:00 01/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.850
- 2) 10.00; 3.776
- 3) 15.00; 2.925
- 4) 20.00; 2.414
- 5) 25.00; 2.092
- 6) 30.00; 1.869
- 7) 40.00; 1.614
- 8) 50.00; 1.398
- 9) 60.00; 1.287
- 10) 90.00; 1.084
- 11) 120.00; 0.947
- 12) 180.00; 0.791
- 13) 360.00; 0.585
- 14) 1440.00; 0.255

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL IN- / OUT- / PARK- / SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER WIDTH (FT)	GEOMETRIES LIP (FT)	MANNING HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50600.00 TO NODE 50601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00  
ELEVATION DATA: UPSTREAM(FEET) = 780.00 DOWNSTREAM(FEET) = 730.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.166  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.748  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	1.44	0.30	1.000	0	10.17

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 4.46  
TOTAL AREA(ACRES) = 1.44 PEAK FLOW RATE(CFS) = 4.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50601.00 TO NODE 50602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.1541  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.584  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.27	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.34  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.18  
AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 0.96  
Tc(MIN.) = 11.13  
SUBAREA AREA(ACRES) = 1.27 SUBAREA RUNOFF(CFS) = 3.76  
EFFECTIVE AREA(ACRES) = 2.71 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 8.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.64 FLOW VELOCITY(FEET/SEC.) = 6.55  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50602.00 = 671.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50602.00 TO NODE 50603.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 258.00 CHANNEL SLOPE = 0.2907  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.501

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.31	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.89

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.77

AVERAGE FLOW DEPTH(FEET) = 0.61 TRAVEL TIME(MIN.) = 0.49

Tc(MIN.) = 11.62

SUBAREA AREA(ACRES) = 1.31 SUBAREA RUNOFF(CFS) = 3.78

EFFECTIVE AREA(ACRES) = 4.02 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 11.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.65 FLOW VELOCITY(FEET/SEC.) = 9.10

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50603.00 = 929.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50603.00 TO NODE 50604.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 585.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 116.00 CHANNEL SLOPE = 0.1293  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.454

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.58	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.82

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.10

AVERAGE FLOW DEPTH(FEET) = 0.81 TRAVEL TIME(MIN.) = 0.27

Tc(MIN.) = 11.89

SUBAREA AREA(ACRES) = 1.58 SUBAREA RUNOFF(CFS) = 4.49

EFFECTIVE AREA(ACRES) = 5.60 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.6 PEAK FLOW RATE(CFS) = 15.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.85 FLOW VELOCITY(FEET/SEC.) = 7.31

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50604.00 = 1045.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50604.00 TO NODE 50605.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 584.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 16.00 CHANNEL SLOPE = 0.0625  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.447

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.98	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.95

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.11

AVERAGE FLOW DEPTH(FEET) = 1.12 TRAVEL TIME(MIN.) = 0.04

Tc(MIN.) = 11.94

SUBAREA AREA(ACRES) = 4.98 SUBAREA RUNOFF(CFS) = 14.11

EFFECTIVE AREA(ACRES) = 10.58 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 10.6 PEAK FLOW RATE(CFS) = 29.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.24 FLOW VELOCITY(FEET/SEC.) = 6.51

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50605.00 = 1061.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50605.00 TO NODE 50606.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 584.00 DOWNSTREAM(FEET) = 579.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 122.00 CHANNEL SLOPE = 0.0410  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.388

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.18	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.17

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.87

AVERAGE FLOW DEPTH(FEET) = 1.45 TRAVEL TIME(MIN.) = 0.35

Tc(MIN.) = 12.28

SUBAREA AREA(ACRES) = 5.18 SUBAREA RUNOFF(CFS) = 14.40

EFFECTIVE AREA(ACRES) = 15.76 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 15.8 PEAK FLOW RATE (CFS) = 43.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.55 FLOW VELOCITY (FEET/SEC.) = 6.11  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50606.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50606.00 TO NODE 50607.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 579.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 637.00 CHANNEL SLOPE = 0.0801  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.169  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.34	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 53.29  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.25  
AVERAGE FLOW DEPTH (FEET) = 1.47 TRAVEL TIME (MIN.) = 1.29  
Tc (MIN.) = 13.57  
SUBAREA AREA (ACRES) = 7.34 SUBAREA RUNOFF (CFS) = 18.96  
EFFECTIVE AREA (ACRES) = 23.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 23.1 PEAK FLOW RATE (CFS) = 59.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.53 FLOW VELOCITY (FEET/SEC.) = 8.49  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50607.00 = 1820.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50607.00 TO NODE 50608.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 422.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 529.00 CHANNEL SLOPE = 0.2004  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.045  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.99	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 63.35  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.17  
AVERAGE FLOW DEPTH (FEET) = 1.32 TRAVEL TIME (MIN.) = 0.72  
Tc (MIN.) = 14.29

SUBAREA AREA (ACRES) = 2.99 SUBAREA RUNOFF (CFS) = 7.39  
EFFECTIVE AREA (ACRES) = 26.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.1 PEAK FLOW RATE (CFS) = 64.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.32 FLOW VELOCITY (FEET/SEC.) = 12.25  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50608.00 = 2349.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50608.00 TO NODE 50609.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 422.00 DOWNSTREAM (FEET) = 297.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 708.00 CHANNEL SLOPE = 0.1766  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.899  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.94	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 78.45  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.23  
AVERAGE FLOW DEPTH (FEET) = 1.46 TRAVEL TIME (MIN.) = 0.96  
Tc (MIN.) = 15.26  
SUBAREA AREA (ACRES) = 11.94 SUBAREA RUNOFF (CFS) = 27.93  
EFFECTIVE AREA (ACRES) = 38.04 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 38.0 PEAK FLOW RATE (CFS) = 88.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.53 FLOW VELOCITY (FEET/SEC.) = 12.66  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50609.00 = 3057.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50609.00 TO NODE 50610.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 297.00 DOWNSTREAM (FEET) = 207.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1321.00 CHANNEL SLOPE = 0.0681  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.699  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.38	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 100.18  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.29

AVERAGE FLOW DEPTH (FEET) = 1.72 TRAVEL TIME (MIN.) = 1.95  
Tc (MIN.) = 17.21  
SUBAREA AREA (ACRES) = 10.38 SUBAREA RUNOFF (CFS) = 22.42  
EFFECTIVE AREA (ACRES) = 48.42 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 104.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.75 FLOW VELOCITY (FEET/SEC.) = 11.38  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50610.00 = 4378.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 17.21  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.699  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.17 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.17 SUBAREA RUNOFF (CFS) = 2.53  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 49.6 PEAK FLOW RATE (CFS) = 107.09

=====

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 49.6 TC (MIN.) = 17.21  
EFFECTIVE AREA (ACRES) = 49.59 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.000  
PEAK FLOW RATE (CFS) = 107.09

=====

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END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 100 Yr \*  
\* From Node: 50700 To Node: 50716 \*  
\*\*\*\*\*

FILE NAME: 0610507Y.DAT  
TIME/DATE OF STUDY: 17:01 01/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.850
- 2) 10.00; 3.776
- 3) 15.00; 2.925
- 4) 20.00; 2.414
- 5) 25.00; 2.092
- 6) 30.00; 1.869
- 7) 40.00; 1.614
- 8) 50.00; 1.398
- 9) 60.00; 1.287
- 10) 90.00; 1.084
- 11) 120.00; 0.947
- 12) 180.00; 0.791
- 13) 360.00; 0.585
- 14) 1440.00; 0.255

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313	0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50700.00 TO NODE 50701.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00  
ELEVATION DATA: UPSTREAM(FEET) = 1121.00 DOWNSTREAM(FEET) = 870.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.572  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.784  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.18	0.30	1.000	0	7.57

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.74  
TOTAL AREA(ACRES) = 0.18 PEAK FLOW RATE(CFS) = 0.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50701.00 TO NODE 50702.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 827.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 127.00 CHANNEL SLOPE = 0.3386  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.632  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.78  
AVERAGE FLOW DEPTH(FEET) = 0.30 TRAVEL TIME(MIN.) = 0.37  
Tc(MIN.) = 7.94  
SUBAREA AREA(ACRES) = 0.42 SUBAREA RUNOFF(CFS) = 1.65  
EFFECTIVE AREA(ACRES) = 0.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 0.6 PEAK FLOW RATE(CFS) = 2.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 FLOW VELOCITY(FEET/SEC.) = 6.50  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50702.00 = 456.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50703.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	827.00	DOWNSTREAM(FEET) =	815.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	94.00	CHANNEL SLOPE =	0.1277
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	4.497		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.34	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.00

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.84

AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 0.32

Tc(MIN.) = 8.26

SUBAREA AREA(ACRES) = 0.34 SUBAREA RUNOFF(CFS) = 1.28

EFFECTIVE AREA(ACRES) = 0.94 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 0.9 PEAK FLOW RATE(CFS) = 3.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.49 FLOW VELOCITY(FEET/SEC.) = 5.05

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50703.00 = 550.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50704.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	815.00	DOWNSTREAM(FEET) =	800.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	169.00	CHANNEL SLOPE =	0.0888
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	4.268		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.72	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.64

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.10

AVERAGE FLOW DEPTH(FEET) = 0.66 TRAVEL TIME(MIN.) = 0.55

Tc(MIN.) = 8.81

SUBAREA AREA(ACRES) = 1.72 SUBAREA RUNOFF(CFS) = 6.15

EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 9.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.75 FLOW VELOCITY(FEET/SEC.) = 5.61

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50704.00 = 719.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50705.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	800.00	DOWNSTREAM(FEET) =	785.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	128.00	CHANNEL SLOPE =	0.1172
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	4.136		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.12	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.19

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.67

AVERAGE FLOW DEPTH(FEET) = 0.81 TRAVEL TIME(MIN.) = 0.32

Tc(MIN.) = 9.13

SUBAREA AREA(ACRES) = 2.12 SUBAREA RUNOFF(CFS) = 7.33

EFFECTIVE AREA(ACRES) = 4.79 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 16.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.88 FLOW VELOCITY(FEET/SEC.) = 7.11

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50705.00 = 847.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50705.00 TO NODE 50706.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	785.00	DOWNSTREAM(FEET) =	775.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	170.00	CHANNEL SLOPE =	0.0588
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.938		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.64	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.48

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.93

AVERAGE FLOW DEPTH(FEET) = 1.12 TRAVEL TIME(MIN.) = 0.48

Tc(MIN.) = 9.61

SUBAREA AREA(ACRES) = 3.64 SUBAREA RUNOFF(CFS) = 11.90

EFFECTIVE AREA(ACRES) = 8.42 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 8.4 PEAK FLOW RATE (CFS) = 27.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.22 FLOW VELOCITY (FEET/SEC.) = 6.22  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50706.00 = 1017.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50706.00 TO NODE 50707.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 775.00 DOWNSTREAM (FEET) = 772.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 162.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.735

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.65	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 34.76  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.28  
AVERAGE FLOW DEPTH (FEET) = 1.65 TRAVEL TIME (MIN.) = 0.63  
Tc (MIN.) = 10.24  
SUBAREA AREA (ACRES) = 4.65 SUBAREA RUNOFF (CFS) = 14.37  
EFFECTIVE AREA (ACRES) = 13.07 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 13.1 PEAK FLOW RATE (CFS) = 40.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.74 FLOW VELOCITY (FEET/SEC.) = 4.44  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50707.00 = 1179.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50707.00 TO NODE 50708.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 772.00 DOWNSTREAM (FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 357.00 CHANNEL SLOPE = 0.0756  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.605

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.55	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 45.70  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.78  
AVERAGE FLOW DEPTH (FEET) = 1.40 TRAVEL TIME (MIN.) = 0.76  
Tc (MIN.) = 11.01

SUBAREA AREA (ACRES) = 3.55 SUBAREA RUNOFF (CFS) = 10.56  
EFFECTIVE AREA (ACRES) = 16.62 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 16.6 PEAK FLOW RATE (CFS) = 49.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.44 FLOW VELOCITY (FEET/SEC.) = 7.96  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50708.00 = 1536.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50708.00 TO NODE 50709.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 733.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 444.00 CHANNEL SLOPE = 0.0270  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.379

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.58	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 57.18  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.57  
AVERAGE FLOW DEPTH (FEET) = 1.85 TRAVEL TIME (MIN.) = 1.33  
Tc (MIN.) = 12.33  
SUBAREA AREA (ACRES) = 5.58 SUBAREA RUNOFF (CFS) = 15.47  
EFFECTIVE AREA (ACRES) = 22.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.2 PEAK FLOW RATE (CFS) = 61.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.90 FLOW VELOCITY (FEET/SEC.) = 5.70  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50709.00 = 1980.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50709.00 TO NODE 50710.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 733.00 DOWNSTREAM (FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 467.00 CHANNEL SLOPE = 0.1242  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.250

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.17	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 67.07  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.27

AVERAGE FLOW DEPTH (FEET) = 1.48 TRAVEL TIME (MIN.) = 0.76  
Tc (MIN.) = 13.09  
SUBAREA AREA (ACRES) = 4.17 SUBAREA RUNOFF (CFS) = 11.08  
EFFECTIVE AREA (ACRES) = 26.38 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.4 PEAK FLOW RATE (CFS) = 70.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.50 FLOW VELOCITY (FEET/SEC.) = 10.40  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50710.00 = 2447.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50710.00 TO NODE 50711.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 619.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 516.00 CHANNEL SLOPE = 0.1085  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.114  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 21.41 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 97.14  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.76  
AVERAGE FLOW DEPTH (FEET) = 1.73 TRAVEL TIME (MIN.) = 0.80  
Tc (MIN.) = 13.89  
SUBAREA AREA (ACRES) = 21.41 SUBAREA RUNOFF (CFS) = 54.21  
EFFECTIVE AREA (ACRES) = 47.78 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 121.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.89 FLOW VELOCITY (FEET/SEC.) = 11.32  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50711.00 = 2963.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50711.00 TO NODE 50712.00 IS CODE = 51

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>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 619.00 DOWNSTREAM (FEET) = 600.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 650.00 CHANNEL SLOPE = 0.0292  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.912  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.43 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 129.74  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.75  
AVERAGE FLOW DEPTH (FEET) = 2.22 TRAVEL TIME (MIN.) = 1.24  
Tc (MIN.) = 15.13  
SUBAREA AREA (ACRES) = 7.43 SUBAREA RUNOFF (CFS) = 17.46  
EFFECTIVE AREA (ACRES) = 55.21 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.2 PEAK FLOW RATE (CFS) = 129.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.22 FLOW VELOCITY (FEET/SEC.) = 8.75  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50712.00 = 3613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50713.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 794.00 CHANNEL SLOPE = 0.0907  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.817  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 36.47 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 171.10  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 14.34  
AVERAGE FLOW DEPTH (FEET) = 1.99 TRAVEL TIME (MIN.) = 0.92  
Tc (MIN.) = 16.05  
SUBAREA AREA (ACRES) = 36.47 SUBAREA RUNOFF (CFS) = 82.64  
EFFECTIVE AREA (ACRES) = 91.68 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 207.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.14 FLOW VELOCITY (FEET/SEC.) = 15.11  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50713.00 = 4407.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50713.00 TO NODE 50714.00 IS CODE = 51

-----  
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 528.00 DOWNSTREAM (FEET) = 423.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1215.00 CHANNEL SLOPE = 0.0864  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.681  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.52 0.30 0.998 -



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.998  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 227.58  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 15.14  
 AVERAGE FLOW DEPTH(FEET) = 2.24 TRAVEL TIME(MIN.) = 1.34  
 Tc(MIN.) = 17.39  
 SUBAREA AREA(ACRES) = 18.52 SUBAREA RUNOFF(CFS) = 39.69  
 EFFECTIVE AREA(ACRES) = 110.22 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 110.2 PEAK FLOW RATE(CFS) = 236.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.27 FLOW VELOCITY(FEET/SEC.) = 15.29  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50714.00 = 5622.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50714.00 TO NODE 50715.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 319.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 768.00 CHANNEL SLOPE = 0.1354  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.609  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.31 0.30 0.993 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 241.67  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 18.22  
 AVERAGE FLOW DEPTH(FEET) = 2.10 TRAVEL TIME(MIN.) = 0.70  
 Tc(MIN.) = 18.09  
 SUBAREA AREA(ACRES) = 5.31 SUBAREA RUNOFF(CFS) = 11.05  
 EFFECTIVE AREA(ACRES) = 115.52 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 115.5 PEAK FLOW RATE(CFS) = 240.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.10 FLOW VELOCITY(FEET/SEC.) = 18.13  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50715.00 = 6390.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50715.00 TO NODE 50716.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 319.00 DOWNSTREAM(FEET) = 182.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1513.00 CHANNEL SLOPE = 0.0905  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.455  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 79.09 0.30 0.979 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 317.00  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 16.73  
 AVERAGE FLOW DEPTH(FEET) = 2.51 TRAVEL TIME(MIN.) = 1.51  
 Tc(MIN.) = 19.60  
 SUBAREA AREA(ACRES) = 79.09 SUBAREA RUNOFF(CFS) = 153.82  
 EFFECTIVE AREA(ACRES) = 194.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 194.6 PEAK FLOW RATE(CFS) = 377.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.68 FLOW VELOCITY(FEET/SEC.) = 17.50  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50716.00 = 7903.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50716.00 TO NODE 50716.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.60  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.455  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 42.18 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 42.18 SUBAREA RUNOFF(CFS) = 81.80  
 EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 236.8 PEAK FLOW RATE(CFS) = 459.67

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 236.8 TC(MIN.) = 19.60  
 EFFECTIVE AREA(ACRES) = 236.79 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.993  
 PEAK FLOW RATE(CFS) = 459.67

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 100 Yr \*  
\* From Node: 50800 To Node: 50811 \*  
\*\*\*\*\*

FILE NAME: 0610508Y.DAT  
TIME/DATE OF STUDY: 17:01 01/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.850
- 2) 10.00; 3.776
- 3) 15.00; 2.925
- 4) 20.00; 2.414
- 5) 25.00; 2.092
- 6) 30.00; 1.869
- 7) 40.00; 1.614
- 8) 50.00; 1.398
- 9) 60.00; 1.287
- 10) 90.00; 1.084
- 11) 120.00; 0.947
- 12) 180.00; 0.791
- 13) 360.00; 0.585
- 14) 1440.00; 0.255

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50800.00 TO NODE 50801.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00  
ELEVATION DATA: UPSTREAM(FEET) = 795.00 DOWNSTREAM(FEET) = 745.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.302  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.725  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	0.60	0.30	1.000	0	10.30
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000						
SUBAREA RUNOFF(CFS) = 1.84						
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.84						

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50801.00 TO NODE 50802.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 725.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 245.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.585

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.35	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.79					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.98					
AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 0.82					
Tc(MIN.) = 11.12					
SUBAREA AREA(ACRES) = 3.35 SUBAREA RUNOFF(CFS) = 9.90					
EFFECTIVE AREA(ACRES) = 3.94 AREA-AVERAGED Fm(INCH/HR) = 0.30					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 3.9 PEAK FLOW RATE(CFS) = 11.66					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.83 FLOW VELOCITY(FEET/SEC.) = 5.69  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50802.00 = 566.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50802.00 TO NODE 50803.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	725.00	DOWNSTREAM(FEET) =	700.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	325.00	CHANNEL SLOPE =	0.0769
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.427		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.52	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.81

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.81

AVERAGE FLOW DEPTH(FEET) = 0.89 TRAVEL TIME(MIN.) = 0.93

Tc(MIN.) = 12.05

SUBAREA AREA(ACRES) = 1.52 SUBAREA RUNOFF(CFS) = 4.29

EFFECTIVE AREA(ACRES) = 5.47 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 15.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.93 FLOW VELOCITY(FEET/SEC.) = 5.96

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50803.00 = 891.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50803.00 TO NODE 50804.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	700.00	DOWNSTREAM(FEET) =	652.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	594.00	CHANNEL SLOPE =	0.0808
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.177		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.12	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.32

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.75

AVERAGE FLOW DEPTH(FEET) = 1.07 TRAVEL TIME(MIN.) = 1.47

Tc(MIN.) = 13.52

SUBAREA AREA(ACRES) = 6.12 SUBAREA RUNOFF(CFS) = 15.85

EFFECTIVE AREA(ACRES) = 11.59 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 11.6 PEAK FLOW RATE(CFS) = 30.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.18 FLOW VELOCITY(FEET/SEC.) = 7.19

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50804.00 = 1485.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50804.00 TO NODE 50805.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	652.00	DOWNSTREAM(FEET) =	542.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	499.00	CHANNEL SLOPE =	0.2204
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	3.048		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.17	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 36.41

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.01

AVERAGE FLOW DEPTH(FEET) = 1.05 TRAVEL TIME(MIN.) = 0.76

Tc(MIN.) = 14.28

SUBAREA AREA(ACRES) = 5.17 SUBAREA RUNOFF(CFS) = 12.79

EFFECTIVE AREA(ACRES) = 16.76 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 41.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.10 FLOW VELOCITY(FEET/SEC.) = 11.35

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50805.00 = 1984.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50805.00 TO NODE 50806.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	542.00	DOWNSTREAM(FEET) =	450.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	650.00	CHANNEL SLOPE =	0.1415
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	2.887		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.22	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 47.55

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.93

AVERAGE FLOW DEPTH(FEET) = 1.26 TRAVEL TIME(MIN.) = 1.09

Tc(MIN.) = 15.37

SUBAREA AREA(ACRES) = 5.22 SUBAREA RUNOFF(CFS) = 12.16

EFFECTIVE AREA(ACRES) = 21.99 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 22.0 PEAK FLOW RATE (CFS) = 51.20

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.30 FLOW VELOCITY (FEET/SEC.) = 10.10  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50806.00 = 2634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50806.00 TO NODE 50807.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 450.00 DOWNSTREAM (FEET) = 400.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 639.00 CHANNEL SLOPE = 0.0782  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.763

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.83	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 68.75  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.73  
AVERAGE FLOW DEPTH (FEET) = 1.62 TRAVEL TIME (MIN.) = 1.22  
Tc (MIN.) = 16.59  
SUBAREA AREA (ACRES) = 15.83 SUBAREA RUNOFF (CFS) = 35.10  
EFFECTIVE AREA (ACRES) = 37.82 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 37.8 PEAK FLOW RATE (CFS) = 83.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.74 FLOW VELOCITY (FEET/SEC.) = 9.18  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50807.00 = 3273.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50807.00 TO NODE 50808.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 400.00 DOWNSTREAM (FEET) = 350.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 448.00 CHANNEL SLOPE = 0.1116  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.691

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 91.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.71  
AVERAGE FLOW DEPTH (FEET) = 1.69 TRAVEL TIME (MIN.) = 0.70  
Tc (MIN.) = 17.28

SUBAREA AREA (ACRES) = 7.46 SUBAREA RUNOFF (CFS) = 16.05  
EFFECTIVE AREA (ACRES) = 45.28 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.3 PEAK FLOW RATE (CFS) = 97.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.73 FLOW VELOCITY (FEET/SEC.) = 10.87  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50808.00 = 3721.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50808.00 TO NODE 50809.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 350.00 DOWNSTREAM (FEET) = 283.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 438.00 CHANNEL SLOPE = 0.1530  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.632

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.20	0.30	0.972	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 105.03  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.47  
AVERAGE FLOW DEPTH (FEET) = 1.68 TRAVEL TIME (MIN.) = 0.59  
Tc (MIN.) = 17.87  
SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 15.16  
EFFECTIVE AREA (ACRES) = 52.48 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 52.5 PEAK FLOW RATE (CFS) = 110.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 1.71 FLOW VELOCITY (FEET/SEC.) = 12.62  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50809.00 = 4159.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50809.00 TO NODE 50810.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 283.00 DOWNSTREAM (FEET) = 243.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 665.00 CHANNEL SLOPE = 0.0602  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.540

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	63.52	0.30	0.983	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.983  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 174.36  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.35

AVERAGE FLOW DEPTH (FEET) = 2.17 TRAVEL TIME (MIN.) = 0.90  
Tc (MIN.) = 18.77  
SUBAREA AREA (ACRES) = 63.52 SUBAREA RUNOFF (CFS) = 128.34  
EFFECTIVE AREA (ACRES) = 116.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 116.0 PEAK FLOW RATE (CFS) = 234.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.42 FLOW VELOCITY (FEET/SEC.) = 13.31  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50810.00 = 4824.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50810.00 TO NODE 50811.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 243.00 DOWNSTREAM (FEET) = 173.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1122.00 CHANNEL SLOPE = 0.0624  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.384

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 11.57 0.30 0.980 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 245.06  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.99  
AVERAGE FLOW DEPTH (FEET) = 2.73 TRAVEL TIME (MIN.) = 1.70  
Tc (MIN.) = 20.47  
SUBAREA AREA (ACRES) = 11.57 SUBAREA RUNOFF (CFS) = 21.76  
EFFECTIVE AREA (ACRES) = 127.57 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 127.6 PEAK FLOW RATE (CFS) = 239.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.70 FLOW VELOCITY (FEET/SEC.) = 10.93  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50811.00 = 5946.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 20.47  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.384  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 3.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 6.94  
EFFECTIVE AREA (ACRES) = 131.27 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 131.3 PEAK FLOW RATE (CFS) = 246.57

=====

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 131.3 TC (MIN.) = 20.47  
EFFECTIVE AREA (ACRES) = 131.27 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.988  
PEAK FLOW RATE (CFS) = 246.57

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

Analysis prepared by:

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 2 \*  
\* HYDROLOGIC ANALYSIS - 100-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E502XXCE.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.820
2)	6.000;	4.350
3)	7.000;	3.990
4)	8.000;	3.700
5)	9.000;	3.460
6)	10.000;	3.260
7)	11.000;	3.090
8)	12.000;	2.940
9)	13.000;	2.810
10)	14.000;	2.690
11)	15.000;	2.590
12)	20.000;	2.200
13)	25.000;	1.940
14)	30.000;	1.750
15)	40.000;	1.490
16)	50.000;	1.310
17)	60.000;	1.180
18)	90.000;	0.940
19)	120.000;	0.800
20)	180.000;	0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50200.00 TO NODE 50201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 497.00 DOWNSTREAM(FEET) = 365.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.563  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.565  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.60	0.30	1.000	95	8.56
NATURAL FAIR COVER "OPEN BRUSH"	-	0.60	0.30	1.000	95	8.56
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.20	0.30	1.000	95	8.56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 4.11  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 4.11

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50201.00 TO NODE 50202.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 365.00 DOWNSTREAM(FEET) = 335.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 259.00 CHANNEL SLOPE = 0.1158  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.11  
FLOW VELOCITY(FEET/SEC.) = 5.00 FLOW DEPTH(FEET) = 0.52  
TRAVEL TIME(MIN.) = 0.86  $T_c$ (MIN.) = 9.43  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50202.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50202.00 IS CODE = 81



=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.43  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.375  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 7.47  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 11.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50202.00 TO NODE 50203.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 335.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.1020  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 11.35  
FLOW VELOCITY(FEET/SEC.) = 6.17 FLOW DEPTH(FEET) = 0.78  
TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 9.96  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50203.00 = 781.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50203.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.96  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.269  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 11.22  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 22.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50203.00 TO NODE 50204.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 304.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.0696  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 22.18  
FLOW VELOCITY(FEET/SEC.) = 6.27 FLOW DEPTH(FEET) = 1.09  
TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 10.38  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50204.00 = 939.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50204.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.38  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.196  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 11.38  
EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 33.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50204.00 TO NODE 50205.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 304.00 DOWNSTREAM(FEET) = 234.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 487.00 CHANNEL SLOPE = 0.1437  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 33.01  
FLOW VELOCITY(FEET/SEC.) = 11.29 FLOW DEPTH(FEET) = 0.99  
TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 11.09  
LONGEST FLOWPATH FROM NODE 50200.00 TO NODE 50205.00 = 1426.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 11.09  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.076  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.100 -

USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.90 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 8.87  
 EFFECTIVE AREA(ACRES) = 16.10 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 16.1 PEAK FLOW RATE(CFS) = 40.52

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50205.00 TO NODE 50205.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN) = 11.09  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.076  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	4.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.850	-
USER-DEFINED	-	3.70	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.882  
 SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 31.88  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
 TOTAL AREA(ACRES) = 28.7 PEAK FLOW RATE(CFS) = 72.40

=====  
 END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 28.7 TC(MIN.) = 11.09  
 EFFECTIVE AREA(ACRES) = 28.70 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.910  
 PEAK FLOW RATE(CFS) = 72.40  
 =====

-----  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

Analysis prepared by:

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 3 \*  
\* HYDROLOGIC ANALYSIS - 100-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E503XXCE.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.820
2)	6.000;	4.350
3)	7.000;	3.990
4)	8.000;	3.700
5)	9.000;	3.460
6)	10.000;	3.260
7)	11.000;	3.090
8)	12.000;	2.940
9)	13.000;	2.810
10)	14.000;	2.690
11)	15.000;	2.590
12)	20.000;	2.200
13)	25.000;	1.940
14)	30.000;	1.750
15)	40.000;	1.490
16)	50.000;	1.310
17)	60.000;	1.180
18)	90.000;	0.940
19)	120.000;	0.800
20)	180.000;	0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50300.00 TO NODE 50301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00  
ELEVATION DATA: UPSTREAM(FEET) = 1110.00 DOWNSTREAM(FEET) = 1035.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.517

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.357

SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------	--------------

NATURAL FAIR COVER

"GRASS"	-	0.60	0.30	1.000	95	9.52
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NATURAL FAIR COVER

"WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.52
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SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000

SUBAREA RUNOFF(CFS) = 2.48

TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 2.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50301.00 TO NODE 50302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 960.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 225.00 CHANNEL SLOPE = 0.3333

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00

CHANNEL FLOW THRU SUBAREA(CFS) = 2.48

FLOW VELOCITY(FEET/SEC.) = 6.52 FLOW DEPTH(FEET) = 0.36

TRAVEL TIME(MIN.) = 0.57  $T_c$ (MIN.) = 10.09

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50302.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50302.00 TO NODE 50302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN) = 10.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.244
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.30    1.000   -
USER-DEFINED        -         1.00    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.10    SUBAREA RUNOFF(CFS) = 2.91
EFFECTIVE AREA(ACRES) = 2.00    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.0        PEAK FLOW RATE(CFS) = 5.30

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*****
FLOW PROCESS FROM NODE 50302.00 TO NODE 50303.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 950.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 84.00 CHANNEL SLOPE = 0.1190
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.30
FLOW VELOCITY(FEET/SEC.) = 5.34 FLOW DEPTH(FEET) = 0.58
TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 10.35
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50303.00 = 631.00 FEET.

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*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50303.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.35
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.200
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.30    1.000   -
USER-DEFINED        -         0.30    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.70    SUBAREA RUNOFF(CFS) = 1.83
EFFECTIVE AREA(ACRES) = 2.70    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.7        PEAK FLOW RATE(CFS) = 7.05

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*****
FLOW PROCESS FROM NODE 50303.00 TO NODE 50304.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 940.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 72.00 CHANNEL SLOPE = 0.1389
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

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MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.05
FLOW VELOCITY(FEET/SEC.) = 6.09 FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 10.55
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50304.00 = 703.00 FEET.

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*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50304.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.55
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.166
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.30    0.30    1.000   -
USER-DEFINED        -         0.90    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.20    SUBAREA RUNOFF(CFS) = 5.68
EFFECTIVE AREA(ACRES) = 4.90    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.9        PEAK FLOW RATE(CFS) = 12.64

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*****
FLOW PROCESS FROM NODE 50304.00 TO NODE 50305.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 940.00 DOWNSTREAM(FEET) = 890.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.2941
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 12.64
FLOW VELOCITY(FEET/SEC.) = 9.43 FLOW DEPTH(FEET) = 0.67
TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 10.85
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50305.00 = 873.00 FEET.

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*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.85
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.115
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00    0.30    1.000   -
USER-DEFINED        -         0.80    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.80    SUBAREA RUNOFF(CFS) = 7.09
EFFECTIVE AREA(ACRES) = 7.70    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 7.7        PEAK FLOW RATE(CFS) = 19.51

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*****
FLOW PROCESS FROM NODE 50305.00 TO NODE 50306.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 890.00 DOWNSTREAM(FEET) = 785.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 439.00 CHANNEL SLOPE = 0.2392
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 19.51
FLOW VELOCITY(FEET/SEC.) = 9.69 FLOW DEPTH(FEET) = 0.82
TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 11.61
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50306.00 = 1312.00 FEET.

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*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 11.61
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.999
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.80   0.30  1.000  -
USER-DEFINED        -         3.30   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 17.25
EFFECTIVE AREA(ACRES) = 14.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.8 PEAK FLOW RATE(CFS) = 35.95

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*****
FLOW PROCESS FROM NODE 50306.00 TO NODE 50307.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 737.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 213.00 CHANNEL SLOPE = 0.2254
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 35.95
FLOW VELOCITY(FEET/SEC.) = 11.03 FLOW DEPTH(FEET) = 1.04
TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 11.93
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50307.00 = 1525.00 FEET.

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*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 11.93
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.951
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00   0.30  1.000  -
USER-DEFINED        -         0.90   0.30  1.000  -
USER-DEFINED        -         0.20   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 7.40
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 42.70

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*****
FLOW PROCESS FROM NODE 50307.00 TO NODE 50308.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 737.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 527.00 CHANNEL SLOPE = 0.2600
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 42.70
FLOW VELOCITY(FEET/SEC.) = 12.19 FLOW DEPTH(FEET) = 1.08
TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 12.65
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50308.00 = 2052.00 FEET.

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*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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```

MAINLINE Tc(MIN) = 12.65
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.856
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         5.70   0.30  1.000  -
USER-DEFINED        -         1.00   0.30  1.000  -
USER-DEFINED        -         3.30   0.30  1.000  -
USER-DEFINED        -         0.40   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 23.92
EFFECTIVE AREA(ACRES) = 28.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 28.3 PEAK FLOW RATE(CFS) = 65.09

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*****
FLOW PROCESS FROM NODE 50308.00 TO NODE 50309.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 555.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 561.00 CHANNEL SLOPE = 0.0802
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00

```

CHANNEL FLOW THRU SUBAREA(CFS) = 65.09  
FLOW VELOCITY(FEET/SEC.) = 8.67 FLOW DEPTH(FEET) = 1.58  
TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 13.73  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 2613.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 13.73  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.723  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 6.76  
EFFECTIVE AREA(ACRES) = 31.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.4 PEAK FLOW RATE(CFS) = 68.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50310.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 555.00 DOWNSTREAM(FEET) = 509.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 401.00 CHANNEL SLOPE = 0.1147  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 68.47  
FLOW VELOCITY(FEET/SEC.) = 10.06 FLOW DEPTH(FEET) = 1.51  
TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 14.39  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50310.00 = 3014.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 14.39  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.651  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	7.60	0.30	1.000	-
USER-DEFINED	-	6.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 36.60

EFFECTIVE AREA(ACRES) = 48.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 48.7 PEAK FLOW RATE(CFS) = 103.04

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50311.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 509.00 DOWNSTREAM(FEET) = 395.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 685.00 CHANNEL SLOPE = 0.1664  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 103.04  
FLOW VELOCITY(FEET/SEC.) = 12.81 FLOW DEPTH(FEET) = 1.64  
TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 15.28  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50311.00 = 3699.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50311.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 15.28  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.568  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 19.19  
EFFECTIVE AREA(ACRES) = 58.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 58.1 PEAK FLOW RATE(CFS) = 118.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50311.00 TO NODE 50312.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 383.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 216.00 CHANNEL SLOPE = 0.0556  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 118.59  
FLOW VELOCITY(FEET/SEC.) = 8.81 FLOW DEPTH(FEET) = 2.12  
TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 15.69  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50312.00 = 3915.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.69

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.536

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	18.40	0.30	1.000	-
USER-DEFINED	-	11.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 37.70 SUBAREA RUNOFF(CFS) = 75.87

EFFECTIVE AREA(ACRES) = 95.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 95.8 PEAK FLOW RATE(CFS) = 192.80

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50312.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.69

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.536

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 6.84

EFFECTIVE AREA(ACRES) = 99.20 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 99.2 PEAK FLOW RATE(CFS) = 199.64

\*\*\*\*\*

FLOW PROCESS FROM NODE 50312.00 TO NODE 50313.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 383.00 DOWNSTREAM(FEET) = 350.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 762.00 CHANNEL SLOPE = 0.0433

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00

CHANNEL FLOW THRU SUBAREA(CFS) = 199.64

FLOW VELOCITY(FEET/SEC.) = 9.10 FLOW DEPTH(FEET) = 2.70

TRAVEL TIME(MIN.) = 1.40 Tc(MIN.) = 17.09

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50313.00 = 4677.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.09

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.427

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 12.06

EFFECTIVE AREA(ACRES) = 105.50 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 105.5 PEAK FLOW RATE(CFS) = 201.99

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.09

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.427

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 10.90 SUBAREA RUNOFF(CFS) = 20.87

EFFECTIVE AREA(ACRES) = 116.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 116.4 PEAK FLOW RATE(CFS) = 222.86

\*\*\*\*\*

FLOW PROCESS FROM NODE 50313.00 TO NODE 50314.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 318.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 957.00 CHANNEL SLOPE = 0.0334

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00

CHANNEL FLOW THRU SUBAREA(CFS) = 222.86

FLOW VELOCITY(FEET/SEC.) = 8.50 FLOW DEPTH(FEET) = 2.96

TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 18.96

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50314.00 = 5634.00 FEET.

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FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 18.96  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.281  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	3.70	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	10.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 21.80 SUBAREA RUNOFF(CFS) = 38.87  
 EFFECTIVE AREA(ACRES) = 138.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 138.2 PEAK FLOW RATE(CFS) = 246.40

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 18.96  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.281  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.80	0.30	1.000	-
USER-DEFINED	-	15.20	0.30	1.000	-
USER-DEFINED	-	5.90	0.30	1.000	-
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 34.70 SUBAREA RUNOFF(CFS) = 61.87  
 EFFECTIVE AREA(ACRES) = 172.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 172.9 PEAK FLOW RATE(CFS) = 308.27

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50314.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 18.96  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.281  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 1.43  
 EFFECTIVE AREA(ACRES) = 173.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 173.7 PEAK FLOW RATE(CFS) = 309.70

\*\*\*\*\*

FLOW PROCESS FROM NODE 50314.00 TO NODE 50315.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 318.00 DOWNSTREAM(FEET) = 313.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00 CHANNEL SLOPE = 0.0179  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 309.70  
 FLOW VELOCITY(FEET/SEC.) = 7.31 FLOW DEPTH(FEET) = 3.76  
 TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 19.60  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50315.00 = 5914.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50315.00 TO NODE 50315.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.60  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.231  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	2.40	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 11.65  
 EFFECTIVE AREA(ACRES) = 180.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 180.4 PEAK FLOW RATE(CFS) = 313.56

\*\*\*\*\*

FLOW PROCESS FROM NODE 50315.00 TO NODE 50316.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 313.00 DOWNSTREAM(FEET) = 285.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 642.00 CHANNEL SLOPE = 0.0436  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 313.56  
 FLOW VELOCITY(FEET/SEC.) = 10.25 FLOW DEPTH(FEET) = 3.19  
 TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 20.64  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50316.00 = 6556.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81



=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 20.64  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.166  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 3.50 0.30 1.000 -  
USER-DEFINED - 1.00 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 2.20 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 12.26  
EFFECTIVE AREA(ACRES) = 187.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 187.7 PEAK FLOW RATE(CFS) = 315.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50316.00 TO NODE 50316.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 20.64  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.166  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 1.000 -  
USER-DEFINED - 1.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 3.70  
EFFECTIVE AREA(ACRES) = 189.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 189.9 PEAK FLOW RATE(CFS) = 319.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50316.00 TO NODE 50317.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 282.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 448.00 CHANNEL SLOPE = 0.0067  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 319.01  
FLOW VELOCITY(FEET/SEC.) = 5.10 FLOW DEPTH(FEET) = 4.57  
TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 22.11  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50317.00 = 7004.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.11  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.090  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.00 0.30 1.000 -  
USER-DEFINED - 2.90 0.30 1.000 -  
USER-DEFINED - 2.60 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 10.20 0.30 1.000 -  
USER-DEFINED - 42.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.997  
SUBAREA AREA(ACRES) = 59.70 SUBAREA RUNOFF(CFS) = 96.25  
EFFECTIVE AREA(ACRES) = 249.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 249.6 PEAK FLOW RATE(CFS) = 402.24

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50317.00 TO NODE 50317.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.11  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.090  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 25.40 0.30 1.000 -  
USER-DEFINED - 17.50 0.30 1.000 -  
USER-DEFINED - 22.00 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 65.80 SUBAREA RUNOFF(CFS) = 106.03  
EFFECTIVE AREA(ACRES) = 315.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 315.4 PEAK FLOW RATE(CFS) = 508.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50317.00 TO NODE 50318.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 600.00 CHANNEL SLOPE = 0.0817  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 508.27  
FLOW VELOCITY(FEET/SEC.) = 14.61 FLOW DEPTH(FEET) = 3.41  
TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 22.79  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50318.00 = 7604.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81  
-----

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.79

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.055

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	0.100	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.839

SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 10.87

EFFECTIVE AREA(ACRES) = 322.10 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 322.1 PEAK FLOW RATE(CFS) = 509.04

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50318.00 TO NODE 50318.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 22.79

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.055

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	5.00	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.935

SUBAREA AREA(ACRES) = 7.60 SUBAREA RUNOFF(CFS) = 12.14

EFFECTIVE AREA(ACRES) = 329.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 329.7 PEAK FLOW RATE(CFS) = 521.17

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50318.00 TO NODE 50319.00 IS CODE = 51  
=====

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 233.00 DOWNSTREAM(FEET) = 228.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 201.00 CHANNEL SLOPE = 0.0249

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00

CHANNEL FLOW THRU SUBAREA(CFS) = 521.17

FLOW VELOCITY(FEET/SEC.) = 11.69 FLOW DEPTH(FEET) = 3.86

TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 23.08

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50319.00 = 7805.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.08

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.040

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 10.18

EFFECTIVE AREA(ACRES) = 336.00 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 336.0 PEAK FLOW RATE(CFS) = 526.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50319.00 TO NODE 50319.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 23.08

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.040

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.994

SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 12.23

EFFECTIVE AREA(ACRES) = 343.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 343.8 PEAK FLOW RATE(CFS) = 539.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50319.00 TO NODE 50320.00 IS CODE = 51  
=====

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 228.00 DOWNSTREAM(FEET) = 214.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 809.00 CHANNEL SLOPE = 0.0173

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00

CHANNEL FLOW THRU SUBAREA(CFS) = 539.16

FLOW VELOCITY(FEET/SEC.) = 10.30 FLOW DEPTH(FEET) = 4.18

TRAVEL TIME (MIN.) = 1.31 Tc (MIN.) = 24.39  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50320.00 = 8614.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 24.39

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.972

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	4.80	0.30	0.850	-
USER-DEFINED	-	5.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.929

SUBAREA AREA (ACRES) = 11.40 SUBAREA RUNOFF (CFS) = 17.37

EFFECTIVE AREA (ACRES) = 355.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 355.2 PEAK FLOW RATE (CFS) = 539.16

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50320.00 TO NODE 50320.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 24.39

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.972

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.90	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.854

SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 17.29

EFFECTIVE AREA (ACRES) = 366.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 366.4 PEAK FLOW RATE (CFS) = 552.75

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 366.4 TC (MIN.) = 24.39

EFFECTIVE AREA (ACRES) = 366.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.985

PEAK FLOW RATE (CFS) = 552.75

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* EXISTING CONDITION - PLANNING AREA 5 - WATERSHED 4 \*  
\* HYDROLOGIC ANALYSIS - 100-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: E504XXCE.DAT  
TIME/DATE OF STUDY: 10:50 09/09/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.000; 4.820
- 2) 6.000; 4.350
- 3) 7.000; 3.990
- 4) 8.000; 3.700
- 5) 9.000; 3.460
- 6) 10.000; 3.260
- 7) 11.000; 3.090
- 8) 12.000; 2.940
- 9) 13.000; 2.810
- 10) 14.000; 2.690
- 11) 15.000; 2.590
- 12) 20.000; 2.200
- 13) 25.000; 1.940
- 14) 30.000; 1.750
- 15) 40.000; 1.490
- 16) 50.000; 1.310
- 17) 60.000; 1.180
- 18) 90.000; 0.940
- 19) 120.000; 0.800
- 20) 180.000; 0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.482  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.178  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.50	0.30	1.000	95	10.48

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.30  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.30  
FLOW VELOCITY(FEET/SEC.) = 4.97 FLOW DEPTH(FEET) = 0.29  
TRAVEL TIME(MIN.) = 0.88  $T_c$ (MIN.) = 11.36  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.36

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.036  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.98  
 EFFECTIVE AREA (ACRES) = 0.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 2.22

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 239.00 CHANNEL SLOPE = 0.4184  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 2.22  
 FLOW VELOCITY (FEET/SEC.) = 6.99 FLOW DEPTH (FEET) = 0.33  
 TRAVEL TIME (MIN.) = 0.57 Tc (MIN.) = 11.93  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50403.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 11.93  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.950  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.95  
 EFFECTIVE AREA (ACRES) = 1.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.3 PEAK FLOW RATE (CFS) = 3.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00 CHANNEL SLOPE = 0.7042  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 3.10

FLOW VELOCITY (FEET/SEC.) = 9.02 FLOW DEPTH (FEET) = 0.34  
 TRAVEL TIME (MIN.) = 0.13 Tc (MIN.) = 12.06  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50404.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.06  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.932  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 2.84  
 EFFECTIVE AREA (ACRES) = 2.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.5 PEAK FLOW RATE (CFS) = 5.92

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 145.00 CHANNEL SLOPE = 0.3448  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 5.92  
 FLOW VELOCITY (FEET/SEC.) = 8.18 FLOW DEPTH (FEET) = 0.49  
 TRAVEL TIME (MIN.) = 0.30 Tc (MIN.) = 12.36  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50405.00 TO NODE 50405.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.36  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.894  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.57  
 EFFECTIVE AREA (ACRES) = 3.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.6 PEAK FLOW RATE (CFS) = 8.40

```

*****
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 8.40
FLOW VELOCITY(FEET/SEC.) = 8.70 FLOW DEPTH(FEET) = 0.57
TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 12.66
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50406.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.66
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.854
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.80 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 2.76
EFFECTIVE AREA(ACRES) = 4.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.8 PEAK FLOW RATE(CFS) = 11.03

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.2193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 11.03
FLOW VELOCITY(FEET/SEC.) = 8.09 FLOW DEPTH(FEET) = 0.67
TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 13.13
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50407.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 13.13
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.794
SUBAREA LOSS RATE DATA(AMC II):

```

```

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.30 1.000 -
USER-DEFINED - 1.20 0.30 1.000 -
USER-DEFINED - 1.70 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 14.37
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 25.15

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 325.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 490.00 CHANNEL SLOPE = 0.1531
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 25.15
FLOW VELOCITY(FEET/SEC.) = 8.74 FLOW DEPTH(FEET) = 0.98
TRAVEL TIME(MIN.) = 0.93 Tc(MIN.) = 14.06
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.06
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.684
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 1.30 0.30 1.000 -
USER-DEFINED - 0.50 0.30 1.000 -
USER-DEFINED - 1.20 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 8.15
EFFECTIVE AREA(ACRES) = 15.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.0 PEAK FLOW RATE(CFS) = 32.18

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.06
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.684
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.93  
EFFECTIVE AREA(ACRES) = 15.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.9 PEAK FLOW RATE(CFS) = 34.11

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 34.11  
FLOW VELOCITY(FEET/SEC.) = 6.97 FLOW DEPTH(FEET) = 1.28  
TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 14.24  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.24  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.666  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	6.40	0.30	1.000	-
USER-DEFINED	-	6.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 14.80 SUBAREA RUNOFF(CFS) = 31.52  
EFFECTIVE AREA(ACRES) = 30.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.7 PEAK FLOW RATE(CFS) = 65.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.24  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.666  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.28  
EFFECTIVE AREA(ACRES) = 31.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 31.3 PEAK FLOW RATE(CFS) = 66.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 66.66  
FLOW VELOCITY(FEET/SEC.) = 8.69 FLOW DEPTH(FEET) = 1.60  
TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 14.43  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.43  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.647  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 13.52  
EFFECTIVE AREA(ACRES) = 37.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 37.7 PEAK FLOW RATE(CFS) = 79.62

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 14.43  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.647  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 1.27  
 EFFECTIVE AREA (ACRES) = 38.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 38.3 PEAK FLOW RATE (CFS) = 80.89

\*\*\*\*\*

FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 312.00 DOWNSTREAM (FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 566.00 CHANNEL SLOPE = 0.0530  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 80.89  
 FLOW VELOCITY (FEET/SEC.) = 7.87 FLOW DEPTH (FEET) = 1.85  
 TRAVEL TIME (MIN.) = 1.20 Tc (MIN.) = 15.63  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 15.63  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.541  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658  
 SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 10.54  
 EFFECTIVE AREA (ACRES) = 43.30 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 43.3 PEAK FLOW RATE (CFS) = 87.78

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 15.63  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.541  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-

USER-DEFINED - 5.80 0.30 1.000 -  
 USER-DEFINED - 0.50 0.30 1.000 -  
 USER-DEFINED - 3.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 10.50 SUBAREA RUNOFF (CFS) = 21.17  
 EFFECTIVE AREA (ACRES) = 53.80 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 53.8 PEAK FLOW RATE (CFS) = 108.96

\*\*\*\*\*

FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 216.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 954.00 CHANNEL SLOPE = 0.0692  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 108.96  
 FLOW VELOCITY (FEET/SEC.) = 11.63 FLOW DEPTH (FEET) = 1.77  
 TRAVEL TIME (MIN.) = 1.37 Tc (MIN.) = 17.00  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 17.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.434  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875  
 SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 7.04  
 EFFECTIVE AREA (ACRES) = 57.40 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 57.4 PEAK FLOW RATE (CFS) = 110.83

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 17.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.434  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-



USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.30 0.30 1.000 -  
 USER-DEFINED - 9.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 20.36  
 EFFECTIVE AREA(ACRES) = 68.00 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 68.0 PEAK FLOW RATE(CFS) = 131.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.434  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.934  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 4.85  
 EFFECTIVE AREA(ACRES) = 70.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA(ACRES) = 70.5 PEAK FLOW RATE(CFS) = 136.04

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 70.5 TC(MIN.) = 17.00  
 EFFECTIVE AREA(ACRES) = 70.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.967  
 PEAK FLOW RATE(CFS) = 136.04

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 2 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 100-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P201XXCE.DAT  
TIME/DATE OF STUDY: 10:20 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.000; 4.820  
2) 6.000; 4.350  
3) 7.000; 3.990  
4) 8.000; 3.700  
5) 9.000; 3.460  
6) 10.000; 3.260  
7) 11.000; 3.090  
8) 12.000; 2.940  
9) 13.000; 2.810  
10) 14.000; 2.690  
11) 15.000; 2.590  
12) 20.000; 2.200  
13) 25.000; 1.940  
14) 30.000; 1.750  
15) 40.000; 1.490  
16) 50.000; 1.310  
17) 60.000; 1.180  
18) 90.000; 0.940  
19) 120.000; 0.800  
20) 180.000; 0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20100.00 TO NODE 20101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 830.00

$T_c = K * [(LENGTH^{**} 3.00) / (ELEVATION CHANGE)]^{**} 0.20$

SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.230

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.414

SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------	--------------

NATURAL FAIR COVER

"OPEN BRUSH" - 0.30 0.30 1.000 95 9.23

NATURAL FAIR COVER

"WOODLAND,GRASS" - 0.30 0.30 1.000 95 9.23

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000

SUBAREA RUNOFF(CFS) = 1.68

TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.68

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20101.00 TO NODE 20102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 750.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 276.00 CHANNEL SLOPE = 0.2899

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00

CHANNEL FLOW THRU SUBAREA(CFS) = 1.68

FLOW VELOCITY(FEET/SEC.) = 5.63 FLOW DEPTH(FEET) = 0.32

TRAVEL TIME(MIN.) = 0.82  $T_c$ (MIN.) = 10.05

LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20102.00 = 595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20102.00 TO NODE 20102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN) = 10.05
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.252
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.80    0.30    1.000   -
USER-DEFINED         -        0.20    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.00    SUBAREA RUNOFF(CFS) = 2.66
EFFECTIVE AREA(ACRES) = 1.60    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6        PEAK FLOW RATE(CFS) = 4.25

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*****
FLOW PROCESS FROM NODE 20102.00 TO NODE 20103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.1863
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.25
FLOW VELOCITY(FEET/SEC.) = 6.01 FLOW DEPTH(FEET) = 0.49
TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 10.49
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20103.00 = 756.00 FEET.

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20103.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.49
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.176
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.50    0.30    1.000   -
USER-DEFINED         -        0.10    0.30    1.000   -
USER-DEFINED         -        0.30    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90    SUBAREA RUNOFF(CFS) = 2.33
EFFECTIVE AREA(ACRES) = 2.50    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.5        PEAK FLOW RATE(CFS) = 6.47

```

```

*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20104.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 690.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 64.00 CHANNEL SLOPE = 0.4688

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CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 6.47
FLOW VELOCITY(FEET/SEC.) = 9.45 FLOW DEPTH(FEET) = 0.48
TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 10.61
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20104.00 = 820.00 FEET.

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20104.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.61
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.157
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.40    0.30    1.000   -
USER-DEFINED         -        3.30    0.30    1.000   -
USER-DEFINED         -        0.10    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 9.77
EFFECTIVE AREA(ACRES) = 6.30    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.3        PEAK FLOW RATE(CFS) = 16.20

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 690.00 DOWNSTREAM(FEET) = 670.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 159.00 CHANNEL SLOPE = 0.1258
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 16.20
FLOW VELOCITY(FEET/SEC.) = 7.22 FLOW DEPTH(FEET) = 0.86
TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 10.97
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20105.00 = 979.00 FEET.

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*****
FLOW PROCESS FROM NODE 20105.00 TO NODE 20105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.97
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.094
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.20    0.30    1.000   -
USER-DEFINED         -        1.50    0.30    1.000   -
USER-DEFINED         -        2.20    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90    SUBAREA RUNOFF(CFS) = 9.81

```

EFFECTIVE AREA(ACRES) = 10.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 10.2 PEAK FLOW RATE(CFS) = 25.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 20105.00 TO NODE 20106.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 670.00 DOWNSTREAM(FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 192.00 CHANNEL SLOPE = 0.1042  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 25.65  
FLOW VELOCITY(FEET/SEC.) = 7.56 FLOW DEPTH(FEET) = 1.06  
TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 11.40  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20106.00 = 1171.00 FEET.

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FLOW PROCESS FROM NODE 20106.00 TO NODE 20106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 11.40  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.030  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.10 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 9.34  
EFFECTIVE AREA(ACRES) = 14.00 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 34.40

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 650.00 DOWNSTREAM(FEET) = 640.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 156.00 CHANNEL SLOPE = 0.0641  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 34.40  
FLOW VELOCITY(FEET/SEC.) = 6.79 FLOW DEPTH(FEET) = 1.30  
TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 11.78  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20107.00 = 1327.00 FEET.

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FLOW PROCESS FROM NODE 20107.00 TO NODE 20107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN) = 11.78  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.973

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.20 0.30 1.000 -  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 9.62  
EFFECTIVE AREA(ACRES) = 18.00 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 18.0 PEAK FLOW RATE(CFS) = 43.30

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FLOW PROCESS FROM NODE 20107.00 TO NODE 20108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 640.00 DOWNSTREAM(FEET) = 609.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 512.00 CHANNEL SLOPE = 0.0605  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 43.30  
FLOW VELOCITY(FEET/SEC.) = 7.06 FLOW DEPTH(FEET) = 1.43  
TRAVEL TIME(MIN.) = 1.21 Tc(MIN.) = 12.99  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20108.00 = 1839.00 FEET.

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 12.99  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.812  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.200 -  
USER-DEFINED - 1.50 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 6.12  
EFFECTIVE AREA(ACRES) = 20.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.7 PEAK FLOW RATE(CFS) = 46.81

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 600.00  
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.42  
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 46.81  
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 13.17  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20109.00 = 2033.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20109.00 TO NODE 20109.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 13.17  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.789  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.200 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.72  
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 48.11

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20109.00 TO NODE 20110.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 594.00  
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.65  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 48.11  
PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 13.69  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20110.00 = 2393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20110.00 TO NODE 20110.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 13.69  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.727  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 0.100 -  
USER-DEFINED - 3.50 0.30 0.200 -  
USER-DEFINED - 2.70 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.20 0.30 1.000 -

USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 18.74  
EFFECTIVE AREA(ACRES) = 29.60 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 29.6 PEAK FLOW RATE(CFS) = 65.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20110.00 TO NODE 20111.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 594.00 DOWNSTREAM(FEET) = 590.00  
FLOW LENGTH(FEET) = 246.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.72  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 65.67  
PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 14.01  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20111.00 = 2639.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20111.00 TO NODE 20111.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 14.01  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.689  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 2.10 0.30 0.200 -  
USER-DEFINED - 2.10 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 4.70 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.792  
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 24.49  
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 89.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20111.00 TO NODE 20112.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 580.00  
FLOW LENGTH(FEET) = 628.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.49  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 89.13

PIPE TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 14.79  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20112.00 = 3267.00 FEET.

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FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 14.79

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.611

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.200	-
USER-DEFINED	-	4.40	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	7.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.797

SUBAREA AREA(ACRES) = 15.20 SUBAREA RUNOFF(CFS) = 32.45

EFFECTIVE AREA(ACRES) = 55.90 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 55.9 PEAK FLOW RATE(CFS) = 118.74

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FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 14.79

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.611

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 5.02

EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 123.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20113.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 580.00 DOWNSTREAM(FEET) = 570.00

FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.65

ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 123.77  
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 15.34  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20113.00 = 3786.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.34

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.563

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.100	-
USER-DEFINED	-	4.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.877

SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 26.09

EFFECTIVE AREA(ACRES) = 70.90 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 147.35

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.34

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.563

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	1.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.787

SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 7.54

EFFECTIVE AREA(ACRES) = 74.50 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 74.5 PEAK FLOW RATE(CFS) = 154.89

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20114.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00

FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 12.07

ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 154.89  
PIPE TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 16.18  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20114.00 = 4393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.18  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.498  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.30 0.100 -  
USER-DEFINED - 4.00 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 0.50 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.747  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 16.17  
EFFECTIVE AREA(ACRES) = 82.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 82.4 PEAK FLOW RATE(CFS) = 166.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.18  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.498  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 1.000 -  
USER-DEFINED - 8.20 0.30 1.000 -  
USER-DEFINED - 3.20 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 3.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.932  
SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 34.94  
EFFECTIVE AREA(ACRES) = 99.90 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 99.9 PEAK FLOW RATE(CFS) = 201.61

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20115.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 560.00  
FLOW LENGTH(FEET) = 461.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 57.0 INCH PIPE IS 42.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.33  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 201.61  
PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 16.71  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20115.00 = 4854.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.71  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.456  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.60 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 0.100 -  
USER-DEFINED - 6.20 0.30 0.850 -  
USER-DEFINED - 2.20 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798  
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 25.54  
EFFECTIVE AREA(ACRES) = 112.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 112.7 PEAK FLOW RATE(CFS) = 223.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.71  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.456  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.36  
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 224.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20116.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 560.00 DOWNSTREAM(FEET) = 528.00  
FLOW LENGTH(FEET) = 219.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 38.86

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 224.75  
 PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 16.81  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20116.00 = 5073.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20116.00 TO NODE 20117.00 IS CODE = 51

=====  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====  
 ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 489.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 174.00 CHANNEL SLOPE = 0.2241  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 224.75  
 FLOW VELOCITY(FEET/SEC.) = 21.55 FLOW DEPTH(FEET) = 1.86  
 TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 16.94  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20117.00 = 5247.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

=====  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====  
 MAINLINE Tc(MIN) = 16.94  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.438  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.910  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 4.87  
 EFFECTIVE AREA(ACRES) = 115.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 115.9 PEAK FLOW RATE(CFS) = 227.80

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

=====  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====  
 MAINLINE Tc(MIN) = 16.94  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.438  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.200	-
USER-DEFINED	-	3.30	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	6.50	0.30	1.000	-

USER-DEFINED - 0.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.855  
 SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 25.14  
 EFFECTIVE AREA(ACRES) = 128.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 128.7 PEAK FLOW RATE(CFS) = 252.94

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

=====  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====  
 MAINLINE Tc(MIN) = 16.94  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.438  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 9.84  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 133.8 PEAK FLOW RATE(CFS) = 262.78

=====  
 END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 133.8 TC(MIN.) = 16.94  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.854  
 PEAK FLOW RATE(CFS) = 262.78

=====  
 END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S31 \*  
\* Rational Method Hydrology Analysis - 100-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S31.DAT  
TIME/DATE OF STUDY: 15:40 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.800
- 2) 10.00; 3.258
- 3) 15.00; 2.590
- 4) 20.00; 2.201
- 5) 25.00; 1.940
- 6) 30.00; 1.740
- 7) 40.00; 1.487
- 8) 50.00; 1.310
- 9) 60.00; 1.150
- 10) 90.00; 0.940
- 11) 120.00; 0.798
- 12) 180.00; 0.647
- 13) 360.00; 0.452
- 14) 1440.00; 0.187

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13100.00 TO NODE 13101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.58  
ELEVATION DATA: UPSTREAM(FEET) = 1069.66 DOWNSTREAM(FEET) = 969.92

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.312  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.779  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.94	0.30	1.000	0	8.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.94  
TOTAL AREA(ACRES) = 0.94 PEAK FLOW RATE(CFS) = 2.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13101.00 TO NODE 13102.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 969.92 DOWNSTREAM(FEET) = 807.20  
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.89 CHANNEL SLOPE = 0.2444  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.28  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.174  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.67	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.92  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.79  
AVERAGE FLOW DEPTH(FEET) = 0.26 TRAVEL TIME(MIN.) = 2.32  
Tc(MIN.) = 10.63  
SUBAREA AREA(ACRES) = 7.67 SUBAREA RUNOFF(CFS) = 19.84  
EFFECTIVE AREA(ACRES) = 8.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 22.27  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 FLOW VELOCITY(FEET/SEC.) = 5.85  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13102.00 = 948.47 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13102.00 TO NODE 13103.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 807.20 DOWNSTREAM(FEET) = 769.94  
CHANNEL LENGTH THRU SUBAREA(FEET) = 691.01 CHANNEL SLOPE = 0.0539  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.88

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.841

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	20.65	0.30	0.999	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.999

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.96

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.62

AVERAGE FLOW DEPTH(FEET) = 0.85 TRAVEL TIME(MIN.) = 2.49

Tc(MIN.) = 13.12

SUBAREA AREA(ACRES) = 20.65 SUBAREA RUNOFF(CFS) = 47.24

EFFECTIVE AREA(ACRES) = 29.26 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 29.3 PEAK FLOW RATE(CFS) = 66.93

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.06 FLOW VELOCITY(FEET/SEC.) = 5.23

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13103.00 = 1639.48 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 769.94 DOWNSTREAM(FEET) = 693.88

FLOW LENGTH(FEET) = 1563.10 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000

DEPTH OF FLOW IN 36.0 INCH PIPE IS 17.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 19.54

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 66.93

PIPE TRAVEL TIME(MIN.) = 1.33 Tc(MIN.) = 14.45

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13104.00 = 3202.58 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.45

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.663

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	28.00	0.30	0.750	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.750

SUBAREA AREA(ACRES) = 28.00 SUBAREA RUNOFF(CFS) = 61.45

EFFECTIVE AREA(ACRES) = 57.26 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88

TOTAL AREA(ACRES) = 57.3 PEAK FLOW RATE(CFS) = 123.69

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 693.88 DOWNSTREAM(FEET) = 645.69

FLOW LENGTH(FEET) = 1068.98 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.57

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 123.69

PIPE TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 15.28

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13105.00 = 4271.56 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.28

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.568

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	35.28	0.30	0.867	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.867

SUBAREA AREA(ACRES) = 35.28 SUBAREA RUNOFF(CFS) = 73.30

EFFECTIVE AREA(ACRES) = 92.54 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87

TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 192.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 645.69 DOWNSTREAM(FEET) = 608.48

FLOW LENGTH(FEET) = 1127.55 MANNING'S N = 0.013

DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.41

ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 192.10

PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 16.16  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.16  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.500  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 37.68 0.30 0.889 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.889  
SUBAREA AREA(ACRES) = 37.68 SUBAREA RUNOFF(CFS) = 75.74  
EFFECTIVE AREA(ACRES) = 130.22 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 130.2 PEAK FLOW RATE(CFS) = 262.15

\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 15.1

>>>>DEFINE MEMORY BANK # 2 <<<<

PEAK FLOWRATE TABLE FILE NAME: S30.DNA  
MEMORY BANK # 2 DEFINED AS FOLLOWS:  
STREAM Q Tc Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (ACRES) NODE  
1 2413.49 36.12 0.30( 0.24) 0.81 1996.3 13000.00  
2 2345.31 38.13 0.30( 0.24) 0.81 2016.1 13010.00  
TOTAL AREA(ACRES) = 2016.1

\*\*\*\*\*

FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 14.0

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:

STREAM Q Tc Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (ACRES) NODE  
1 2413.49 36.12 0.30( 0.24) 0.81 1996.3 13000.00  
2 2345.31 38.13 0.30( 0.24) 0.81 2016.1 13010.00  
TOTAL AREA(ACRES) = 2016.1

\*\*\*\*\*

FLOW PROCESS FROM NODE 13026.00 TO NODE 13106.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 662.66 DOWNSTREAM(FEET) = 608.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 3098.88 CHANNEL SLOPE = 0.0175  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.22  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.484  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 75.28 0.30 0.755 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.755  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2456.09  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.80  
AVERAGE FLOW DEPTH(FEET) = 3.22 TRAVEL TIME(MIN.) = 4.03  
Tc(MIN.) = 40.16  
SUBAREA AREA(ACRES) = 75.28 SUBAREA RUNOFF(CFS) = 85.20  
EFFECTIVE AREA(ACRES) = 2071.57 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 2091.4 PEAK FLOW RATE(CFS) = 2413.49  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.19 FLOW VELOCITY(FEET/SEC.) = 12.72  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 2413.49 40.16 1.484 0.30( 0.24) 0.80 2071.6 13000.00  
2 2345.31 42.21 1.448 0.30( 0.24) 0.80 2091.4 13010.00  
NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 2413.49 Tc(MIN.) = 40.16  
AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA(ACRES) = 2071.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 2413.49 40.16 1.484 0.30( 0.24) 0.80 2071.6 13000.00  
2 2345.31 42.21 1.448 0.30( 0.24) 0.80 2091.4 13010.00  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 262.15 16.16 2.500 0.30( 0.26) 0.88 130.2 13100.00  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2027.04	16.16	2.500	0.30 ( 0.24)	0.81	963.6	13100.00
2	2556.54	40.16	1.484	0.30 ( 0.24)	0.81	2201.8	13000.00
3	2484.13	42.21	1.448	0.30 ( 0.24)	0.81	2221.6	13010.00
TOTAL AREA (ACRES) =		2221.6					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 2556.54 Tc (MIN.) = 40.159  
EFFECTIVE AREA (ACRES) = 2201.79 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA (ACRES) = 2221.6  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13106.00 TO NODE 13107.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 608.48 DOWNSTREAM (FEET) = 584.29  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1650.20 CHANNEL SLOPE = 0.0147  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.55

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.445

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	190.45	0.30	0.755	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2660.95

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.39

AVERAGE FLOW DEPTH (FEET) = 3.54 TRAVEL TIME (MIN.) = 2.22

Tc (MIN.) = 42.38

SUBAREA AREA (ACRES) = 190.45 SUBAREA RUNOFF (CFS) = 208.83

EFFECTIVE AREA (ACRES) = 2392.24 AREA-AVERAGED Fm (INCH/HR) = 0.24

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80

TOTAL AREA (ACRES) = 2412.1 PEAK FLOW RATE (CFS) = 2591.55

GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 3.49 FLOW VELOCITY (FEET/SEC.) = 12.27

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13107.00 = 20924.84 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2155.27	18.52	2.316	0.30 ( 0.24)	0.80	1154.1	13100.00
2	2591.55	42.38	1.445	0.30 ( 0.24)	0.80	2392.2	13000.00
3	2534.07	44.45	1.408	0.30 ( 0.24)	0.80	2412.1	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 2591.55 Tc (MIN.) = 42.38

AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA (ACRES) = 2392.24

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13107.00 TO NODE 13108.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 584.29 DOWNSTREAM (FEET) = 563.78  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1061.67 CHANNEL SLOPE = 0.0193  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.34

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.422

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	314.12	0.30	0.939	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.939

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2752.76

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.74

AVERAGE FLOW DEPTH (FEET) = 3.34 TRAVEL TIME (MIN.) = 1.29

Tc (MIN.) = 43.67

SUBAREA AREA (ACRES) = 314.12 SUBAREA RUNOFF (CFS) = 322.40

EFFECTIVE AREA (ACRES) = 2706.35 AREA-AVERAGED Fm (INCH/HR) = 0.25

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82

TOTAL AREA (ACRES) = 2726.2 PEAK FLOW RATE (CFS) = 2865.04

GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 3.42 FLOW VELOCITY (FEET/SEC.) = 13.93

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13108.00 = 21986.51 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2592.23	19.86	2.212	0.30 ( 0.25)	0.83	1468.2	13100.00
2	2865.04	43.67	1.422	0.30 ( 0.25)	0.82	2706.4	13000.00
3	2796.44	45.74	1.385	0.30 ( 0.25)	0.82	2726.2	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 2865.04 Tc (MIN.) = 43.67

AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2706.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13108.00 TO NODE 13109.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 563.78 DOWNSTREAM (FEET) = 541.61  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1657.28 CHANNEL SLOPE = 0.0134  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.87  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.383  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 203.63 0.30 0.785 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.785  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2970.19  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.45  
 AVERAGE FLOW DEPTH (FEET) = 3.87 TRAVEL TIME (MIN.) = 2.22  
 Tc (MIN.) = 45.89  
 SUBAREA AREA (ACRES) = 203.63 SUBAREA RUNOFF (CFS) = 210.29  
 EFFECTIVE AREA (ACRES) = 2909.98 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 2929.8 PEAK FLOW RATE (CFS) = 2979.98  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.88 FLOW VELOCITY (FEET/SEC.) = 12.47  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13109.00 = 23643.79 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 2770.45 22.14 2.089 0.30 ( 0.25) 0.83 1671.8 13100.00  
 2 2979.98 45.89 1.383 0.30 ( 0.25) 0.82 2910.0 13000.00  
 3 2903.13 47.98 1.346 0.30 ( 0.24) 0.82 2929.8 13010.00  
 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 2979.98 Tc (MIN.) = 45.89  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2909.98

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13109.00 TO NODE 13110.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 541.61 DOWNSTREAM (FEET) = 509.94  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 2016.96 CHANNEL SLOPE = 0.0157  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.81  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.339  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 283.06 0.30 0.791 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.791  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3120.25  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.36  
 AVERAGE FLOW DEPTH (FEET) = 3.80 TRAVEL TIME (MIN.) = 2.52  
 Tc (MIN.) = 48.40  
 SUBAREA AREA (ACRES) = 283.06 SUBAREA RUNOFF (CFS) = 280.55

EFFECTIVE AREA (ACRES) = 3193.04 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3212.9 PEAK FLOW RATE (CFS) = 3144.25  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.82 FLOW VELOCITY (FEET/SEC.) = 13.39  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13110.00 = 25660.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 3007.72 24.69 1.956 0.30 ( 0.25) 0.82 1954.9 13100.00  
 2 3144.25 48.40 1.339 0.30 ( 0.24) 0.81 3193.0 13000.00  
 3 3058.44 50.52 1.302 0.30 ( 0.24) 0.81 3212.9 13010.00  
 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 3144.25 Tc (MIN.) = 48.40  
 AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA (ACRES) = 3193.04

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13110.00 TO NODE 13111.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 509.94 DOWNSTREAM (FEET) = 461.07  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 3058.95 CHANNEL SLOPE = 0.0160  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.89  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.276  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 248.05 0.30 0.783 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3260.46  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.63  
 AVERAGE FLOW DEPTH (FEET) = 3.88 TRAVEL TIME (MIN.) = 3.74  
 Tc (MIN.) = 52.14  
 SUBAREA AREA (ACRES) = 248.05 SUBAREA RUNOFF (CFS) = 232.42  
 EFFECTIVE AREA (ACRES) = 3441.09 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3460.9 PEAK FLOW RATE (CFS) = 3196.96  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.84 FLOW VELOCITY (FEET/SEC.) = 13.53  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13111.00 = 28719.70 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	3085.76	28.46	1.802	0.30 ( 0.25)	0.82	2203.0 13100.00
2	3196.96	52.14	1.276	0.30 ( 0.24)	0.81	3441.1 13000.00
3	3108.17	54.30	1.241	0.30 ( 0.24)	0.81	3460.9 13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 3196.96 Tc(MIN.) = 52.14  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3441.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 13111.00 TO NODE 13112.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 461.07 DOWNSTREAM(FEET) = 452.77  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1781.78 CHANNEL SLOPE = 0.0047  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 5.50  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.223

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	179.91	0.30	0.694	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.694  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3279.11  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.96  
 AVERAGE FLOW DEPTH(FEET) = 5.50 TRAVEL TIME(MIN.) = 3.32  
 Tc(MIN.) = 55.46

SUBAREA AREA(ACRES) = 179.91 SUBAREA RUNOFF(CFS) = 164.29  
 EFFECTIVE AREA(ACRES) = 3621.00 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3640.9 PEAK FLOW RATE(CFS) = 3196.96

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 5.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 5.43 FLOW VELOCITY(FEET/SEC.) = 8.89  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13112.00 = 30501.48 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3114.11	31.80	1.694	0.30 ( 0.24)	0.81	2382.9	13100.00
2	3196.96	55.46	1.223	0.30 ( 0.24)	0.81	3621.0	13000.00
3	3108.17	57.64	1.188	0.30 ( 0.24)	0.81	3640.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 3196.96 Tc(MIN.) = 55.46  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3621.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 13112.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 452.77 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1625.01 CHANNEL SLOPE = 0.0155  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.92  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.191

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	155.96	0.30	0.836	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.836  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3262.93  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.49  
 AVERAGE FLOW DEPTH(FEET) = 3.92 TRAVEL TIME(MIN.) = 2.01  
 Tc(MIN.) = 57.47

SUBAREA AREA(ACRES) = 155.96 SUBAREA RUNOFF(CFS) = 131.93  
 EFFECTIVE AREA(ACRES) = 3776.96 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3796.8 PEAK FLOW RATE(CFS) = 3223.67  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.89 FLOW VELOCITY(FEET/SEC.) = 13.45  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13222.00 = 32126.49 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3200.10	33.81	1.643	0.30 ( 0.24)	0.81	2538.8	13100.00
2	3223.67	57.47	1.191	0.30 ( 0.24)	0.81	3777.0	13000.00
3	3120.61	59.66	1.155	0.30 ( 0.24)	0.81	3796.8	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 3223.67 Tc(MIN.) = 57.47  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3776.96

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 3796.8 TC(MIN.) = 57.47  
 EFFECTIVE AREA(ACRES) = 3776.96 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.808  
 PEAK FLOW RATE(CFS) = 3223.67

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3200.10	33.81	1.643	0.30 ( 0.24)	0.81	2538.8	13100.00
2	3223.67	57.47	1.191	0.30 ( 0.24)	0.81	3777.0	13000.00
3	3120.61	59.66	1.155	0.30 ( 0.24)	0.81	3796.8	13010.00

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S32 \*  
\* Rational Method Hydrology Analysis - 100-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S32.DAT  
TIME/DATE OF STUDY: 15:41 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.800
- 2) 10.00; 3.258
- 3) 15.00; 2.590
- 4) 20.00; 2.201
- 5) 25.00; 1.940
- 6) 30.00; 1.740
- 7) 40.00; 1.487
- 8) 50.00; 1.310
- 9) 60.00; 1.150
- 10) 90.00; 0.940
- 11) 120.00; 0.798
- 12) 180.00; 0.647
- 13) 360.00; 0.452
- 14) 1440.00; 0.187

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13200.00 TO NODE 13201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 298.57  
ELEVATION DATA: UPSTREAM(FEET) = 1069.04 DOWNSTREAM(FEET) = 1005.76

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.440  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.67	0.30	1.000	0	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.89  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 1.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13201.00 TO NODE 13202.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.76 DOWNSTREAM(FEET) = 896.98  
CHANNEL LENGTH THRU SUBAREA(FEET) = 747.55 CHANNEL SLOPE = 0.1455  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.29  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.892  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.64  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.74  
AVERAGE FLOW DEPTH(FEET) = 0.27 TRAVEL TIME(MIN.) = 3.33  
Tc(MIN.) = 12.74  
SUBAREA AREA(ACRES) = 7.42 SUBAREA RUNOFF(CFS) = 17.31  
EFFECTIVE AREA(ACRES) = 8.09 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.1 PEAK FLOW RATE(CFS) = 18.87  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 FLOW VELOCITY(FEET/SEC.) = 4.66  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13202.00 = 1046.12 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 896.98 DOWNSTREAM(FEET) = 840.27  
FLOW LENGTH(FEET) = 1789.59 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 10.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.83  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 18.87  
PIPE TRAVEL TIME(MIN.) = 2.52 Tc(MIN.) = 15.26  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13203.00 = 2835.71 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.26  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.570  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.89 0.30 0.731 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.731  
SUBAREA AREA(ACRES) = 38.89 SUBAREA RUNOFF(CFS) = 82.27  
EFFECTIVE AREA(ACRES) = 46.98 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
TOTAL AREA(ACRES) = 47.0 PEAK FLOW RATE(CFS) = 98.80

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 840.27 DOWNSTREAM(FEET) = 782.97  
FLOW LENGTH(FEET) = 992.54 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 21.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.90  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 98.80  
PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 15.98  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13204.00 = 3828.25 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.98  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.514  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 83.09 0.30 0.645 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645  
SUBAREA AREA(ACRES) = 83.09 SUBAREA RUNOFF(CFS) = 173.51  
EFFECTIVE AREA(ACRES) = 130.07 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 130.1 PEAK FLOW RATE(CFS) = 269.93

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 782.97 DOWNSTREAM(FEET) = 692.52  
FLOW LENGTH(FEET) = 2046.57 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.93  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 269.93  
PIPE TRAVEL TIME(MIN.) = 1.32 Tc(MIN.) = 17.30  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13205.00 = 5874.82 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.30  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.411  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 88.51 0.30 0.679 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.679  
SUBAREA AREA(ACRES) = 88.51 SUBAREA RUNOFF(CFS) = 175.85  
EFFECTIVE AREA(ACRES) = 218.58 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 218.6 PEAK FLOW RATE(CFS) = 433.79

\*\*\*\*\*

FLOW PROCESS FROM NODE 13205.00 TO NODE 13206.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 692.52 DOWNSTREAM(FEET) = 605.24  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2704.69 CHANNEL SLOPE = 0.0323  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.23  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.129

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	163.73	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 571.91  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.07  
AVERAGE FLOW DEPTH(FEET) = 3.16 TRAVEL TIME(MIN.) = 4.07  
Tc(MIN.) = 21.37  
SUBAREA AREA(ACRES) = 163.73 SUBAREA RUNOFF(CFS) = 275.87  
EFFECTIVE AREA(ACRES) = 382.31 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 382.3 PEAK FLOW RATE(CFS) = 654.22  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.39 FLOW VELOCITY(FEET/SEC.) = 11.50  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13206.00 = 8579.51 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13206.00 TO NODE 13207.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 761.07  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.08  
AVERAGE FLOW DEPTH(FEET) = 4.13 TRAVEL TIME(MIN.) = 4.10  
Tc(MIN.) = 25.47  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 213.59  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 796.14  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.22

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 761.07  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.08  
AVERAGE FLOW DEPTH(FEET) = 4.13 TRAVEL TIME(MIN.) = 4.10  
Tc(MIN.) = 25.47  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 213.59  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 796.14  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 4.22 FLOW VELOCITY(FEET/SEC.) = 10.22  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13207.00 = 11058.66 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 883.29  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.96  
AVERAGE FLOW DEPTH(FEET) = 4.07 TRAVEL TIME(MIN.) = 2.42  
Tc(MIN.) = 27.89  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 174.28  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 924.71  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.17

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 883.29  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.96  
AVERAGE FLOW DEPTH(FEET) = 4.07 TRAVEL TIME(MIN.) = 2.42  
Tc(MIN.) = 27.89  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 174.28  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 924.71  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 4.17 FLOW VELOCITY(FEET/SEC.) = 12.10  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 27.89  
RAINFALL INTENSITY(INCH/HR) = 1.82  
AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.81  
EFFECTIVE STREAM AREA(ACRES) = 649.28  
TOTAL STREAM AREA(ACRES) = 649.28  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 924.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13210.00 TO NODE 13211.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.51  
ELEVATION DATA: UPSTREAM(FEET) = 949.80 DOWNSTREAM(FEET) = 828.64

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.525  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.713  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"OPEN BRUSH" - 1.96 0.30 1.000 0 8.53  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 6.02  
TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 6.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13211.00 TO NODE 13212.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 828.64 DOWNSTREAM(FEET) = 767.94  
CHANNEL LENGTH THRU SUBAREA(FEET) = 652.49 CHANNEL SLOPE = 0.0930  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.50

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.111

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.95	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.22

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.22

AVERAGE FLOW DEPTH(FEET) = 0.46 TRAVEL TIME(MIN.) = 2.58

Tc(MIN.) = 11.10

SUBAREA AREA(ACRES) = 11.95 SUBAREA RUNOFF(CFS) = 30.23

EFFECTIVE AREA(ACRES) = 13.91 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 35.19

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 5.04

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13212.00 = 967.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13212.00 TO NODE 13213.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 767.94 DOWNSTREAM(FEET) = 706.43  
CHANNEL LENGTH THRU SUBAREA(FEET) = 967.91 CHANNEL SLOPE = 0.0635  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.03

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.717

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 27.07 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 64.75  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.48  
AVERAGE FLOW DEPTH(FEET) = 0.99 TRAVEL TIME(MIN.) = 2.94  
Tc(MIN.) = 14.05  
SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 58.90  
EFFECTIVE AREA(ACRES) = 40.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 41.0 PEAK FLOW RATE(CFS) = 89.16  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.19 FLOW VELOCITY(FEET/SEC.) = 6.07

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13213.00 = 1934.91 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13213.00 TO NODE 13214.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 706.43 DOWNSTREAM(FEET) = 659.31  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.11 CHANNEL SLOPE = 0.0497  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.42

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.456

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	18.09	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 106.73

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.91

AVERAGE FLOW DEPTH(FEET) = 1.41 TRAVEL TIME(MIN.) = 2.67

Tc(MIN.) = 16.72

SUBAREA AREA(ACRES) = 18.09 SUBAREA RUNOFF(CFS) = 35.11

EFFECTIVE AREA(ACRES) = 59.07 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 114.64

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.47 FLOW VELOCITY(FEET/SEC.) = 6.04

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13214.00 = 2883.02 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13214.00 TO NODE 13215.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 659.31 DOWNSTREAM(FEET) = 628.91  
CHANNEL LENGTH THRU SUBAREA(FEET) = 970.24 CHANNEL SLOPE = 0.0313  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.16

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.242

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	71.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 177.12

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.87

AVERAGE FLOW DEPTH(FEET) = 2.12 TRAVEL TIME(MIN.) = 2.75

Tc(MIN.) = 19.47

SUBAREA AREA(ACRES) = 71.42 SUBAREA RUNOFF(CFS) = 124.83

EFFECTIVE AREA(ACRES) = 130.49 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 130.5 PEAK FLOW RATE(CFS) = 228.07

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.43 FLOW VELOCITY(FEET/SEC.) = 6.32

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13215.00 = 3853.26 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13215.00 TO NODE 13216.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 628.91 DOWNSTREAM(FEET) = 598.39  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.63 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.57

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.108

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	36.33	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 257.64

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.68

AVERAGE FLOW DEPTH(FEET) = 2.55 TRAVEL TIME(MIN.) = 2.30

Tc(MIN.) = 21.78

SUBAREA AREA(ACRES) = 36.33 SUBAREA RUNOFF(CFS) = 59.13

EFFECTIVE AREA(ACRES) = 166.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 166.8 PEAK FLOW RATE(CFS) = 271.50

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.63 FLOW VELOCITY(FEET/SEC.) = 6.77

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13216.00 = 4775.89 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13216.00 TO NODE 13217.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 598.39 DOWNSTREAM(FEET) = 568.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.40 CHANNEL SLOPE = 0.0470  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.55

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.038

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	42.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 304.76

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.93

AVERAGE FLOW DEPTH(FEET) = 2.55 TRAVEL TIME(MIN.) = 1.34

Tc(MIN.) = 23.11

SUBAREA AREA(ACRES) = 42.51 SUBAREA RUNOFF(CFS) = 66.51

EFFECTIVE AREA(ACRES) = 209.33 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 209.3 PEAK FLOW RATE(CFS) = 327.53

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.64 FLOW VELOCITY(FEET/SEC.) = 8.10

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13217.00 = 5412.29 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 568.48 DOWNSTREAM(FEET) = 505.65  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1896.50 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.16

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.846

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	73.24	0.30	0.951	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.951  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 378.98  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 7.44  
 AVERAGE FLOW DEPTH( FEET) = 3.13 TRAVEL TIME( MIN.) = 4.25  
 Tc( MIN.) = 27.36  
 SUBAREA AREA( ACRES) = 73.24 SUBAREA RUNOFF( CFS) = 102.85  
 EFFECTIVE AREA( ACRES) = 282.57 AREA-AVERAGED Fm( INCH/HR) = 0.30  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA( ACRES) = 282.6 PEAK FLOW RATE( CFS) = 394.05  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 3.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 3.19 FLOW VELOCITY( FEET/SEC.) = 7.53  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13220.00 = 7308.79 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION( MIN.) = 27.36  
 RAINFALL INTENSITY( INCH/HR) = 1.85  
 AREA-AVERAGED Fm( INCH/HR) = 0.30  
 AREA-AVERAGED Fp( INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.99  
 EFFECTIVE STREAM AREA( ACRES) = 282.57  
 TOTAL STREAM AREA( ACRES) = 282.57  
 PEAK FLOW RATE( CFS) AT CONFLUENCE = 394.05

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	924.71	27.89	1.825	0.30( 0.24)	0.81	649.3	13200.00
2	394.05	27.36	1.846	0.30( 0.30)	0.99	282.6	13210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1313.36	27.36	1.846	0.30( 0.26)	0.86	919.6	13210.00
2	1313.40	27.89	1.825	0.30( 0.26)	0.86	931.8	13200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE( CFS) = 1313.40 Tc( MIN.) = 27.89  
 EFFECTIVE AREA( ACRES) = 931.85 AREA-AVERAGED Fm( INCH/HR) = 0.26  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA( ACRES) = 931.8  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13220.00 TO NODE 13221.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM( FEET) = 505.65 DOWNSTREAM( FEET) = 478.94  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 1949.14 CHANNEL SLOPE = 0.0137  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 5.31  
 \* 100 YEAR RAINFALL INTENSITY( INCH/HR) = 1.729

SUBAREA LOSS RATE DATA( AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 108.50 0.30 0.637 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.637  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1388.48  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 12.70  
 AVERAGE FLOW DEPTH( FEET) = 5.31 TRAVEL TIME( MIN.) = 2.56  
 Tc( MIN.) = 30.44

SUBAREA AREA( ACRES) = 108.50 SUBAREA RUNOFF( CFS) = 150.16  
 EFFECTIVE AREA( ACRES) = 1040.35 AREA-AVERAGED Fm( INCH/HR) = 0.25  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA( ACRES) = 1040.3 PEAK FLOW RATE( CFS) = 1383.25  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 5.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 5.29 FLOW VELOCITY( FEET/SEC.) = 12.70  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13221.00 = 14742.35 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1380.36	29.92	1.743	0.30( 0.25)	0.84	1028.1	13210.00
2	1383.25	30.44	1.729	0.30( 0.25)	0.84	1040.3	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE( CFS) = 1383.25 Tc( MIN.) = 30.44  
 AREA-AVERAGED Fm( INCH/HR) = 0.25 AREA-AVERAGED Fp( INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.84 EFFECTIVE AREA( ACRES) = 1040.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13221.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM( FEET) = 478.94 DOWNSTREAM( FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 2078.70 CHANNEL SLOPE = 0.0247  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 4.67  
 \* 100 YEAR RAINFALL INTENSITY( INCH/HR) = 1.674

SUBAREA LOSS RATE DATA( AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 87.26 0.30 0.699 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.699  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1440.74  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 15.94  
 AVERAGE FLOW DEPTH (FEET) = 4.67 TRAVEL TIME (MIN.) = 2.17  
 Tc (MIN.) = 32.62  
 SUBAREA AREA (ACRES) = 87.26 SUBAREA RUNOFF (CFS) = 114.98  
 EFFECTIVE AREA (ACRES) = 1127.61 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA (ACRES) = 1127.6 PEAK FLOW RATE (CFS) = 1446.69  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 4.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 4.68 FLOW VELOCITY (FEET/SEC.) = 15.96  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13222.00 = 16821.05 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1444.32	32.09	1.687	0.30 (0.25)	0.83	1115.4	13210.00
2	1446.69	32.62	1.674	0.30 (0.25)	0.83	1127.6	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1446.69 Tc (MIN.) = 32.62  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.83 EFFECTIVE AREA (ACRES) = 1127.61

=====  
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1127.6 TC (MIN.) = 32.62  
 EFFECTIVE AREA (ACRES) = 1127.61 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.828  
 PEAK FLOW RATE (CFS) = 1446.69

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1444.32	32.09	1.687	0.30 (0.25)	0.83	1115.4	13210.00
2	1446.69	32.62	1.674	0.30 (0.25)	0.83	1127.6	13200.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S35 \*  
\* Rational Method Hydrology Analysis - 100-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S35.DAT  
TIME/DATE OF STUDY: 15:41 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.800
- 2) 10.00; 3.258
- 3) 15.00; 2.590
- 4) 20.00; 2.201
- 5) 25.00; 1.940
- 6) 30.00; 1.740
- 7) 40.00; 1.487
- 8) 50.00; 1.310
- 9) 60.00; 1.150
- 10) 90.00; 0.940
- 11) 120.00; 0.798
- 12) 180.00; 0.647
- 13) 360.00; 0.452
- 14) 1440.00; 0.187

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.00 TO NODE 13500.50 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 548.43  
ELEVATION DATA: UPSTREAM(FEET) = 1183.47 DOWNSTREAM(FEET) = 1065.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.997  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	5.11	0.30	1.000	0	11.96

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 12.40  
TOTAL AREA(ACRES) = 5.11 PEAK FLOW RATE(CFS) = 12.40

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.50 TO NODE 13501.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1033.15  
CHANNEL LENGTH THRU SUBAREA(FEET) = 431.71 CHANNEL SLOPE = 0.0738  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.52  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.756  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.87	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.22  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.98  
AVERAGE FLOW DEPTH(FEET) = 0.51 TRAVEL TIME(MIN.) = 1.81  
Tc(MIN.) = 13.76  
SUBAREA AREA(ACRES) = 8.87 SUBAREA RUNOFF(CFS) = 19.60  
EFFECTIVE AREA(ACRES) = 13.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 30.90  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:



DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 4.47  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13501.00 = 980.14 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13501.00 TO NODE 13502.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1033.15 DOWNSTREAM(FEET) = 990.26  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.63 CHANNEL SLOPE = 0.0452  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.93  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.406

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.82	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 46.88  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.39  
AVERAGE FLOW DEPTH(FEET) = 0.91 TRAVEL TIME(MIN.) = 3.60  
Tc(MIN.) = 17.37

SUBAREA AREA(ACRES) = 16.82 SUBAREA RUNOFF(CFS) = 31.88  
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 58.38  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.03 FLOW VELOCITY(FEET/SEC.) = 4.72  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13502.00 = 1928.77 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13502.00 TO NODE 13503.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.26 DOWNSTREAM(FEET) = 956.06  
CHANNEL LENGTH THRU SUBAREA(FEET) = 940.98 CHANNEL SLOPE = 0.0363  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.50  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.180

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	46.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 97.35  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.16  
AVERAGE FLOW DEPTH(FEET) = 1.46 TRAVEL TIME(MIN.) = 3.04

Tc(MIN.) = 20.41  
SUBAREA AREA(ACRES) = 46.02 SUBAREA RUNOFF(CFS) = 77.86  
EFFECTIVE AREA(ACRES) = 76.82 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 76.8 PEAK FLOW RATE(CFS) = 129.97  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.71 FLOW VELOCITY(FEET/SEC.) = 5.65  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13503.00 = 2869.75 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13503.00 TO NODE 13504.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 956.06 DOWNSTREAM(FEET) = 889.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2131.31 CHANNEL SLOPE = 0.0312  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.13  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.879

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	58.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 171.61  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.81  
AVERAGE FLOW DEPTH(FEET) = 2.09 TRAVEL TIME(MIN.) = 6.12  
Tc(MIN.) = 26.52

SUBAREA AREA(ACRES) = 58.46 SUBAREA RUNOFF(CFS) = 83.08  
EFFECTIVE AREA(ACRES) = 135.28 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 135.3 PEAK FLOW RATE(CFS) = 192.25  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.22 FLOW VELOCITY(FEET/SEC.) = 6.01  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13504.00 = 5001.06 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13504.00 TO NODE 13505.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 889.48 DOWNSTREAM(FEET) = 848.10  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1661.97 CHANNEL SLOPE = 0.0249  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.58

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.707  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	49.30	0.30	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 223.48  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.79  
 AVERAGE FLOW DEPTH (FEET) = 2.55 TRAVEL TIME (MIN.) = 4.78  
 Tc (MIN.) = 31.30  
 SUBAREA AREA (ACRES) = 49.30 SUBAREA RUNOFF (CFS) = 62.43  
 EFFECTIVE AREA (ACRES) = 184.58 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 184.6 PEAK FLOW RATE (CFS) = 233.74  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.62  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.62 FLOW VELOCITY (FEET/SEC.) = 5.85  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.00 = 6663.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13505.00 TO NODE 13505.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 848.10 DOWNSTREAM (FEET) = 811.10  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1234.61 CHANNEL SLOPE = 0.0300  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.63  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.626  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.35	0.30	0.811	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.811  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 258.23  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.44  
 AVERAGE FLOW DEPTH (FEET) = 2.63 TRAVEL TIME (MIN.) = 3.19  
 Tc (MIN.) = 34.50  
 SUBAREA AREA (ACRES) = 39.35 SUBAREA RUNOFF (CFS) = 48.97  
 EFFECTIVE AREA (ACRES) = 223.93 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 223.9 PEAK FLOW RATE (CFS) = 269.28  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.69  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.69 FLOW VELOCITY (FEET/SEC.) = 6.51  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.50 = 7897.64 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13505.50 TO NODE 13506.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 811.10 DOWNSTREAM (FEET) = 781.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1415.98 CHANNEL SLOPE = 0.0213  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.12  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.526  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	54.33	0.30	0.738	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.738  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 301.17  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.95  
 AVERAGE FLOW DEPTH (FEET) = 3.12 TRAVEL TIME (MIN.) = 3.97  
 Tc (MIN.) = 38.46  
 SUBAREA AREA (ACRES) = 54.33 SUBAREA RUNOFF (CFS) = 63.78  
 EFFECTIVE AREA (ACRES) = 278.26 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
 TOTAL AREA (ACRES) = 278.3 PEAK FLOW RATE (CFS) = 312.81  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.18  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.18 FLOW VELOCITY (FEET/SEC.) = 6.02  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.00 = 9313.62 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13506.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 781.00 DOWNSTREAM (FEET) = 743.17  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1542.62 CHANNEL SLOPE = 0.0245  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.24  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.444  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	61.33	0.30	0.783	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 346.19  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.51  
 AVERAGE FLOW DEPTH (FEET) = 3.23 TRAVEL TIME (MIN.) = 3.95  
 Tc (MIN.) = 42.41  
 SUBAREA AREA (ACRES) = 61.33 SUBAREA RUNOFF (CFS) = 66.75  
 EFFECTIVE AREA (ACRES) = 339.59 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90

TOTAL AREA (ACRES) = 339.6 PEAK FLOW RATE (CFS) = 359.16  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.29  
  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.29 FLOW VELOCITY (FEET/SEC.) = 6.58  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.50 = 10856.24 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.50 TO NODE 13520.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 743.17 DOWNSTREAM (FEET) = 717.04  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1370.93 CHANNEL SLOPE = 0.0191  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.62  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.378  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.86	0.30	0.848	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.848  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 379.32  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.09  
 AVERAGE FLOW DEPTH (FEET) = 3.61 TRAVEL TIME (MIN.) = 3.75  
 Tc (MIN.) = 46.16  
 SUBAREA AREA (ACRES) = 39.86 SUBAREA RUNOFF (CFS) = 40.31  
 EFFECTIVE AREA (ACRES) = 379.45 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
 TOTAL AREA (ACRES) = 379.5 PEAK FLOW RATE (CFS) = 379.26  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.61 FLOW VELOCITY (FEET/SEC.) = 6.09  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 46.16  
 RAINFALL INTENSITY (INCH/HR) = 1.38  
 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.89  
 EFFECTIVE STREAM AREA (ACRES) = 379.45  
 TOTAL STREAM AREA (ACRES) = 379.45  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 379.26

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13510.00 TO NODE 13511.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

ELEVATION DATA: UPSTREAM (FEET) = 1216.90 DOWNSTREAM (FEET) = 1022.78  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 903.68  
 CHANNEL SLOPE = 0.0232

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.615  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.642  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	6.66	0.30	1.000	0	14.62

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 14.04  
 TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 14.04

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13511.00 TO NODE 13512.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1022.78 DOWNSTREAM (FEET) = 954.27  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1027.63 CHANNEL SLOPE = 0.0667  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.74  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.332  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.30	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 37.36  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.63  
 AVERAGE FLOW DEPTH (FEET) = 0.71 TRAVEL TIME (MIN.) = 3.70  
 Tc (MIN.) = 18.31  
 SUBAREA AREA (ACRES) = 25.40 SUBAREA RUNOFF (CFS) = 46.46  
 EFFECTIVE AREA (ACRES) = 32.06 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 58.64  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.92 FLOW VELOCITY (FEET/SEC.) = 5.38  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13512.00 = 1931.31 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13512.00 TO NODE 13513.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 954.27 DOWNSTREAM(FEET) = 872.45
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.42 CHANNEL SLOPE = 0.0425
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.72
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.007

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 90.23 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 128.25

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.93

AVERAGE FLOW DEPTH(FEET) = 1.63 TRAVEL TIME(MIN.) = 5.41

Tc(MIN.) = 23.72

SUBAREA AREA(ACRES) = 90.23 SUBAREA RUNOFF(CFS) = 138.59

EFFECTIVE AREA(ACRES) = 122.29 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 122.3 PEAK FLOW RATE(CFS) = 187.83

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.01 FLOW VELOCITY(FEET/SEC.) = 6.66

LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13513.00 = 3857.73 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13513.00 TO NODE 13514.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 872.45 DOWNSTREAM(FEET) = 813.12
CHANNEL LENGTH THRU SUBAREA(FEET) = 1895.66 CHANNEL SLOPE = 0.0313
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.77
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.802

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 135.65 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 279.68

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.69

AVERAGE FLOW DEPTH(FEET) = 2.71 TRAVEL TIME(MIN.) = 4.72

Tc(MIN.) = 28.45

SUBAREA AREA(ACRES) = 135.65 SUBAREA RUNOFF(CFS) = 183.39

EFFECTIVE AREA(ACRES) = 257.94 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 257.9 PEAK FLOW RATE(CFS) = 348.72

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.04 FLOW VELOCITY(FEET/SEC.) = 7.13

LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13514.00 = 5753.39 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13514.00 TO NODE 13515.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 813.12 DOWNSTREAM(FEET) = 773.74
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.15 CHANNEL SLOPE = 0.0204
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.75

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.652

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 109.30 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 415.27

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.40

AVERAGE FLOW DEPTH(FEET) = 3.72 TRAVEL TIME(MIN.) = 5.01

Tc(MIN.) = 33.46

SUBAREA AREA(ACRES) = 109.30 SUBAREA RUNOFF(CFS) = 133.04

EFFECTIVE AREA(ACRES) = 367.24 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 367.2 PEAK FLOW RATE(CFS) = 447.01

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.86 FLOW VELOCITY(FEET/SEC.) = 6.54

LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13515.00 = 7679.54 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 773.74 DOWNSTREAM(FEET) = 717.04
CHANNEL LENGTH THRU SUBAREA(FEET) = 2279.49 CHANNEL SLOPE = 0.0249
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.22

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.524

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 231.44 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 574.62  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 7.52  
 AVERAGE FLOW DEPTH( FEET) = 4.17 TRAVEL TIME( MIN.) = 5.05  
 Tc( MIN.) = 38.51  
 SUBAREA AREA( ACRES) = 231.44 SUBAREA RUNOFF( CFS) = 255.05  
 EFFECTIVE AREA( ACRES) = 598.68 AREA-AVERAGED Fm( INCH/HR) = 0.30  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA( ACRES) = 598.7 PEAK FLOW RATE( CFS) = 659.77  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 4.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 4.47 FLOW VELOCITY( FEET/SEC.) = 7.80  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13520.00 = 9959.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION( MIN.) = 38.51  
 RAINFALL INTENSITY( INCH/HR) = 1.52  
 AREA-AVERAGED Fm( INCH/HR) = 0.30  
 AREA-AVERAGED Fp( INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA( ACRES) = 598.68  
 TOTAL STREAM AREA( ACRES) = 598.68  
 PEAK FLOW RATE( CFS) AT CONFLUENCE = 659.77

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	379.26	46.16	1.378	0.30( 0.27)	0.89	379.5	13500.00
2	659.77	38.51	1.524	0.30( 0.30)	1.00	598.7	13510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1017.88	38.51	1.524	0.30( 0.29)	0.96	915.3	13510.00
2	960.16	46.16	1.378	0.30( 0.29)	0.96	978.1	13500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE( CFS) = 1017.88 Tc( MIN.) = 38.51  
 EFFECTIVE AREA( ACRES) = 915.25 AREA-AVERAGED Fm( INCH/HR) = 0.29  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA( ACRES) = 978.1  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.00 TO NODE 13520.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM( FEET) = 717.04 DOWNSTREAM( FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 2019.22 CHANNEL SLOPE = 0.0084  
 GIVEN CHANNEL BASE( FEET) = 30.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 3.86  
 \* 100 YEAR RAINFALL INTENSITY( INCH/HR) = 1.428  
 SUBAREA LOSS RATE DATA( AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1116.96  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 7.00  
 AVERAGE FLOW DEPTH( FEET) = 3.84 TRAVEL TIME( MIN.) = 4.81  
 Tc( MIN.) = 43.32  
 SUBAREA AREA( ACRES) = 193.31 SUBAREA RUNOFF( CFS) = 198.12  
 EFFECTIVE AREA( ACRES) = 1108.56 AREA-AVERAGED Fm( INCH/HR) = 0.29  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA( ACRES) = 1171.4 PEAK FLOW RATE( CFS) = 1136.73  
 GIVEN CHANNEL BASE( FEET) = 30.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 3.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 3.88 FLOW VELOCITY( FEET/SEC.) = 7.04  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.50 = 14246.39 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1136.73	43.32	1.428	0.30( 0.29)	0.96	1108.6	13510.00
2	1060.17	51.07	1.293	0.30( 0.29)	0.96	1171.4	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE( CFS) = 1136.73 Tc( MIN.) = 43.32  
 AREA-AVERAGED Fm( INCH/HR) = 0.29 AREA-AVERAGED Fp( INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA( ACRES) = 1108.56

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.50 TO NODE 13521.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM( FEET) = 700.00 DOWNSTREAM( FEET) = 661.95  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 1622.36 CHANNEL SLOPE = 0.0235  
 GIVEN CHANNEL BASE( FEET) = 30.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 3.02  
 \* 100 YEAR RAINFALL INTENSITY( INCH/HR) = 1.381  
 SUBAREA LOSS RATE DATA( AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -        129.79      0.30        0.897       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1201.70  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.20  
 AVERAGE FLOW DEPTH(FEET) = 3.02    TRAVEL TIME(MIN.) = 2.65  
 Tc(MIN.) = 45.97  
 SUBAREA AREA(ACRES) = 129.79        SUBAREA RUNOFF(CFS) = 129.94  
 EFFECTIVE AREA(ACRES) = 1238.35    AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 1301.2        PEAK FLOW RATE(CFS) = 1220.02  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.04    FLOW VELOCITY(FEET/SEC.) = 10.25  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13521.00 = 15868.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1220.02	45.97	1.381	0.30( 0.29)	0.96	1238.4	13510.00
2	1128.89	53.78	1.250	0.30( 0.29)	0.95	1301.2	13500.00

 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1220.02    Tc(MIN.) = 45.97  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96    EFFECTIVE AREA(ACRES) = 1238.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13521.00 TO NODE 13522.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 661.95    DOWNSTREAM(FEET) = 632.19  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2746.01    CHANNEL SLOPE = 0.0108  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.99  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.284  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	278.60	0.30	0.905	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1347.00  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.09  
 AVERAGE FLOW DEPTH(FEET) = 3.97    TRAVEL TIME(MIN.) = 5.66  
 Tc(MIN.) = 51.63  
 SUBAREA AREA(ACRES) = 278.60        SUBAREA RUNOFF(CFS) = 253.95  
 EFFECTIVE AREA(ACRES) = 1516.95    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.95  
 TOTAL AREA(ACRES) = 1579.8        PEAK FLOW RATE(CFS) = 1365.67  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040

\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.00  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 4.00    FLOW VELOCITY(FEET/SEC.) = 8.12  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13522.00 = 18614.76 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1365.67	51.63	1.284	0.30( 0.28)	0.95	1517.0	13510.00
2	1241.97	59.58	1.157	0.30( 0.28)	0.94	1579.8	13500.00

 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1365.67    Tc(MIN.) = 51.63  
 AREA-AVERAGED Fm(INCH/HR) = 0.28    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.95    EFFECTIVE AREA(ACRES) = 1516.95

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1579.8    TC(MIN.) = 51.63  
 EFFECTIVE AREA(ACRES) = 1516.95    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.947  
 PEAK FLOW RATE(CFS) = 1365.67

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1365.67	51.63	1.284	0.30( 0.28)	0.95	1517.0	13510.00
2	1241.97	59.58	1.157	0.30( 0.28)	0.94	1579.8	13500.00

 =====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 2-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P02EVAA.DAT  
TIME/DATE OF STUDY: 14:35 11/14/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.806
- 2) 10.00; 1.204
- 3) 15.00; 0.925
- 4) 20.00; 0.762
- 5) 25.00; 0.659
- 6) 30.00; 0.585
- 7) 40.00; 0.504
- 8) 50.00; 0.447
- 9) 60.00; 0.390
- 10) 90.00; 0.330
- 11) 120.00; 0.270
- 12) 180.00; 0.210
- 13) 360.00; 0.150
- 14) 1200.00; 0.080

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE/ WAY		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 571.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.305  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.528  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	-	0.80	0.60	0.200	0	7.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 1.01  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 1.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.528  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.60	0.200	-
USER-DEFINED	-	1.00	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.170  
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 4.24  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 5.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.528  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.60	0.200	-
USER-DEFINED	-	1.00	0.60	0.100	-



USER-DEFINED - 2.60 0.60 0.200 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA (ACRES) = 2.60 SUBAREA RUNOFF (CFS) = 3.30  
 EFFECTIVE AREA (ACRES) = 6.70 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.19  
 TOTAL AREA (ACRES) = 6.7 PEAK FLOW RATE (CFS) = 8.55

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 571.00 DOWNSTREAM ELEVATION (FEET) = 530.50  
 STREET LENGTH (FEET) = 1215.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.22  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.35  
 HALFSTREET FLOOD WIDTH (FEET) = 10.74  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.17  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.48

STREET FLOW TRAVEL TIME (MIN.) = 4.85 Tc (MIN.) = 12.16

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.084

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.200	-
USER-DEFINED	-	2.40	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.135  
 SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 3.34  
 EFFECTIVE AREA (ACRES) = 10.40 AREA-AVERAGED Fm (INCH/HR) = 0.10  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA (ACRES) = 10.4 PEAK FLOW RATE (CFS) = 9.20

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.35 HALFSTREET FLOOD WIDTH (FEET) = 10.27  
 FLOW VELOCITY (FEET/SEC.) = 4.05 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.40  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1542.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.16  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.084  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.40	0.60	0.200	-
USER-DEFINED	-	18.20	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.119  
 SUBAREA AREA (ACRES) = 22.60 SUBAREA RUNOFF (CFS) = 20.58  
 EFFECTIVE AREA (ACRES) = 33.00 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.13  
 TOTAL AREA (ACRES) = 33.0 PEAK FLOW RATE (CFS) = 29.79

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.16  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.084  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.20	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198  
 SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 5.47  
 EFFECTIVE AREA (ACRES) = 39.30 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA (ACRES) = 39.3 PEAK FLOW RATE (CFS) = 35.25

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 530.50 DOWNSTREAM (FEET) = 522.00  
 FLOW LENGTH (FEET) = 837.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.2 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.04  
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 35.25  
 PIPE TRAVEL TIME (MIN.) = 1.54 Tc (MIN.) = 13.70  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2379.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.70  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.997  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED - 15.30 0.60 0.100 -  
 USER-DEFINED - 0.70 0.60 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.133  
 SUBAREA AREA (ACRES) = 16.00 SUBAREA RUNOFF (CFS) = 13.22  
 EFFECTIVE AREA (ACRES) = 55.30 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA (ACRES) = 55.3 PEAK FLOW RATE (CFS) = 45.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 522.00 DOWNSTREAM (FEET) = 473.00  
 FLOW LENGTH (FEET) = 568.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.1 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 21.84  
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 45.43  
 PIPE TRAVEL TIME (MIN.) = 0.43 Tc (MIN.) = 14.13  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2947.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.13  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.973

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	0.500	-
USER-DEFINED	-	0.50	0.60	0.100	-
USER-DEFINED	-	13.00	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.820  
 SUBAREA AREA (ACRES) = 15.90 SUBAREA RUNOFF (CFS) = 6.89  
 EFFECTIVE AREA (ACRES) = 71.20 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA (ACRES) = 71.2 PEAK FLOW RATE (CFS) = 51.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 104.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 473.00 DOWNSTREAM (FEET) = 435.00  
 FLOW LENGTH (FEET) = 588.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.4 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 19.74  
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 51.11  
 PIPE TRAVEL TIME (MIN.) = 0.50 Tc (MIN.) = 14.63

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 100.00 TO NODE 121.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 577.00 DOWNSTREAM (FEET) = 574.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.438  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.392  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	-	0.60	0.60	0.200	0	8.44

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF (CFS) = 0.69  
 TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 0.69

\*\*\*\*\*

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 574.00 DOWNSTREAM ELEVATION (FEET) = 557.00  
 STREET LENGTH (FEET) = 221.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.14  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.30  
 HALFSTREET FLOOD WIDTH (FEET) = 7.78  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.54  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.67  
 STREET FLOW TRAVEL TIME (MIN.) = 0.66 Tc (MIN.) = 9.10  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.312  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.200	-
USER-DEFINED	-	7.90	0.60	0.200	-
USER-DEFINED	-	4.10	0.60	0.400	-
USER-DEFINED	-	2.20	0.60	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.257  
SUBAREA AREA (ACRES) = 14.30 SUBAREA RUNOFF (CFS) = 14.90  
EFFECTIVE AREA (ACRES) = 14.90 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.26  
TOTAL AREA (ACRES) = 14.9 PEAK FLOW RATE (CFS) = 15.54

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.35 HALFSTREET FLOOD WIDTH (FEET) = 10.74  
FLOW VELOCITY (FEET/SEC.) = 6.35 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.25  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 551.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 557.00 DOWNSTREAM ELEVATION (FEET) = 527.00  
STREET LENGTH (FEET) = 317.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 19.79  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.37  
HALFSTREET FLOOD WIDTH (FEET) = 11.45  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.26  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.66  
STREET FLOW TRAVEL TIME (MIN.) = 0.73 Tc (MIN.) = 9.83  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.224

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED	-	0.20	0.60	0.320	-
USER-DEFINED	-	4.50	0.60	0.400	-
USER-DEFINED	-	0.70	0.60	0.200	-
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	3.50	0.60	0.350	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.352  
SUBAREA AREA (ACRES) = 9.30 SUBAREA RUNOFF (CFS) = 8.48  
EFFECTIVE AREA (ACRES) = 24.20 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.29

TOTAL AREA (ACRES) = 24.2 PEAK FLOW RATE (CFS) = 22.85

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.38 HALFSTREET FLOOD WIDTH (FEET) = 12.23  
FLOW VELOCITY (FEET/SEC.) = 7.47 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.85  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 123.00 = 868.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 527.00 DOWNSTREAM ELEVATION (FEET) = 496.00  
STREET LENGTH (FEET) = 315.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.70  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.40  
HALFSTREET FLOOD WIDTH (FEET) = 13.24  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.87  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.14  
STREET FLOW TRAVEL TIME (MIN.) = 0.67 Tc (MIN.) = 10.50  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.176

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED	-	2.90	0.60	0.400	-
USER-DEFINED	-	1.40	0.60	0.350	-
USER-DEFINED	-	4.00	0.60	0.400	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	2.70	0.60	0.350	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387  
SUBAREA AREA (ACRES) = 11.40 SUBAREA RUNOFF (CFS) = 9.68  
EFFECTIVE AREA (ACRES) = 35.60 AREA-AVERAGED Fm (INCH/HR) = 0.19  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.32  
TOTAL AREA (ACRES) = 35.6 PEAK FLOW RATE (CFS) = 31.49

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.41 HALFSTREET FLOOD WIDTH (FEET) = 13.95  
FLOW VELOCITY (FEET/SEC.) = 8.16 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.36  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 124.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 10.50
RAINFALL INTENSITY(INCH/HR) = 1.18
AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA(ACRES) = 35.60
TOTAL STREAM AREA(ACRES) = 35.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 31.49

\*\*\*\*\*
FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 317.00
ELEVATION DATA: UPSTREAM(FEET) = 699.00 DOWNSTREAM(FEET) = 610.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.111
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.311
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"OPEN BRUSH" - 1.50 0.60 1.000 0 9.11
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.96
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 0.96

\*\*\*\*\*
FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 575.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 206.00 CHANNEL SLOPE = 0.1699
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.222
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.80 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.75
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.65
AVERAGE FLOW DEPTH(FEET) = 0.35 TRAVEL TIME(MIN.) = 0.74
Tc(MIN.) = 9.85
SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 1.57
EFFECTIVE AREA(ACRES) = 4.30 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 4.3 PEAK FLOW RATE(CFS) = 2.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.40 FLOW VELOCITY(FEET/SEC.) = 5.03
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 523.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 548.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.1350
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.175
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.30 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.26
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.96
AVERAGE FLOW DEPTH(FEET) = 0.47 TRAVEL TIME(MIN.) = 0.67
Tc(MIN.) = 10.52
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 1.71
EFFECTIVE AREA(ACRES) = 7.60 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 7.6 PEAK FLOW RATE(CFS) = 3.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.50 FLOW VELOCITY(FEET/SEC.) = 5.23
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 723.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 548.00 DOWNSTREAM(FEET) = 524.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 318.00 CHANNEL SLOPE = 0.0755
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.107
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.30 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.46
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.35
AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 1.22
Tc(MIN.) = 11.74

SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 1.05  
EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 4.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.59 FLOW VELOCITY (FEET/SEC.) = 4.32  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 1041.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 524.00 DOWNSTREAM (FEET) = 515.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 94.00 CHANNEL SLOPE = 0.0957  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.089

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.33

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.97

AVERAGE FLOW DEPTH (FEET) = 0.60 TRAVEL TIME (MIN.) = 0.32

Tc (MIN.) = 12.06

SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 1.63

EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 5.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.62 FLOW VELOCITY (FEET/SEC.) = 5.15

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 1135.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 507.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 207.00 CHANNEL SLOPE = 0.0386  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.039

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.63

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.86

AVERAGE FLOW DEPTH (FEET) = 0.81 TRAVEL TIME (MIN.) = 0.89  
Tc (MIN.) = 12.95  
SUBAREA AREA (ACRES) = 8.30 SUBAREA RUNOFF (CFS) = 3.28  
EFFECTIVE AREA (ACRES) = 21.90 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 21.9 PEAK FLOW RATE (CFS) = 8.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.85 FLOW VELOCITY (FEET/SEC.) = 3.98

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 1342.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 507.00 DOWNSTREAM (FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 338.00 CHANNEL SLOPE = 0.0207  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.946

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	0.400	-
USER-DEFINED	-	13.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.91

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.35

AVERAGE FLOW DEPTH (FEET) = 1.04 TRAVEL TIME (MIN.) = 1.68

Tc (MIN.) = 14.63

SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 4.48

EFFECTIVE AREA (ACRES) = 36.00 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 36.0 PEAK FLOW RATE (CFS) = 11.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.06 FLOW VELOCITY (FEET/SEC.) = 3.38

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 1680.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 137.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 500.00 DOWNSTREAM (FEET) = 496.00  
FLOW LENGTH (FEET) = 726.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 14.9 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 5.50

ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 11.30

PIPE TRAVEL TIME (MIN.) = 2.20 Tc (MIN.) = 16.83

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 16.83  
RAINFALL INTENSITY(INCH/HR) = 0.87  
AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 36.00  
TOTAL STREAM AREA(ACRES) = 36.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.30

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	31.49	10.50	1.176	0.60( 0.19)	0.32	35.6	100.00
2	11.30	16.83	0.865	0.60( 0.60)	1.00	36.0	130.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	42.79	10.50	1.176	0.60( 0.35)	0.58	58.1	100.00
2	32.82	16.83	0.865	0.60( 0.40)	0.66	71.6	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 42.79 Tc(MIN.) = 10.50  
EFFECTIVE AREA(ACRES) = 58.05 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 71.6  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 444.00  
FLOW LENGTH(FEET) = 888.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.46  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 42.79  
PIPE TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 11.30  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 125.00 = 3294.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 11.30

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.132

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.60	0.400	-
USER-DEFINED	-	7.50	0.60	0.400	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.407  
SUBAREA AREA(ACRES) = 8.60 SUBAREA RUNOFF(CFS) = 6.87  
EFFECTIVE AREA(ACRES) = 66.65 AREA-AVERAGED Fm(INCH/HR) = 0.34  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 47.73

\*\*\*\*\*  
FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 444.00 DOWNSTREAM(FEET) = 438.00  
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 27.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.18  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 47.73  
PIPE TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 12.50  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 12.50  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.065  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.30	0.60	0.200	-
USER-DEFINED	-	0.70	0.60	0.400	-
USER-DEFINED	-	0.90	0.60	0.100	-
USER-DEFINED	-	0.60	0.60	0.350	-
USER-DEFINED	-	0.40	0.60	0.200	-
USER-DEFINED	-	0.20	0.60	0.400	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.225  
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 5.94  
EFFECTIVE AREA(ACRES) = 73.75 AREA-AVERAGED Fm(INCH/HR) = 0.32  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 87.3 PEAK FLOW RATE(CFS) = 49.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN.) = 12.50
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.065
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.60     0.100   -
USER-DEFINED        -         0.10     0.60     0.350   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225
SUBAREA AREA(ACRES) = 0.20   SUBAREA RUNOFF(CFS) = 0.17
EFFECTIVE AREA(ACRES) = 73.95   AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 87.5   PEAK FLOW RATE(CFS) = 49.82

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*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.50
RAINFALL INTENSITY(INCH/HR) = 1.06
AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.53
EFFECTIVE STREAM AREA(ACRES) = 73.95
TOTAL STREAM AREA(ACRES) = 87.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 49.82

```

```

*****
FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21
-----

```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

```

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 557.00   DOWNSTREAM(FEET) = 546.00

```

```

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.105
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.673
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS   Tc
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          -         0.50     0.60     0.100   0    6.11
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 0.73
TOTAL AREA(ACRES) = 0.50   PEAK FLOW RATE(CFS) = 0.73

```

```

*****
FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62
-----

```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

```

UPSTREAM ELEVATION(FEET) = 546.00   DOWNSTREAM ELEVATION(FEET) = 488.00
STREET LENGTH(FEET) = 671.00   CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

```

```

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

```

```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

```

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.70

```

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.24
HALFSTREET FLOOD WIDTH(FEET) = 4.16
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.31
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.26
STREET FLOW TRAVEL TIME(MIN.) = 2.10   Tc(MIN.) = 8.21

```

```

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.420
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50     0.60     0.200   -
USER-DEFINED        -         0.90     0.60     0.100   -
USER-DEFINED        -         3.90     0.60     0.350   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
SUBAREA AREA(ACRES) = 5.30   SUBAREA RUNOFF(CFS) = 5.93
EFFECTIVE AREA(ACRES) = 5.80   AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 5.8   PEAK FLOW RATE(CFS) = 6.54

```

```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) = 6.59
FLOW VELOCITY(FEET/SEC.) = 5.62   DEPTH*VELOCITY(FT*FT/SEC.) = 1.58
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1001.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 8.21
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.420
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         14.60    0.60     0.200   -
USER-DEFINED        -         1.10     0.60     0.100   -
USER-DEFINED        -         4.30     0.60     0.350   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.227
SUBAREA AREA(ACRES) = 20.00   SUBAREA RUNOFF(CFS) = 23.10
EFFECTIVE AREA(ACRES) = 25.80   AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 25.8   PEAK FLOW RATE(CFS) = 29.65

```

```

*****
FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 488.00 DOWNSTREAM ELEVATION(FEET) = 460.00
STREET LENGTH(FEET) = 371.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.03
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.45
HALFSTREET FLOOD WIDTH(FEET) = 15.82
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.62
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 3.39
STREET FLOW TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 9.02
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.322
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.60 0.200 -
USER-DEFINED - 10.00 0.60 0.200 -
USER-DEFINED - 1.70 0.60 0.200 -
USER-DEFINED - 0.50 0.60 0.100 -
USER-DEFINED - 1.00 0.60 0.350 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.207
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 14.77
EFFECTIVE AREA(ACRES) = 39.50 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 39.5 PEAK FLOW RATE(CFS) = 42.14

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.68
FLOW VELOCITY(FEET/SEC.) = 7.87 DEPTH*VELOCITY(FT*FT/SEC.) = 3.62
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1372.00 FEET.

*****
FLOW PROCESS FROM NODE 113.00 TO NODE 126.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.29

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ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 42.14
PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 9.53
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 1872.00 FEET.

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 9.53
RAINFALL INTENSITY(INCH/HR) = 1.26
AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.23
EFFECTIVE STREAM AREA(ACRES) = 39.50
TOTAL STREAM AREA(ACRES) = 39.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 42.14

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 49.82 12.50 1.065 0.60( 0.32) 0.53 74.0 100.00
1 34.30 18.98 0.795 0.60( 0.36) 0.60 87.5 130.00
2 42.14 9.53 1.260 0.60( 0.14) 0.23 39.5 110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 90.08 9.53 1.260 0.60( 0.24) 0.40 95.9 110.00
2 84.63 12.50 1.065 0.60( 0.25) 0.42 113.5 100.00
3 59.01 18.98 0.795 0.60( 0.29) 0.48 127.0 130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 90.08 Tc(MIN.) = 9.53
EFFECTIVE AREA(ACRES) = 95.91 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 127.0
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 435.00
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.35
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.08

```



PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 9.97  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.97  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.208  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.60 0.200 -  
USER-DEFINED - 5.10 0.60 0.400 -  
USER-DEFINED - 0.30 0.60 0.100 -  
USER-DEFINED - 0.10 0.60 0.850 -  
USER-DEFINED - 0.80 0.60 0.200 -  
USER-DEFINED - 0.80 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.366  
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 6.94  
EFFECTIVE AREA(ACRES) = 103.71 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.40  
TOTAL AREA(ACRES) = 134.8 PEAK FLOW RATE(CFS) = 90.31

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.97  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.208  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.10 0.60 0.400 -  
USER-DEFINED - 0.30 0.60 0.100 -  
USER-DEFINED - 1.50 0.60 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 3.95  
EFFECTIVE AREA(ACRES) = 108.61 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 139.7 PEAK FLOW RATE(CFS) = 94.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\*\*\*\* MAIN STREAM CONFLUENCE DATA \*\*\*\*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 94.26 9.97 1.208 0.60( 0.24) 0.41 108.6 110.00  
2 89.30 12.93 1.040 0.60( 0.25) 0.42 126.2 100.00  
3 61.92 19.47 0.779 0.60( 0.29) 0.48 139.7 130.00

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 51.11 14.63 0.946 0.60( 0.18) 0.29 71.2 100.00  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 140.95 9.97 1.208 0.60( 0.22) 0.37 157.1 110.00  
2 140.05 12.93 1.040 0.60( 0.23) 0.38 189.1 100.00  
3 133.31 14.63 0.946 0.60( 0.23) 0.39 200.9 100.00  
4 102.00 19.47 0.779 0.60( 0.25) 0.42 210.9 130.00  
TOTAL AREA(ACRES) = 210.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 140.95 Tc(MIN.) = 9.967  
EFFECTIVE AREA(ACRES) = 157.12 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 210.9  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 370.00  
FLOW LENGTH(FEET) = 500.20 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 21.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 33.67  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 140.95  
PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 10.22  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.10 = 4750.20 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.10 TO NODE 127.20 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 353.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 595.30 CHANNEL SLOPE = 0.0218  
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.079  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.60 0.100 -  
USER-DEFINED - 0.10 0.60 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 142.60

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.91  
 AVERAGE FLOW DEPTH (FEET) = 0.57 TRAVEL TIME (MIN.) = 2.02  
 Tc (MIN.) = 12.23  
 SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 3.30  
 EFFECTIVE AREA (ACRES) = 160.72 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA (ACRES) = 214.5 PEAK FLOW RATE (CFS) = 140.95  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.56 FLOW VELOCITY (FEET/SEC.) = 4.91  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.20 = 5345.50 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.20 TO NODE 127.30 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 353.00 DOWNSTREAM (FEET) = 340.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 476.00 CHANNEL SLOPE = 0.0273  
 CHANNEL BASE (FEET) = 50.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.50  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.995

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 142.30  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.27  
 AVERAGE FLOW DEPTH (FEET) = 0.53 TRAVEL TIME (MIN.) = 1.51  
 Tc (MIN.) = 13.74

SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 2.69  
 EFFECTIVE AREA (ACRES) = 163.92 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36  
 TOTAL AREA (ACRES) = 217.7 PEAK FLOW RATE (CFS) = 140.95  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.52 FLOW VELOCITY (FEET/SEC.) = 5.27  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.30 = 5821.50 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.30 TO NODE 13569.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 340.00 DOWNSTREAM (FEET) = 338.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 506.00 CHANNEL SLOPE = 0.0040  
 CHANNEL BASE (FEET) = 150.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.50  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.823

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.100	-

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.80 0.60 0.100 -  
 USER-DEFINED - 0.60 0.60 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 142.12  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 1.92  
 AVERAGE FLOW DEPTH (FEET) = 0.49 TRAVEL TIME (MIN.) = 4.40  
 Tc (MIN.) = 18.14

SUBAREA AREA (ACRES) = 3.40 SUBAREA RUNOFF (CFS) = 2.33  
 EFFECTIVE AREA (ACRES) = 167.32 AREA-AVERAGED Fm (INCH/HR) = 0.21  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.35  
 TOTAL AREA (ACRES) = 221.1 PEAK FLOW RATE (CFS) = 140.95  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.49 FLOW VELOCITY (FEET/SEC.) = 1.92  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 13569.00 = 6327.50 FEET.

END OF STUDY SUMMARY:  
 TOTAL AREA (ACRES) = 221.1 TC (MIN.) = 18.14  
 EFFECTIVE AREA (ACRES) = 167.32 AREA-AVERAGED Fm (INCH/HR) = 0.21  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.355  
 PEAK FLOW RATE (CFS) = 140.95

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	140.95	18.14	0.823	0.60 ( 0.21)	0.35	167.3	110.00
2	140.05	21.10	0.739	0.60 ( 0.22)	0.37	199.3	100.00
3	133.31	22.95	0.701	0.60 ( 0.22)	0.37	211.1	100.00
4	102.00	28.72	0.604	0.60 ( 0.24)	0.40	221.1	130.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 2-YR ULTIMATE EV DECEMBER 2013 MCHANDOO/TMULI \*  
\*\*\*\*\*

FILE NAME: 2P02EVBB.DAT  
TIME/DATE OF STUDY: 16:38 12/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.819
- 2) 10.00; 1.213
- 3) 15.00; 0.930
- 4) 20.00; 0.765
- 5) 25.00; 0.661
- 6) 30.00; 0.587
- 7) 40.00; 0.505
- 8) 50.00; 0.448
- 9) 60.00; 0.390
- 10) 90.00; 0.336
- 11) 120.00; 0.281
- 12) 180.00; 0.227
- 13) 360.00; 0.170
- 14) 1200.00; 0.116

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00  
ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 543.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.596  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.504  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.80	0.60	0.100	56	7.60

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 1.04  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 1.04

\*\*\*\*\*  
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 543.00 DOWNSTREAM ELEVATION(FEET) = 523.00  
STREET LENGTH(FEET) = 502.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.91  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.33  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.86  
STREET FLOW TRAVEL TIME(MIN.) = 1.93 Tc(MIN.) = 9.53  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.270

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.200	-
USER-DEFINED	-	1.30	0.60	0.100	-

USER-DEFINED - 0.30 0.60 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.261  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 1.80  
 EFFECTIVE AREA(ACRES) = 2.60 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 2.68

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.24 HALFSTREET FLOOD WIDTH(FEET) = 4.14  
 FLOW VELOCITY(FEET/SEC.) = 3.71 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.89  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 810.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

=====  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc(MIN.) = 9.53  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.270  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	1.40	0.60	0.100	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.53  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 4.20

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

=====  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 2 USED)<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 523.00 DOWNSTREAM ELEVATION(FEET) = 468.00  
 STREET LENGTH(FEET) = 987.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.69  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.29  
 HALFSTREET FLOOD WIDTH(FEET) = 6.48  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.67  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.34  
 STREET FLOW TRAVEL TIME(MIN.) = 3.52 Tc(MIN.) = 13.05  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.040  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
-------------------	----------	------	----	----	-----

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.50	0.60	0.500	-
USER-DEFINED	-	2.40	0.60	0.100	-
USER-DEFINED	-	1.30	0.60	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.426  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 2.97  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 6.34

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 6.89  
 FLOW VELOCITY(FEET/SEC.) = 4.77 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.41  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 1797.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

=====  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 468.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.38  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.30  
 HALFSTREET FLOOD WIDTH(FEET) = 7.91  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.91  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.49  
 STREET FLOW TRAVEL TIME(MIN.) = 3.32 Tc(MIN.) = 16.37  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.885

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.500	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.60	0.60	0.500	-
USER-DEFINED	-	1.90	0.60	0.100	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 2.08  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 7.27

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.84
FLOW VELOCITY(FEET/SEC.) = 4.89 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.48
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2774.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.37

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.885

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.30 0.60 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 0.33

EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36

TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 7.60

\*\*\*\*\*

FLOW PROCESS FROM NODE 204.00 TO NODE 218.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 343.00

STREET LENGTH(FEET) = 1228.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.47

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.32

HALFSTREET FLOOD WIDTH(FEET) = 8.72

AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.86

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.55

STREET FLOW TRAVEL TIME(MIN.) = 4.22 Tc(MIN.) = 20.59

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 0.500 -

USER-DEFINED - 0.50 0.60 0.100 -

USER-DEFINED - 0.40 0.60 1.000 -

USER-DEFINED - 0.70 0.60 0.500 -

USER-DEFINED - 1.50 0.60 0.100 -
USER-DEFINED - 0.80 0.60 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450

SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 1.74

EFFECTIVE AREA(ACRES) = 16.60 AREA-AVERAGED Fm(INCH/HR) = 0.23

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.38

TOTAL AREA(ACRES) = 16.6 PEAK FLOW RATE(CFS) = 7.85

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 8.41

FLOW VELOCITY(FEET/SEC.) = 4.76 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.49

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.59

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.20 0.60 0.500 -

USER-DEFINED - 0.10 0.60 0.100 -

USER-DEFINED - 0.20 0.60 0.500 -

USER-DEFINED - 0.10 0.60 0.100 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450

SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 0.70

EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.23

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.39

TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 8.54

\*\*\*\*\*

FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 20.59

RAINFALL INTENSITY(INCH/HR) = 0.75

AREA-AVERAGED Fm(INCH/HR) = 0.23

AREA-AVERAGED Fp(INCH/HR) = 0.60

AREA-AVERAGED Ap = 0.39

EFFECTIVE STREAM AREA(ACRES) = 18.20

TOTAL STREAM AREA(ACRES) = 18.20

PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.54

\*\*\*\*\*

FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 268.00

ELEVATION DATA: UPSTREAM(FEET) = 514.00 DOWNSTREAM(FEET) = 511.50

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.724  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.489

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	-	2.30	0.60	0.500	56	9.27
APARTMENTS	-	0.40	0.60	0.200	56	7.72

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.456  
SUBAREA RUNOFF(CFS) = 2.95  
TOTAL AREA(ACRES) = 2.70 PEAK FLOW RATE(CFS) = 2.95

\*\*\*\*\*  
FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 511.50 DOWNSTREAM ELEVATION(FEET) = 503.00  
STREET LENGTH(FEET) = 503.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.85  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 9.72  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.82  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.95  
STREET FLOW TRAVEL TIME(MIN.) = 2.97 Tc(MIN.) = 10.70  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.174

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	0.60	0.60	0.200	-
USER-DEFINED	-	6.20	0.60	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.475  
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 5.76  
EFFECTIVE AREA(ACRES) = 9.90 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.47  
TOTAL AREA(ACRES) = 9.9 PEAK FLOW RATE(CFS) = 7.95

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.21  
FLOW VELOCITY(FEET/SEC.) = 3.02 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.10  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 771.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.70  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.174

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	0.200	-
USER-DEFINED	-	0.30	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.350	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.281  
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 1.18  
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 9.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 503.00 DOWNSTREAM ELEVATION(FEET) = 476.00  
STREET LENGTH(FEET) = 423.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.57

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 8.91  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.30  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.71  
STREET FLOW TRAVEL TIME(MIN.) = 1.33 Tc(MIN.) = 12.03  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.098

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.350	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.454  
SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 0.89  
EFFECTIVE AREA (ACRES) = 12.40 AREA-AVERAGED Fm (INCH/HR) = 0.27  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.45  
TOTAL AREA (ACRES) = 12.4 PEAK FLOW RATE (CFS) = 9.26

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.32 HALFSTREET FLOOD WIDTH (FEET) = 8.78  
FLOW VELOCITY (FEET/SEC.) = 5.24 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.68  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.03  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.098  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.60 0.200 -  
USER-DEFINED - 0.20 0.60 0.500 -  
USER-DEFINED - 0.30 0.60 0.100 -  
USER-DEFINED - 3.30 0.60 0.350 -  
USER-DEFINED - 0.20 0.60 0.200 -  
USER-DEFINED - 0.40 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.332  
SUBAREA AREA (ACRES) = 4.90 SUBAREA RUNOFF (CFS) = 3.97  
EFFECTIVE AREA (ACRES) = 17.30 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.42  
TOTAL AREA (ACRES) = 17.3 PEAK FLOW RATE (CFS) = 13.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.03  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.098  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.40 0.60 0.100 -  
USER-DEFINED - 8.10 0.60 0.350 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.276  
SUBAREA AREA (ACRES) = 11.50 SUBAREA RUNOFF (CFS) = 9.65  
EFFECTIVE AREA (ACRES) = 28.80 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36  
TOTAL AREA (ACRES) = 28.8 PEAK FLOW RATE (CFS) = 22.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 476.00 DOWNSTREAM ELEVATION (FEET) = 460.00  
STREET LENGTH (FEET) = 789.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 22.88

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.47  
HALFSTREET FLOOD WIDTH (FEET) = 16.99  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.13  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.92  
STREET FLOW TRAVEL TIME (MIN.) = 3.19 Tc (MIN.) = 15.21  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.923  
SUBAREA AREA (ACRES) = 0.00 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 28.80 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36  
TOTAL AREA (ACRES) = 28.8 PEAK FLOW RATE (CFS) = 22.88  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.47 HALFSTREET FLOOD WIDTH (FEET) = 16.99  
FLOW VELOCITY (FEET/SEC.) = 4.13 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.92  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1983.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 15.21  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.923  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.00 0.60 0.500 -  
USER-DEFINED - 6.40 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 14.40 SUBAREA RUNOFF (CFS) = 8.07  
EFFECTIVE AREA (ACRES) = 43.20 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.41  
TOTAL AREA (ACRES) = 43.2 PEAK FLOW RATE (CFS) = 26.41

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<



UPSTREAM ELEVATION (FEET) = 460.00 DOWNSTREAM ELEVATION (FEET) = 419.00  
STREET LENGTH (FEET) = 529.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.45  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.41  
HALFSTREET FLOOD WIDTH (FEET) = 13.87  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.18  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.95  
STREET FLOW TRAVEL TIME (MIN.) = 1.23 Tc (MIN.) = 16.44

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.882  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.20 0.60 0.500 -  
USER-DEFINED - 2.80 0.60 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 2.10  
EFFECTIVE AREA (ACRES) = 47.20 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.41  
TOTAL AREA (ACRES) = 47.2 PEAK FLOW RATE (CFS) = 26.93

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.41 HALFSTREET FLOOD WIDTH (FEET) = 13.71  
FLOW VELOCITY (FEET/SEC.) = 7.19 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.93  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 2512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.44  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.882  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.60 0.500 -  
USER-DEFINED - 4.10 0.60 0.500 -  
USER-DEFINED - 0.70 0.60 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 2.94  
EFFECTIVE AREA (ACRES) = 52.80 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.42  
TOTAL AREA (ACRES) = 52.8 PEAK FLOW RATE (CFS) = 29.86

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.44  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.882  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.60 0.500 -  
USER-DEFINED - 4.10 0.60 0.500 -  
USER-DEFINED - 2.50 0.60 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 3.93  
EFFECTIVE AREA (ACRES) = 60.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43  
TOTAL AREA (ACRES) = 60.3 PEAK FLOW RATE (CFS) = 33.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 419.00 DOWNSTREAM ELEVATION (FEET) = 405.00  
STREET LENGTH (FEET) = 174.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 33.80  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.43  
HALFSTREET FLOOD WIDTH (FEET) = 15.04  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.63  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.29  
STREET FLOW TRAVEL TIME (MIN.) = 0.38 Tc (MIN.) = 16.82

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.870  
SUBAREA AREA (ACRES) = 0.00 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 60.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43  
TOTAL AREA (ACRES) = 60.3 PEAK FLOW RATE (CFS) = 33.80  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.43 HALFSTREET FLOOD WIDTH (FEET) = 15.04  
FLOW VELOCITY (FEET/SEC.) = 7.63 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.29  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 2686.00 FEET.

```

*****
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 372.00
FLOW LENGTH(FEET) = 395.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.97
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 33.80
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 17.15
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 3081.00 FEET.
*****
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.15
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.859
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.60 0.500 -
USER-DEFINED - 1.00 0.60 0.500 -
USER-DEFINED - 1.00 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 1.11
EFFECTIVE AREA(ACRES) = 62.50 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 62.5 PEAK FLOW RATE(CFS) = 33.80
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.15
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.859
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.60 0.500 -
USER-DEFINED - 6.90 0.60 0.500 -
USER-DEFINED - 0.20 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 5.33
EFFECTIVE AREA(ACRES) = 73.10 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 73.1 PEAK FLOW RATE(CFS) = 38.97
*****
FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 343.00
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.70
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 38.97
PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 17.76
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 3688.00 FEET.
*****
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.76
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.839
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.60 0.500 -
USER-DEFINED - 0.40 0.60 0.400 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.443
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.36
EFFECTIVE AREA(ACRES) = 73.80 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 73.8 PEAK FLOW RATE(CFS) = 38.97
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 17.76
RAINFALL INTENSITY(INCH/HR) = 0.84
AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.44
EFFECTIVE STREAM AREA(ACRES) = 73.80
TOTAL STREAM AREA(ACRES) = 73.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 38.97

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 8.54 20.59 0.753 0.60( 0.23) 0.39 18.2 200.00
2 38.97 17.76 0.839 0.60( 0.27) 0.44 73.8 210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

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\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	47.51	17.76	0.839	0.60 ( 0.26)	0.43	89.5	210.00
2	41.64	20.59	0.753	0.60 ( 0.26)	0.43	92.0	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 47.51 Tc(MIN.) = 17.76  
EFFECTIVE AREA(ACRES) = 89.50 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 92.0  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 343.00 DOWNSTREAM(FEET) = 326.50  
FLOW LENGTH(FEET) = 734.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.25  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 47.51  
PIPE TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 18.68  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 219.00 = 4736.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.68

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.809

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	0.30	0.60	0.400	-
USER-DEFINED	-	0.60	0.60	0.100	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.90	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 1.25  
EFFECTIVE AREA(ACRES) = 92.40 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 94.9 PEAK FLOW RATE(CFS) = 47.51

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.68

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.809

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.31  
EFFECTIVE AREA(ACRES) = 93.00 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 95.5 PEAK FLOW RATE(CFS) = 47.51

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 326.50 DOWNSTREAM(FEET) = 325.00  
FLOW LENGTH(FEET) = 161.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.29  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 47.51  
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 18.97  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 220.00 = 4897.00 FEET.

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FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.97

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.799

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.90	0.60	0.500	-
USER-DEFINED	-	3.60	0.60	0.400	-
USER-DEFINED	-	18.40	0.60	0.500	-
USER-DEFINED	-	4.30	0.60	0.400	-
USER-DEFINED	-	0.50	0.60	0.500	-
USER-DEFINED	-	6.90	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462  
SUBAREA AREA(ACRES) = 38.60 SUBAREA RUNOFF(CFS) = 18.14  
EFFECTIVE AREA(ACRES) = 131.60 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 134.1 PEAK FLOW RATE(CFS) = 63.04

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FLOW PROCESS FROM NODE 220.00 TO NODE 245.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 315.00
FLOW LENGTH(FEET) = 1019.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 26.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.42
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 63.04
PIPE TRAVEL TIME(MIN.) = 1.63 Tc(MIN.) = 20.60
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

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FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 20.60
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap      SCS
LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.40    0.60    0.400   -
USER-DEFINED         -         0.40    0.60    0.100   -
USER-DEFINED         -         0.30    0.60    1.000   -
USER-DEFINED         -         0.40    0.60    0.400   -
USER-DEFINED         -         0.40    0.60    0.100   -
USER-DEFINED         -         1.00    0.60    0.400   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 1.37
EFFECTIVE AREA(ACRES) = 134.50 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 137.0 PEAK FLOW RATE(CFS) = 63.04
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 20.60
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap      SCS
LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.90    0.60    0.100   -
USER-DEFINED         -         0.20    0.60    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.264
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 0.59
EFFECTIVE AREA(ACRES) = 135.60 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 138.1 PEAK FLOW RATE(CFS) = 63.04
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN.) = 20.60
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap      SCS
LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         1.10    0.60    0.500   -
USER-DEFINED         -         0.30    0.60    0.400   -
USER-DEFINED         -         0.10    0.60    0.100   -
USER-DEFINED         -         0.30    0.60    0.500   -
USER-DEFINED         -         1.40    0.60    0.400   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.434
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 1.42
EFFECTIVE AREA(ACRES) = 138.80 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 141.3 PEAK FLOW RATE(CFS) = 63.04
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3<<<<
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FLOW PROCESS FROM NODE 220.50 TO NODE 221.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH(FEET) = 251.00
ELEVATION DATA: UPSTREAM(FEET) = 551.00 DOWNSTREAM(FEET) = 547.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.785
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.239
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap      SCS  Tc
LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE"    -         3.10    0.60    0.200   56   9.79
RESIDENTIAL
"1 DWELLING/ACRE"    -         3.10    0.60    0.100   56   9.79
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.150
SUBAREA RUNOFF(CFS) = 6.41
TOTAL AREA(ACRES) = 6.20 PEAK FLOW RATE(CFS) = 6.41

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FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 542.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0130
CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.000

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MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 5.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.132  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.200	-
USER-DEFINED	-	3.70	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.163  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.60  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.92  
 AVERAGE FLOW DEPTH (FEET) = 0.21 TRAVEL TIME (MIN.) = 1.64  
 Tc (MIN.) = 11.43  
 SUBAREA AREA (ACRES) = 4.70 SUBAREA RUNOFF (CFS) = 4.38  
 EFFECTIVE AREA (ACRES) = 10.90 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.16  
 TOTAL AREA (ACRES) = 10.9 PEAK FLOW RATE (CFS) = 10.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.23 FLOW VELOCITY (FEET/SEC.) = 4.17  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 222.00 = 637.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<<

UPSTREAM ELEVATION (FEET) = 542.00 DOWNSTREAM ELEVATION (FEET) = 531.00  
 STREET LENGTH (FEET) = 1146.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.44  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.46  
 HALFSTREET FLOOD WIDTH (FEET) = 16.84  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.83  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.31  
 STREET FLOW TRAVEL TIME (MIN.) = 6.74 Tc (MIN.) = 18.17  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.825

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.50	0.60	0.200	-
USER-DEFINED	-	2.90	0.60	0.200	-
USER-DEFINED	-	0.70	0.60	0.100	-
USER-DEFINED	-	2.60	0.60	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.292  
 SUBAREA AREA (ACRES) = 17.70 SUBAREA RUNOFF (CFS) = 10.36  
 EFFECTIVE AREA (ACRES) = 28.60 AREA-AVERAGED Fm (INCH/HR) = 0.14  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 28.6 PEAK FLOW RATE (CFS) = 17.54

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.48 HALFSTREET FLOOD WIDTH (FEET) = 17.77  
 FLOW VELOCITY (FEET/SEC.) = 2.91 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.40  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 223.00 = 1783.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 62

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<<

UPSTREAM ELEVATION (FEET) = 531.00 DOWNSTREAM ELEVATION (FEET) = 520.00  
 STREET LENGTH (FEET) = 702.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 20.95  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.47  
 HALFSTREET FLOOD WIDTH (FEET) = 17.30  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.65  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.72  
 STREET FLOW TRAVEL TIME (MIN.) = 3.20 Tc (MIN.) = 21.37  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.736

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	0.200	-
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	6.40	0.60	0.200	-
USER-DEFINED	-	3.70	0.60	0.100	-
USER-DEFINED	-	0.70	0.60	0.350	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175  
 SUBAREA AREA (ACRES) = 12.00 SUBAREA RUNOFF (CFS) = 6.82  
 EFFECTIVE AREA (ACRES) = 40.60 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.22  
 TOTAL AREA (ACRES) = 40.6 PEAK FLOW RATE (CFS) = 22.07

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.48 HALFSTREET FLOOD WIDTH (FEET) = 17.62  
 FLOW VELOCITY (FEET/SEC.) = 3.72 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.78  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 224.00 = 2485.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 463.00
FLOW LENGTH(FEET) = 1760.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.54
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 22.07
PIPE TRAVEL TIME(MIN.) = 2.34 Tc(MIN.) = 23.71
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 225.00 = 4245.00 FEET.

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FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.71
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.688
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.20 0.60 0.200 -
USER-DEFINED - 0.10 0.60 0.500 -
USER-DEFINED - 0.30 0.60 0.350 -
USER-DEFINED - 6.80 0.60 0.200 -
USER-DEFINED - 0.10 0.60 0.500 -
USER-DEFINED - 2.00 0.60 0.350 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.235
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 5.66
EFFECTIVE AREA(ACRES) = 52.10 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 52.1 PEAK FLOW RATE(CFS) = 25.95

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FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.71
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.688
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.40 0.60 0.500 -
USER-DEFINED - 0.90 0.60 0.350 -
USER-DEFINED - 5.20 0.60 0.500 -
USER-DEFINED - 0.80 0.60 0.350 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.481
SUBAREA AREA(ACRES) = 13.30 SUBAREA RUNOFF(CFS) = 4.78
EFFECTIVE AREA(ACRES) = 65.40 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.28

TOTAL AREA(ACRES) = 65.4 PEAK FLOW RATE(CFS) = 30.73

\*\*\*\*\*

FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 425.00
FLOW LENGTH(FEET) = 639.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.07
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 30.73
PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 24.34
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 226.00 = 4884.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 226.00 TO NODE 226.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.34
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.675
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.90 0.60 0.200 -
USER-DEFINED - 2.90 0.60 0.500 -
USER-DEFINED - 6.30 0.60 0.200 -
USER-DEFINED - 6.00 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 7.60
EFFECTIVE AREA(ACRES) = 83.50 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.29
TOTAL AREA(ACRES) = 83.5 PEAK FLOW RATE(CFS) = 37.56

\*\*\*\*\*

FLOW PROCESS FROM NODE 226.00 TO NODE 243.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 653.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.55
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 37.56
PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 25.00
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 243.00 = 5537.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 25.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.661  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.90 0.60 0.200 -  
 USER-DEFINED - 1.60 0.60 0.500 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
 SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 1.93  
 EFFECTIVE AREA(ACRES) = 88.00 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 88.0 PEAK FLOW RATE(CFS) = 38.47

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 25.00  
 RAINFALL INTENSITY(INCH/HR) = 0.66  
 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.29  
 EFFECTIVE STREAM AREA(ACRES) = 88.00  
 TOTAL STREAM AREA(ACRES) = 88.00  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 38.47

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====  
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 547.50

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.751  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.364  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 APARTMENTS - 0.60 0.60 0.200 56 8.75  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 0.67  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.67

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====  
 ELEVATION DATA: UPSTREAM(FEET) = 547.50 DOWNSTREAM(FEET) = 541.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 802.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 3.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.093  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.20 0.60 0.200 -  
 USER-DEFINED - 5.90 0.60 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.52  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.96  
 AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 3.37  
 Tc(MIN.) = 12.13  
 SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 5.66  
 EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 6.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.82 FLOW VELOCITY(FEET/SEC.) = 4.59  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1132.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====  
 ELEVATION DATA: UPSTREAM(FEET) = 541.00 DOWNSTREAM(FEET) = 533.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 849.00 CHANNEL SLOPE = 0.0094  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.953  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 14.90 0.60 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.19  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.71  
 AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 2.48  
 Tc(MIN.) = 14.60  
 SUBAREA AREA(ACRES) = 14.90 SUBAREA RUNOFF(CFS) = 11.97  
 EFFECTIVE AREA(ACRES) = 21.60 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 21.6 PEAK FLOW RATE(CFS) = 17.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.18 FLOW VELOCITY(FEET/SEC.) = 6.24  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1981.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN.) = 14.60
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.953
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.60   0.400  -
USER-DEFINED        -         0.20   0.60   0.200  -
USER-DEFINED        -         1.80   0.60   0.100  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.124
SUBAREA AREA(ACRES) = 2.10   SUBAREA RUNOFF(CFS) = 1.66
EFFECTIVE AREA(ACRES) = 23.70   AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.11
TOTAL AREA(ACRES) = 23.7   PEAK FLOW RATE(CFS) = 18.97

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*****
FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN.) = 14.60
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.953
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40   0.60   0.100  -
USER-DEFINED        -         0.10   0.60   0.400  -
USER-DEFINED        -         1.30   0.60   0.100  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.117
SUBAREA AREA(ACRES) = 1.80   SUBAREA RUNOFF(CFS) = 1.43
EFFECTIVE AREA(ACRES) = 25.50   AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.11
TOTAL AREA(ACRES) = 25.5   PEAK FLOW RATE(CFS) = 20.40

```

```

*****
FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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```

ELEVATION DATA: UPSTREAM(FEET) = 537.00 DOWNSTREAM(FEET) = 510.00
FLOW LENGTH(FEET) = 513.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.62
ESTIMATED PIPE DIAMETER(INCH) = 18.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.40
PIPE TRAVEL TIME(MIN.) = 0.58   Tc(MIN.) = 15.19
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2494.00 FEET.

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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```

MAINLINE Tc(MIN.) = 15.19
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.924

```

```

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         9.40   0.60   0.400  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.40   SUBAREA RUNOFF(CFS) = 5.79
EFFECTIVE AREA(ACRES) = 34.90   AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 34.9   PEAK FLOW RATE(CFS) = 25.52

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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```

MAINLINE Tc(MIN.) = 15.19
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.924
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70   0.60   0.200  -
USER-DEFINED        -         2.50   0.60   0.400  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.356
SUBAREA AREA(ACRES) = 3.20   SUBAREA RUNOFF(CFS) = 2.05
EFFECTIVE AREA(ACRES) = 38.10   AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 38.1   PEAK FLOW RATE(CFS) = 27.57

```

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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```

ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 478.00
FLOW LENGTH(FEET) = 474.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.60
ESTIMATED PIPE DIAMETER(INCH) = 21.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 27.57
PIPE TRAVEL TIME(MIN.) = 0.45   Tc(MIN.) = 15.64
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 2968.00 FEET.

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*****
FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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```

MAINLINE Tc(MIN.) = 15.64
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.909
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.70   0.60   0.200  -
USER-DEFINED        -         1.60   0.60   0.400  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

```



SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297  
SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 2.17  
EFFECTIVE AREA (ACRES) = 41.40 AREA-AVERAGED Fm (INCH/HR) = 0.12  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.21  
TOTAL AREA (ACRES) = 41.4 PEAK FLOW RATE (CFS) = 29.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	478.00	DOWNSTREAM (FEET) =	471.00
FLOW LENGTH (FEET) =	473.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	27.0 INCH PIPE IS	18.6 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	10.02		
ESTIMATED PIPE DIAMETER (INCH) =	27.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	29.23		
PIPE TRAVEL TIME (MIN.) =	0.79	Tc (MIN.) =	16.42
LONGEST FLOWPATH FROM NODE	230.00 TO NODE	236.00 =	3441.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.42  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.883  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.60	0.200	-
USER-DEFINED	-	7.10	0.60	0.400	-
USER-DEFINED	-	2.70	0.60	0.200	-
USER-DEFINED	-	1.10	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
SUBAREA AREA (ACRES) = 12.30 SUBAREA RUNOFF (CFS) = 7.74  
EFFECTIVE AREA (ACRES) = 53.70 AREA-AVERAGED Fm (INCH/HR) = 0.14  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.23  
TOTAL AREA (ACRES) = 53.7 PEAK FLOW RATE (CFS) = 36.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.42  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.883  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.60	0.200	-
USER-DEFINED	-	5.40	0.60	0.500	-
USER-DEFINED	-	1.00	0.60	0.400	-
USER-DEFINED	-	0.60	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.378

SUBAREA AREA (ACRES) = 9.90 SUBAREA RUNOFF (CFS) = 5.85  
EFFECTIVE AREA (ACRES) = 63.60 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.25  
TOTAL AREA (ACRES) = 63.6 PEAK FLOW RATE (CFS) = 41.86

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	471.00	DOWNSTREAM (FEET) =	468.00
FLOW LENGTH (FEET) =	283.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	33.0 INCH PIPE IS	22.5 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	9.68		
ESTIMATED PIPE DIAMETER (INCH) =	33.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	41.86		
PIPE TRAVEL TIME (MIN.) =	0.49	Tc (MIN.) =	16.91
LONGEST FLOWPATH FROM NODE	230.00 TO NODE	237.00 =	3724.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.91  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.867  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.10	0.60	0.200	-
USER-DEFINED	-	0.60	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.218  
SUBAREA AREA (ACRES) = 6.70 SUBAREA RUNOFF (CFS) = 4.44  
EFFECTIVE AREA (ACRES) = 70.30 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.25  
TOTAL AREA (ACRES) = 70.3 PEAK FLOW RATE (CFS) = 45.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	468.00	DOWNSTREAM (FEET) =	461.00
FLOW LENGTH (FEET) =	698.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	33.0 INCH PIPE IS	24.5 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	9.58		
ESTIMATED PIPE DIAMETER (INCH) =	33.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	45.38		
PIPE TRAVEL TIME (MIN.) =	1.21	Tc (MIN.) =	18.12
LONGEST FLOWPATH FROM NODE	230.00 TO NODE	238.00 =	4422.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN.) = 18.12
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.827
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         8.40     0.60     0.200    -
USER-DEFINED        -         0.60     0.60     0.500    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.220
SUBAREA AREA(ACRES) = 9.00      SUBAREA RUNOFF(CFS) = 5.63
EFFECTIVE AREA(ACRES) = 79.30   AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 79.3      PEAK FLOW RATE(CFS) = 48.47

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*****
FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 18.12
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.827
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.10     0.60     0.200    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 2.10      SUBAREA RUNOFF(CFS) = 1.34
EFFECTIVE AREA(ACRES) = 81.40   AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 81.4      PEAK FLOW RATE(CFS) = 49.80

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*****
FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31
-----

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 461.00 DOWNSTREAM(FEET) = 440.00
FLOW LENGTH(FEET) = 582.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.87
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 49.80
PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 18.73
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 5004.00 FEET.

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*****
FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 18.73
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.807
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN

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USER-DEFINED        -         5.00     0.60     0.200    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 5.00      SUBAREA RUNOFF(CFS) = 3.09
EFFECTIVE AREA(ACRES) = 86.40   AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 86.4      PEAK FLOW RATE(CFS) = 51.42

```

```

*****
FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31
-----

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 418.00
FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.47
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 51.42
PIPE TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 19.44
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 5654.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 19.44
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.784
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         5.30     0.60     0.200    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 5.30      SUBAREA RUNOFF(CFS) = 3.17
EFFECTIVE AREA(ACRES) = 91.70   AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 91.7      PEAK FLOW RATE(CFS) = 52.79

```

```

*****
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 19.44
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.784
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20     0.60     0.200    -
USER-DEFINED        -         0.20     0.60     0.100    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186
SUBAREA AREA(ACRES) = 1.40      SUBAREA RUNOFF(CFS) = 0.85
EFFECTIVE AREA(ACRES) = 93.10   AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24

```

TOTAL AREA (ACRES) = 93.1 PEAK FLOW RATE (CFS) = 53.63

\*\*\*\*\*  
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.44  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.784  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.20 0.60 0.200 -  
USER-DEFINED - 0.70 0.60 0.600 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.347  
SUBAREA AREA (ACRES) = 1.90 SUBAREA RUNOFF (CFS) = 0.98  
EFFECTIVE AREA (ACRES) = 95.00 AREA-AVERAGED Fm (INCH/HR) = 0.14  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24  
TOTAL AREA (ACRES) = 95.0 PEAK FLOW RATE (CFS) = 54.62

\*\*\*\*\*  
FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 418.00 DOWNSTREAM (FEET) = 404.00  
FLOW LENGTH (FEET) = 1279.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.9 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.46  
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 54.62  
PIPE TRAVEL TIME (MIN.) = 2.04 Tc (MIN.) = 21.47  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 241.00 = 6933.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.47  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.734  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.60 0.200 -  
USER-DEFINED - 1.20 0.60 0.100 -  
USER-DEFINED - 6.30 0.60 0.850 -  
USER-DEFINED - 4.60 0.60 0.600 -  
USER-DEFINED - 1.60 0.60 0.200 -  
USER-DEFINED - 4.00 0.60 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.488  
SUBAREA AREA (ACRES) = 18.80 SUBAREA RUNOFF (CFS) = 7.47  
EFFECTIVE AREA (ACRES) = 113.80 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.28  
TOTAL AREA (ACRES) = 113.8 PEAK FLOW RATE (CFS) = 57.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.47  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.734  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.90 0.60 0.850 -  
USER-DEFINED - 10.80 0.60 0.600 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.666  
SUBAREA AREA (ACRES) = 14.70 SUBAREA RUNOFF (CFS) = 4.43  
EFFECTIVE AREA (ACRES) = 128.50 AREA-AVERAGED Fm (INCH/HR) = 0.20  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.33  
TOTAL AREA (ACRES) = 128.5 PEAK FLOW RATE (CFS) = 62.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 404.00 DOWNSTREAM (FEET) = 403.00  
FLOW LENGTH (FEET) = 66.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 12.24  
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 62.30  
PIPE TRAVEL TIME (MIN.) = 0.09 Tc (MIN.) = 21.56  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 6999.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.56  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.732  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.40 0.60 0.200 -  
USER-DEFINED - 16.40 0.60 0.200 -  
USER-DEFINED - 1.30 0.60 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.193  
SUBAREA AREA (ACRES) = 19.10 SUBAREA RUNOFF (CFS) = 10.60  
EFFECTIVE AREA (ACRES) = 147.60 AREA-AVERAGED Fm (INCH/HR) = 0.19  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31  
TOTAL AREA (ACRES) = 147.6 PEAK FLOW RATE (CFS) = 72.69

\*\*\*\*\*  
FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 1270.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.46
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 72.69
PIPE TRAVEL TIME(MIN.) = 2.24 Tc(MIN.) = 23.80
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 23.80
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.686
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.60 0.200 -
USER-DEFINED - 2.00 0.60 0.850 -
USER-DEFINED - 2.80 0.60 0.200 -
USER-DEFINED - 1.50 0.60 0.100 -
USER-DEFINED - 0.10 0.60 0.350 -
USER-DEFINED - 1.10 0.60 0.850 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.421
SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 3.31
EFFECTIVE AREA(ACRES) = 156.10 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 156.1 PEAK FLOW RATE(CFS) = 72.69
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1
-----

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```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====

```

```

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 23.80
RAINFALL INTENSITY(INCH/HR) = 0.69
AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA(ACRES) = 156.10
TOTAL STREAM AREA(ACRES) = 156.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 72.69

```

```

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 38.47 25.00 0.661 0.60( 0.18) 0.29 88.0 220.50
2 72.69 23.80 0.686 0.60( 0.19) 0.32 156.1 230.00

```

```

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

```

```

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 111.15 23.80 0.686 0.60( 0.18) 0.31 239.9 230.00
2 107.52 25.00 0.661 0.60( 0.18) 0.31 244.1 220.50

```

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 111.15 Tc(MIN.) = 23.80
EFFECTIVE AREA(ACRES) = 239.90 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 244.1
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 243.00 TO NODE 244.00 IS CODE = 31
-----

```

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 394.00 DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 849.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.03
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 111.15
PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 24.39
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 244.00 = 9118.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 244.00 TO NODE 244.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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```

MAINLINE Tc(MIN.) = 24.39
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.674
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 0.200 -
USER-DEFINED - 1.70 0.60 0.500 -
USER-DEFINED - 0.30 0.60 0.850 -
USER-DEFINED - 0.80 0.60 0.500 -
USER-DEFINED - 0.10 0.60 0.850 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.537
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 0.95
EFFECTIVE AREA(ACRES) = 242.90 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 247.1 PEAK FLOW RATE(CFS) = 111.15
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 244.00 TO NODE 245.00 IS CODE = 31
-----

```

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 315.00
FLOW LENGTH(FEET) = 777.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.30
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 111.15
PIPE TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 25.10
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 25.10
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.660
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.60 0.500 -
USER-DEFINED - 0.20 0.60 0.850 -
USER-DEFINED - 0.20 0.60 0.500 -
USER-DEFINED - 0.10 0.60 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631
SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 0.20
EFFECTIVE AREA(ACRES) = 243.70 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 247.9 PEAK FLOW RATE(CFS) = 111.15
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 11
-----
>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<
=====

```

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	111.15	25.10	0.660	0.60( 0.19)	0.31	243.7	230.00
2	107.52	26.30	0.642	0.60( 0.19)	0.31	247.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	63.04	20.60	0.753	0.60( 0.26)	0.44	138.8	210.00
2	55.57	23.54	0.691	0.60( 0.26)	0.44	141.3	200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	172.21	20.60	0.753	0.60( 0.22)	0.36	338.8	210.00

2	166.72	23.54	0.691	0.60( 0.22)	0.36	369.9	200.00
3	162.60	25.10	0.660	0.60( 0.22)	0.36	385.0	230.00
4	156.65	26.30	0.642	0.60( 0.21)	0.36	389.2	220.50

TOTAL AREA(ACRES) = 389.2

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 172.21 Tc(MIN.) = 20.597
EFFECTIVE AREA(ACRES) = 338.80 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 389.2
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 12
-----

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```

>>>>CLEAR MEMORY BANK # 3 <<<<
=====
*****
FLOW PROCESS FROM NODE 245.00 TO NODE 246.00 IS CODE = 31
-----

```

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 306.00
FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 37.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.39
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 172.21
PIPE TRAVEL TIME(MIN.) = 0.67 Tc(MIN.) = 21.27
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 246.00 = 10514.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 21.27
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.739
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.90 0.60 0.500 -
USER-DEFINED - 0.30 0.60 0.400 -
USER-DEFINED - 2.50 0.60 0.500 -
USER-DEFINED - 0.70 0.60 0.400 -
USER-DEFINED - 9.10 0.60 0.350 -
USER-DEFINED - 2.80 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.410
SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 7.23
EFFECTIVE AREA(ACRES) = 355.10 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 405.5 PEAK FLOW RATE(CFS) = 172.21
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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```

*****

```

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.27

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.739

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.60	0.60	0.400	-
USER-DEFINED	-	7.40	0.60	0.350	-
USER-DEFINED	-	0.30	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.375

SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 4.30

EFFECTIVE AREA(ACRES) = 364.40 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 414.8 PEAK FLOW RATE(CFS) = 172.21

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 247.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 306.00 DOWNSTREAM(FEET) = 300.00

FLOW LENGTH(FEET) = 185.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 20.93

ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 172.21

PIPE TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 21.41

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 247.00 = 10699.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.41

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.736

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.400	-
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	1.30	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.413

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 0.88

EFFECTIVE AREA(ACRES) = 366.40 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 416.8 PEAK FLOW RATE(CFS) = 172.21

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.41

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.736

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.80	0.60	0.400	-
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.365

SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 1.21

EFFECTIVE AREA(ACRES) = 369.00 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 419.4 PEAK FLOW RATE(CFS) = 172.21

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 247.00 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 271.00

FLOW LENGTH(FEET) = 859.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 20.78

ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 172.21

PIPE TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 22.10

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.10

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.721

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	0.400	-
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	2.60	0.60	0.400	-
USER-DEFINED	-	1.00	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356

SUBAREA AREA(ACRES) = 4.80 SUBAREA RUNOFF(CFS) = 2.19

EFFECTIVE AREA (ACRES) = 373.80 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
TOTAL AREA (ACRES) = 424.2 PEAK FLOW RATE (CFS) = 172.21  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 22.10  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.721  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.60 0.400 -  
USER-DEFINED - 0.30 0.60 0.100 -  
USER-DEFINED - 0.10 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.367  
SUBAREA AREA (ACRES) = 0.90 SUBAREA RUNOFF (CFS) = 0.41  
EFFECTIVE AREA (ACRES) = 374.70 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
TOTAL AREA (ACRES) = 425.1 PEAK FLOW RATE (CFS) = 172.21  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 22.10  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.721  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.500 -  
USER-DEFINED - 0.70 0.60 0.400 -  
USER-DEFINED - 2.20 0.60 0.500 -  
USER-DEFINED - 1.80 0.60 0.400 -  
USER-DEFINED - 0.20 0.60 0.350 -  
USER-DEFINED - 3.20 0.60 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.466  
SUBAREA AREA (ACRES) = 8.20 SUBAREA RUNOFF (CFS) = 3.26  
EFFECTIVE AREA (ACRES) = 382.90 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
TOTAL AREA (ACRES) = 433.3 PEAK FLOW RATE (CFS) = 172.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 22.10  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.721  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 5.70 0.60 0.400 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400  
SUBAREA AREA (ACRES) = 5.70 SUBAREA RUNOFF (CFS) = 2.47  
EFFECTIVE AREA (ACRES) = 388.60 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
TOTAL AREA (ACRES) = 439.0 PEAK FLOW RATE (CFS) = 174.72

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 22.10  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.721  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 6.40 0.60 1.000 -  
USER-DEFINED - 1.40 0.60 1.000 -  
USER-DEFINED - 0.60 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 0.92  
EFFECTIVE AREA (ACRES) = 397.00 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.38  
TOTAL AREA (ACRES) = 447.4 PEAK FLOW RATE (CFS) = 175.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
ELEVATION DATA: UPSTREAM (FEET) = 413.04 DOWNSTREAM (FEET) = 405.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.928  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.585  
SUBAREA Tc AND LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
CONDOMINIUMS - 0.20 0.60 0.350 56 7.70  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" - 0.10 0.60 0.200 56 6.93  
CONDOMINIUMS - 0.10 0.60 0.350 56 7.70  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.312  
SUBAREA RUNOFF (CFS) = 0.50  
TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 0.50

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*****
FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 405.00 DOWNSTREAM ELEVATION(FEET) = 385.00
STREET LENGTH(FEET) = 587.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.84
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.21
HALFSTREET FLOOD WIDTH(FEET) = 2.41
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.75
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.77
STREET FLOW TRAVEL TIME(MIN.) = 2.61 Tc(MIN.) = 9.54
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.269
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.20 0.60 0.100 -
USER-DEFINED - 0.60 0.60 0.350 -
USER-DEFINED - 0.10 0.60 0.850 -
USER-DEFINED - 0.10 0.60 0.200 -
USER-DEFINED - 0.30 0.60 0.100 -
USER-DEFINED - 0.40 0.60 0.350 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.224
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 2.76
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 3.15

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 5.47
FLOW VELOCITY(FEET/SEC.) = 3.41 DEPTH*VELOCITY(FT*FT/SEC.) = 0.89
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 917.00 FEET.

*****
FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 385.00 DOWNSTREAM(FEET) = 378.50
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

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DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.24
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.15
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 9.87
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1079.00 FEET.

*****
FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.87
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.229
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.10 0.60 0.100 -
USER-DEFINED - 1.30 0.60 0.100 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 2.53
EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.18
TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 5.56

*****
FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 378.50 DOWNSTREAM(FEET) = 348.50
FLOW LENGTH(FEET) = 637.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.25
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.56
PIPE TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 10.90
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 1716.00 FEET.

*****
FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.90
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.162
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.60 0.500 -
USER-DEFINED - 1.70 0.60 0.100 -
USER-DEFINED - 1.00 0.60 0.350 -
USER-DEFINED - 0.10 0.60 0.500 -
USER-DEFINED - 0.70 0.60 0.100 -
USER-DEFINED - 0.40 0.60 0.350 -

```



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.240  
 SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 4.12  
 EFFECTIVE AREA(ACRES) = 10.00 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.20  
 TOTAL AREA(ACRES) = 10.0 PEAK FLOW RATE(CFS) = 9.35

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 348.50 DOWNSTREAM(FEET) = 306.00  
 FLOW LENGTH(FEET) = 944.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.60  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 9.35  
 PIPE TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 12.26  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.26  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.085

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.60	0.500	-
USER-DEFINED	-	0.40	0.60	0.400	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	1.50	0.60	0.500	-
USER-DEFINED	-	1.90	0.60	0.400	-
USER-DEFINED	-	2.00	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
 SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 5.76  
 EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.16  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.27  
 TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 14.42

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.26  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.085

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.40	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.100	-

USER-DEFINED - 6.70 0.60 0.200 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.199  
 SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 9.73  
 EFFECTIVE AREA(ACRES) = 28.50 AREA-AVERAGED Fm(INCH/HR) = 0.14  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 28.5 PEAK FLOW RATE(CFS) = 24.15

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.26  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.085  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 1.35  
 EFFECTIVE AREA(ACRES) = 31.60 AREA-AVERAGED Fm(INCH/HR) = 0.19  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 25.51

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 12.26  
 RAINFALL INTENSITY(INCH/HR) = 1.09  
 AREA-AVERAGED Fm(INCH/HR) = 0.19  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.31  
 EFFECTIVE STREAM AREA(ACRES) = 31.60  
 TOTAL STREAM AREA(ACRES) = 31.60  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 25.51

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 400.00 TO NODE 420.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 300.40  
 ELEVATION DATA: UPSTREAM(FEET) = 312.80 DOWNSTREAM(FEET) = 310.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.115  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.441  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.50	0.60	0.100	56	8.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 0.62  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.62

\*\*\*\*\*  
FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 307.00  
STREET LENGTH(FEET) = 266.50 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 67.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 62.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.93

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.25

HALFSTREET FLOOD WIDTH(FEET) = 5.27

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.15

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.55

STREET FLOW TRAVEL TIME(MIN.) = 2.06 Tc(MIN.) = 10.18

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.203

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.62

EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.06

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 1.13

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 6.12

FLOW VELOCITY(FEET/SEC.) = 2.20 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.59

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.00 = 566.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.00 TO NODE 421.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 307.00 DOWNSTREAM(FEET) = 305.50

FLOW LENGTH(FEET) = 105.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 4.23  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 1.13  
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 10.59  
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.10 = 671.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
=====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 10.59

RAINFALL INTENSITY(INCH/HR) = 1.18

AREA-AVERAGED Fm(INCH/HR) = 0.06

AREA-AVERAGED Fp(INCH/HR) = 0.60

AREA-AVERAGED Ap = 0.10

EFFECTIVE STREAM AREA(ACRES) = 1.10

TOTAL STREAM AREA(ACRES) = 1.10

PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.13

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	25.51	12.26	1.085	0.60( 0.19)	0.31	31.6	300.00
2	1.13	10.59	1.180	0.60( 0.06)	0.10	1.1	400.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	25.49	10.59	1.180	0.60( 0.18)	0.31	28.4	400.00
2	26.54	12.26	1.085	0.60( 0.18)	0.31	32.7	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 26.54 Tc(MIN.) = 12.26

EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31

TOTAL AREA(ACRES) = 32.7

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 426.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 305.50 DOWNSTREAM(FEET) = 301.00

FLOW LENGTH(FEET) = 261.40 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.19

ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 26.54

PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 12.69

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.10 = 2921.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.69  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.061  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.15  
 EFFECTIVE AREA(ACRES) = 32.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 32.9 PEAK FLOW RATE(CFS) = 26.54  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.20 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 289.00  
 FLOW LENGTH(FEET) = 448.56 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.28  
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 26.54  
 PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 13.29  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.20 = 3369.96 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.20 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.29  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.027  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.400	-
USER-DEFINED	-	0.30	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 0.35  
 EFFECTIVE AREA(ACRES) = 33.40 AREA-AVERAGED Fm(INCH/HR) = 0.19  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 33.4 PEAK FLOW RATE(CFS) = 26.54  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.30 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 289.00 DOWNSTREAM(FEET) = 282.00  
 FLOW LENGTH(FEET) = 260.45 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.30  
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 26.54  
 PIPE TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 13.65  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.30 = 3630.41 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.30 TO NODE 426.30 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.65  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.007  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.400	-
USER-DEFINED	-	0.80	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 0.76  
 EFFECTIVE AREA(ACRES) = 34.50 AREA-AVERAGED Fm(INCH/HR) = 0.19  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 34.5 PEAK FLOW RATE(CFS) = 26.54  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.30 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 271.00  
 FLOW LENGTH(FEET) = 411.44 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.28  
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 26.54  
 PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 14.21  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 14.21  
 RAINFALL INTENSITY(INCH/HR) = 0.97  
 AREA-AVERAGED Fm(INCH/HR) = 0.19

AREA-AVERAGED Fp (INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.31  
EFFECTIVE STREAM AREA (ACRES) = 34.50  
TOTAL STREAM AREA (ACRES) = 34.50  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 26.54

\*\*\*\*\*  
FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----

INITIAL SUBAREA FLOW-LENGTH (FEET) = 233.60  
ELEVATION DATA: UPSTREAM (FEET) = 306.50 DOWNSTREAM (FEET) = 301.80

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.882  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.712  
SUBAREA Tc AND LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL - 0.20 0.60 0.100 56 5.88  
COMMERCIAL - 0.20 0.60 0.100 56 5.88  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF (CFS) = 0.59  
TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 0.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 426.00 TO NODE 427.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 301.80 DOWNSTREAM ELEVATION (FEET) = 294.00  
STREET LENGTH (FEET) = 478.70 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 51.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 0.99  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.25  
HALFSTREET FLOOD WIDTH (FEET) = 5.25  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.29  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.58  
STREET FLOW TRAVEL TIME (MIN.) = 3.48 Tc (MIN.) = 9.36  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.290

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 0.20 0.60 0.100 -  
USER-DEFINED - 0.50 0.60 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 0.78  
EFFECTIVE AREA (ACRES) = 1.10 AREA-AVERAGED Fm (INCH/HR) = 0.06  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 1.22

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.27 HALFSTREET FLOOD WIDTH (FEET) = 6.15  
FLOW VELOCITY (FEET/SEC.) = 2.36 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.63  
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 427.00 = 712.30 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 427.00 TO NODE 428.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 294.00 DOWNSTREAM ELEVATION (FEET) = 286.00  
STREET LENGTH (FEET) = 300.80 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 55.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.46  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.26  
HALFSTREET FLOOD WIDTH (FEET) = 5.91  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.97  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.79  
STREET FLOW TRAVEL TIME (MIN.) = 1.69 Tc (MIN.) = 11.05  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.154

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.100 -  
USER-DEFINED - 0.40 0.60 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA (ACRES) = 0.50 SUBAREA RUNOFF (CFS) = 0.49  
EFFECTIVE AREA (ACRES) = 1.60 AREA-AVERAGED Fm (INCH/HR) = 0.06  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
TOTAL AREA (ACRES) = 1.6 PEAK FLOW RATE (CFS) = 1.57

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.27 HALFSTREET FLOOD WIDTH (FEET) = 6.24  
FLOW VELOCITY (FEET/SEC.) = 2.99 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.81  
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 428.00 = 1013.10 FEET.

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*****
FLOW PROCESS FROM NODE 428.00 TO NODE 429.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STANDARD CURB SECTION USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 286.00 DOWNSTREAM ELEVATION(FEET) = 276.00
STREET LENGTH(FEET) = 242.40 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.76
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.26
HALFSTREET FLOOD WIDTH(FEET) = 5.70
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.73
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.97
STREET FLOW TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 12.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.092
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.40 0.60 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.37
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 1.86

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 6.02
FLOW VELOCITY(FEET/SEC.) = 3.69 DEPTH*VELOCITY(FT*FT/SEC.) = 0.98
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 429.00 = 1255.50 FEET.

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*****
FLOW PROCESS FROM NODE 429.00 TO NODE 429.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 12.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.092
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.60 0.400 -
USER-DEFINED - 1.50 0.60 0.400 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 1.53

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EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 3.39

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*****
FLOW PROCESS FROM NODE 429.00 TO NODE 248.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 273.00
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.58
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.39
PIPE TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 12.35
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 248.00 = 1355.50 FEET.

```

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*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====

```

```

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 12.35
RAINFALL INTENSITY(INCH/HR) = 1.08
AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.25
EFFECTIVE STREAM AREA(ACRES) = 4.00
TOTAL STREAM AREA(ACRES) = 4.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.39

```

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	25.49	12.55	1.069	0.60( 0.19)	0.31	30.2	400.00
1	26.54	14.21	0.975	0.60( 0.19)	0.31	34.5	300.00
2	3.39	12.35	1.080	0.60( 0.15)	0.25	4.0	425.00

```

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

```

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	28.79	12.35	1.080	0.60( 0.18)	0.30	33.7	425.00
2	28.84	12.55	1.069	0.60( 0.18)	0.30	34.2	400.00
3	29.55	14.21	0.975	0.60( 0.18)	0.31	38.5	300.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 29.55 Tc(MIN.) = 14.21
EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31

```

TOTAL AREA (ACRES) = 38.5  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 11

-----  
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\*\*\*\*  
\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	28.79	12.35	1.080	0.60 ( 0.18)	0.30	33.7	425.00
2	28.84	12.55	1.069	0.60 ( 0.18)	0.30	34.2	400.00
3	29.55	14.21	0.975	0.60 ( 0.18)	0.31	38.5	300.00

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	175.64	22.10	0.721	0.60 ( 0.23)	0.38	397.0	210.00
2	166.96	25.06	0.660	0.60 ( 0.23)	0.38	428.1	200.00
3	164.10	26.63	0.637	0.60 ( 0.23)	0.38	443.2	230.00
4	158.68	27.84	0.619	0.60 ( 0.22)	0.38	447.4	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	198.55	12.35	1.080	0.60 ( 0.22)	0.37	255.6	425.00
2	199.04	12.55	1.069	0.60 ( 0.22)	0.37	259.6	400.00
3	200.69	14.21	0.975	0.60 ( 0.22)	0.37	293.6	300.00
4	195.72	22.10	0.721	0.60 ( 0.23)	0.38	435.5	210.00
5	184.76	25.06	0.660	0.60 ( 0.22)	0.37	466.6	200.00
6	181.03	26.63	0.637	0.60 ( 0.22)	0.37	481.7	230.00
7	174.95	27.84	0.619	0.60 ( 0.22)	0.37	485.9	220.50

TOTAL AREA (ACRES) = 485.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 200.69 Tc (MIN.) = 14.206  
EFFECTIVE AREA (ACRES) = 293.65 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
TOTAL AREA (ACRES) = 485.9  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 12

-----  
>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 249.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 271.00 DOWNSTREAM (FEET) = 261.00

FLOW LENGTH (FEET) = 345.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.5 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 20.78  
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 200.69  
PIPE TRAVEL TIME (MIN.) = 0.28 Tc (MIN.) = 14.48  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 10

-----  
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 429.00 TO NODE 430.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
ELEVATION DATA: UPSTREAM (FEET) = 271.00 DOWNSTREAM (FEET) = 262.70

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.459

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.642

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.60	0.100	56	6.46
COMMERCIAL	-	0.40	0.60	0.100	56	6.46

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF (CFS) = 0.85

TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 0.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

-----  
UPSTREAM ELEVATION (FEET) = 262.70 DOWNSTREAM ELEVATION (FEET) = 258.98  
STREET LENGTH (FEET) = 345.60 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 51.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.19

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.28

HALFSTREET FLOOD WIDTH (FEET) = 6.94  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.96  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.55  
 STREET FLOW TRAVEL TIME (MIN.) = 2.94 Tc (MIN.) = 9.40  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.286  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.50	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 0.66  
 EFFECTIVE AREA (ACRES) = 1.20 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 1.2 PEAK FLOW RATE (CFS) = 1.32

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.29 HALFSTREET FLOOD WIDTH (FEET) = 7.44  
 FLOW VELOCITY (FEET/SEC.) = 1.99 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.58  
 LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.00 = 675.60 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.00 TO NODE 431.10 IS CODE = 31  
 -----

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 258.98 DOWNSTREAM (FEET) = 258.00  
 FLOW LENGTH (FEET) = 91.03 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.4 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.02  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 1.32  
 PIPE TRAVEL TIME (MIN.) = 0.38 Tc (MIN.) = 9.77  
 LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.10 = 766.63 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
 -----

>>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 9.77  
 RAINFALL INTENSITY (INCH/HR) = 1.24  
 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.10  
 EFFECTIVE STREAM AREA (ACRES) = 1.20  
 TOTAL STREAM AREA (ACRES) = 1.20  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 1.32

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 410.00 TO NODE 440.00 IS CODE = 21  
 -----

>>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<<  
 =====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 299.70  
 ELEVATION DATA: UPSTREAM (FEET) = 312.69 DOWNSTREAM (FEET) = 310.80

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.196  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.432  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.40	0.60	0.100	56	8.20

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 0.49  
 TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 0.49

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 61  
 -----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>> (STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 310.80 DOWNSTREAM ELEVATION (FEET) = 306.50  
 STREET LENGTH (FEET) = 299.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 55.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 0.70  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.23  
 HALFSTREET FLOOD WIDTH (FEET) = 3.83  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.17  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.50  
 STREET FLOW TRAVEL TIME (MIN.) = 2.29 Tc (MIN.) = 10.49  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.185

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.41  
 EFFECTIVE AREA (ACRES) = 0.80 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 0.8 PEAK FLOW RATE (CFS) = 0.81

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.24 HALFSTREET FLOOD WIDTH (FEET) = 4.58

FLOW VELOCITY(FEET/SEC.) = 2.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.52  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 441.00 = 598.70 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 306.50 DOWNSTREAM ELEVATION(FEET) = 299.00  
STREET LENGTH(FEET) = 341.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.08  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.25  
HALFSTREET FLOOD WIDTH(FEET) = 4.95  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.68  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.66  
STREET FLOW TRAVEL TIME(MIN.) = 2.13 Tc(MIN.) = 12.61

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.065

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.54  
EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.06  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 1.27

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 5.65  
FLOW VELOCITY(FEET/SEC.) = 2.71 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.71  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 442.00 = 940.30 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 299.00 DOWNSTREAM ELEVATION(FEET) = 288.50  
STREET LENGTH(FEET) = 390.10 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.50

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.27  
HALFSTREET FLOOD WIDTH(FEET) = 5.95  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.03  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.81  
STREET FLOW TRAVEL TIME(MIN.) = 2.14 Tc(MIN.) = 14.76

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.944

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.48  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.06  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 1.59

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 6.25  
FLOW VELOCITY(FEET/SEC.) = 3.02 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.82  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 443.00 = 1330.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 443.00 TO NODE 444.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 288.50 DOWNSTREAM ELEVATION(FEET) = 281.00  
STREET LENGTH(FEET) = 272.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.74

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.28  
HALFSTREET FLOOD WIDTH(FEET) = 6.54  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.11  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.86



STREET FLOW TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 16.22  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.890  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.60 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.30  
 EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 1.79

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.28 HALFSTREET FLOOD WIDTH(FEET) = 6.74  
 FLOW VELOCITY(FEET/SEC.) = 3.08 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.86  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 444.00 = 1603.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 444.00 TO NODE 445.00 IS CODE = 61  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 281.00 DOWNSTREAM ELEVATION(FEET) = 268.10  
 STREET LENGTH(FEET) = 462.90 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.03  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.29  
 HALFSTREET FLOOD WIDTH(FEET) = 7.24  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.16  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.91  
 STREET FLOW TRAVEL TIME(MIN.) = 2.44 Tc(MIN.) = 18.66  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.809

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.70 0.60 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.47  
 EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 2.09

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 7.34

FLOW VELOCITY(FEET/SEC.) = 3.20 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.92  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 445.00 = 2065.90 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 445.00 TO NODE 446.00 IS CODE = 61  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 268.10 DOWNSTREAM ELEVATION(FEET) = 257.00  
 STREET LENGTH(FEET) = 532.90 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.39  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.31  
 HALFSTREET FLOOD WIDTH(FEET) = 8.60  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.90  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.90  
 STREET FLOW TRAVEL TIME(MIN.) = 3.06 Tc(MIN.) = 21.72  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.729

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.60 0.100 -  
 USER-DEFINED - 0.60 0.60 0.100 -  
 USER-DEFINED - 0.30 0.60 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 0.60  
 EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 2.47

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 8.71  
 FLOW VELOCITY(FEET/SEC.) = 2.94 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.92  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 446.00 = 2598.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 446.00 TO NODE 431.10 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 257.00 DOWNSTREAM(FEET) = 256.50  
 FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 3.64  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 2.47  
 PIPE TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 22.17  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 22.17  
 RAINFALL INTENSITY(INCH/HR) = 0.72  
 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.10  
 EFFECTIVE STREAM AREA(ACRES) = 4.10  
 TOTAL STREAM AREA(ACRES) = 4.10  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.47

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1.32	9.77	1.241	0.60( 0.06)	0.10	1.2	429.00
2	2.47	22.17	0.720	0.60( 0.06)	0.10	4.1	410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3.27	9.77	1.241	0.60( 0.06)	0.10	3.0	429.00
2	3.21	22.17	0.720	0.60( 0.06)	0.10	5.3	410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 3.27 Tc(MIN.) = 9.77  
 EFFECTIVE AREA(ACRES) = 3.01 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 5.3  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 249.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 258.00 DOWNSTREAM(FEET) = 257.00  
 FLOW LENGTH(FEET) = 230.42 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 3.71  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 3.27

PIPE TRAVEL TIME(MIN.) = 1.03 Tc(MIN.) = 10.81  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<  
 =====

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3.27	10.81	1.167	0.60( 0.06)	0.10	3.0	429.00
2	3.21	23.21	0.698	0.60( 0.06)	0.10	5.3	410.00

LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	198.55	12.63	1.064	0.60( 0.22)	0.37	255.6	425.00
2	199.04	12.83	1.053	0.60( 0.22)	0.37	259.6	400.00
3	200.69	14.48	0.959	0.60( 0.22)	0.37	293.6	300.00
4	195.72	22.38	0.715	0.60( 0.23)	0.38	435.5	210.00
5	184.76	25.35	0.656	0.60( 0.22)	0.37	466.6	200.00
6	181.03	26.92	0.633	0.60( 0.22)	0.37	481.7	230.00
7	174.95	28.12	0.615	0.60( 0.22)	0.37	485.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	194.02	10.81	1.167	0.60( 0.22)	0.37	221.7	429.00
2	201.81	12.63	1.064	0.60( 0.22)	0.37	258.9	425.00
3	202.30	12.83	1.053	0.60( 0.22)	0.37	263.0	400.00
4	203.94	14.48	0.959	0.60( 0.22)	0.37	297.3	300.00
5	198.94	22.38	0.715	0.60( 0.22)	0.37	440.6	210.00
6	195.86	23.21	0.698	0.60( 0.22)	0.37	449.5	410.00
7	187.76	25.35	0.656	0.60( 0.22)	0.37	471.9	200.00
8	183.91	26.92	0.633	0.60( 0.22)	0.37	487.0	230.00
9	177.74	28.12	0.615	0.60( 0.22)	0.37	491.2	220.50

TOTAL AREA(ACRES) = 491.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 203.94 Tc(MIN.) = 14.483  
 EFFECTIVE AREA(ACRES) = 297.33 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA(ACRES) = 491.2  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 491.2 TC(MIN.) = 14.48  
 EFFECTIVE AREA(ACRES) = 297.33 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.369  
 PEAK FLOW RATE(CFS) = 203.94

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
---------------	---------	-----------	---------------------	------------------	----	------------	----------------

1	194.02	10.81	1.167	0.60	( 0.22)	0.37	221.7	429.00
2	201.81	12.63	1.064	0.60	( 0.22)	0.37	258.9	425.00
3	202.30	12.83	1.053	0.60	( 0.22)	0.37	263.0	400.00
4	203.94	14.48	0.959	0.60	( 0.22)	0.37	297.3	300.00
5	198.94	22.38	0.715	0.60	( 0.22)	0.37	440.6	210.00
6	195.86	23.21	0.698	0.60	( 0.22)	0.37	449.5	410.00
7	187.76	25.35	0.656	0.60	( 0.22)	0.37	471.9	200.00
8	183.91	26.92	0.633	0.60	( 0.22)	0.37	487.0	230.00
9	177.74	28.12	0.615	0.60	( 0.22)	0.37	491.2	220.50

=====  
 END OF RATIONAL METHOD ANALYSIS  
 =====

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506101G.DAT  
TIME/DATE OF STUDY: 12:42 04/15/2013  
=====

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-----  
USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:  
=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.00; 1.580  
2) 6.00; 1.430  
3) 7.00; 1.310  
4) 8.00; 1.210  
5) 9.00; 1.130  
6) 10.00; 1.060  
7) 11.00; 1.010  
8) 12.00; 0.960  
9) 13.00; 0.920  
10) 14.00; 0.880  
11) 15.00; 0.840  
12) 20.00; 0.720  
13) 25.00; 0.630  
14) 30.00; 0.570  
15) 40.00; 0.480  
16) 50.00; 0.420  
17) 60.00; 0.380  
18) 90.00; 0.300  
19) 120.00; 0.260  
20) 180.00; 0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10100.00 TO NODE 10101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 820.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.606  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.088  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.10	0.60	1.000	98	9.61
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.60	1.000	98	9.61

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.18  
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 0.18

\*\*\*\*\*

FLOW PROCESS FROM NODE 10101.00 TO NODE 10102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 790.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 152.00 CHANNEL SLOPE = 0.1974  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.18  
FLOW VELOCITY(FEET/SEC.) = 2.68 FLOW DEPTH(FEET) = 0.15  
TRAVEL TIME(MIN.) = 0.95  $T_c$ (MIN.) = 10.55  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10102.00 = 479.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10102.00 TO NODE 10102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 10.55  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.032  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL	AREA	Fp	Ap	SCS
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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.50      0.60      1.000      -
USER-DEFINED  -        0.30      0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.80  SUBAREA RUNOFF (CFS) = 0.31
EFFECTIVE AREA (ACRES) = 1.20  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.2  PEAK FLOW RATE (CFS) = 0.47

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*****
FLOW PROCESS FROM NODE 10102.00 TO NODE 10103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 790.00  DOWNSTREAM(FEET) = 762.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00  CHANNEL SLOPE = 0.1400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.47
FLOW VELOCITY(FEET/SEC.) = 3.10  FLOW DEPTH(FEET) = 0.22
TRAVEL TIME(MIN.) = 1.08  Tc(MIN.) = 11.63
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10103.00 = 679.00 FEET.

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.63
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.979
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.40  0.60  1.000  -
USER-DEFINED      -        0.80  0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.20  SUBAREA RUNOFF (CFS) = 0.41
EFFECTIVE AREA (ACRES) = 2.40  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 2.4  PEAK FLOW RATE (CFS) = 0.82

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 762.00  DOWNSTREAM(FEET) = 754.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 124.00  CHANNEL SLOPE = 0.0645
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.82
FLOW VELOCITY(FEET/SEC.) = 2.70  FLOW DEPTH(FEET) = 0.32
TRAVEL TIME(MIN.) = 0.76  Tc(MIN.) = 12.39
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10104.00 = 803.00 FEET.

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10104.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----

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MAINLINE Tc(MIN.) = 12.39
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.944
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.70  0.60  1.000  -
USER-DEFINED      -        1.10  0.60  1.000  -
USER-DEFINED      -        0.10  0.60  1.000  -
USER-DEFINED      -        0.40  0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 0.71
EFFECTIVE AREA (ACRES) = 4.70  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.7  PEAK FLOW RATE (CFS) = 1.46

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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ELEVATION DATA: UPSTREAM(FEET) = 754.00  DOWNSTREAM(FEET) = 740.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00  CHANNEL SLOPE = 0.0255
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.46
FLOW VELOCITY(FEET/SEC.) = 2.20  FLOW DEPTH(FEET) = 0.47
TRAVEL TIME(MIN.) = 4.17  Tc(MIN.) = 16.56
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10105.00 = 1353.00 FEET.

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 16.56
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.803
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        3.40  0.60  1.000  -
USER-DEFINED      -        0.60  0.60  1.000  -
USER-DEFINED      -        6.00  0.60  1.000  -
USER-DEFINED      -        0.60  0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 10.60  SUBAREA RUNOFF (CFS) = 1.93
EFFECTIVE AREA (ACRES) = 15.30  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 15.3  PEAK FLOW RATE (CFS) = 2.79

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10106.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 740.00 DOWNSTREAM(FEET) = 623.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 929.00 CHANNEL SLOPE = 0.1259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.79
FLOW VELOCITY(FEET/SEC.) = 4.69 FLOW DEPTH(FEET) = 0.45
TRAVEL TIME(MIN.) = 3.30 Tc(MIN.) = 19.86
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10106.00 = 2282.00 FEET.
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10106.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.86
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.723
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 10.40 0.60 1.000 -
USER-DEFINED - 0.40 0.60 1.000 -
USER-DEFINED - 4.50 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 1.72
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 3.42
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 592.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 417.00 CHANNEL SLOPE = 0.0743
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.42
FLOW VELOCITY(FEET/SEC.) = 4.04 FLOW DEPTH(FEET) = 0.53
TRAVEL TIME(MIN.) = 1.72 Tc(MIN.) = 21.58
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10107.00 = 2699.00 FEET.
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10107.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 21.58

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* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.691
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.60 1.000 -
USER-DEFINED - 0.60 0.60 1.000 -
USER-DEFINED - 5.10 0.60 1.000 -
USER-DEFINED - 1.10 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
USER-DEFINED - 2.30 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 0.78
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 3.42
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 592.00 DOWNSTREAM(FEET) = 590.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0333
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.42
FLOW VELOCITY(FEET/SEC.) = 3.01 FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 21.92
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10108.00 = 2759.00 FEET.
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 21.92
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.686
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.60 1.000 -
USER-DEFINED - 1.10 0.60 1.000 -
USER-DEFINED - 7.00 0.60 1.000 -
USER-DEFINED - 0.40 0.60 1.000 -
USER-DEFINED - 7.50 0.60 1.000 -
USER-DEFINED - 1.80 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 1.40
EFFECTIVE AREA(ACRES) = 58.40 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.4 PEAK FLOW RATE(CFS) = 4.50
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81

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=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 21.92  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.686  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.02  
EFFECTIVE AREA(ACRES) = 58.60 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 58.6 PEAK FLOW RATE(CFS) = 4.52

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10108.00 TO NODE 10109.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 526.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 973.00 CHANNEL SLOPE = 0.0658  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
FLOW VELOCITY(FEET/SEC.) = 4.11 FLOW DEPTH(FEET) = 0.61  
TRAVEL TIME(MIN.) = 3.95 Tc(MIN.) = 25.86  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10109.00 = 3732.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10109.00 TO NODE 10109.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 25.86  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.620  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 16.40 0.60 1.000 -  
USER-DEFINED - 0.60 0.60 1.000 -  
USER-DEFINED - 3.00 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 0.36  
EFFECTIVE AREA(ACRES) = 78.60 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 78.6 PEAK FLOW RATE(CFS) = 4.52  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10109.00 TO NODE 10110.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 526.00 DOWNSTREAM(FEET) = 455.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1045.00 CHANNEL SLOPE = 0.0679  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
FLOW VELOCITY(FEET/SEC.) = 4.19 FLOW DEPTH(FEET) = 0.60  
TRAVEL TIME(MIN.) = 4.16 Tc(MIN.) = 30.03  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10110.00 = 4777.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10110.00 TO NODE 10110.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 30.03  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.570  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.00 0.60 1.000 -  
USER-DEFINED - 0.50 0.60 1.000 -  
USER-DEFINED - 31.60 0.60 1.000 -  
USER-DEFINED - 1.60 0.60 1.000 -  
USER-DEFINED - 0.40 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 35.10 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 113.70 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 113.7 PEAK FLOW RATE(CFS) = 4.52  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10110.00 TO NODE 10111.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 675.00 CHANNEL SLOPE = 0.0667  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
FLOW VELOCITY(FEET/SEC.) = 4.19 FLOW DEPTH(FEET) = 0.60  
TRAVEL TIME(MIN.) = 2.69 Tc(MIN.) = 32.71  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10111.00 = 5452.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10111.00 TO NODE 10111.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 32.71  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.546

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.40	0.60	1.000	-
USER-DEFINED	-	6.00	0.60	1.000	-
USER-DEFINED	-	24.80	0.60	1.000	-
USER-DEFINED	-	0.90	0.60	1.000	-
USER-DEFINED	-	4.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 43.20 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 156.90 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 156.9 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10111.00 TO NODE 10112.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 405.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 143.00 CHANNEL SLOPE = 0.0350  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
 FLOW VELOCITY(FEET/SEC.) = 3.24 FLOW DEPTH(FEET) = 0.68  
 TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 33.45  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10112.00 = 5595.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10112.00 TO NODE 10112.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 33.45  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.539  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	7.90	0.60	1.000	-
USER-DEFINED	-	25.90	0.60	1.000	-
USER-DEFINED	-	19.30	0.60	1.000	-
USER-DEFINED	-	2.10	0.60	1.000	-
USER-DEFINED	-	0.90	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 56.20 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 213.10 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 213.1 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10112.00 TO NODE 10113.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 363.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1642.00 CHANNEL SLOPE = 0.0256  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
 FLOW VELOCITY(FEET/SEC.) = 2.90 FLOW DEPTH(FEET) = 0.72  
 TRAVEL TIME(MIN.) = 9.42 Tc(MIN.) = 42.87  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10113.00 = 7237.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10113.00 TO NODE 10113.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 42.87  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.463  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.60	1.000	-
USER-DEFINED	-	33.10	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 35.40 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 248.50 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 248.5 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10113.00 TO NODE 10114.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 363.00 DOWNSTREAM(FEET) = 340.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 918.00 CHANNEL SLOPE = 0.0251  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
 FLOW VELOCITY(FEET/SEC.) = 2.89 FLOW DEPTH(FEET) = 0.72



TRAVEL TIME(MIN.) = 5.30 Tc(MIN.) = 48.17  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10114.00 = 8155.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 48.17

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.431

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	10.10	0.60	1.000	-
USER-DEFINED	-	17.70	0.60	1.000	-
USER-DEFINED	-	52.90	0.60	1.000	-
USER-DEFINED	-	1.00	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 83.10 SUBAREA RUNOFF(CFS) = 0.00

EFFECTIVE AREA(ACRES) = 331.60 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 331.6 PEAK FLOW RATE(CFS) = 4.52

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 48.17

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.431

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 0.00

EFFECTIVE AREA(ACRES) = 333.10 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 333.1 PEAK FLOW RATE(CFS) = 4.52

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10115.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 301.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1467.00 CHANNEL SLOPE = 0.0266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
FLOW VELOCITY(FEET/SEC.) = 2.95 FLOW DEPTH(FEET) = 0.71  
TRAVEL TIME(MIN.) = 8.28 Tc(MIN.) = 56.45  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10115.00 = 9622.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10115.00 TO NODE 10115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 56.45

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.394

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.60	0.60	1.000	-
USER-DEFINED	-	24.30	0.60	1.000	-
USER-DEFINED	-	47.70	0.60	1.000	-
USER-DEFINED	-	9.80	0.60	1.000	-
USER-DEFINED	-	1.60	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 94.00 SUBAREA RUNOFF(CFS) = 0.00

EFFECTIVE AREA(ACRES) = 427.10 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 427.1 PEAK FLOW RATE(CFS) = 4.52

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10115.00 TO NODE 10116.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 272.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1696.00 CHANNEL SLOPE = 0.0171  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
FLOW VELOCITY(FEET/SEC.) = 2.51 FLOW DEPTH(FEET) = 0.78  
TRAVEL TIME(MIN.) = 11.28 Tc(MIN.) = 67.73  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10116.00 = 11318.00 FEET.

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FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 67.73  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.359  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.60 1.000 -  
 USER-DEFINED - 4.90 0.60 1.000 -  
 USER-DEFINED - 4.10 0.60 1.000 -  
 USER-DEFINED - 0.40 0.60 1.000 -  
 USER-DEFINED - 32.00 0.60 1.000 -  
 USER-DEFINED - 3.80 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 45.60 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 472.70 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 472.7 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 67.73  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.359  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.00 0.60 1.000 -  
 USER-DEFINED - 7.70 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 9.70 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 482.40 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 482.4 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10116.00 TO NODE 10117.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 272.00 DOWNSTREAM(FEET) = 252.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 878.00 CHANNEL SLOPE = 0.0228  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.52

FLOW VELOCITY(FEET/SEC.) = 2.79 FLOW DEPTH(FEET) = 0.74  
 TRAVEL TIME(MIN.) = 5.25 Tc(MIN.) = 72.99  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10117.00 = 12196.00 FEET.

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FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 72.99  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.345  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.60 0.850 -  
 USER-DEFINED - 0.60 0.60 1.000 -  
 USER-DEFINED - 0.90 0.60 1.000 -  
 USER-DEFINED - 0.90 0.60 1.000 -  
 USER-DEFINED - 8.20 0.60 1.000 -  
 USER-DEFINED - 1.10 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 0.03  
 EFFECTIVE AREA(ACRES) = 494.70 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 494.7 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 72.99  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.345  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.60 0.850 -  
 USER-DEFINED - 14.60 0.60 1.000 -  
 USER-DEFINED - 6.10 0.60 1.000 -  
 USER-DEFINED - 0.20 0.60 1.000 -  
 USER-DEFINED - 3.50 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 25.00 SUBAREA RUNOFF(CFS) = 0.03  
 EFFECTIVE AREA(ACRES) = 519.70 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 519.7 PEAK FLOW RATE(CFS) = 4.52  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10117.00 TO NODE 10118.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 252.00 DOWNSTREAM(FEET) = 249.00
FLOW LENGTH(FEET) = 280.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.64
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.52
PIPE TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 73.81
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10118.00 = 12476.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10118.00 TO NODE 10119.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 249.00 DOWNSTREAM(FEET) = 240.00
FLOW LENGTH(FEET) = 892.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.52
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.52
PIPE TRAVEL TIME(MIN.) = 2.69 Tc(MIN.) = 76.51
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10119.00 = 13368.00 FEET.

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FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 76.51
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.336
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.60 0.100 -
USER-DEFINED - 1.00 0.60 0.600 -
USER-DEFINED - 0.80 0.60 0.850 -
USER-DEFINED - 0.90 0.60 1.000 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.706
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 0.32
EFFECTIVE AREA(ACRES) = 523.30 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 523.3 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 76.51
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.336
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.80 0.60 1.000 -
USER-DEFINED - 1.20 0.60 0.100 -
USER-DEFINED - 9.60 0.60 0.600 -
USER-DEFINED - 1.00 0.60 0.850 -
USER-DEFINED - 0.80 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.627
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 1.53
EFFECTIVE AREA(ACRES) = 536.90 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 536.9 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 76.51
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.336
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 537.00 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 537.0 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10119.00 TO NODE 10120.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 240.00 DOWNSTREAM(FEET) = 239.00
FLOW LENGTH(FEET) = 120.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.14
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.52
PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 76.89
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10120.00 = 13488.00 FEET.

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FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 76.89
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.335
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.20 0.60 0.100 -
USER-DEFINED - 0.20 0.60 0.850 -
USER-DEFINED - 0.90 0.60 0.100 -
USER-DEFINED - 0.30 0.60 1.000 -
USER-DEFINED - 2.80 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.657
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 0.58
EFFECTIVE AREA(ACRES) = 542.60 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 542.6 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 76.89
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.335
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.50 0.60 0.100 -
USER-DEFINED - 0.20 0.60 0.600 -
USER-DEFINED - 0.10 0.60 0.850 -
USER-DEFINED - 2.90 0.60 1.000 -
USER-DEFINED - 0.40 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.717
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 0.44
EFFECTIVE AREA(ACRES) = 547.70 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 547.7 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 76.89
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.335
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 1.00 0.60 1.000 -
USER-DEFINED - 2.70 0.60 1.000 -
USER-DEFINED - 11.20 0.60 1.000 -
USER-DEFINED - 0.70 0.60 1.000 -
USER-DEFINED - 0.10 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 563.50 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 563.5 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10120.00 TO NODE 10121.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 239.00 DOWNSTREAM(FEET) = 213.00
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.05
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.52
PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 77.12
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10121.00 = 13682.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10121.00 TO NODE 10122.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 213.00 DOWNSTREAM(FEET) = 176.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 995.00 CHANNEL SLOPE = 0.0372
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52
FLOW VELOCITY(FEET/SEC.) = 3.31 FLOW DEPTH(FEET) = 0.67
TRAVEL TIME(MIN.) = 5.01 Tc(MIN.) = 82.13
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10122.00 = 14677.00 FEET.

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FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 82.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.321
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        0.10      0.60      1.000      -
USER-DEFINED          -        1.40      0.60      1.000      -
USER-DEFINED          -        0.20      0.60      1.000      -
USER-DEFINED          -        0.40      0.60      1.000      -
USER-DEFINED          -        4.80      0.60      1.000      -
USER-DEFINED          -        0.40      0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 570.80 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 570.8 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----

```

```

MAINLINE Tc(MIN.) = 82.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.321
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        2.80      0.60      1.000      -
USER-DEFINED          -        3.30      0.60      1.000      -
USER-DEFINED          -        1.40      0.60      1.000      -
USER-DEFINED          -        3.00      0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 581.30 AREA-AVERAGED Fm(INCH/HR) = 0.59

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AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 581.3 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 82.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.321
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        0.30      0.60      1.000      -
USER-DEFINED          -        3.30      0.60      1.000      -
USER-DEFINED          -        0.10      0.60      1.000      -
USER-DEFINED          -        0.60      0.60      1.000      -
USER-DEFINED          -        3.50      0.60      1.000      -
USER-DEFINED          -        0.10      0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 589.20 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 589.2 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN.) = 82.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.321
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED          -        1.80      0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 591.00 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 591.0 PEAK FLOW RATE(CFS) = 4.52
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF STUDY SUMMARY:

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TOTAL AREA (ACRES) = 591.0 TC (MIN.) = 82.13  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.59  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.60 AREA-AVERAGED  $A_p$  = 0.984  
PEAK FLOW RATE (CFS) = 4.52

=====  
=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2007 Advanced Engineering Software (aes)  
Ver. 13.4 Release Date: 01/25/2007 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506102G.DAT  
TIME/DATE OF STUDY: 14:02 01/08/2009  
=====

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.596
- 2) 10.00; 1.064
- 3) 15.00; 0.843
- 4) 20.00; 0.715
- 5) 25.00; 0.629
- 6) 30.00; 0.560
- 7) 40.00; 0.480
- 8) 50.00; 0.423
- 9) 60.00; 0.371
- 10) 90.00; 0.302
- 11) 120.00; 0.256
- 12) 180.00; 0.208
- 13) 360.00; 0.142
- 14) 1440.00; 0.060

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10200.00 TO NODE 10201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 293.00  
ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 617.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.991

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.065

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
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RESIDENTIAL

"3-4 DWELLINGS/ACRE" - 0.73 0.60 0.600 0 9.99

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600

SUBAREA RUNOFF(CFS) = 0.46

TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 0.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10201.00 TO NODE 10202.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 617.00 DOWNSTREAM ELEVATION(FEET) = 613.00  
STREET LENGTH(FEET) = 323.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.70

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.23

HALFSTREET FLOOD WIDTH(FEET) = 3.83

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.08

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.49

STREET FLOW TRAVEL TIME(MIN.) = 2.59 Tc(MIN.) = 12.58

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.950

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

USER-DEFINED - 0.88 0.60 0.600 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 0.47  
EFFECTIVE AREA(ACRES) = 1.62 AREA-AVERAGED Fm(INCH/HR) = 0.36  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 0.86

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.25 HALFSTREET FLOOD WIDTH(FEET) = 4.71  
FLOW VELOCITY(FEET/SEC.) = 2.09 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.53  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10202.00 = 616.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10202.00 TO NODE 10203.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 613.00 DOWNSTREAM ELEVATION(FEET) = 594.00  
STREET LENGTH(FEET) = 613.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.23  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.24  
HALFSTREET FLOOD WIDTH(FEET) = 4.32  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.28  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.80  
STREET FLOW TRAVEL TIME(MIN.) = 3.12 Tc(MIN.) = 15.70  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.825

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.82 0.60 0.614 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.614  
SUBAREA AREA(ACRES) = 1.82 SUBAREA RUNOFF(CFS) = 0.75  
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.36  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 1.43

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 4.93  
FLOW VELOCITY(FEET/SEC.) = 3.30 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.85  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10203.00 = 1229.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10203.00 TO NODE 10204.00 IS CODE = 63

-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 594.00 DOWNSTREAM ELEVATION(FEET) = 578.00  
STREET LENGTH(FEET) = 433.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.63  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.26  
HALFSTREET FLOOD WIDTH(FEET) = 5.09  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.64  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.95  
STREET FLOW TRAVEL TIME(MIN.) = 1.98 Tc(MIN.) = 17.68  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.774

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.21 0.60 0.655 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.655  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 0.41  
EFFECTIVE AREA(ACRES) = 4.64 AREA-AVERAGED Fm(INCH/HR) = 0.37  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 1.68

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 5.20  
FLOW VELOCITY(FEET/SEC.) = 3.66 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.96  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10204.00 = 1662.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 578.00 DOWNSTREAM(FEET) = 575.00  
FLOW LENGTH(FEET) = 147.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.40  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 1.68  
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 18.14  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10205.00 = 1809.00 FEET.



```

*****
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.14
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.763
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -        3.61    0.60    0.917  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917
SUBAREA AREA(ACRES) = 3.61    SUBAREA RUNOFF(CFS) = 0.69
EFFECTIVE AREA(ACRES) = 8.25    AREA-AVERAGED Fm(INCH/HR) = 0.45
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 0.75
TOTAL AREA(ACRES) = 8.3    PEAK FLOW RATE(CFS) = 2.32

*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 563.00
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.01
ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.32
PIPE TRAVEL TIME(MIN.) = 1.57    Tc(MIN.) = 19.70
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10206.00 = 2374.00 FEET.

*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.70
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.723
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -        4.75    0.60    0.669  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.669
SUBAREA AREA(ACRES) = 4.75    SUBAREA RUNOFF(CFS) = 1.37
EFFECTIVE AREA(ACRES) = 13.00    AREA-AVERAGED Fm(INCH/HR) = 0.43
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 13.0    PEAK FLOW RATE(CFS) = 3.40

*****
FLOW PROCESS FROM NODE 10206.00 TO NODE 10207.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 563.00 DOWNSTREAM(FEET) = 547.00
FLOW LENGTH(FEET) = 599.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.29
ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.40
PIPE TRAVEL TIME(MIN.) = 1.37    Tc(MIN.) = 21.07
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10207.00 = 2973.00 FEET.

*****
FLOW PROCESS FROM NODE 10206.10 TO NODE 10207.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 21.07
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.697
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -        4.59    0.60    0.664  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.664
SUBAREA AREA(ACRES) = 4.59    SUBAREA RUNOFF(CFS) = 1.23
EFFECTIVE AREA(ACRES) = 17.58    AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 17.6    PEAK FLOW RATE(CFS) = 4.33

*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 516.00
FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.87
ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.33
PIPE TRAVEL TIME(MIN.) = 1.01    Tc(MIN.) = 22.08
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10208.00 = 3573.00 FEET.

*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.08
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.679
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
    LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED          -        3.60    0.60    0.697  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.697
SUBAREA AREA(ACRES) = 3.60    SUBAREA RUNOFF(CFS) = 0.85

```

EFFECTIVE AREA(ACRES) = 21.18 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 21.2 PEAK FLOW RATE(CFS) = 4.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 516.00 DOWNSTREAM(FEET) = 480.00  
FLOW LENGTH(FEET) = 604.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.77  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 4.90  
PIPE TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 23.02  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10209.00 = 4177.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.02  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.663  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.21 0.60 0.645 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645  
SUBAREA AREA(ACRES) = 8.21 SUBAREA RUNOFF(CFS) = 2.04  
EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 6.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 438.00  
FLOW LENGTH(FEET) = 678.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.89  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 6.63  
PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 23.97  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10210.00 = 4855.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 23.97  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.647

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.49 0.60 0.986 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA(ACRES) = 10.49 SUBAREA RUNOFF(CFS) = 0.52  
EFFECTIVE AREA(ACRES) = 39.89 AREA-AVERAGED Fm(INCH/HR) = 0.46  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.77  
TOTAL AREA(ACRES) = 39.9 PEAK FLOW RATE(CFS) = 6.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 280.00  
FLOW LENGTH(FEET) = 2662.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.75  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 6.72  
PIPE TRAVEL TIME(MIN.) = 3.78 Tc(MIN.) = 27.75  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10211.00 = 7517.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 27.75  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.591  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.00 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 49.89 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 49.9 PEAK FLOW RATE(CFS) = 6.72  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 280.00 DOWNSTREAM(FEET) = 176.00  
FLOW LENGTH(FEET) = 935.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.72  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 6.72  
PIPE TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 28.80  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10212.00 = 8452.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 28.80  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.576  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.37 0.60 0.926 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.926  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 18.37 SUBAREA RUNOFF(CFS) = 0.71  
EFFECTIVE AREA(ACRES) = 68.26 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 68.3 PEAK FLOW RATE(CFS) = 6.72  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10212.00 TO NODE 10242.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 176.00 DOWNSTREAM(FEET) = 169.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00 CHANNEL SLOPE = 0.0211  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.555  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.97 0.60 0.970 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.73  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.99  
AVERAGE FLOW DEPTH(FEET) = 0.87 TRAVEL TIME(MIN.) = 1.85  
Tc(MIN.) = 30.66  
SUBAREA AREA(ACRES) = 1.97 SUBAREA RUNOFF(CFS) = 0.03

EFFECTIVE AREA(ACRES) = 70.23 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 6.72  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.87 FLOW VELOCITY(FEET/SEC.) = 2.98  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10220.00 TO NODE 10221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 308.00 DOWNSTREAM(FEET) = 300.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.111  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.840  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"GRASS" - 1.03 0.60 1.000 0 15.11  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.22  
TOTAL AREA(ACRES) = 1.03 PEAK FLOW RATE(CFS) = 0.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10221.10 TO NODE 10222.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<

\*\*\*\*\*  
UPSTREAM ELEVATION(FEET) = 300.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.38  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.51  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.29  
STREET FLOW TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 16.22  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.812  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.64	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 0.31  
EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 0.51

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00  
FLOW VELOCITY(FEET/SEC.) = 6.51 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.29  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10222.00 = 764.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10221.20 TO NODE 10222.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 16.22  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.812  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.12	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.12 SUBAREA RUNOFF(CFS) = 0.59  
EFFECTIVE AREA(ACRES) = 5.78 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 1.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10222.10 TO NODE 10223.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

\*\*\*\*\*  
UPSTREAM ELEVATION(FEET) = 261.00 DOWNSTREAM ELEVATION(FEET) = 208.00  
STREET LENGTH(FEET) = 622.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.24  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.34  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.26  
STREET FLOW TRAVEL TIME(MIN.) = 1.64 Tc(MIN.) = 17.86  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.770

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.75	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 0.27  
EFFECTIVE AREA(ACRES) = 7.54 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.5 PEAK FLOW RATE(CFS) = 1.15

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00  
FLOW VELOCITY(FEET/SEC.) = 6.34 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.26  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10223.00 = 1386.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10222.20 TO NODE 10223.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 17.86  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.770  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.91	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.91 SUBAREA RUNOFF(CFS) = 1.21  
EFFECTIVE AREA(ACRES) = 15.45 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 2.36

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.10 TO NODE 10224.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

\*\*\*\*\*  
UPSTREAM ELEVATION(FEET) = 208.00 DOWNSTREAM ELEVATION(FEET) = 204.00  
STREET LENGTH(FEET) = 758.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020  
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.40  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.71  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.53  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.48  
STREET FLOW TRAVEL TIME(MIN.) = 8.27 Tc(MIN.) = 26.13

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.613  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.70 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 0.06  
EFFECTIVE AREA(ACRES) = 20.15 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.1 PEAK FLOW RATE(CFS) = 2.36  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 7.66  
FLOW VELOCITY(FEET/SEC.) = 1.52 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.47  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10224.00 = 2144.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.20 TO NODE 10224.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 26.13  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.613  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.21 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 0.01  
EFFECTIVE AREA(ACRES) = 21.35 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 2.36  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 204.00 DOWNSTREAM(FEET) = 201.00  
FLOW LENGTH(FEET) = 422.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.08  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 2.36  
PIPE TRAVEL TIME(MIN.) = 1.72 Tc(MIN.) = 27.85  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10225.00 = 2566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 27.85  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.590  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.81 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 4.81 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 26.17 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 26.2 PEAK FLOW RATE(CFS) = 2.36  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 201.00 DOWNSTREAM(FEET) = 197.00  
FLOW LENGTH(FEET) = 799.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.60  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 2.36  
PIPE TRAVEL TIME(MIN.) = 3.70 Tc(MIN.) = 31.55  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10238.00 = 3365.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 31.55  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.548  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 4.24 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 SUBAREA AREA(ACRES) = 4.24 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 30.41 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 30.4 PEAK FLOW RATE(CFS) = 2.36  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

\*\*\*\*\*  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 31.55  
 RAINFALL INTENSITY(INCH/HR) = 0.55  
 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 30.41  
 TOTAL STREAM AREA(ACRES) = 30.41  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.36

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10230.00 TO NODE 10231.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 276.00  
 ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 390.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.944  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.496

SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 AGRICULTURAL POOR COVER  
 "FALLOW" - 0.95 0.60 1.000 0 5.94  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 0.77  
 TOTAL AREA(ACRES) = 0.95 PEAK FLOW RATE(CFS) = 0.77

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10231.10 TO NODE 10232.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

\*\*\*\*\*  
 ELEVATION DATA: UPSTREAM(FEET) = 390.00 DOWNSTREAM(FEET) = 301.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 394.00 CHANNEL SLOPE = 0.2259  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.382

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.68 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.36  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.13  
 AVERAGE FLOW DEPTH(FEET) = 0.27 TRAVEL TIME(MIN.) = 1.07  
 Tc(MIN.) = 7.01  
 SUBAREA AREA(ACRES) = 1.68 SUBAREA RUNOFF(CFS) = 1.18  
 EFFECTIVE AREA(ACRES) = 2.63 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 1.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.31 FLOW VELOCITY(FEET/SEC.) = 6.51  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10232.00 = 670.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10231.20 TO NODE 10232.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

\*\*\*\*\*  
 MAINLINE Tc(MIN.) = 7.01  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.382  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.38 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 6.38 SUBAREA RUNOFF(CFS) = 4.49  
 EFFECTIVE AREA(ACRES) = 9.01 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 9.0 PEAK FLOW RATE(CFS) = 6.34

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10232.00 TO NODE 10233.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 4 USED)<<<<

\*\*\*\*\*  
 UPSTREAM ELEVATION(FEET) = 301.00 DOWNSTREAM ELEVATION(FEET) = 277.00  
 STREET LENGTH(FEET) = 341.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.61

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.40  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.30  
HALFSTREET FLOOD WIDTH(FEET) = 7.05  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.38  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.61  
STREET FLOW TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 8.07  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.269

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 2.11  
EFFECTIVE AREA(ACRES) = 12.52 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 12.5 PEAK FLOW RATE(CFS) = 7.54

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.10  
FLOW VELOCITY(FEET/SEC.) = 5.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.63  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10233.00 = 1011.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10233.10 TO NODE 10234.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 277.00 DOWNSTREAM ELEVATION(FEET) = 226.00  
STREET LENGTH(FEET) = 682.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.43  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.46  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.65  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.74  
STREET FLOW TRAVEL TIME(MIN.) = 2.01 Tc(MIN.) = 10.08  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.060  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.27 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.27 SUBAREA RUNOFF(CFS) = 1.77  
EFFECTIVE AREA(ACRES) = 16.78 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 7.54  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.00  
FLOW VELOCITY(FEET/SEC.) = 5.55 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.65  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10234.00 = 1693.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10233.20 TO NODE 10234.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 10.08  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.060  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 15.60 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 6.46  
EFFECTIVE AREA(ACRES) = 32.38 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 13.42

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10234.10 TO NODE 10235.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 3 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 226.00 DOWNSTREAM ELEVATION(FEET) = 205.00  
STREET LENGTH(FEET) = 759.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.13  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.40  
HALFSTREET FLOOD WIDTH(FEET) = 12.09

AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.28  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.71  
 STREET FLOW TRAVEL TIME (MIN.) = 2.96 Tc (MIN.) = 13.04  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.930  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.74	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 4.74 SUBAREA RUNOFF (CFS) = 1.41  
 EFFECTIVE AREA (ACRES) = 37.13 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 37.1 PEAK FLOW RATE (CFS) = 13.42  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.39 HALFSTREET FLOOD WIDTH (FEET) = 11.81  
 FLOW VELOCITY (FEET/SEC.) = 4.24 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.67  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10235.00 = 2452.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10234.20 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.04  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.930  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.02	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 8.02 SUBAREA RUNOFF (CFS) = 2.38  
 EFFECTIVE AREA (ACRES) = 45.15 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 45.1 PEAK FLOW RATE (CFS) = 13.42  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10234.30 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.04  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.930  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.62	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.62 SUBAREA RUNOFF (CFS) = 0.78  
 EFFECTIVE AREA (ACRES) = 47.76 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 14.18

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10235.00 TO NODE 10236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 205.00 DOWNSTREAM (FEET) = 201.00  
 FLOW LENGTH (FEET) = 489.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.2 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 6.74  
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 14.18  
 PIPE TRAVEL TIME (MIN.) = 1.21 Tc (MIN.) = 14.25  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10236.00 = 2941.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10235.10 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.25  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.876  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.89	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.89 SUBAREA RUNOFF (CFS) = 0.72  
 EFFECTIVE AREA (ACRES) = 50.65 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 50.7 PEAK FLOW RATE (CFS) = 14.18  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10235.20 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.25  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.876  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.84	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 4.84 SUBAREA RUNOFF (CFS) = 1.20  
 EFFECTIVE AREA (ACRES) = 55.49 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 14.18  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<



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=====
ELEVATION DATA: UPSTREAM(FEET) = 201.00 DOWNSTREAM(FEET) = 199.00
FLOW LENGTH(FEET) = 278.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.41
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 14.18
PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 14.97
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10237.00 = 3219.00 FEET.

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*****
FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.97
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.844
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -       1.62     0.60     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.62 SUBAREA RUNOFF(CFS) = 0.36
EFFECTIVE AREA(ACRES) = 57.11 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 57.1 PEAK FLOW RATE(CFS) = 14.18
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 197.00
FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.86
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 14.18
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 15.95
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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```

MAINLINE Tc(MIN.) = 15.95
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.819
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -       1.38     0.60     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.38 SUBAREA RUNOFF(CFS) = 0.27

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EFFECTIVE AREA(ACRES) = 58.49 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 14.18
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1
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```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====

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```

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 15.95
RAINFALL INTENSITY(INCH/HR) = 0.82
AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 58.49
TOTAL STREAM AREA(ACRES) = 58.49
PEAK FLOW RATE(CFS) AT CONFLUENCE = 14.18

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```

** CONFLUENCE DATA **

```

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2.36	31.55	0.548	0.60( 0.60)	1.00	30.4	10220.00
2	14.18	15.95	0.819	0.60( 0.60)	1.00	58.5	10230.00

```

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

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** PEAK FLOW RATE TABLE **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	15.96	15.95	0.819	0.60( 0.60)	1.00	73.9	10230.00
2	2.36	31.55	0.548	0.60( 0.60)	1.00	88.9	10220.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

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```

PEAK FLOW RATE(CFS) = 15.96 Tc(MIN.) = 15.95
EFFECTIVE AREA(ACRES) = 73.87 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 88.9
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 10238.00 TO NODE 10239.00 IS CODE = 31
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```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 197.00 DOWNSTREAM(FEET) = 193.00
FLOW LENGTH(FEET) = 753.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.90
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 15.96
PIPE TRAVEL TIME(MIN.) = 2.13 Tc(MIN.) = 18.08
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10239.00 = 4317.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 10238.10 TO NODE 10239.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.08
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.744
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
  LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -      2.22    0.60    0.916  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.72    SUBAREA RUNOFF(CFS) = 0.40
EFFECTIVE AREA(ACRES) = 76.59  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 91.6    PEAK FLOW RATE(CFS) = 15.96
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

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*****
FLOW PROCESS FROM NODE 10238.20 TO NODE 10239.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.08
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.744
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
  LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -     34.37    0.60    0.991  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991
SUBAREA AREA(ACRES) = 34.37    SUBAREA RUNOFF(CFS) = 5.25
EFFECTIVE AREA(ACRES) = 110.95  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 126.0    PEAK FLOW RATE(CFS) = 16.57

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*****
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 193.00  DOWNSTREAM(FEET) = 191.00
FLOW LENGTH(FEET) = 301.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.33
ESTIMATED PIPE DIAMETER(INCH) = 24.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 16.57
PIPE TRAVEL TIME(MIN.) = 0.79    Tc(MIN.) = 18.87
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10240.00 = 4618.00 FEET.
*****
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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```

MAINLINE Tc(MIN.) = 18.87
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.744
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
  LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -      2.22    0.60    0.916  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.916
SUBAREA AREA(ACRES) = 2.22    SUBAREA RUNOFF(CFS) = 0.39
EFFECTIVE AREA(ACRES) = 113.18  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 128.2    PEAK FLOW RATE(CFS) = 16.57
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10240.00 TO NODE 10241.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 191.00  DOWNSTREAM(FEET) = 180.00
FLOW LENGTH(FEET) = 150.00  MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.05
ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 16.57
PIPE TRAVEL TIME(MIN.) = 0.16    Tc(MIN.) = 19.03
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10241.00 = 4768.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10241.00 TO NODE 10242.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 180.00  DOWNSTREAM(FEET) = 169.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 267.00  CHANNEL SLOPE = 0.0412
CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.721
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
  LAND USE          GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -      2.16    0.60    0.958  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.72
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.97
AVERAGE FLOW DEPTH(FEET) = 0.97  TRAVEL TIME(MIN.) = 0.75
Tc(MIN.) = 19.77
SUBAREA AREA(ACRES) = 2.16    SUBAREA RUNOFF(CFS) = 0.28
EFFECTIVE AREA(ACRES) = 115.34  AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 130.4    PEAK FLOW RATE(CFS) = 16.57
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.96 FLOW VELOCITY(FEET/SEC.) = 5.94  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 11

-----  
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\*\*\*\*  
\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	16.57	19.77	0.721	0.60( 0.60)	0.99	115.3	10230.00
2	2.36	37.69	0.498	0.60( 0.60)	1.00	130.4	10220.00

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\*\*\*\*  
\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	6.72	30.66	0.555	0.60( 0.51)	0.85	70.2	10200.00

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	23.29	19.77	0.721	0.60( 0.57)	0.95	160.6	10230.00
2	14.66	30.66	0.555	0.60( 0.56)	0.94	194.7	10200.00
3	8.40	37.69	0.498	0.60( 0.57)	0.94	200.6	10220.00

TOTAL AREA(ACRES) = 200.6

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 23.29 Tc(MIN.) = 19.772  
EFFECTIVE AREA(ACRES) = 160.63 AREA-AVERAGED Fm(INCH/HR) = 0.57  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 200.6  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 12

-----  
>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10256.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 169.00 DOWNSTREAM(FEET) = 163.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 315.00 CHANNEL SLOPE = 0.0190  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.700

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.10	0.60	0.995	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.72

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.89

AVERAGE FLOW DEPTH(FEET) = 1.27 TRAVEL TIME(MIN.) = 1.07

Tc(MIN.) = 20.85

SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 0.85

EFFECTIVE AREA(ACRES) = 169.74 AREA-AVERAGED Fm(INCH/HR) = 0.57

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96

TOTAL AREA(ACRES) = 209.7 PEAK FLOW RATE(CFS) = 23.29

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.26 FLOW VELOCITY(FEET/SEC.) = 4.86

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10243.00 TO NODE 10256.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 20.85

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.700

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.01	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 7.01 SUBAREA RUNOFF(CFS) = 0.63

EFFECTIVE AREA(ACRES) = 176.74 AREA-AVERAGED Fm(INCH/HR) = 0.57

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96

TOTAL AREA(ACRES) = 216.7 PEAK FLOW RATE(CFS) = 23.29

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 20.85

RAINFALL INTENSITY(INCH/HR) = 0.70

AREA-AVERAGED Fm(INCH/HR) = 0.57

AREA-AVERAGED Fp(INCH/HR) = 0.60

AREA-AVERAGED Ap = 0.96

EFFECTIVE STREAM AREA(ACRES) = 176.74

TOTAL STREAM AREA(ACRES) = 216.71

PEAK FLOW RATE(CFS) AT CONFLUENCE = 23.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10250.00 TO NODE 10251.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 284.00

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 243.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.802  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.797

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "WOODLAND,GRASS"	-	1.04	0.60	1.000	0	16.80

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.18  
TOTAL AREA(ACRES) = 1.04 PEAK FLOW RATE(CFS) = 0.18

\*\*\*\*\*

FLOW PROCESS FROM NODE 10251.00 TO NODE 10252.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 243.00 DOWNSTREAM ELEVATION(FEET) = 240.00  
STREET LENGTH(FEET) = 301.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.28  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.17  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.43  
STREET FLOW TRAVEL TIME(MIN.) = 2.31 Tc(MIN.) = 19.12  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.738

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.47	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 0.18  
EFFECTIVE AREA(ACRES) = 2.51 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 0.31

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00  
FLOW VELOCITY(FEET/SEC.) = 2.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.43  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10252.00 = 585.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10252.00 TO NODE 10253.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 240.00 DOWNSTREAM ELEVATION(FEET) = 234.00  
STREET LENGTH(FEET) = 544.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.44  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.28  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.45  
STREET FLOW TRAVEL TIME(MIN.) = 3.98 Tc(MIN.) = 23.09  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.662

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.60 SUBAREA RUNOFF(CFS) = 0.26  
EFFECTIVE AREA(ACRES) = 7.12 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 0.40

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00  
FLOW VELOCITY(FEET/SEC.) = 2.28 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.45  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10253.00 = 1129.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 234.00 DOWNSTREAM(FEET) = 219.00  
FLOW LENGTH(FEET) = 362.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 1.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.53  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 0.40

PIPE TRAVEL TIME(MIN.) = 1.33 Tc(MIN.) = 24.42  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10254.00 = 1491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 24.42  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.639  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.55 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 0.30  
EFFECTIVE AREA(ACRES) = 15.66 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.7 PEAK FLOW RATE(CFS) = 0.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10254.00 TO NODE 10255.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 219.00 DOWNSTREAM(FEET) = 182.00  
FLOW LENGTH(FEET) = 716.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 1.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.39  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 0.55  
PIPE TRAVEL TIME(MIN.) = 2.21 Tc(MIN.) = 26.64  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10255.00 = 2207.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10255.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 182.00 DOWNSTREAM(FEET) = 163.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.0833  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.591  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 13.88 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.55  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.36

AVERAGE FLOW DEPTH(FEET) = 0.23 TRAVEL TIME(MIN.) = 1.13  
Tc(MIN.) = 27.77  
SUBAREA AREA(ACRES) = 13.88 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 29.54 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 29.5 PEAK FLOW RATE(CFS) = 0.55  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.23 FLOW VELOCITY(FEET/SEC.) = 3.36  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10256.00 = 2435.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 27.77  
RAINFALL INTENSITY(INCH/HR) = 0.59  
AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 29.54  
TOTAL STREAM AREA(ACRES) = 29.54  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 0.55

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	23.29	20.85	0.700	0.60( 0.57)	0.96	176.7	10230.00
1	14.66	31.87	0.545	0.60( 0.57)	0.95	210.8	10200.00
1	8.40	39.09	0.487	0.60( 0.57)	0.95	216.7	10220.00
2	0.55	27.77	0.591	0.60( 0.60)	1.00	29.5	10250.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	23.78	20.85	0.700	0.60( 0.58)	0.96	198.9	10230.00
2	18.42	27.77	0.591	0.60( 0.57)	0.96	227.7	10250.00
3	15.17	31.87	0.545	0.60( 0.57)	0.95	240.4	10200.00
4	8.86	39.09	0.487	0.60( 0.57)	0.95	246.3	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 23.78 Tc(MIN.) = 20.85  
EFFECTIVE AREA(ACRES) = 198.92 AREA-AVERAGED Fm(INCH/HR) = 0.58  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96  
TOTAL AREA(ACRES) = 246.3  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 246.3 TC (MIN.) = 20.85  
 EFFECTIVE AREA (ACRES) = 198.92 AREA-AVERAGED Fm (INCH/HR) = 0.58  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.962  
 PEAK FLOW RATE (CFS) = 23.78

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	23.78	20.85	0.700	0.60 ( 0.58)	0.96	198.9	10230.00
2	18.42	27.77	0.591	0.60 ( 0.57)	0.96	227.7	10250.00
3	15.17	31.87	0.545	0.60 ( 0.57)	0.95	240.4	10200.00
4	8.86	39.09	0.487	0.60 ( 0.57)	0.95	246.3	10220.00

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 END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

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FILE NAME: 0506103G.DAT  
TIME/DATE OF STUDY: 12:45 04/15/2013  
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--\*TIME-OF-CONCENTRATION MODEL\*--  
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NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10300.00 TO NODE 10301.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
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FLOW PROCESS FROM NODE 10301.00 TO NODE 10302.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
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FLOW PROCESS FROM NODE 10302.00 TO NODE 10302.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 1.62  
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 2.92

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10302.00 TO NODE 10303.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 467.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.2575  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.92  
FLOW VELOCITY(FEET/SEC.) = 6.10 FLOW DEPTH(FEET) = 0.40  
TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 5.97  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10303.00 = 610.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10303.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.97  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.434  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 2.25  
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 5.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10304.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 467.00 DOWNSTREAM(FEET) = 446.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 5.00  
FLOW VELOCITY(FEET/SEC.) = 6.26 FLOW DEPTH(FEET) = 0.52  
TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 6.28  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10304.00 = 725.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10304.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.28  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.397  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.60 0.500 -  
USER-DEFINED - 0.40 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 2.26  
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.32  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 7.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10305.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 446.00 DOWNSTREAM(FEET) = 366.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 423.00 CHANNEL SLOPE = 0.1891  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.10  
FLOW VELOCITY(FEET/SEC.) = 6.92 FLOW DEPTH(FEET) = 0.58  
TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 7.30  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10305.00 = 1148.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10305.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 7.30  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.280  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.60 0.500 -  
USER-DEFINED - 1.30 0.60 1.000 -  
USER-DEFINED - 1.50 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.912  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 2.24  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.39  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.65  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 8.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10306.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 300.00



CHANNEL LENGTH THRU SUBAREA(FEET) = 574.00 CHANNEL SLOPE = 0.1150  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.58  
 FLOW VELOCITY(FEET/SEC.) = 5.98 FLOW DEPTH(FEET) = 0.69  
 TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 8.89  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10306.00 = 1722.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10306.00 TO NODE 10306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 8.89  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.138  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	2.80	0.60	1.000	-
USER-DEFINED	-	0.50	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
 SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 1.77  
 EFFECTIVE AREA(ACRES) = 14.30 AREA-AVERAGED Fm(INCH/HR) = 0.44  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 14.3 PEAK FLOW RATE(CFS) = 8.98

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10306.00 TO NODE 10307.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 293.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.0350  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.98  
 FLOW VELOCITY(FEET/SEC.) = 3.86 FLOW DEPTH(FEET) = 0.88  
 TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 9.76  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10307.00 = 1922.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10307.00 TO NODE 10307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN.) = 9.76  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.077  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.30  
 EFFECTIVE AREA(ACRES) = 15.00 AREA-AVERAGED Fm(INCH/HR) = 0.45  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.75  
 TOTAL AREA(ACRES) = 15.0 PEAK FLOW RATE(CFS) = 8.98  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10307.00 TO NODE 10308.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 293.00 DOWNSTREAM(FEET) = 276.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.0850  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.98  
 FLOW VELOCITY(FEET/SEC.) = 6.70 FLOW DEPTH(FEET) = 0.67  
 TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 10.25  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10308.00 = 2122.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10308.00 TO NODE 10308.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 10.25  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.047  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.60	1.000	-
USER-DEFINED	-	8.50	0.60	0.500	-
USER-DEFINED	-	3.80	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.696  
 SUBAREA AREA(ACRES) = 14.00 SUBAREA RUNOFF(CFS) = 7.93  
 EFFECTIVE AREA(ACRES) = 29.00 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA(ACRES) = 29.0 PEAK FLOW RATE(CFS) = 16.02

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10308.00 TO NODE 10309.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 250.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 600.00 CHANNEL SLOPE = 0.0433  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 16.02  
 FLOW VELOCITY(FEET/SEC.) = 6.03 FLOW DEPTH(FEET) = 0.94  
 TRAVEL TIME(MIN.) = 1.66 Tc(MIN.) = 11.91  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10309.00 = 2722.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.91

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.964

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.00	0.60	0.600	-
USER-DEFINED	-	1.80	0.60	0.850	-
USER-DEFINED	-	1.40	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	3.40	0.60	0.500	-
USER-DEFINED	-	2.10	0.60	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.662

SUBAREA AREA(ACRES) = 15.40 SUBAREA RUNOFF(CFS) = 7.86

EFFECTIVE AREA(ACRES) = 44.40 AREA-AVERAGED Fm(INCH/HR) = 0.42

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.70

TOTAL AREA(ACRES) = 44.4 PEAK FLOW RATE(CFS) = 21.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.91

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.964

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.60	0.850	-
USER-DEFINED	-	8.80	0.60	1.000	-
USER-DEFINED	-	3.50	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.967

SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 5.47

EFFECTIVE AREA(ACRES) = 60.20 AREA-AVERAGED Fm(INCH/HR) = 0.46

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.77

TOTAL AREA(ACRES) = 60.2 PEAK FLOW RATE(CFS) = 27.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 250.00 DOWNSTREAM(FEET) = 208.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 1021.00 CHANNEL SLOPE = 0.0411

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00

CHANNEL FLOW THRU SUBAREA(CFS) = 27.19

FLOW VELOCITY(FEET/SEC.) = 6.77 FLOW DEPTH(FEET) = 1.16

TRAVEL TIME(MIN.) = 2.51 Tc(MIN.) = 14.43

LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10310.00 = 3743.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.43

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.863

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	4.00	0.60	0.600	-
USER-DEFINED	-	1.80	0.60	0.850	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.668

SUBAREA AREA(ACRES) = 6.60 SUBAREA RUNOFF(CFS) = 2.75

EFFECTIVE AREA(ACRES) = 66.80 AREA-AVERAGED Fm(INCH/HR) = 0.46

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.76

TOTAL AREA(ACRES) = 66.8 PEAK FLOW RATE(CFS) = 27.19

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.43

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.863

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.500	-
USER-DEFINED	-	8.00	0.60	0.600	-
USER-DEFINED	-	7.10	0.60	0.850	-
USER-DEFINED	-	8.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA(ACRES) = 23.50 SUBAREA RUNOFF(CFS) = 7.92

EFFECTIVE AREA(ACRES) = 90.30 AREA-AVERAGED Fm(INCH/HR) = 0.46

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.77

TOTAL AREA(ACRES) = 90.3 PEAK FLOW RATE(CFS) = 32.36

\*\*\*\*\*

FLOW PROCESS FROM NODE 10310.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 208.00 DOWNSTREAM(FEET) = 189.00

FLOW LENGTH(FEET) = 1595.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 9.52

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 32.36

PIPE TRAVEL TIME(MIN.) = 2.79 Tc(MIN.) = 17.22

LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10335.00 = 5338.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 17.22
RAINFALL INTENSITY(INCH/HR) = 0.79
AREA-AVERAGED Fm(INCH/HR) = 0.46
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.77
EFFECTIVE STREAM AREA(ACRES) = 90.30
TOTAL STREAM AREA(ACRES) = 90.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 32.36

\*\*\*\*\*

FLOW PROCESS FROM NODE 10320.00 TO NODE 10321.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 671.00 DOWNSTREAM(FEET) = 622.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.795
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.461

SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.00 0.60 0.500 95 5.79
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 1.04
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 1.04

\*\*\*\*\*

FLOW PROCESS FROM NODE 10321.00 TO NODE 10322.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 622.00 DOWNSTREAM(FEET) = 599.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 227.00 CHANNEL SLOPE = 0.1013
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.04
FLOW VELOCITY(FEET/SEC.) = 4.23 FLOW DEPTH(FEET) = 0.29
TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 6.69
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10322.00 = 557.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10322.00 TO NODE 10322.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.69
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.347
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.32
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 2.26

\*\*\*\*\*

FLOW PROCESS FROM NODE 10322.00 TO NODE 10323.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 599.00 DOWNSTREAM(FEET) = 539.00
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 2.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.39
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.26
PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 6.85
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10323.00 = 719.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10323.00 TO NODE 10323.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.85
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.327
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 0.46
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 2.68

\*\*\*\*\*

FLOW PROCESS FROM NODE 10323.00 TO NODE 10324.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 539.00 DOWNSTREAM(FEET) = 530.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 97.00 CHANNEL SLOPE = 0.0928
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.68  
FLOW VELOCITY (FEET/SEC.) = 4.18 FLOW DEPTH (FEET) = 0.46  
TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 7.24  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10324.00 = 816.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10324.00 TO NODE 10324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 7.24  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.286  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.80 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 1.60  
EFFECTIVE AREA (ACRES) = 4.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 4.7 PEAK FLOW RATE (CFS) = 4.17

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10324.00 TO NODE 10325.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 530.00 DOWNSTREAM (FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 210.00 CHANNEL SLOPE = 0.1429  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.17  
FLOW VELOCITY (FEET/SEC.) = 5.42 FLOW DEPTH (FEET) = 0.51  
TRAVEL TIME (MIN.) = 0.65 Tc (MIN.) = 7.89  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10325.00 = 1026.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10325.00 TO NODE 10325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 7.89  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.221  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 1.70 SUBAREA RUNOFF (CFS) = 1.41  
EFFECTIVE AREA (ACRES) = 6.40 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 6.4 PEAK FLOW RATE (CFS) = 5.31

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10326.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 500.00 DOWNSTREAM (FEET) = 460.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 345.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 5.31  
FLOW VELOCITY (FEET/SEC.) = 5.31 FLOW DEPTH (FEET) = 0.58  
TRAVEL TIME (MIN.) = 1.08 Tc (MIN.) = 8.97  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10326.00 = 1371.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10326.00 TO NODE 10326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.97  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.132  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.90 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 1.90 SUBAREA RUNOFF (CFS) = 1.42  
EFFECTIVE AREA (ACRES) = 8.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 8.3 PEAK FLOW RATE (CFS) = 6.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10326.00 TO NODE 10327.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 460.00 DOWNSTREAM (FEET) = 430.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 263.00 CHANNEL SLOPE = 0.1141  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 6.22  
FLOW VELOCITY (FEET/SEC.) = 5.51 FLOW DEPTH (FEET) = 0.61  
TRAVEL TIME (MIN.) = 0.80 Tc (MIN.) = 9.76  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10327.00 = 1634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.76  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.077  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.60 0.500 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 2.87  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 8.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10328.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 375.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 437.00 CHANNEL SLOPE = 0.1259  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 8.67  
FLOW VELOCITY(FEET/SEC.) = 7.68 FLOW DEPTH(FEET) = 0.61  
TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 10.71  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10328.00 = 2071.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10328.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 10.71  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.024  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.60 0.500 -  
USER-DEFINED - 1.20 0.60 0.850 -  
USER-DEFINED - 0.90 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.772  
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 1.62  
EFFECTIVE AREA(ACRES) = 15.60 AREA-AVERAGED Fm(INCH/HR) = 0.33  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 15.6 PEAK FLOW RATE(CFS) = 9.70

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10329.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 375.00 DOWNSTREAM(FEET) = 372.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 224.00 CHANNEL SLOPE = 0.0134  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.70  
FLOW VELOCITY(FEET/SEC.) = 3.42 FLOW DEPTH(FEET) = 0.97  
TRAVEL TIME(MIN.) = 1.09 Tc(MIN.) = 11.80  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10329.00 = 2295.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10329.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 11.80  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.970  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.20 0.60 0.500 -  
USER-DEFINED - 1.40 0.60 0.850 -  
USER-DEFINED - 0.60 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.571  
SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 6.33  
EFFECTIVE AREA(ACRES) = 26.80 AREA-AVERAGED Fm(INCH/HR) = 0.34  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 26.8 PEAK FLOW RATE(CFS) = 15.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10329.00 TO NODE 10330.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 300.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 452.00 CHANNEL SLOPE = 0.1593  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 15.26  
FLOW VELOCITY(FEET/SEC.) = 9.76 FLOW DEPTH(FEET) = 0.72  
TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 12.57  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10330.00 = 2747.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10330.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 12.57  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.937  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.60 0.850 -  
USER-DEFINED - 4.20 0.60 0.500 -  
USER-DEFINED - 2.50 0.60 0.850 -  
USER-DEFINED - 0.60 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.673  
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 3.74  
EFFECTIVE AREA(ACRES) = 34.60 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 34.6 PEAK FLOW RATE(CFS) = 18.21

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10331.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 295.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 182.00 CHANNEL SLOPE = 0.0275
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 18.21
FLOW VELOCITY(FEET/SEC.) = 5.22 FLOW DEPTH(FEET) = 1.08
TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 13.16
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10331.00 = 2929.00 FEET.

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*****
FLOW PROCESS FROM NODE 10331.00 TO NODE 10331.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.16
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.914
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.70   0.60  0.850 -
USER-DEFINED        -        11.30   0.60  0.500 -
USER-DEFINED        -         0.20   0.60  0.600 -
USER-DEFINED        -         4.20   0.60  0.850 -
USER-DEFINED        -         1.60   0.60  1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.652
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 8.94
EFFECTIVE AREA(ACRES) = 53.60 AREA-AVERAGED Fm(INCH/HR) = 0.37
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 53.6 PEAK FLOW RATE(CFS) = 26.43

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*****
FLOW PROCESS FROM NODE 10331.00 TO NODE 10332.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 295.00 DOWNSTREAM(FEET) = 245.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.00 CHANNEL SLOPE = 0.0542
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 26.43
FLOW VELOCITY(FEET/SEC.) = 7.44 FLOW DEPTH(FEET) = 1.09
TRAVEL TIME(MIN.) = 2.07 Tc(MIN.) = 15.22
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10332.00 = 3851.00 FEET.

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*****
FLOW PROCESS FROM NODE 10332.00 TO NODE 10332.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.22
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.835
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS

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LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.60  0.850 -
USER-DEFINED        -         1.40   0.60  0.500 -
USER-DEFINED        -        15.40   0.60  0.850 -
USER-DEFINED        -         8.60   0.60  1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.881
SUBAREA AREA(ACRES) = 25.60 SUBAREA RUNOFF(CFS) = 7.05
EFFECTIVE AREA(ACRES) = 79.20 AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 79.2 PEAK FLOW RATE(CFS) = 29.67

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*****
FLOW PROCESS FROM NODE 10332.00 TO NODE 10333.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 199.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 564.00 CHANNEL SLOPE = 0.0816
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 29.67
FLOW VELOCITY(FEET/SEC.) = 8.87 FLOW DEPTH(FEET) = 1.06
TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 16.28
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10333.00 = 4415.00 FEET.

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*****
FLOW PROCESS FROM NODE 10333.00 TO NODE 10333.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.28
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.809
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.50   0.60  0.500 -
USER-DEFINED        -         0.50   0.60  0.850 -
USER-DEFINED        -         0.60   0.60  0.500 -
USER-DEFINED        -         5.70   0.60  0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.761
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 2.63
EFFECTIVE AREA(ACRES) = 87.50 AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 87.5 PEAK FLOW RATE(CFS) = 30.49

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*****
FLOW PROCESS FROM NODE 10333.00 TO NODE 10334.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 195.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 454.00 CHANNEL SLOPE = 0.0088
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 4.00

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CHANNEL FLOW THRU SUBAREA(CFS) = 30.49  
 FLOW VELOCITY(FEET/SEC.) = 3.90 FLOW DEPTH(FEET) = 1.61  
 TRAVEL TIME(MIN.) = 1.94 Tc(MIN.) = 18.22  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10334.00 = 4869.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10334.00 TO NODE 10334.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 18.22  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.763  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.10 0.60 0.800 -  
 USER-DEFINED - 2.60 0.60 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835  
 SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 0.87  
 EFFECTIVE AREA(ACRES) = 91.20 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.71  
 TOTAL AREA(ACRES) = 91.2 PEAK FLOW RATE(CFS) = 30.49  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10334.00 TO NODE 10335.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 195.00 DOWNSTREAM(FEET) = 189.00  
 FLOW LENGTH(FEET) = 1291.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 6.51  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 30.49  
 PIPE TRAVEL TIME(MIN.) = 3.31 Tc(MIN.) = 21.53  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 21.53  
 RAINFALL INTENSITY(INCH/HR) = 0.69  
 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.71  
 EFFECTIVE STREAM AREA(ACRES) = 91.20  
 TOTAL STREAM AREA(ACRES) = 91.20  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 30.49

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	32.36	17.22	0.787	0.60( 0.46)	0.77	90.3	10300.00
2	30.49	21.53	0.693	0.60( 0.43)	0.71	91.2	10320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	62.85	17.22	0.787	0.60( 0.45)	0.75	163.2	10300.00
2	53.38	21.53	0.693	0.60( 0.44)	0.74	181.5	10320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 62.85 Tc(MIN.) = 17.22  
 EFFECTIVE AREA(ACRES) = 163.24 AREA-AVERAGED Fm(INCH/HR) = 0.45  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.75  
 TOTAL AREA(ACRES) = 181.5  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10335.00 TO NODE 10336.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 189.00 DOWNSTREAM(FEET) = 188.00  
 FLOW LENGTH(FEET) = 103.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 26.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.37  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 62.85  
 PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 17.38  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10336.00 = 6263.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10336.00 TO NODE 10337.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 180.00  
 FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.22  
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 62.85  
 PIPE TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 17.59  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10337.00 = 6475.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10337.00 TO NODE 10338.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 161.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 872.00 CHANNEL SLOPE = 0.0218  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 62.85  
FLOW VELOCITY (FEET/SEC.) = 6.55 FLOW DEPTH (FEET) = 1.79  
TRAVEL TIME (MIN.) = 2.22 Tc (MIN.) = 19.81  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10338.00 = 7347.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 19.81  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.725  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.60 0.850 -  
USER-DEFINED - 0.80 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 1.000 -  
USER-DEFINED - 1.30 0.60 1.000 -  
USER-DEFINED - 0.90 0.60 0.850 -  
USER-DEFINED - 0.20 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.943  
SUBAREA AREA (ACRES) = 4.20 SUBAREA RUNOFF (CFS) = 0.60  
EFFECTIVE AREA (ACRES) = 167.44 AREA-AVERAGED Fm (INCH/HR) = 0.45  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 185.7 PEAK FLOW RATE (CFS) = 62.85  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 19.81  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.725  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.60 1.000 -  
USER-DEFINED - 4.60 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 0.56  
EFFECTIVE AREA (ACRES) = 172.44 AREA-AVERAGED Fm (INCH/HR) = 0.45  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 190.7 PEAK FLOW RATE (CFS) = 62.85  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10339.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
-----

ELEVATION DATA: UPSTREAM (FEET) = 161.00 DOWNSTREAM (FEET) = 159.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 328.00 CHANNEL SLOPE = 0.0061  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 62.85  
FLOW VELOCITY (FEET/SEC.) = 4.06 FLOW DEPTH (FEET) = 2.27  
TRAVEL TIME (MIN.) = 1.35 Tc (MIN.) = 21.15  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10339.00 = 7675.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 21.15  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.699  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.60 0.850 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 0.20 0.60 1.000 -  
USER-DEFINED - 0.40 0.60 0.500 -  
USER-DEFINED - 2.30 0.60 0.850 -  
USER-DEFINED - 0.40 0.60 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.767  
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 1.49  
EFFECTIVE AREA (ACRES) = 179.34 AREA-AVERAGED Fm (INCH/HR) = 0.45  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 62.85  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 21.15  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.699  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.60 0.500 -  
USER-DEFINED - 6.30 0.60 0.850 -  
USER-DEFINED - 0.20 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 2.20 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.876  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 1.44  
EFFECTIVE AREA (ACRES) = 188.54 AREA-AVERAGED Fm (INCH/HR) = 0.46  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 206.8 PEAK FLOW RATE (CFS) = 62.85  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10390.00 IS CODE = 51



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-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 159.00 DOWNSTREAM(FEET) = 155.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 782.00 CHANNEL SLOPE = 0.0051
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 62.85
FLOW VELOCITY(FEET/SEC.) = 3.80 FLOW DEPTH(FEET) = 2.35
TRAVEL TIME(MIN.) = 3.43 Tc(MIN.) = 24.58
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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MAINLINE Tc(MIN.) = 24.58
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.638
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.30     0.60     0.800   -
USER-DEFINED        -         3.70     0.60     0.850   -
USER-DEFINED        -         0.10     0.60     1.000   -
USER-DEFINED        -         2.10     0.60     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.901
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 0.54
EFFECTIVE AREA(ACRES) = 194.74 AREA-AVERAGED Fm(INCH/HR) = 0.46
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 213.0 PEAK FLOW RATE(CFS) = 62.85
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
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*****
FLOW PROCESS FROM NODE 10340.00 TO NODE 10341.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

```

```

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 585.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.581
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.031
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS   Tc
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE"   -         0.10     0.60     0.800   95   10.58

```

```

PUBLIC PARK - 0.50 0.60 0.850 95 10.90
AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW" - 0.40 0.60 1.000 95 21.09
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA RUNOFF(CFS) = 0.44
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 0.44

```

```

*****
FLOW PROCESS FROM NODE 10341.00 TO NODE 10342.00 IS CODE = 63
-----

```

```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====

```

```

UPSTREAM ELEVATION(FEET) = 585.00 DOWNSTREAM ELEVATION(FEET) = 570.00
STREET LENGTH(FEET) = 250.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

```

```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.85
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.32
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.05
STREET FLOW TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 11.36
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.992

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```

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70     0.60     0.800   -
USER-DEFINED        -         1.40     0.60     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 0.82
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.55
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 1.22

```

```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00
FLOW VELOCITY(FEET/SEC.) = 5.32 DEPTH*VELOCITY(FT*FT/SEC.) = 1.05
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10342.00 = 558.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

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```

=====
UPSTREAM ELEVATION(FEET) = 570.00  DOWNSTREAM ELEVATION(FEET) = 560.00
STREET LENGTH(FEET) = 415.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.65
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.22
HALFSTREET FLOOD WIDTH(FEET) = 2.89
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.02
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.65
STREET FLOW TRAVEL TIME(MIN.) = 2.29  Tc(MIN.) = 13.65
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.894
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -  1.20  0.60  0.800  -
USER-DEFINED  -  1.20  0.60  0.850  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.825
SUBAREA AREA(ACRES) = 2.40  SUBAREA RUNOFF(CFS) = 0.86
EFFECTIVE AREA(ACRES) = 5.50  AREA-AVERAGED Fm(INCH/HR) = 0.53
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 5.5  PEAK FLOW RATE(CFS) = 1.81

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.23  HALFSTREET FLOOD WIDTH(FEET) = 3.45
FLOW VELOCITY(FEET/SEC.) = 2.93  DEPTH*VELOCITY(FT*FT/SEC.) = 0.67
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10343.00 = 973.00 FEET.

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*****
FLOW PROCESS FROM NODE 10343.00 TO NODE 10344.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

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```

=====
UPSTREAM ELEVATION(FEET) = 560.00  DOWNSTREAM ELEVATION(FEET) = 550.00
STREET LENGTH(FEET) = 616.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.18
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.26
HALFSTREET FLOOD WIDTH(FEET) = 5.12
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.41
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.63
STREET FLOW TRAVEL TIME(MIN.) = 4.26  Tc(MIN.) = 17.92
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.770
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -  2.10  0.60  0.800  -
USER-DEFINED  -  0.80  0.60  0.850  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814
SUBAREA AREA(ACRES) = 2.90  SUBAREA RUNOFF(CFS) = 0.74
EFFECTIVE AREA(ACRES) = 8.40  AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.86
TOTAL AREA(ACRES) = 8.4  PEAK FLOW RATE(CFS) = 1.93

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.25  HALFSTREET FLOOD WIDTH(FEET) = 4.67
FLOW VELOCITY(FEET/SEC.) = 2.37  DEPTH*VELOCITY(FT*FT/SEC.) = 0.60
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10344.00 = 1589.00 FEET.

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*****
FLOW PROCESS FROM NODE 10344.00 TO NODE 10345.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

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=====
UPSTREAM ELEVATION(FEET) = 550.00  DOWNSTREAM ELEVATION(FEET) = 510.00
STREET LENGTH(FEET) = 474.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.28
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.31
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.25
STREET FLOW TRAVEL TIME(MIN.) = 1.25  Tc(MIN.) = 19.17
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.740
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN

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USER-DEFINED          -      2.80      0.60      0.800      -
USER-DEFINED          -      0.20      0.60      0.850      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803
SUBAREA AREA(ACRES) =      3.00      SUBAREA RUNOFF(CFS) =      0.70
EFFECTIVE AREA(ACRES) =      11.40      AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) =      11.4      PEAK FLOW RATE(CFS) =      2.40

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00
FLOW VELOCITY(FEET/SEC.) = 6.31 DEPTH*VELOCITY(FT*FT/SEC.) = 1.25
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10345.00 = 2063.00 FEET.

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*****
FLOW PROCESS FROM NODE 10345.00 TO NODE 10346.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 510.00 DOWNSTREAM ELEVATION(FEET) = 484.00
STREET LENGTH(FEET) = 231.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.54

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.67
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.28
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.44
STREET FLOW TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 19.70
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.727
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -      2.40      0.60      0.800      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 0.53
EFFECTIVE AREA(ACRES) = 13.80 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 13.8 PEAK FLOW RATE(CFS) = 2.81

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00
FLOW VELOCITY(FEET/SEC.) = 7.28 DEPTH*VELOCITY(FT*FT/SEC.) = 1.44
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10346.00 = 2294.00 FEET.

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*****
FLOW PROCESS FROM NODE 10346.00 TO NODE 10347.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 484.00 DOWNSTREAM ELEVATION(FEET) = 378.00
STREET LENGTH(FEET) = 995.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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```

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.55

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.18
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.09
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.41
STREET FLOW TRAVEL TIME(MIN.) = 2.34 Tc(MIN.) = 22.04
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.683
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -      4.10      0.60      0.800      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 0.75
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.83
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 3.01

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00
FLOW VELOCITY(FEET/SEC.) = 7.09 DEPTH*VELOCITY(FT*FT/SEC.) = 1.41
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10347.00 = 3289.00 FEET.

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*****
FLOW PROCESS FROM NODE 10347.00 TO NODE 10348.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 378.00 DOWNSTREAM ELEVATION(FEET) = 303.00
STREET LENGTH(FEET) = 751.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

```

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.56

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.62  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.23  
HALFSTREET FLOOD WIDTH(FEET) = 3.35  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.01  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.35  
STREET FLOW TRAVEL TIME(MIN.) = 2.08 Tc(MIN.) = 24.12  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.646

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.20 0.60 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 1.22  
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 3.63

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.23 HALFSTREET FLOOD WIDTH(FEET) = 3.40  
FLOW VELOCITY(FEET/SEC.) = 5.96 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.35  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10348.00 = 4040.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10348.00 TO NODE 10349.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 303.00 DOWNSTREAM ELEVATION(FEET) = 252.00  
STREET LENGTH(FEET) = 607.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.23  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.25  
HALFSTREET FLOOD WIDTH(FEET) = 4.46  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.44  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.35  
STREET FLOW TRAVEL TIME(MIN.) = 1.86 Tc(MIN.) = 25.98  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.618

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.30 0.60 0.800 -  
USER-DEFINED - 3.00 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.815  
SUBAREA AREA(ACRES) = 10.30 SUBAREA RUNOFF(CFS) = 1.20  
EFFECTIVE AREA(ACRES) = 36.40 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 36.4 PEAK FLOW RATE(CFS) = 4.18

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.25 HALFSTREET FLOOD WIDTH(FEET) = 4.46  
FLOW VELOCITY(FEET/SEC.) = 5.38 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.33  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10349.00 = 4647.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10349.00 TO NODE 10350.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 252.00 DOWNSTREAM ELEVATION(FEET) = 246.00  
STREET LENGTH(FEET) = 224.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.92  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.36  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.36  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.03  
STREET FLOW TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 27.09  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.605

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 12.60 0.60 0.800 -  
USER-DEFINED - 0.50 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.802  
SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 1.46  
EFFECTIVE AREA(ACRES) = 49.50 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 49.5 PEAK FLOW RATE(CFS) = 5.21

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 7.56  
FLOW VELOCITY(FEET/SEC.) = 3.42 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.06  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10350.00 = 4871.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10350.00 TO NODE 10351.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	246.00	DOWNSTREAM(FEET) =	237.00
FLOW LENGTH(FEET) =	519.00	MANNING'S N =	0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO	18.000		
DEPTH OF FLOW IN 18.0 INCH PIPE IS	7.9 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	7.00		
ESTIMATED PIPE DIAMETER(INCH) =	18.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	5.21		
PIPE TRAVEL TIME(MIN.) =	1.24	Tc(MIN.) =	28.32
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10351.00 =	5390.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10351.00 TO NODE 10351.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	28.32				
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.590				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	5.60	0.60	0.800	-
USER-DEFINED	-	0.70	0.60	0.850	-
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =	0.60				
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =	0.784				
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;					
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.					
SUBAREA AREA(ACRES) =	6.50	SUBAREA RUNOFF(CFS) =	0.75		
EFFECTIVE AREA(ACRES) =	56.00	AREA-AVERAGED Fm(INCH/HR) =	0.49		
AREA-AVERAGED Fp(INCH/HR) =	0.60	AREA-AVERAGED Ap =	0.81		
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;					
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.					
TOTAL AREA(ACRES) =	56.0	PEAK FLOW RATE(CFS) =	5.65		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10351.00 TO NODE 10352.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	237.00	DOWNSTREAM(FEET) =	230.00
FLOW LENGTH(FEET) =	675.00	MANNING'S N =	0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO	18.000		
DEPTH OF FLOW IN 18.0 INCH PIPE IS	9.6 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	5.89		
ESTIMATED PIPE DIAMETER(INCH) =	18.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	5.65		
PIPE TRAVEL TIME(MIN.) =	1.91	Tc(MIN.) =	30.23

LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10352.00 = 6065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	30.23				
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.568				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	1.00	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	0.800	-
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =	0.60				
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =	0.300				
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;					
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.					
SUBAREA AREA(ACRES) =	1.40	SUBAREA RUNOFF(CFS) =	0.50		
EFFECTIVE AREA(ACRES) =	57.40	AREA-AVERAGED Fm(INCH/HR) =	0.48		
AREA-AVERAGED Fp(INCH/HR) =	0.60	AREA-AVERAGED Ap =	0.80		
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;					
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.					
TOTAL AREA(ACRES) =	57.4	PEAK FLOW RATE(CFS) =	5.94		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	30.23				
* 2 YEAR RAINFALL INTENSITY(INCH/HR) =	0.568				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.80	0.60	0.100	-
USER-DEFINED	-	9.40	0.60	0.800	-
USER-DEFINED	-	1.10	0.60	0.850	-
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =	0.60				
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =	0.755				
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;					
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.					
SUBAREA AREA(ACRES) =	11.30	SUBAREA RUNOFF(CFS) =	1.41		
EFFECTIVE AREA(ACRES) =	68.70	AREA-AVERAGED Fm(INCH/HR) =	0.47		
AREA-AVERAGED Fp(INCH/HR) =	0.60	AREA-AVERAGED Ap =	0.79		
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;					
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.					
TOTAL AREA(ACRES) =	68.7	PEAK FLOW RATE(CFS) =	7.35		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10352.00 TO NODE 10353.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	230.00	DOWNSTREAM(FEET) =	180.00
FLOW LENGTH(FEET) =	301.00	MANNING'S N =	0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO	18.000		

DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.44  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 7.35  
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 30.52  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10353.00 = 6366.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10353.00 TO NODE 10353.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 30.52  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.565  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.100 -  
USER-DEFINED - 6.00 0.60 0.800 -  
USER-DEFINED - 1.30 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.799  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 0.76  
EFFECTIVE AREA(ACRES) = 76.10 AREA-AVERAGED Fm(INCH/HR) = 0.47  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.79  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 76.1 PEAK FLOW RATE(CFS) = 8.07

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10353.00 TO NODE 10354.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 172.00  
FLOW LENGTH(FEET) = 458.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.83  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 8.07  
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 31.50  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10354.00 = 6824.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10354.00 TO NODE 10390.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 172.00 DOWNSTREAM(FEET) = 155.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00 CHANNEL SLOPE = 0.0411  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 8.07

FLOW VELOCITY(FEET/SEC.) = 4.98 FLOW DEPTH(FEET) = 0.74  
TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 32.88  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 32.88  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.544  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.60 0.100 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 0.100 -  
USER-DEFINED - 0.90 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 0.47  
EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.47  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.78  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 8.24

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 32.88  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.544  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.60 1.000 -  
USER-DEFINED - 0.60 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 0.850 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 0.100 -  
USER-DEFINED - 2.10 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.964  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 0.07  
EFFECTIVE AREA(ACRES) = 81.90 AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.79  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 81.9 PEAK FLOW RATE(CFS) = 8.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 32.88
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.544
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.50 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 84.40 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 84.4 PEAK FLOW RATE(CFS) = 8.30

\*\*\*\*\*
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 8.30 32.88 0.544 0.60( 0.48) 0.80 84.4 10340.00
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 62.85 24.58 0.638 0.60( 0.46) 0.77 194.7 10300.00
2 53.38 29.19 0.580 0.60( 0.46) 0.76 213.0 10320.00
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 71.16 24.58 0.638 0.60( 0.47) 0.78 257.8 10300.00
2 61.23 29.19 0.580 0.60( 0.46) 0.77 287.9 10320.00
3 58.40 32.88 0.544 0.60( 0.46) 0.77 297.4 10340.00
TOTAL AREA(ACRES) = 297.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 71.16 Tc(MIN.) = 24.578
EFFECTIVE AREA(ACRES) = 257.82 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 297.4
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1<<<<

\*\*\*\*\*
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<

\*\*\*\*\*
FLOW PROCESS FROM NODE 10360.00 TO NODE 10361.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 337.00 DOWNSTREAM(FEET) = 292.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.697
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.025
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"WOODLAND,GRASS" - 0.30 0.60 1.000 95 10.70
NATURAL FAIR COVER
"GRASS" - 0.50 0.60 1.000 95 10.70
NATURAL FAIR COVER
"WOODLAND,GRASS" - 0.10 0.60 1.000 95 10.70
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.34
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 0.34

\*\*\*\*\*
FLOW PROCESS FROM NODE 10361.00 TO NODE 10362.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 292.00 DOWNSTREAM(FEET) = 290.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 199.00 CHANNEL SLOPE = 0.0101
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.34
FLOW VELOCITY(FEET/SEC.) = 1.34 FLOW DEPTH(FEET) = 0.29
TRAVEL TIME(MIN.) = 2.48 Tc(MIN.) = 13.17
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10362.00 = 529.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10362.00 TO NODE 10362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.17
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.913
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.90	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 0.32  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 0.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10362.00 TO NODE 10363.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 290.00 DOWNSTREAM(FEET) = 288.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.57  
FLOW VELOCITY(FEET/SEC.) = 1.72 FLOW DEPTH(FEET) = 0.33  
TRAVEL TIME(MIN.) = 1.42 Tc(MIN.) = 14.60  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10363.00 = 676.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10363.00 TO NODE 10363.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 14.60  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.856  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	0.80	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.988  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 0.57  
EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 1.04

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10363.00 TO NODE 10364.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 288.00 DOWNSTREAM(FEET) = 286.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.04

FLOW VELOCITY(FEET/SEC.) = 1.99 FLOW DEPTH(FEET) = 0.42  
TRAVEL TIME(MIN.) = 1.23 Tc(MIN.) = 15.83  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10364.00 = 823.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10364.00 TO NODE 10364.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 15.83  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.820  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	1.40	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.984  
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 0.39  
EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 1.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10364.00 TO NODE 10365.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 286.00 DOWNSTREAM(FEET) = 284.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.29  
FLOW VELOCITY(FEET/SEC.) = 1.71 FLOW DEPTH(FEET) = 0.50  
TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 18.24  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10365.00 = 1071.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10365.00 TO NODE 10365.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 18.24  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.762  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	1.000	-
USER-DEFINED	-	1.80	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	0.50	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.987  
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 0.54



EFFECTIVE AREA (ACRES) = 9.80 AREA-AVERAGED Fm (INCH/HR) = 0.59  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 9.8 PEAK FLOW RATE (CFS) = 1.50

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10365.00 TO NODE 10366.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 284.00 DOWNSTREAM (FEET) = 282.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 248.00 CHANNEL SLOPE = 0.0081  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 1.50  
FLOW VELOCITY (FEET/SEC.) = 1.77 FLOW DEPTH (FEET) = 0.53  
TRAVEL TIME (MIN.) = 2.34 Tc (MIN.) = 20.57  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10366.00 = 1319.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10366.00 TO NODE 10366.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 20.57  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.710  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.850 -  
USER-DEFINED - 3.20 0.60 1.000 -  
USER-DEFINED - 2.30 0.60 1.000 -  
USER-DEFINED - 0.20 0.60 0.850 -  
USER-DEFINED - 2.70 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.995  
SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 0.86  
EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.59  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 1.90

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10366.00 TO NODE 10367.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 279.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 292.00 CHANNEL SLOPE = 0.0103  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 1.90  
FLOW VELOCITY (FEET/SEC.) = 2.06 FLOW DEPTH (FEET) = 0.55  
TRAVEL TIME (MIN.) = 2.36 Tc (MIN.) = 22.93  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10367.00 = 1611.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10367.00 TO NODE 10367.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 22.93  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.667  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.60 0.850 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 1.10 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 0.850 -  
USER-DEFINED - 0.10 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.972  
SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 0.12  
EFFECTIVE AREA (ACRES) = 19.90 AREA-AVERAGED Fm (INCH/HR) = 0.59  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 19.9 PEAK FLOW RATE (CFS) = 1.90  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10367.00 TO NODE 10368.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 279.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 378.00 CHANNEL SLOPE = 0.0079  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 1.90  
FLOW VELOCITY (FEET/SEC.) = 1.86 FLOW DEPTH (FEET) = 0.58  
TRAVEL TIME (MIN.) = 3.38 Tc (MIN.) = 26.31  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10368.00 = 1989.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10368.00 TO NODE 10368.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 26.31  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.614  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.60 0.850 -  
USER-DEFINED - 0.90 0.60 1.000 -  
USER-DEFINED - 0.90 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.973  
SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 0.06  
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.59  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 1.90  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10369.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 247.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 229.00 CHANNEL SLOPE = 0.1266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.90  
FLOW VELOCITY(FEET/SEC.) = 5.28 FLOW DEPTH(FEET) = 0.35  
TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 27.04  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10369.00 = 2218.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10369.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----

MAINLINE Tc(MIN.) = 27.04  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.606  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	9.70	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	1.40	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.996  
SUBAREA AREA(ACRES) = 11.60 SUBAREA RUNOFF(CFS) = 0.08  
EFFECTIVE AREA(ACRES) = 33.70 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 33.7 PEAK FLOW RATE(CFS) = 1.90  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10370.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 247.00 DOWNSTREAM(FEET) = 226.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 179.00 CHANNEL SLOPE = 0.1173  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.90  
FLOW VELOCITY(FEET/SEC.) = 5.05 FLOW DEPTH(FEET) = 0.35  
TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 27.63  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10370.00 = 2397.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10370.00 TO NODE 10370.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 27.63  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.598

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	3.60	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	5.60	0.60	1.000	-
USER-DEFINED	-	1.50	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.997  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 0.02  
EFFECTIVE AREA(ACRES) = 44.80 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 44.8 PEAK FLOW RATE(CFS) = 1.90  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10370.00 TO NODE 10371.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 226.00 DOWNSTREAM(FEET) = 188.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 434.00 CHANNEL SLOPE = 0.0876  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.90  
FLOW VELOCITY(FEET/SEC.) = 4.60 FLOW DEPTH(FEET) = 0.37  
TRAVEL TIME(MIN.) = 1.57 Tc(MIN.) = 29.20  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10371.00 = 2831.00 FEET.

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FLOW PROCESS FROM NODE 10371.00 TO NODE 10371.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 29.20  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.580  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	1.20	0.60	0.850	-
USER-DEFINED	-	1.60	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	7.20	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.958  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA(ACRES) = 10.70 SUBAREA RUNOFF(CFS) = 0.23  
EFFECTIVE AREA(ACRES) = 55.50 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 1.90  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10371.00 TO NODE 10389.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 157.00  
 FLOW LENGTH(FEET) = 1918.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.16  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 1.90  
 PIPE TRAVEL TIME(MIN.) = 6.20 Tc(MIN.) = 35.40  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1  
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

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TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 35.40  
 RAINFALL INTENSITY(INCH/HR) = 0.52  
 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.99  
 EFFECTIVE STREAM AREA(ACRES) = 55.50  
 TOTAL STREAM AREA(ACRES) = 55.50  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.90

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10380.00 TO NODE 10381.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 241.00  
 ELEVATION DATA: UPSTREAM(FEET) = 275.00 DOWNSTREAM(FEET) = 273.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.110  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.299

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.60	0.100	95	7.11
PUBLIC PARK	-	1.10	0.60	0.850	95	11.30

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.735  
 SUBAREA RUNOFF(CFS) = 1.00  
 TOTAL AREA(ACRES) = 1.30 PEAK FLOW RATE(CFS) = 1.00

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10381.00 TO NODE 10382.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 273.00 DOWNSTREAM ELEVATION(FEET) = 271.00  
 STREET LENGTH(FEET) = 238.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.52

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.26  
 HALFSTREET FLOOD WIDTH(FEET) = 5.03  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.72  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.44  
 STREET FLOW TRAVEL TIME(MIN.) = 2.31 Tc(MIN.) = 9.42  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.100

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	1.40	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.718  
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 1.03  
 EFFECTIVE AREA(ACRES) = 3.00 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 1.80

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 5.66  
 FLOW VELOCITY(FEET/SEC.) = 1.76 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.48  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10382.00 = 479.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10382.00 TO NODE 10383.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 271.00 DOWNSTREAM ELEVATION(FEET) = 268.00  
 STREET LENGTH(FEET) = 357.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020  
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.69  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.30  
HALFSTREET FLOOD WIDTH(FEET) = 7.28  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.87  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.57  
STREET FLOW TRAVEL TIME(MIN.) = 3.18 Tc(MIN.) = 12.60  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.936

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.60 0.100 -  
USER-DEFINED - 0.20 0.60 0.500 -  
USER-DEFINED - 1.30 0.60 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.452  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 1.80  
EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 3.15

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 7.91  
FLOW VELOCITY(FEET/SEC.) = 1.93 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.61  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10383.00 = 836.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10383.00 TO NODE 10384.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 268.00 DOWNSTREAM ELEVATION(FEET) = 264.00  
STREET LENGTH(FEET) = 473.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.07  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 8.97

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.05  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.69  
STREET FLOW TRAVEL TIME(MIN.) = 3.85 Tc(MIN.) = 16.45  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.805

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.60 0.500 -  
USER-DEFINED - 0.10 0.60 0.850 -  
USER-DEFINED - 0.10 0.60 0.100 -  
USER-DEFINED - 3.00 0.60 0.500 -  
USER-DEFINED - 0.60 0.60 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 1.84  
EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.34  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.57  
TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 4.29

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 9.22  
FLOW VELOCITY(FEET/SEC.) = 2.06 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.71  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10384.00 = 1309.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10384.00 TO NODE 10385.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 264.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
STREET LENGTH(FEET) = 463.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.22  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 10.74  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.94  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.72  
STREET FLOW TRAVEL TIME(MIN.) = 3.97 Tc(MIN.) = 20.42  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.712

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.60 0.600 -  
USER-DEFINED - 0.30 0.60 0.600 -  
USER-DEFINED - 0.60 0.60 0.850 -

USER-DEFINED - 0.30 0.60 0.500 -  
 USER-DEFINED - 4.00 0.60 0.600 -  
 USER-DEFINED - 0.80 0.60 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.650  
 SUBAREA AREA (ACRES) = 6.40 SUBAREA RUNOFF (CFS) = 1.86  
 EFFECTIVE AREA (ACRES) = 16.70 AREA-AVERAGED Fm (INCH/HR) = 0.36  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA (ACRES) = 16.7 PEAK FLOW RATE (CFS) = 5.28

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 10.82  
 FLOW VELOCITY (FEET/SEC.) = 1.94 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.73  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10385.00 = 1772.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10385.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 20.42  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.712  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.500	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.07  
 EFFECTIVE AREA (ACRES) = 16.90 AREA-AVERAGED Fm (INCH/HR) = 0.36  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA (ACRES) = 16.9 PEAK FLOW RATE (CFS) = 5.36

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10386.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 261.00 DOWNSTREAM (FEET) = 200.00  
 FLOW LENGTH (FEET) = 712.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.2 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.59  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 5.36  
 PIPE TRAVEL TIME (MIN.) = 0.94 Tc (MIN.) = 21.36  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10386.00 = 2484.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 21.36  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.695  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	ACRES	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.561  
 SUBAREA AREA (ACRES) = 1.40 SUBAREA RUNOFF (CFS) = 0.45  
 EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.36  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 5.55

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 21.36  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.695  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.600	-
USER-DEFINED	-	1.70	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.544  
 SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 1.36  
 EFFECTIVE AREA (ACRES) = 22.40 AREA-AVERAGED Fm (INCH/HR) = 0.35  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA (ACRES) = 22.4 PEAK FLOW RATE (CFS) = 6.92

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 21.36  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.695  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.600	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	0.70	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.850	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223  
 SUBAREA AREA (ACRES) = 3.50 SUBAREA RUNOFF (CFS) = 1.77  
 EFFECTIVE AREA (ACRES) = 25.90 AREA-AVERAGED Fm (INCH/HR) = 0.32  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.54

TOTAL AREA (ACRES) = 25.9 PEAK FLOW RATE (CFS) = 8.69

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 21.36

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.695

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	1.70	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.228

SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 1.01

EFFECTIVE AREA (ACRES) = 27.90 AREA-AVERAGED Fm (INCH/HR) = 0.31

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.52

TOTAL AREA (ACRES) = 27.9 PEAK FLOW RATE (CFS) = 9.69

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 21.36

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.695

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.50	0.60	0.850	-
USER-DEFINED	-	2.10	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225

SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 1.51

EFFECTIVE AREA (ACRES) = 30.90 AREA-AVERAGED Fm (INCH/HR) = 0.29

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.49

TOTAL AREA (ACRES) = 30.9 PEAK FLOW RATE (CFS) = 11.20

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 21.36

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.695

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.60	0.100	-
USER-DEFINED	-	1.50	0.60	0.600	-
USER-DEFINED	-	1.70	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.204

SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 3.71

EFFECTIVE AREA (ACRES) = 38.10 AREA-AVERAGED Fm (INCH/HR) = 0.26

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43

TOTAL AREA (ACRES) = 38.1 PEAK FLOW RATE (CFS) = 14.92

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10387.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 200.00 DOWNSTREAM (FEET) = 163.00

FLOW LENGTH (FEET) = 1145.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.5 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 11.34

ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 14.92

PIPE TRAVEL TIME (MIN.) = 1.68 Tc (MIN.) = 23.05

LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10387.00 = 3629.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 23.05

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.665

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	0.100	-
USER-DEFINED	-	23.80	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.80	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	0.100	-
USER-DEFINED	-	6.90	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.830

SUBAREA AREA (ACRES) = 32.90 SUBAREA RUNOFF (CFS) = 4.95

EFFECTIVE AREA (ACRES) = 71.00 AREA-AVERAGED Fm (INCH/HR) = 0.37

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.62

TOTAL AREA (ACRES) = 71.0 PEAK FLOW RATE (CFS) = 18.83

\*\*\*\*\*

FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 23.05

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.665

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	1.20	0.60	0.100	-
USER-DEFINED	-	1.70	0.60	0.850	-

USER-DEFINED - 0.30 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.641  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 0.96  
EFFECTIVE AREA(ACRES) = 74.80 AREA-AVERAGED Fm(INCH/HR) = 0.37  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 74.8 PEAK FLOW RATE(CFS) = 19.79

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10388.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 163.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.42  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 19.79  
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 23.25  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10388.00 = 3779.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 23.25  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.662  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.80 0.60 0.100 -  
USER-DEFINED - 0.40 0.60 0.400 -  
USER-DEFINED - 0.60 0.60 0.850 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 2.90  
EFFECTIVE AREA(ACRES) = 80.90 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 80.9 PEAK FLOW RATE(CFS) = 22.45

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 23.25  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.662  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.100 -

USER-DEFINED - 10.70 0.60 0.400 -  
USER-DEFINED - 2.30 0.60 0.850 -  
USER-DEFINED - 0.50 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 1.000 -  
USER-DEFINED - 0.70 0.60 0.400 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.502  
SUBAREA AREA(ACRES) = 14.60 SUBAREA RUNOFF(CFS) = 4.74  
EFFECTIVE AREA(ACRES) = 95.50 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 95.5 PEAK FLOW RATE(CFS) = 27.19

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 23.25  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.662  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.60 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.10  
EFFECTIVE AREA(ACRES) = 96.20 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 96.2 PEAK FLOW RATE(CFS) = 27.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10389.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 158.00 DOWNSTREAM(FEET) = 157.00  
FLOW LENGTH(FEET) = 51.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.84  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 27.28  
PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 23.33  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10389.00 = 3830.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 23.33  
RAINFALL INTENSITY(INCH/HR) = 0.66  
AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.58

EFFECTIVE STREAM AREA(ACRES) = 96.20  
TOTAL STREAM AREA(ACRES) = 96.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 27.28

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1.90	35.40	0.521	0.60( 0.59)	0.99	55.5	10360.00
2	27.28	23.33	0.660	0.60( 0.35)	0.58	96.2	10380.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	28.86	23.33	0.660	0.60( 0.41)	0.69	132.8	10380.00
2	21.06	35.40	0.521	0.60( 0.44)	0.73	151.7	10360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 28.86 Tc(MIN.) = 23.33  
EFFECTIVE AREA(ACRES) = 132.77 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 151.7  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10390.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 157.00 DOWNSTREAM(FEET) = 155.00  
FLOW LENGTH(FEET) = 312.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.21  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 28.86  
PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 24.05  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc(MIN.) = 24.05  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.647

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	3.10	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	5.70	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.997  
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 0.42  
EFFECTIVE AREA(ACRES) = 142.27 AREA-AVERAGED Fm(INCH/HR) = 0.43  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.71  
TOTAL AREA(ACRES) = 161.2 PEAK FLOW RATE(CFS) = 28.86  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc(MIN.) = 24.05

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.647

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.20	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 0.09

EFFECTIVE AREA(ACRES) = 144.47 AREA-AVERAGED Fm(INCH/HR) = 0.43

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.71

TOTAL AREA(ACRES) = 163.4 PEAK FLOW RATE(CFS) = 28.86

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
-----

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	28.86	24.05	0.647	0.60( 0.43)	0.71	144.5	10380.00
2	21.06	36.17	0.514	0.60( 0.45)	0.75	163.4	10360.00

LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	71.16	24.58	0.638	0.60( 0.47)	0.78	257.8	10300.00
2	61.23	29.19	0.580	0.60( 0.46)	0.77	287.9	10320.00
3	58.40	32.88	0.544	0.60( 0.46)	0.77	297.4	10340.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	100.02	24.05	0.647	0.60( 0.45)	0.75	396.7	10380.00
2	99.68	24.58	0.638	0.60( 0.45)	0.75	403.1	10300.00
3	86.78	29.19	0.580	0.60( 0.45)	0.76	440.4	10320.00
4	81.58	32.88	0.544	0.60( 0.46)	0.76	455.7	10340.00
5	76.28	36.17	0.514	0.60( 0.46)	0.76	460.8	10360.00

TOTAL AREA(ACRES) = 460.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:



PEAK FLOW RATE(CFS) = 100.02 Tc(MIN.) = 24.048  
 EFFECTIVE AREA(ACRES) = 396.74 AREA-AVERAGED Fm(INCH/HR) = 0.45  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.75  
 TOTAL AREA(ACRES) = 460.8  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

=====  
 END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 460.8 TC(MIN.) = 24.05  
 EFFECTIVE AREA(ACRES) = 396.74 AREA-AVERAGED Fm(INCH/HR)= 0.45  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.754  
 PEAK FLOW RATE(CFS) = 100.02

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	100.02	24.05	0.647	0.60( 0.45)	0.75	396.7	10380.00
2	99.68	24.58	0.638	0.60( 0.45)	0.75	403.1	10300.00
3	86.78	29.19	0.580	0.60( 0.45)	0.76	440.4	10320.00
4	81.58	32.88	0.544	0.60( 0.46)	0.76	455.7	10340.00
5	76.28	36.17	0.514	0.60( 0.46)	0.76	460.8	10360.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

FILE NAME: 0506104G.DAT
TIME/DATE OF STUDY: 12:47 04/15/2013

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 1.580
2) 6.00; 1.430
3) 7.00; 1.310
4) 8.00; 1.210
5) 9.00; 1.130
6) 10.00; 1.060
7) 11.00; 1.010
8) 12.00; 0.960
9) 13.00; 0.920
10) 14.00; 0.880
11) 15.00; 0.840
12) 20.00; 0.720
13) 25.00; 0.630
14) 30.00; 0.570
15) 40.00; 0.480
16) 50.00; 0.420
17) 60.00; 0.380
18) 90.00; 0.300
19) 120.00; 0.260
20) 180.00; 0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

Table with columns: NO., HALF WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-SIDE, PARK-/SIDE/WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), LIP HIKE (FT), GEOMETRIES (FT), MANNING FACTOR (n). Rows 1-4.

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10400.00 TO NODE 10401.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 540.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.434
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.378
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
PUBLIC PARK - 0.50 0.60 0.850 95 6.43
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA RUNOFF(CFS) = 0.39
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 10401.00 TO NODE 10402.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 500.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.3419
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.39
FLOW VELOCITY(FEET/SEC.) = 4.09 FLOW DEPTH(FEET) = 0.18
TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 6.91
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10402.00 = 424.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10402.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 6.91
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.321
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.60 0.850 -
USER-DEFINED - 0.30 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.940  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 0.34  
EFFECTIVE AREA(ACRES) = 1.00 AREA-AVERAGED Fm(INCH/HR) = 0.54  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 0.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10402.00 TO NODE 10403.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.2439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.71  
FLOW VELOCITY(FEET/SEC.) = 4.31 FLOW DEPTH(FEET) = 0.23  
TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 7.39  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10403.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10403.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 7.39  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.271  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.60 0.850 -  
USER-DEFINED - 0.40 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 0.58  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.54  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.91  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 1.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10404.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 420.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 266.00 CHANNEL SLOPE = 0.1880  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.25  
FLOW VELOCITY(FEET/SEC.) = 4.38 FLOW DEPTH(FEET) = 0.31  
TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 8.40  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10404.00 = 813.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10404.00 IS CODE = 81  
-----

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc(MIN.) = 8.40  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.178  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.60 0.850 -  
USER-DEFINED - 0.20 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.863  
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 1.37  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.53  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 2.45

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10405.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 370.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 289.00 CHANNEL SLOPE = 0.1730  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.45  
FLOW VELOCITY(FEET/SEC.) = 5.12 FLOW DEPTH(FEET) = 0.40  
TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 9.34  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10405.00 = 1102.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10405.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 9.34  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.106  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.60 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 2.15  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.52  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 4.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10406.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 367.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 23.00 CHANNEL SLOPE = 0.1304  
-----

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.33  
FLOW VELOCITY (FEET/SEC.) = 5.30 FLOW DEPTH (FEET) = 0.52  
TRAVEL TIME (MIN.) = 0.07 Tc (MIN.) = 9.41  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10406.00 = 1125.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.41  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.101  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 1.12  
EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.52  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 5.41

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 367.00 DOWNSTREAM (FEET) = 344.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 214.00 CHANNEL SLOPE = 0.1075  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 5.41  
FLOW VELOCITY (FEET/SEC.) = 5.17 FLOW DEPTH (FEET) = 0.59  
TRAVEL TIME (MIN.) = 0.69 Tc (MIN.) = 10.10  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10407.00 = 1339.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.10  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.055  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 0.98  
EFFECTIVE AREA (ACRES) = 12.30 AREA-AVERAGED Fm (INCH/HR) = 0.52  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 5.96

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 344.00 DOWNSTREAM (FEET) = 327.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 919.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 5.96  
FLOW VELOCITY (FEET/SEC.) = 3.44 FLOW DEPTH (FEET) = 0.76  
TRAVEL TIME (MIN.) = 4.45 Tc (MIN.) = 14.55  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10408.00 = 2258.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10408.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 14.55  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.858  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.800 -  
USER-DEFINED - 7.90 0.60 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.849  
SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 2.51  
EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.51  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 6.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 327.00 DOWNSTREAM (FEET) = 314.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 807.00 CHANNEL SLOPE = 0.0161  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 6.29  
FLOW VELOCITY (FEET/SEC.) = 3.29 FLOW DEPTH (FEET) = 0.80  
TRAVEL TIME (MIN.) = 4.09 Tc (MIN.) = 18.64  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10409.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10409.00 TO NODE 10409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 18.64  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.753  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

```

LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        6.90     0.60      0.800      -
USER-DEFINED  -        5.70     0.60      0.850      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.823
SUBAREA AREA (ACRES) = 12.60    SUBAREA RUNOFF (CFS) = 2.94
EFFECTIVE AREA (ACRES) = 32.90  AREA-AVERAGED Fm (INCH/HR) = 0.51
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.84
TOTAL AREA (ACRES) = 32.9    PEAK FLOW RATE (CFS) = 7.30

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*****
FLOW PROCESS FROM NODE 10409.00 TO NODE 10410.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 314.00  DOWNSTREAM(FEET) = 266.00
FLOW LENGTH(FEET) = 213.00  MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.41
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.30
PIPE TRAVEL TIME(MIN.) = 0.18  Tc(MIN.) = 18.83
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10410.00 = 3278.00 FEET.

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*****
FLOW PROCESS FROM NODE 10410.00 TO NODE 10411.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 266.00  DOWNSTREAM(FEET) = 170.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1470.00  CHANNEL SLOPE = 0.0653
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.30
FLOW VELOCITY(FEET/SEC.) = 5.74  FLOW DEPTH(FEET) = 0.65
TRAVEL TIME(MIN.) = 4.27  Tc(MIN.) = 23.10
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10411.00 = 4748.00 FEET.

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*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10411.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 23.10
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.664
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.60     0.60  0.100  -
USER-DEFINED  -        0.10     0.60  0.850  -
USER-DEFINED  -        0.40     0.60  0.100  -
USER-DEFINED  -        6.60     0.60  0.800  -
USER-DEFINED  -        0.80     0.60  0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.723

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SUBAREA AREA(ACRES) = 8.50    SUBAREA RUNOFF(CFS) = 1.76
EFFECTIVE AREA(ACRES) = 41.40  AREA-AVERAGED Fm (INCH/HR) = 0.49
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.82
TOTAL AREA (ACRES) = 41.4    PEAK FLOW RATE (CFS) = 7.30
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10412.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 170.00  DOWNSTREAM(FEET) = 161.00
FLOW LENGTH(FEET) = 1129.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.62
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.30
PIPE TRAVEL TIME(MIN.) = 3.35  Tc(MIN.) = 26.45
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10412.00 = 5877.00 FEET.

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*****
FLOW PROCESS FROM NODE 10412.00 TO NODE 10413.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 161.00  DOWNSTREAM(FEET) = 141.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 360.00  CHANNEL SLOPE = 0.0556
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.30
FLOW VELOCITY(FEET/SEC.) = 5.45  FLOW DEPTH(FEET) = 0.67
TRAVEL TIME(MIN.) = 1.10  Tc(MIN.) = 27.55
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10413.00 = 6237.00 FEET.

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*****
FLOW PROCESS FROM NODE 10413.00 TO NODE 10413.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 27.55
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.599
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        1.20     0.60  0.100  -
USER-DEFINED  -        0.40     0.60  0.850  -
USER-DEFINED  -        0.30     0.60  0.100  -
USER-DEFINED  -        0.10     0.60  0.850  -
USER-DEFINED  -        0.90     0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.509
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 2.90    SUBAREA RUNOFF(CFS) = 0.77
EFFECTIVE AREA(ACRES) = 44.30  AREA-AVERAGED Fm (INCH/HR) = 0.48
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.80

```

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED  $F_p$ ;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 44.3 PEAK FLOW RATE (CFS) = 7.30  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 44.3 TC (MIN.) = 27.55  
EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.48  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.60 AREA-AVERAGED  $A_p$  = 0.798  
PEAK FLOW RATE (CFS) = 7.30

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

FILE NAME: 0506105N.DAT
TIME/DATE OF STUDY: 12:50 04/15/2013

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 1.580
2) 6.00; 1.430
3) 7.00; 1.310
4) 8.00; 1.210
5) 9.00; 1.130
6) 10.00; 1.060
7) 11.00; 1.010
8) 12.00; 0.960
9) 13.00; 0.920
10) 14.00; 0.880
11) 15.00; 0.840
12) 20.00; 0.720
13) 25.00; 0.630
14) 30.00; 0.570
15) 40.00; 0.480
16) 50.00; 0.420
17) 60.00; 0.380
18) 90.00; 0.300
19) 120.00; 0.260
20) 180.00; 0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

Table with 9 columns: NO., HALF WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-SIDE, PARK-/SIDE/WAY, CURB HEIGHT (FT), GUTTER WIDTH (FT), GEOMETRIES LIP HIKE (FT), MANNING FACTOR (n)

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10500.00 TO NODE 10501.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00
ELEVATION DATA: UPSTREAM(FEET) = 1123.00 DOWNSTREAM(FEET) = 1085.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.984
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.011
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"GRASS" - 0.20 0.60 1.000 95 10.98
NATURAL FAIR COVER
"GRASS" - 0.30 0.60 1.000 95 10.98
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.18
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.18

\*\*\*\*\*

FLOW PROCESS FROM NODE 10501.00 TO NODE 10502.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1085.00 DOWNSTREAM(FEET) = 1050.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 181.00 CHANNEL SLOPE = 0.1934
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.18
FLOW VELOCITY(FEET/SEC.) = 2.82 FLOW DEPTH(FEET) = 0.15
TRAVEL TIME(MIN.) = 1.07 Tc(MIN.) = 12.05
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10502.00 = 507.00 FEET.

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FLOW PROCESS FROM NODE 10502.00 TO NODE 10502.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.05
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.958
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

```

LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.10     0.60      1.000     -
USER-DEFINED  -        0.80     0.60      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 0.29
EFFECTIVE AREA (ACRES) = 1.40  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.4    PEAK FLOW RATE (CFS) = 0.45

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FLOW PROCESS FROM NODE 10502.00 TO NODE 10503.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1025.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 193.00  CHANNEL SLOPE = 0.1295
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.45
FLOW VELOCITY(FEET/SEC.) = 2.99  FLOW DEPTH(FEET) = 0.22
TRAVEL TIME(MIN.) = 1.07  Tc(MIN.) = 13.13
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10503.00 = 700.00 FEET.

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10503.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.915
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.50   0.60  1.000  -
USER-DEFINED      -        1.80   0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 0.65
EFFECTIVE AREA (ACRES) = 3.70  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 3.7    PEAK FLOW RATE (CFS) = 1.05

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10504.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 1025.00  DOWNSTREAM(FEET) = 1020.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00  CHANNEL SLOPE = 0.0151
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.05
FLOW VELOCITY(FEET/SEC.) = 2.03  FLOW DEPTH(FEET) = 0.41
TRAVEL TIME(MIN.) = 2.72  Tc(MIN.) = 15.85
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10504.00 = 1032.00 FEET.

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10504.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.85
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.820
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.10   0.60  1.000  -
USER-DEFINED      -        0.80   0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 0.18
EFFECTIVE AREA (ACRES) = 4.60  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.6    PEAK FLOW RATE (CFS) = 1.05
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10505.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1020.00  DOWNSTREAM(FEET) = 975.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 397.00  CHANNEL SLOPE = 0.1134
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.05
FLOW VELOCITY(FEET/SEC.) = 4.30  FLOW DEPTH(FEET) = 0.29
TRAVEL TIME(MIN.) = 1.54  Tc(MIN.) = 17.39
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10505.00 = 1429.00 FEET.

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10505.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 17.39
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.783
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.20   0.60  1.000  -
USER-DEFINED      -        1.20   0.60  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.40  SUBAREA RUNOFF (CFS) = 0.23
EFFECTIVE AREA (ACRES) = 6.00  AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.0    PEAK FLOW RATE (CFS) = 1.05
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10505.00 TO NODE 10506.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 905.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 334.00 CHANNEL SLOPE = 0.2096
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.05
FLOW VELOCITY(FEET/SEC.) = 5.39 FLOW DEPTH(FEET) = 0.25
TRAVEL TIME(MIN.) = 1.03 Tc(MIN.) = 18.42
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10506.00 = 1763.00 FEET.

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10506.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.42
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.758
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.10 0.60 1.000 -
USER-DEFINED - 3.70 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 1.39
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 2.25

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10507.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 790.00 CHANNEL SLOPE = 0.0380
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.25
FLOW VELOCITY(FEET/SEC.) = 2.83 FLOW DEPTH(FEET) = 0.51
TRAVEL TIME(MIN.) = 4.65 Tc(MIN.) = 23.07
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10507.00 = 2553.00 FEET.

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10507.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 23.07
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.665
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.70 0.60 1.000 -

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USER-DEFINED - 6.30 0.60 1.000 -
USER-DEFINED - 0.30 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 0.54
EFFECTIVE AREA(ACRES) = 25.10 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 2.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10508.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 755.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.25
FLOW VELOCITY(FEET/SEC.) = 4.16 FLOW DEPTH(FEET) = 0.42
TRAVEL TIME(MIN.) = 4.49 Tc(MIN.) = 27.56
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10508.00 = 3673.00 FEET.

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10508.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 27.56
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.599
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.80 0.60 1.000 -
USER-DEFINED - 11.10 0.60 1.000 -
USER-DEFINED - 3.10 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 40.10 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 2.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10509.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 755.00 DOWNSTREAM(FEET) = 533.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1578.00 CHANNEL SLOPE = 0.1407

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CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.25  
FLOW VELOCITY (FEET/SEC.) = 4.65 FLOW DEPTH (FEET) = 0.40  
TRAVEL TIME (MIN.) = 5.66 Tc (MIN.) = 33.22  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10509.00 = 5251.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10509.00 TO NODE 10509.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 33.22

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.541

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.80	0.60	1.000	-
USER-DEFINED	-	11.40	0.60	1.000	-
USER-DEFINED	-	1.10	0.60	1.000	-
USER-DEFINED	-	8.30	0.60	1.000	-
USER-DEFINED	-	38.10	0.60	1.000	-
USER-DEFINED	-	8.70	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA (ACRES) = 77.40 SUBAREA RUNOFF (CFS) = 0.00

EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 2.25

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10509.00 TO NODE 10510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 415.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1236.00 CHANNEL SLOPE = 0.0955  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.25  
FLOW VELOCITY (FEET/SEC.) = 4.01 FLOW DEPTH (FEET) = 0.43  
TRAVEL TIME (MIN.) = 5.13 Tc (MIN.) = 38.35  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10510.00 = 6487.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10510.00 TO NODE 10510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 38.35

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.495

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	30.10	0.60	1.000	-
USER-DEFINED	-	15.30	0.60	1.000	-
USER-DEFINED	-	2.00	0.60	1.000	-
USER-DEFINED	-	11.30	0.60	1.000	-
USER-DEFINED	-	5.10	0.60	1.000	-
USER-DEFINED	-	1.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA (ACRES) = 64.90 SUBAREA RUNOFF (CFS) = 0.00

EFFECTIVE AREA (ACRES) = 182.40 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 182.4 PEAK FLOW RATE (CFS) = 2.25

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10510.00 TO NODE 10511.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 302.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1161.00 CHANNEL SLOPE = 0.0973  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.25  
FLOW VELOCITY (FEET/SEC.) = 4.01 FLOW DEPTH (FEET) = 0.43  
TRAVEL TIME (MIN.) = 4.82 Tc (MIN.) = 43.18  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10511.00 = 7648.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10511.00 TO NODE 10511.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 43.18

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.461

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.50	0.60	1.000	-
USER-DEFINED	-	10.80	0.60	1.000	-
USER-DEFINED	-	1.10	0.60	1.000	-
USER-DEFINED	-	22.10	0.60	1.000	-
USER-DEFINED	-	4.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA (ACRES) = 54.80 SUBAREA RUNOFF (CFS) = 0.00

EFFECTIVE AREA (ACRES) = 237.20 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 237.2 PEAK FLOW RATE (CFS) = 2.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10511.00 TO NODE 10512.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	302.00	DOWNSTREAM (FEET) =	190.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	1644.00	CHANNEL SLOPE =	0.0681
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	4.00
CHANNEL FLOW THRU SUBAREA (CFS) =	2.25		
FLOW VELOCITY (FEET/SEC.) =	3.53	FLOW DEPTH (FEET) =	0.46
TRAVEL TIME (MIN.) =	7.76	Tc (MIN.) =	50.94
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10512.00 =	9292.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10512.00 TO NODE 10512.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) =	50.94				
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.416				
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.50	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	1.70	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	14.20	0.60	1.000	-
USER-DEFINED	-	2.80	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA (ACRES) = 19.50 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 256.70 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 256.7 PEAK FLOW RATE (CFS) = 2.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10512.00 TO NODE 10513.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	190.00	DOWNSTREAM (FEET) =	183.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	86.00	CHANNEL SLOPE =	0.0814
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	4.00
CHANNEL FLOW THRU SUBAREA (CFS) =	2.25		

FLOW VELOCITY (FEET/SEC.) = 3.78 FLOW DEPTH (FEET) = 0.45  
TRAVEL TIME (MIN.) = 0.38 Tc (MIN.) = 51.32  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10513.00 = 9378.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) =	51.32				
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.415				
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	1.30	0.60	1.000	-
USER-DEFINED	-	29.90	0.60	1.000	-
USER-DEFINED	-	11.90	0.60	1.000	-
USER-DEFINED	-	1.70	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA (ACRES) = 45.50 SUBAREA RUNOFF (CFS) = 0.24  
EFFECTIVE AREA (ACRES) = 302.20 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 302.2 PEAK FLOW RATE (CFS) = 2.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc (MIN.) =	51.32				
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.415				
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	9.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA (ACRES) = 9.30 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 311.50 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 311.5 PEAK FLOW RATE (CFS) = 2.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10513.00 TO NODE 10514.00 IS CODE = 31  
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=====

MAINLINE Tc (MIN.) =	51.32				
* 2 YEAR RAINFALL INTENSITY (INCH/HR) =	0.415				
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	9.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
SUBAREA AREA (ACRES) = 9.30 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 311.50 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 311.5 PEAK FLOW RATE (CFS) = 2.25  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 171.00
FLOW LENGTH(FEET) = 1209.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.54
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.25
PIPE TRAVEL TIME(MIN.) = 4.43 Tc(MIN.) = 55.75
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10514.00 = 10587.00 FEET.

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FLOW PROCESS FROM NODE 10514.00 TO NODE 10514.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 55.75
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.397
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.60 0.100 -
USER-DEFINED - 0.40 0.60 1.000 -
USER-DEFINED - 1.70 0.60 0.100 -
USER-DEFINED - 31.30 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 33.60 SUBAREA RUNOFF(CFS) = 0.61
EFFECTIVE AREA(ACRES) = 345.10 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 345.1 PEAK FLOW RATE(CFS) = 2.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10515.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 171.00 DOWNSTREAM(FEET) = 165.00
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.66
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.25
PIPE TRAVEL TIME(MIN.) = 2.02 Tc(MIN.) = 57.78
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10515.00 = 11152.00 FEET.

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*****
FLOW PROCESS FROM NODE 10515.00 TO NODE 10515.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 57.78
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.389
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.60 0.850 -
USER-DEFINED - 1.30 0.60 0.100 -
USER-DEFINED - 0.90 0.60 0.850 -
USER-DEFINED - 15.30 0.60 0.100 -
USER-DEFINED - 1.10 0.60 0.850 -
USER-DEFINED - 0.10 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.202
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 5.36
EFFECTIVE AREA(ACRES) = 364.30 AREA-AVERAGED Fm(INCH/HR) = 0.57
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 364.3 PEAK FLOW RATE(CFS) = 6.18

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*****
FLOW PROCESS FROM NODE 10515.00 TO NODE 10525.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00
FLOW LENGTH(FEET) = 709.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.91
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 6.18
PIPE TRAVEL TIME(MIN.) = 2.00 Tc(MIN.) = 59.78
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

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*****
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 59.78
RAINFALL INTENSITY(INCH/HR) = 0.38
AREA-AVERAGED Fm(INCH/HR) = 0.57
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.95
EFFECTIVE STREAM AREA(ACRES) = 364.30
TOTAL STREAM AREA(ACRES) = 364.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.18

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FLOW PROCESS FROM NODE 10520.00 TO NODE 10521.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 289.00  
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 180.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.311  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.279

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.30	0.60	0.100	95	7.31
PUBLIC PARK	-	1.20	0.60	0.850	95	11.62

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.700

SUBAREA RUNOFF(CFS) = 1.16

TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 1.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10521.00 TO NODE 10522.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 180.00 DOWNSTREAM ELEVATION(FEET) = 176.00  
STREET LENGTH(FEET) = 408.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.95

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.27

HALFSTREET FLOOD WIDTH(FEET) = 5.66

AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.92

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.52

STREET FLOW TRAVEL TIME(MIN.) = 3.55 Tc(MIN.) = 10.86

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.017

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	0.100	-
USER-DEFINED	-	0.60	0.60	0.850	-
USER-DEFINED	-	0.60	0.60	0.100	-
USER-DEFINED	-	0.80	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.520

SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 1.59

EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.35

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 2.39

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 6.47

FLOW VELOCITY(FEET/SEC.) = 1.97 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.57

LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10522.00 = 697.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10522.00 TO NODE 10523.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 176.00 DOWNSTREAM ELEVATION(FEET) = 173.00

STREET LENGTH(FEET) = 333.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.42

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.34

HALFSTREET FLOOD WIDTH(FEET) = 9.22

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.13

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.73

STREET FLOW TRAVEL TIME(MIN.) = 2.61 Tc(MIN.) = 13.47

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.901

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	0.100	-
USER-DEFINED	-	4.70	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.600	-
USER-DEFINED	-	0.10	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.109

SUBAREA AREA(ACRES) = 5.40 SUBAREA RUNOFF(CFS) = 4.06

EFFECTIVE AREA(ACRES) = 9.40 AREA-AVERAGED Fm(INCH/HR) = 0.19

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31

TOTAL AREA(ACRES) = 9.4 PEAK FLOW RATE(CFS) = 6.04

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.66

FLOW VELOCITY(FEET/SEC.) = 2.28 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.85

LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10523.00 = 1030.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10523.00 TO NODE 10523.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 13.47  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.901  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	1.90	0.60	0.850	-
USER-DEFINED	-	0.80	0.60	0.100	-
USER-DEFINED	-	4.80	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	4.90	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785  
 SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 4.92  
 EFFECTIVE AREA(ACRES) = 22.10 AREA-AVERAGED Fm(INCH/HR) = 0.35  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA(ACRES) = 22.1 PEAK FLOW RATE(CFS) = 10.96

\*\*\*\*\*

FLOW PROCESS FROM NODE 10523.00 TO NODE 10524.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 173.00 DOWNSTREAM(FEET) = 165.00  
 FLOW LENGTH(FEET) = 736.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.05  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 10.96  
 PIPE TRAVEL TIME(MIN.) = 1.74 Tc(MIN.) = 15.21  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10524.00 = 1766.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10524.00 TO NODE 10524.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 15.21  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.835  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.90	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.308  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 1.05  
 EFFECTIVE AREA(ACRES) = 23.90 AREA-AVERAGED Fm(INCH/HR) = 0.34  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.56  
 TOTAL AREA(ACRES) = 23.9 PEAK FLOW RATE(CFS) = 10.96  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10524.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
 FLOW LENGTH(FEET) = 623.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.14  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 10.96  
 PIPE TRAVEL TIME(MIN.) = 1.45 Tc(MIN.) = 16.66  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10525.00 = 2389.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 16.66  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.800  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	6.80	0.60	0.850	-
USER-DEFINED	-	0.90	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
 SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 2.36  
 EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.39  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.64  
 TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 12.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 16.66  
 RAINFALL INTENSITY(INCH/HR) = 0.80  
 AREA-AVERAGED Fm(INCH/HR) = 0.39  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.64  
 EFFECTIVE STREAM AREA(ACRES) = 33.00  
 TOTAL STREAM AREA(ACRES) = 33.00  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.30

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	6.18	59.78	0.381	0.60( 0.57)	0.95	364.3	10500.00
2	12.30	16.66	0.800	0.60( 0.39)	0.64	33.0	10520.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	18.48	16.66	0.800	0.60( 0.53)	0.88	134.6	10520.00
2	10.21	59.78	0.381	0.60( 0.56)	0.93	397.3	10500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 18.48 Tc(MIN.) = 16.66  
EFFECTIVE AREA(ACRES) = 134.56 AREA-AVERAGED Fm(INCH/HR) = 0.53  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 397.3  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10526.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 158.00 DOWNSTREAM(FEET) = 148.00  
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 28.99  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 18.48  
PIPE TRAVEL TIME(MIN.) = 0.02 Tc(MIN.) = 16.68  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10526.00 = 11891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10526.00 TO NODE 10527.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 148.00 DOWNSTREAM(FEET) = 135.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 296.00 CHANNEL SLOPE = 0.0439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 18.48  
FLOW VELOCITY(FEET/SEC.) = 6.30 FLOW DEPTH(FEET) = 0.99  
TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 17.46  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10527.00 = 12187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.46  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.781  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 0.30 0.60 1.000 -  
USER-DEFINED - 0.80 0.60 1.000 -  
USER-DEFINED - 0.20 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 0.23  
EFFECTIVE AREA(ACRES) = 135.96 AREA-AVERAGED Fm(INCH/HR) = 0.53  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 398.7 PEAK FLOW RATE(CFS) = 31.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.46  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.781  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.100 -  
USER-DEFINED - 1.10 0.60 1.000 -  
USER-DEFINED - 0.40 0.60 1.000 -  
USER-DEFINED - 1.10 0.60 1.000 -  
USER-DEFINED - 2.20 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.982  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 0.85  
EFFECTIVE AREA(ACRES) = 140.86 AREA-AVERAGED Fm(INCH/HR) = 0.53  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 403.6 PEAK FLOW RATE(CFS) = 32.00

=====

END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 403.6 TC(MIN.) = 17.46  
EFFECTIVE AREA(ACRES) = 140.86 AREA-AVERAGED Fm(INCH/HR) = 0.53  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.881  
PEAK FLOW RATE(CFS) = 32.00

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	32.00	17.46	0.781	0.60( 0.53)	0.88	140.9	10520.00
2	10.21	60.70	0.378	0.60( 0.56)	0.93	403.6	10500.00

=====

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

FILE NAME: 0506106G.DAT
TIME/DATE OF STUDY: 12:52 04/15/2013

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 1.580
2) 6.00; 1.430
3) 7.00; 1.310
4) 8.00; 1.210
5) 9.00; 1.130
6) 10.00; 1.060
7) 11.00; 1.010
8) 12.00; 0.960
9) 13.00; 0.920
10) 14.00; 0.880
11) 15.00; 0.840
12) 20.00; 0.720
13) 25.00; 0.630
14) 30.00; 0.570
15) 40.00; 0.480
16) 50.00; 0.420
17) 60.00; 0.380
18) 90.00; 0.300
19) 120.00; 0.260
20) 180.00; 0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

Table with columns: NO., HALF WIDTH (FT), CROWN TO CROSSFALL (FT), STREET-CROSSFALL IN- / OUT- / SIDE / SIDE / WAY, CURB HEIGHT (FT), GUTTER GEOMETRIES (LIP HIKE), MANNING FACTOR (n). Rows 1-4.

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10600.00 TO NODE 10601.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 311.00
ELEVATION DATA: UPSTREAM(FEET) = 166.00 DOWNSTREAM(FEET) = 164.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.602
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.030
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 0.50 0.60 0.500 95 10.60
PUBLIC PARK - 0.60 0.60 0.850 95 13.16
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.691
SUBAREA RUNOFF(CFS) = 0.61
TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 0.61

\*\*\*\*\*

FLOW PROCESS FROM NODE 10601.00 TO NODE 10602.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 164.00 DOWNSTREAM ELEVATION(FEET) = 162.00
STREET LENGTH(FEET) = 220.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.20
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.24
HALFSTREET FLOOD WIDTH(FEET) = 3.84
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.78

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.42  
 STREET FLOW TRAVEL TIME (MIN.) = 2.06 Tc (MIN.) = 12.66  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.933  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	1.80	0.60	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.517  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 1.18  
 EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.35  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 1.69

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.26 HALFSTREET FLOOD WIDTH (FEET) = 5.28  
 FLOW VELOCITY (FEET/SEC.) = 1.81 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.48  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10602.00 = 531.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10602.00 TO NODE 10603.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<<  
 =====

UPSTREAM ELEVATION (FEET) = 162.00 DOWNSTREAM ELEVATION (FEET) = 159.00  
 STREET LENGTH (FEET) = 328.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.59  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.30  
 HALFSTREET FLOOD WIDTH (FEET) = 6.91  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.94  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.58  
 STREET FLOW TRAVEL TIME (MIN.) = 2.81 Tc (MIN.) = 15.48  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.829

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.60	0.500	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	2.40	0.60	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527  
 SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 1.80

EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.33  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 3.19

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.31 HALFSTREET FLOOD WIDTH (FEET) = 7.78  
 FLOW VELOCITY (FEET/SEC.) = 2.01 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.63  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10603.00 = 859.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10603.00 TO NODE 10604.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<<  
 =====

UPSTREAM ELEVATION (FEET) = 159.00 DOWNSTREAM ELEVATION (FEET) = 155.00  
 STREET LENGTH (FEET) = 465.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.66  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.35  
 HALFSTREET FLOOD WIDTH (FEET) = 9.53  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.12  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.74  
 STREET FLOW TRAVEL TIME (MIN.) = 3.66 Tc (MIN.) = 19.13  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.741

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.60	0.500	-
USER-DEFINED	-	0.40	0.60	0.850	-
USER-DEFINED	-	3.00	0.60	0.500	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.513  
 SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 2.92  
 EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.32  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 5.55

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 10.35  
 FLOW VELOCITY (FEET/SEC.) = 2.20 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.80  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10604.00 = 1324.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10604.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.13
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.741
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.60    0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.10    SUBAREA RUNOFF(CFS) = 0.02
EFFECTIVE AREA(ACRES) = 14.70  AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 14.7    PEAK FLOW RATE(CFS) = 5.57

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10605.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 155.00  DOWNSTREAM(FEET) = 140.00
FLOW LENGTH(FEET) = 214.00  MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.84
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.57
PIPE TRAVEL TIME(MIN.) = 0.30  Tc(MIN.) = 19.43
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10605.00 = 1538.00 FEET.

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10605.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.43
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.734
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20    0.60    0.100  -
USER-DEFINED        -         1.70    0.60    0.100  -
USER-DEFINED        -        10.20    0.60    0.800  -
USER-DEFINED        -         2.90    0.60    0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.682
SUBAREA AREA(ACRES) = 16.00    SUBAREA RUNOFF(CFS) = 4.67
EFFECTIVE AREA(ACRES) = 30.70  AREA-AVERAGED Fm(INCH/HR) = 0.37
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 30.7    PEAK FLOW RATE(CFS) = 10.15

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10606.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 140.00  DOWNSTREAM(FEET) = 133.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00  CHANNEL SLOPE = 0.0400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.15
FLOW VELOCITY(FEET/SEC.) = 5.21  FLOW DEPTH(FEET) = 0.81
TRAVEL TIME(MIN.) = 0.56  Tc(MIN.) = 19.99
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10606.00 = 1713.00 FEET.

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.99
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.720
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.60    0.500  -
USER-DEFINED        -         0.30    0.60    0.850  -
USER-DEFINED        -         0.10    0.60    1.000  -
USER-DEFINED        -         1.10    0.60    1.000  -
USER-DEFINED        -         0.10    0.60    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 1.80    SUBAREA RUNOFF(CFS) = 0.27
EFFECTIVE AREA(ACRES) = 32.50  AREA-AVERAGED Fm(INCH/HR) = 0.38
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 32.5    PEAK FLOW RATE(CFS) = 10.15
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.99
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.720
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.60    0.850  -
USER-DEFINED        -         1.20    0.60    1.000  -
USER-DEFINED        -         0.10    0.60    1.000  -
USER-DEFINED        -         1.80    0.60    1.000  -
USER-DEFINED        -         0.10    0.60    0.850  -
USER-DEFINED        -         0.20    0.60    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 0.45
EFFECTIVE AREA(ACRES) = 36.30  AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.66
TOTAL AREA(ACRES) = 36.3    PEAK FLOW RATE(CFS) = 10.50

```

\*\*\*\*\*

FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 19.99

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.720

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.06

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.40

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.67

TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 10.57

=====  
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 36.9 TC(MIN.) = 19.99

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR)= 0.40

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.670

PEAK FLOW RATE(CFS) = 10.57

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2006 Advanced Engineering Software (aes)  
Ver. 13.1 Release Date: 06/15/2006 License ID 1202

Analysis prepared by:

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 2 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 2-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P201XX02.DAT  
TIME/DATE OF STUDY: 10:20 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	1.580
2)	6.000;	1.430
3)	7.000;	1.310
4)	8.000;	1.210
5)	9.000;	1.130
6)	10.000;	1.060
7)	11.000;	1.010
8)	12.000;	0.960
9)	13.000;	0.920
10)	14.000;	0.880
11)	15.000;	0.840
12)	20.000;	0.720
13)	25.000;	0.630
14)	30.000;	0.570
15)	40.000;	0.480
16)	50.000;	0.420
17)	60.000;	0.380
18)	90.000;	0.300
19)	120.000;	0.260
20)	180.000;	0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20100.00 TO NODE 20101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 830.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.230  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.114  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.60	1.000	95	9.23
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.60	1.000	95	9.23

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.28  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20101.00 TO NODE 20102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 276.00 CHANNEL SLOPE = 0.2899  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.28  
FLOW VELOCITY(FEET/SEC.) = 3.48 FLOW DEPTH(FEET) = 0.16  
TRAVEL TIME(MIN.) = 1.32  $T_c$ (MIN.) = 10.55  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20102.00 = 595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20102.00 TO NODE 20102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN) = 10.55
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.032
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.80    0.60    1.000  -
USER-DEFINED         -        0.20    0.60    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.00    SUBAREA RUNOFF(CFS) = 0.39
EFFECTIVE AREA(ACRES) = 1.60    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6    PEAK FLOW RATE(CFS) = 0.62

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*****
FLOW PROCESS FROM NODE 20102.00 TO NODE 20103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.1863
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.62
FLOW VELOCITY(FEET/SEC.) = 3.80 FLOW DEPTH(FEET) = 0.23
TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 11.26
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20103.00 = 756.00 FEET.

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.26
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.997
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.50    0.60    1.000  -
USER-DEFINED         -        0.10    0.60    1.000  -
USER-DEFINED         -        0.30    0.60    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90    SUBAREA RUNOFF(CFS) = 0.32
EFFECTIVE AREA(ACRES) = 2.50    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.5    PEAK FLOW RATE(CFS) = 0.89

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 690.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 64.00 CHANNEL SLOPE = 0.4688

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CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.89
FLOW VELOCITY(FEET/SEC.) = 5.83 FLOW DEPTH(FEET) = 0.23
TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 11.44
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20104.00 = 820.00 FEET.

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.44
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.988
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.40    0.60    1.000  -
USER-DEFINED         -        3.30    0.60    1.000  -
USER-DEFINED         -        0.10    0.60    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 1.33
EFFECTIVE AREA(ACRES) = 6.30    AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.3    PEAK FLOW RATE(CFS) = 2.20

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 690.00 DOWNSTREAM(FEET) = 670.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 159.00 CHANNEL SLOPE = 0.1258
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.20
FLOW VELOCITY(FEET/SEC.) = 4.42 FLOW DEPTH(FEET) = 0.41
TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 12.04
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20105.00 = 979.00 FEET.

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*****
FLOW PROCESS FROM NODE 20105.00 TO NODE 20105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 12.04
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.958
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.20    0.60    1.000  -
USER-DEFINED         -        1.50    0.60    1.000  -
USER-DEFINED         -        2.20    0.60    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90    SUBAREA RUNOFF(CFS) = 1.26

```

EFFECTIVE AREA (ACRES) = 10.20 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 10.2 PEAK FLOW RATE (CFS) = 3.29

\*\*\*\*\*

FLOW PROCESS FROM NODE 20105.00 TO NODE 20106.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 670.00 DOWNSTREAM (FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 192.00 CHANNEL SLOPE = 0.1042  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 3.29  
FLOW VELOCITY (FEET/SEC.) = 4.55 FLOW DEPTH (FEET) = 0.49  
TRAVEL TIME (MIN.) = 0.70 Tc (MIN.) = 12.74  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20106.00 = 1171.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 12.74  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.930  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.60 1.000 -  
USER-DEFINED - 2.10 0.60 1.000 -  
USER-DEFINED - 0.90 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 3.80 SUBAREA RUNOFF (CFS) = 1.13  
EFFECTIVE AREA (ACRES) = 14.00 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 14.0 PEAK FLOW RATE (CFS) = 4.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 650.00 DOWNSTREAM (FEET) = 640.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 156.00 CHANNEL SLOPE = 0.0641  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.16  
FLOW VELOCITY (FEET/SEC.) = 3.98 FLOW DEPTH (FEET) = 0.59  
TRAVEL TIME (MIN.) = 0.65 Tc (MIN.) = 13.40  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20107.00 = 1327.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 13.40  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.904  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	1.20	0.60	1.000	-
USER-DEFINED	-	2.30	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 1.10  
EFFECTIVE AREA (ACRES) = 18.00 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 18.0 PEAK FLOW RATE (CFS) = 4.93

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 640.00 DOWNSTREAM (FEET) = 609.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 512.00 CHANNEL SLOPE = 0.0605  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.93  
FLOW VELOCITY (FEET/SEC.) = 4.14 FLOW DEPTH (FEET) = 0.63  
TRAVEL TIME (MIN.) = 2.06 Tc (MIN.) = 15.46  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20108.00 = 1839.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20108.00 TO NODE 20108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 15.46  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.829  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 0.200 -  
USER-DEFINED - 1.50 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 1.000 -  
USER-DEFINED - 0.80 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970  
SUBAREA AREA (ACRES) = 2.70 SUBAREA RUNOFF (CFS) = 0.60  
EFFECTIVE AREA (ACRES) = 20.70 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.7 PEAK FLOW RATE (CFS) = 4.93  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

```

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 600.00
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.86
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.93
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 15.79
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20109.00 = 2033.00 FEET.

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*****
FLOW PROCESS FROM NODE 20109.00 TO NODE 20109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 15.79
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.821
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         0.70   0.60  0.200  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.44
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.58
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 4.93
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 20109.00 TO NODE 20110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 594.00
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.79
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.93
PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 16.67
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20110.00 = 2393.00 FEET.

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*****
FLOW PROCESS FROM NODE 20110.00 TO NODE 20110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 16.67
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.800
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         0.30   0.60  0.100  -

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USER-DEFINED       -         3.50   0.60  0.200  -
USER-DEFINED       -         2.70   0.60  1.000  -
USER-DEFINED       -         0.20   0.60  1.000  -
USER-DEFINED       -         1.20   0.60  1.000  -
USER-DEFINED       -         0.30   0.60  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.626
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 3.13
EFFECTIVE AREA(ACRES) = 29.60 AREA-AVERAGED Fm(INCH/HR) = 0.52
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 29.6 PEAK FLOW RATE(CFS) = 7.33

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*****
FLOW PROCESS FROM NODE 20110.00 TO NODE 20111.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 594.00 DOWNSTREAM(FEET) = 590.00
FLOW LENGTH(FEET) = 246.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.45
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.33
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 17.22
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20111.00 = 2639.00 FEET.

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*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 17.22
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.787
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         0.70   0.60  0.100  -
USER-DEFINED       -         2.10   0.60  0.200  -
USER-DEFINED       -         2.10   0.60  1.000  -
USER-DEFINED       -         0.60   0.60  1.000  -
USER-DEFINED       -         4.70   0.60  1.000  -
USER-DEFINED       -         0.90   0.60  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.792
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 3.11
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 10.09

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*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20112.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 580.00

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FLOW LENGTH(FEET) = 628.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.91  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 10.09  
PIPE TRAVEL TIME(MIN.) = 1.32 Tc(MIN.) = 18.54  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20112.00 = 3267.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 18.54  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.755  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.60	0.100	-
USER-DEFINED	-	0.90	0.60	0.200	-
USER-DEFINED	-	4.40	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	7.50	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.797  
SUBAREA AREA(ACRES) = 15.20 SUBAREA RUNOFF(CFS) = 3.79  
EFFECTIVE AREA(ACRES) = 55.90 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 55.9 PEAK FLOW RATE(CFS) = 12.72

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 18.54  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.755  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	0.80	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 0.40  
EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 13.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20112.00 TO NODE 20113.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 580.00 DOWNSTREAM(FEET) = 570.00  
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.90  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 13.12  
PIPE TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 19.52  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20113.00 = 3786.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.52  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.732  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.60	0.100	-
USER-DEFINED	-	4.30	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	1.80	0.60	1.000	-
USER-DEFINED	-	4.60	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.877  
SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 2.33  
EFFECTIVE AREA(ACRES) = 70.90 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 14.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 19.52  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.732  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	0.100	-
USER-DEFINED	-	0.90	0.60	0.850	-
USER-DEFINED	-	1.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.787  
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 0.84  
EFFECTIVE AREA(ACRES) = 74.50 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 74.5 PEAK FLOW RATE(CFS) = 15.07

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20113.00 TO NODE 20114.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.84
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 15.07
PIPE TRAVEL TIME(MIN.) = 1.48 Tc(MIN.) = 20.99
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20114.00 = 4393.00 FEET.

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FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 20.99
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.702
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -       0.90   0.60  0.100 -
USER-DEFINED       -       4.00   0.60  0.850 -
USER-DEFINED       -       0.20   0.60  1.000 -
USER-DEFINED       -       1.40   0.60  1.000 -
USER-DEFINED       -       0.50   0.60  0.100 -
USER-DEFINED       -       0.90   0.60  0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.747
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 1.80
EFFECTIVE AREA(ACRES) = 82.40 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 82.4 PEAK FLOW RATE(CFS) = 15.07
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----

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```

MAINLINE Tc(MIN) = 20.99
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.702
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -       1.70   0.60  1.000 -
USER-DEFINED       -       8.20   0.60  1.000 -
USER-DEFINED       -       3.20   0.60  1.000 -
USER-DEFINED       -       0.70   0.60  0.100 -
USER-DEFINED       -       3.70   0.60  0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.932
SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 2.25
EFFECTIVE AREA(ACRES) = 99.90 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 99.9 PEAK FLOW RATE(CFS) = 17.14

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*****
FLOW PROCESS FROM NODE 20114.00 TO NODE 20115.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 560.00
FLOW LENGTH(FEET) = 461.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.84
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 17.14
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 21.97
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20115.00 = 4854.00 FEET.

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*****
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 21.97
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.684
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -       2.60   0.60  0.850 -
USER-DEFINED       -       0.10   0.60  1.000 -
USER-DEFINED       -       1.40   0.60  0.100 -
USER-DEFINED       -       6.20   0.60  0.850 -
USER-DEFINED       -       2.20   0.60  1.000 -
USER-DEFINED       -       0.30   0.60  1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 2.37
EFFECTIVE AREA(ACRES) = 112.70 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 112.7 PEAK FLOW RATE(CFS) = 17.92

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*****
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----

```

```

MAINLINE Tc(MIN) = 21.97
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.684
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -       0.70   0.60  1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.05
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 17.98

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*****
FLOW PROCESS FROM NODE 20115.00 TO NODE 20116.00 IS CODE = 31
-----

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

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>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 560.00 DOWNSTREAM(FEET) = 528.00
FLOW LENGTH(FEET) = 219.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.25
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 17.98
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 22.15
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20116.00 = 5073.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 20116.00 TO NODE 20117.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 489.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 174.00 CHANNEL SLOPE = 0.2241
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 17.98
FLOW VELOCITY(FEET/SEC.) = 11.50 FLOW DEPTH(FEET) = 0.72
TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 22.40
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20117.00 = 5247.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.40
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.677
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.60 0.850 -
USER-DEFINED - 0.40 0.60 1.000 -
USER-DEFINED - 0.10 0.60 0.850 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 0.40 0.60 1.000 -
USER-DEFINED - 0.10 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.910
SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 0.29
EFFECTIVE AREA(ACRES) = 115.90 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 115.9 PEAK FLOW RATE(CFS) = 17.98
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.40
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.677

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.70 0.60 0.200 -
USER-DEFINED - 3.30 0.60 0.850 -
USER-DEFINED - 0.90 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
USER-DEFINED - 6.50 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.855
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 1.89
EFFECTIVE AREA(ACRES) = 128.70 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 128.7 PEAK FLOW RATE(CFS) = 19.38

\*\*\*\*\*
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.40
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.677
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.10 0.60 1.000 -
USER-DEFINED - 0.70 0.60 0.850 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 2.80 0.60 1.000 -
USER-DEFINED - 0.40 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 0.41
EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 133.8 PEAK FLOW RATE(CFS) = 19.79

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 133.8 TC(MIN.) = 22.40
EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.854
PEAK FLOW RATE(CFS) = 19.79

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 2-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P501XX02.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.000; 1.580  
2) 6.000; 1.430  
3) 7.000; 1.310  
4) 8.000; 1.210  
5) 9.000; 1.130  
6) 10.000; 1.060  
7) 11.000; 1.010  
8) 12.000; 0.960  
9) 13.000; 0.920  
10) 14.000; 0.880  
11) 15.000; 0.840  
12) 20.000; 0.720  
13) 25.000; 0.630  
14) 30.000; 0.570  
15) 40.000; 0.480  
16) 50.000; 0.420  
17) 60.000; 0.380  
18) 90.000; 0.300  
19) 120.000; 0.260  
20) 180.000; 0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50100.00 TO NODE 50101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 424.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.479  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.172  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "8-10 DWELLINGS/ACRE"	-	0.10	0.60	0.400	95	8.48
RESIDENTIAL "8-10 DWELLINGS/ACRE"	-	0.90	0.60	0.400	95	8.48

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.400  
SUBAREA RUNOFF(CFS) = 0.84  
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 0.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50101.00 TO NODE 50102.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 424.00 DOWNSTREAM ELEVATION(FEET) = 420.00  
STREET LENGTH(FEET) = 115.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.25  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.05  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.80  
STREET FLOW TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 8.95  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.134  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.400	-
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.178  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 0.83  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.29  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 1.64

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00  
FLOW VELOCITY(FEET/SEC.) = 4.05 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.80  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50102.00 = 445.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50102.00 TO NODE 50103.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 420.00 DOWNSTREAM ELEVATION(FEET) = 418.00  
STREET LENGTH(FEET) = 84.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.09  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.24  
HALFSTREET FLOOD WIDTH(FEET) = 4.16  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.88  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.70  
STREET FLOW TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 9.44  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.099  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	0.500	-
USER-DEFINED	-	0.50	0.60	0.500	-

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.90	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.433  
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 0.91  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.35  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 2.48

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 4.91  
FLOW VELOCITY(FEET/SEC.) = 2.89 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.74  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50103.00 = 529.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50103.00 TO NODE 50104.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 418.00 DOWNSTREAM ELEVATION(FEET) = 416.00  
STREET LENGTH(FEET) = 84.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.97  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.27  
HALFSTREET FLOOD WIDTH(FEET) = 5.59  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.95  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.80  
STREET FLOW TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 9.91  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.066  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	0.500	-
USER-DEFINED	-	0.50	0.60	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 0.97  
EFFECTIVE AREA(ACRES) = 4.50 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.40  
TOTAL AREA(ACRES) = 4.5 PEAK FLOW RATE(CFS) = 3.36

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.28 HALFSTREET FLOOD WIDTH (FEET) = 6.09  
FLOW VELOCITY (FEET/SEC.) = 2.99 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.84  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50104.00 = 613.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50104.00 TO NODE 50105.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

-----  
UPSTREAM ELEVATION (FEET) = 416.00 DOWNSTREAM ELEVATION (FEET) = 400.00  
STREET LENGTH (FEET) = 513.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.34

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.29  
HALFSTREET FLOOD WIDTH (FEET) = 6.53  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.52  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.02  
STREET FLOW TRAVEL TIME (MIN.) = 2.43 Tc (MIN.) = 12.34

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.946

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	0.500	-
USER-DEFINED	-	0.40	0.60	0.600	-
USER-DEFINED	-	2.40	0.60	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.512  
SUBAREA AREA (ACRES) = 3.40 SUBAREA RUNOFF (CFS) = 1.96  
EFFECTIVE AREA (ACRES) = 7.90 AREA-AVERAGED Fm (INCH/HR) = 0.27  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.45  
TOTAL AREA (ACRES) = 7.9 PEAK FLOW RATE (CFS) = 4.83

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.30 HALFSTREET FLOOD WIDTH (FEET) = 6.97  
FLOW VELOCITY (FEET/SEC.) = 3.58 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.06  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50105.00 = 1126.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50105.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN) = 12.34

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.946

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	2.50	0.60	0.600	-
USER-DEFINED	-	1.00	0.60	0.500	-
USER-DEFINED	-	3.00	0.60	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 3.54  
EFFECTIVE AREA (ACRES) = 14.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.51  
TOTAL AREA (ACRES) = 14.5 PEAK FLOW RATE (CFS) = 8.37

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50106.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

-----  
UPSTREAM ELEVATION (FEET) = 400.00 DOWNSTREAM ELEVATION (FEET) = 390.00  
STREET LENGTH (FEET) = 562.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.58

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.39  
HALFSTREET FLOOD WIDTH (FEET) = 11.76  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.36  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.32  
STREET FLOW TRAVEL TIME (MIN.) = 2.78 Tc (MIN.) = 15.13

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.837

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	3.70	0.60	0.600	-
USER-DEFINED	-	1.10	0.60	0.500	-
USER-DEFINED	-	5.20	0.60	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.588  
SUBAREA AREA (ACRES) = 10.10 SUBAREA RUNOFF (CFS) = 4.40  
EFFECTIVE AREA (ACRES) = 24.60 AREA-AVERAGED Fm (INCH/HR) = 0.32  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.54  
TOTAL AREA (ACRES) = 24.6 PEAK FLOW RATE (CFS) = 11.35

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.40 HALFSTREET FLOOD WIDTH (FEET) = 12.15  
FLOW VELOCITY (FEET/SEC.) = 3.41 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.37

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50106.00 = 1688.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50106.00 TO NODE 50107.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 390.00 DOWNSTREAM ELEVATION(FEET) = 381.00
STREET LENGTH(FEET) = 252.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.76

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.38

HALFSTREET FLOOD WIDTH(FEET) = 10.90

AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.63

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.74

STREET FLOW TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 16.03

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.815

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 0.600 -
USER-DEFINED - 6.80 0.60 0.600 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600

SUBAREA AREA(ACRES) = 6.90 SUBAREA RUNOFF(CFS) = 2.83

EFFECTIVE AREA(ACRES) = 31.50 AREA-AVERAGED Fm(INCH/HR) = 0.33

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.55

TOTAL AREA(ACRES) = 31.5 PEAK FLOW RATE(CFS) = 13.69

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 11.29

FLOW VELOCITY(FEET/SEC.) = 4.68 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.80

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50107.00 = 1940.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50107.00 TO NODE 50108.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 381.00 DOWNSTREAM(FEET) = 345.00
FLOW LENGTH(FEET) = 109.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.60

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 13.69

PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 16.10

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50108.00 = 2049.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50108.00 TO NODE 50109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 315.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 220.00 CHANNEL SLOPE = 0.1364
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 13.69
FLOW VELOCITY(FEET/SEC.) = 7.16 FLOW DEPTH(FEET) = 0.80
TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 16.61
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50109.00 = 2269.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 16.61

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.801

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.60 0.600 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 0.20 0.60 0.600 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.667

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.22

EFFECTIVE AREA(ACRES) = 32.10 AREA-AVERAGED Fm(INCH/HR) = 0.33

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.56

TOTAL AREA(ACRES) = 32.1 PEAK FLOW RATE(CFS) = 13.69

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 16.61

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.801

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.60 0.100 -
USER-DEFINED - 2.30 0.60 0.600 -
USER-DEFINED - 0.70 0.60 1.000 -
USER-DEFINED - 8.30 0.60 1.000 -
USER-DEFINED - 6.90 0.60 1.000 -
USER-DEFINED - 13.20 0.60 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60



SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965  
SUBAREA AREA (ACRES) = 31.60 SUBAREA RUNOFF (CFS) = 6.32  
EFFECTIVE AREA (ACRES) = 63.70 AREA-AVERAGED Fm (INCH/HR) = 0.46  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 63.7 PEAK FLOW RATE (CFS) = 19.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 16.61  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.801  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.60	0.600	-
USER-DEFINED	-	4.30	0.60	1.000	-
USER-DEFINED	-	4.10	0.60	1.000	-
USER-DEFINED	-	37.30	0.60	1.000	-
USER-DEFINED	-	37.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990  
SUBAREA AREA (ACRES) = 84.90 SUBAREA RUNOFF (CFS) = 15.85  
EFFECTIVE AREA (ACRES) = 148.60 AREA-AVERAGED Fm (INCH/HR) = 0.53  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.89  
TOTAL AREA (ACRES) = 148.6 PEAK FLOW RATE (CFS) = 35.69

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 16.61  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.801  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.600	-
USER-DEFINED	-	1.20	0.60	1.000	-
USER-DEFINED	-	4.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.985  
SUBAREA AREA (ACRES) = 5.50 SUBAREA RUNOFF (CFS) = 1.04  
EFFECTIVE AREA (ACRES) = 154.10 AREA-AVERAGED Fm (INCH/HR) = 0.54  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.89  
TOTAL AREA (ACRES) = 154.1 PEAK FLOW RATE (CFS) = 36.73

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50119.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 315.00 DOWNSTREAM (FEET) = 284.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 893.00 CHANNEL SLOPE = 0.0347  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 36.73  
FLOW VELOCITY (FEET/SEC.) = 5.50 FLOW DEPTH (FEET) = 1.49  
TRAVEL TIME (MIN.) = 2.71 Tc (MIN.) = 19.32  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50119.00 = 3162.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 19.32  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.736  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	0.600	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	5.30	0.60	1.000	-
USER-DEFINED	-	2.70	0.60	1.000	-
USER-DEFINED	-	2.50	0.60	1.000	-
USER-DEFINED	-	2.80	0.60	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.904  
SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 2.45  
EFFECTIVE AREA (ACRES) = 168.10 AREA-AVERAGED Fm (INCH/HR) = 0.54  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.90  
TOTAL AREA (ACRES) = 168.1 PEAK FLOW RATE (CFS) = 36.73  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 19.32  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.736  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.80	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	1.50	0.60	1.000	-
USER-DEFINED	-	1.10	0.60	0.850	-
USER-DEFINED	-	2.30	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980  
SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 1.12  
EFFECTIVE AREA (ACRES) = 176.50 AREA-AVERAGED Fm (INCH/HR) = 0.54  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.90  
TOTAL AREA (ACRES) = 176.5 PEAK FLOW RATE (CFS) = 36.73  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

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=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 19.32
RAINFALL INTENSITY(INCH/HR) = 0.74
AREA-AVERAGED Fm(INCH/HR) = 0.54
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.90
EFFECTIVE STREAM AREA(ACRES) = 176.50
TOTAL STREAM AREA(ACRES) = 176.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 36.73

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FLOW PROCESS FROM NODE 50110.00 TO NODE 50111.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 420.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.342
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.276
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp    Ap    SCS  Tc
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" -        1.20    0.60    0.500  95    7.34
RESIDENTIAL
"3-4 DWELLINGS/ACRE" -        0.20    0.60    0.600  95    7.78
RESIDENTIAL
"5-7 DWELLINGS/ACRE" -        0.10    0.60    0.500  95    7.34
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.513
SUBAREA RUNOFF(CFS) = 1.31
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 1.31

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*****
FLOW PROCESS FROM NODE 50111.00 TO NODE 50112.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<
=====

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UPSTREAM ELEVATION(FEET) = 420.00 DOWNSTREAM ELEVATION(FEET) = 415.00
STREET LENGTH(FEET) = 122.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.66

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.87
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.40
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.87
STREET FLOW TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 7.80
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.230
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp    Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.50    0.60    0.600  -
USER-DEFINED         -        0.30    0.60    0.500  -
USER-DEFINED         -        0.50    0.60    0.600  -
USER-DEFINED         -        0.10    0.60    0.500  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.571
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.12
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.32
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 2.36

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.23 HALFSTREET FLOOD WIDTH(FEET) = 3.47
FLOW VELOCITY(FEET/SEC.) = 3.81 DEPTH*VELOCITY(FT*FT/SEC.) = 0.87
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50112.00 = 452.00 FEET.

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*****
FLOW PROCESS FROM NODE 50112.00 TO NODE 50113.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<
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UPSTREAM ELEVATION(FEET) = 415.00 DOWNSTREAM ELEVATION(FEET) = 410.00
STREET LENGTH(FEET) = 122.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.66

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.96
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.25
HALFSTREET FLOOD WIDTH(FEET) = 4.47
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.80
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.94
STREET FLOW TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 8.34
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.183
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp    Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN

```

USER-DEFINED - 0.20 0.60 0.600 -  
 USER-DEFINED - 0.10 0.60 0.500 -  
 USER-DEFINED - 1.00 0.60 0.600 -  
 USER-DEFINED - 0.20 0.60 0.500 -  
 USER-DEFINED - 0.10 0.60 0.600 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.581  
 SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 1.20  
 EFFECTIVE AREA (ACRES) = 4.50 AREA-AVERAGED Fm (INCH/HR) = 0.33  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.56  
 TOTAL AREA (ACRES) = 4.5 PEAK FLOW RATE (CFS) = 3.44

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.26 HALFSTREET FLOOD WIDTH (FEET) = 5.09  
 FLOW VELOCITY (FEET/SEC.) = 3.83 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.00  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50113.00 = 574.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50113.00 TO NODE 50113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 8.34

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.183

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	0.500	-
USER-DEFINED	-	1.90	0.60	0.600	-
USER-DEFINED	-	0.20	0.60	0.500	-
USER-DEFINED	-	0.20	0.60	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.575

SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 2.11

EFFECTIVE AREA (ACRES) = 7.30 AREA-AVERAGED Fm (INCH/HR) = 0.34

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.56

TOTAL AREA (ACRES) = 7.3 PEAK FLOW RATE (CFS) = 5.55

\*\*\*\*\*

FLOW PROCESS FROM NODE 50113.00 TO NODE 50114.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<

UPSTREAM ELEVATION (FEET) = 410.00 DOWNSTREAM ELEVATION (FEET) = 400.00  
 STREET LENGTH (FEET) = 238.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.57

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.31

HALFSTREET FLOOD WIDTH (FEET) = 7.59

AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.29

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.33

STREET FLOW TRAVEL TIME (MIN.) = 0.93 Tc (MIN.) = 9.26

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.111

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.60	0.600	-
USER-DEFINED	-	1.90	0.60	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600

SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 2.03

EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.34

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.57

TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 7.11

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.32 HALFSTREET FLOOD WIDTH (FEET) = 7.91

FLOW VELOCITY (FEET/SEC.) = 4.37 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.38

LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50114.00 = 812.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50114.00 TO NODE 50115.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<

UPSTREAM ELEVATION (FEET) = 400.00 DOWNSTREAM ELEVATION (FEET) = 390.00  
 STREET LENGTH (FEET) = 241.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.85

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.34

HALFSTREET FLOOD WIDTH (FEET) = 8.91

AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.50

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.51

STREET FLOW TRAVEL TIME (MIN.) = 0.89 Tc (MIN.) = 10.16

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.052

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.60	0.600	-
USER-DEFINED	-	1.50	0.60	0.600	-

USER-DEFINED - 0.10 0.60 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.607  
 SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 3.47  
 EFFECTIVE AREA (ACRES) = 15.90 AREA-AVERAGED Fm (INCH/HR) = 0.35  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA (ACRES) = 15.9 PEAK FLOW RATE (CFS) = 10.03

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.35 HALFSTREET FLOOD WIDTH (FEET) = 9.47  
 FLOW VELOCITY (FEET/SEC.) = 4.62 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.61  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50115.00 = 1053.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50115.00 TO NODE 50116.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<<

UPSTREAM ELEVATION (FEET) = 390.00 DOWNSTREAM ELEVATION (FEET) = 380.00  
 STREET LENGTH (FEET) = 268.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.27

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.36  
 HALFSTREET FLOOD WIDTH (FEET) = 10.20  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.59  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.66  
 STREET FLOW TRAVEL TIME (MIN.) = 0.97 Tc (MIN.) = 11.13

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.003

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.60	0.600	-
USER-DEFINED	-	3.50	0.60	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600  
 SUBAREA AREA (ACRES) = 4.30 SUBAREA RUNOFF (CFS) = 2.49  
 EFFECTIVE AREA (ACRES) = 20.20 AREA-AVERAGED Fm (INCH/HR) = 0.35  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA (ACRES) = 20.2 PEAK FLOW RATE (CFS) = 11.82

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 10.43  
 FLOW VELOCITY (FEET/SEC.) = 4.63 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.70  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50116.00 = 1321.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50116.00 TO NODE 50117.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<<

UPSTREAM ELEVATION (FEET) = 380.00 DOWNSTREAM ELEVATION (FEET) = 355.00  
 STREET LENGTH (FEET) = 507.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.64

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.39

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.38  
 HALFSTREET FLOOD WIDTH (FEET) = 11.05  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.45  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.07  
 STREET FLOW TRAVEL TIME (MIN.) = 1.55 Tc (MIN.) = 12.68

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.933

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.80	0.60	0.600	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	6.10	0.60	0.600	-
USER-DEFINED	-	1.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.644  
 SUBAREA AREA (ACRES) = 14.50 SUBAREA RUNOFF (CFS) = 7.13  
 EFFECTIVE AREA (ACRES) = 34.70 AREA-AVERAGED Fm (INCH/HR) = 0.37  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.61  
 TOTAL AREA (ACRES) = 34.7 PEAK FLOW RATE (CFS) = 17.67

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.39 HALFSTREET FLOOD WIDTH (FEET) = 11.76  
 FLOW VELOCITY (FEET/SEC.) = 5.62 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.21  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50117.00 = 1828.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50117.00 TO NODE 50118.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 355.00 DOWNSTREAM (FEET) = 315.00  
 FLOW LENGTH (FEET) = 171.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 25.17  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 17.67  
 PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 12.79  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50118.00 = 1999.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50118.00 TO NODE 50119.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 180.00 CHANNEL SLOPE = 0.1722  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 17.67  
 FLOW VELOCITY(FEET/SEC.) = 8.31 FLOW DEPTH(FEET) = 0.84  
 TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 13.16  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50119.00 = 2179.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 13.16  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.914  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.600	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	2.30	0.60	0.600	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.688  
 SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 1.44  
 EFFECTIVE AREA(ACRES) = 37.90 AREA-AVERAGED Fm(INCH/HR) = 0.37  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.62  
 TOTAL AREA(ACRES) = 37.9 PEAK FLOW RATE(CFS) = 18.52

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 13.16  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.914  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.17  
 EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.37  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.62  
 TOTAL AREA(ACRES) = 38.5 PEAK FLOW RATE(CFS) = 18.69

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 13.16  
 RAINFALL INTENSITY(INCH/HR) = 0.91  
 AREA-AVERAGED Fm(INCH/HR) = 0.37  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.62  
 EFFECTIVE STREAM AREA(ACRES) = 38.50  
 TOTAL STREAM AREA(ACRES) = 38.50  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 18.69

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	36.73	19.32	0.736	0.60( 0.54)	0.90	176.5	50100.00
2	18.69	13.16	0.914	0.60( 0.37)	0.62	38.5	50110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	55.42	13.16	0.914	0.60( 0.50)	0.83	158.7	50110.00
2	49.27	19.32	0.736	0.60( 0.51)	0.85	215.0	50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 55.42 Tc(MIN.) = 13.16  
 EFFECTIVE AREA(ACRES) = 158.68 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA(ACRES) = 215.0  
 LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50119.00 = 3162.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50119.00 TO NODE 50120.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 240.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00 CHANNEL SLOPE = 0.0437  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 55.42  
 FLOW VELOCITY(FEET/SEC.) = 6.64 FLOW DEPTH(FEET) = 1.67  
 TRAVEL TIME(MIN.) = 2.53 Tc(MIN.) = 15.69

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50120.00 = 4170.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50120.00 TO NODE 50120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.69

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.824

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	0.100	-
USER-DEFINED	-	0.70	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.640

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 0.79

EFFECTIVE AREA(ACRES) = 160.68 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.83

TOTAL AREA(ACRES) = 217.0 PEAK FLOW RATE(CFS) = 55.42

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50120.00 TO NODE 50120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.69

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.824

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	1.000	-
USER-DEFINED	-	1.70	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.50	0.60	1.000	-
USER-DEFINED	-	2.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.929

SUBAREA AREA(ACRES) = 5.30 SUBAREA RUNOFF(CFS) = 1.27

EFFECTIVE AREA(ACRES) = 165.98 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.83

TOTAL AREA(ACRES) = 222.3 PEAK FLOW RATE(CFS) = 55.42

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50120.00 TO NODE 50120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.69

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.824

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN

USER-DEFINED - 0.90 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 0.18

EFFECTIVE AREA(ACRES) = 166.88 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.83

TOTAL AREA(ACRES) = 223.2 PEAK FLOW RATE(CFS) = 55.42

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 223.2 TC(MIN.) = 15.69

EFFECTIVE AREA(ACRES) = 166.88 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.834

PEAK FLOW RATE(CFS) = 55.42

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	55.42	15.69	0.824	0.60( 0.50)	0.83	166.9	50110.00
2	49.27	21.93	0.685	0.60( 0.51)	0.85	223.2	50100.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2013 Advanced Engineering Software (aes)  
Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

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92707

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PA3 & PA4 ROMP \*  
\* REGIONAL WATERSHED S29 - FREE DRAINING - ULTIMATE CONDITION \*  
\* 2-YR RM EV JULY 2018 ROKAMOTO \*  
\*\*\*\*\*

FILE NAME: P503XX02.DAT  
TIME/DATE OF STUDY: 09:14 07/24/2018

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.00; 1.580  
2) 6.00; 1.430  
3) 7.00; 1.310  
4) 8.00; 1.210  
5) 9.00; 1.130  
6) 10.00; 1.060  
7) 11.00; 1.010  
8) 12.00; 0.960  
9) 13.00; 0.920  
10) 14.00; 0.880  
11) 15.00; 0.840  
12) 20.00; 0.720  
13) 25.00; 0.630  
14) 30.00; 0.570  
15) 40.00; 0.480  
16) 50.00; 0.420  
17) 60.00; 0.380  
18) 90.00; 0.300  
19) 120.00; 0.260  
20) 180.00; 0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```
=== =====  
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0312 0.167 0.0150  
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0312 0.167 0.0150  
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0312 0.167 0.0150  
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0312 0.167 0.0150  
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0312 0.167 0.0150
```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50300.00 TO NODE 50301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 660.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.792  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.075  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.70	0.60	1.000	0	9.79
NATURAL FAIR COVER "GRASS"	-	0.40	0.60	1.000	0	9.79
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.20	0.60	1.000	0	9.79
NATURAL FAIR COVER "GRASS"	-	0.10	0.60	1.000	0	9.79

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.60  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 0.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50301.00 TO NODE 50302.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 660.00 DOWNSTREAM ELEVATION(FEET) = 650.00  
STREET LENGTH(FEET) = 259.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2



STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.95  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.27  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.85  
STREET FLOW TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 10.80  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.020

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.60 1.000 -  
USER-DEFINED - 0.50 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 1.000 -  
USER-DEFINED - 0.20 0.60 0.700 -  
USER-DEFINED - 0.30 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.967  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 0.71  
EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.59  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 1.24

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00  
FLOW VELOCITY(FEET/SEC.) = 4.27 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.85  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50302.00 = 589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50302.00 TO NODE 50303.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 650.00 DOWNSTREAM ELEVATION(FEET) = 630.00  
STREET LENGTH(FEET) = 298.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.58  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00

AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.63  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.12  
STREET FLOW TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 11.69  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.976  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 1.30 0.60 0.700 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.721  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 0.68  
EFFECTIVE AREA(ACRES) = 4.60 AREA-AVERAGED Fm(INCH/HR) = 0.54  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 1.80

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.20 HALFSTREET FLOOD WIDTH(FEET) = 2.00  
FLOW VELOCITY(FEET/SEC.) = 5.63 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.12  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50303.00 = 887.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50303.00 TO NODE 50304.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 630.00 DOWNSTREAM ELEVATION(FEET) = 590.00  
STREET LENGTH(FEET) = 724.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.62

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.77  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.23  
HALFSTREET FLOOD WIDTH(FEET) = 3.53  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.41  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.01  
STREET FLOW TRAVEL TIME(MIN.) = 2.74 Tc(MIN.) = 14.43  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.863

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.40 0.60 0.700 -  
USER-DEFINED - 0.70 0.60 1.000 -  
USER-DEFINED - 0.70 0.60 0.700 -  
USER-DEFINED - 0.50 0.60 1.000 -  
USER-DEFINED - 1.00 0.60 1.000 -  
USER-DEFINED - 0.80 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.848  
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 1.95  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.52  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 3.28

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.24 HALFSTREET FLOOD WIDTH(FEET) = 4.28  
FLOW VELOCITY(FEET/SEC.) = 4.40 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.07  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50304.00 = 1611.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50304.00 TO NODE 50304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 14.43

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.863

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.02

EFFECTIVE AREA(ACRES) = 10.80 AREA-AVERAGED Fm(INCH/HR) = 0.52

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.87

TOTAL AREA(ACRES) = 10.8 PEAK FLOW RATE(CFS) = 3.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50304.00 TO NODE 50305.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 590.00 DOWNSTREAM ELEVATION(FEET) = 550.00  
STREET LENGTH(FEET) = 788.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.63

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.81

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.28

HALFSTREET FLOOD WIDTH(FEET) = 5.97

AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.41

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.22

STREET FLOW TRAVEL TIME(MIN.) = 2.98 Tc(MIN.) = 17.40

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.782

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.60	0.60	0.600	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	1.30	0.60	0.600	-
USER-DEFINED	-	2.20	0.60	1.000	-
USER-DEFINED	-	4.00	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835

SUBAREA AREA(ACRES) = 11.90 SUBAREA RUNOFF(CFS) = 3.01

EFFECTIVE AREA(ACRES) = 22.70 AREA-AVERAGED Fm(INCH/HR) = 0.51

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 22.7 PEAK FLOW RATE(CFS) = 5.53

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 6.53

FLOW VELOCITY(FEET/SEC.) = 4.49 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.30

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50305.00 = 2399.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 17.40

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.782

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.700	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.11

EFFECTIVE AREA(ACRES) = 23.30 AREA-AVERAGED Fm(INCH/HR) = 0.51

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.86

TOTAL AREA(ACRES) = 23.3 PEAK FLOW RATE(CFS) = 5.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 17.40

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.782

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.60	0.600	-
USER-DEFINED	-	1.20	0.60	0.700	-
USER-DEFINED	-	2.50	0.60	0.600	-
USER-DEFINED	-	7.60	0.60	0.700	-
USER-DEFINED	-	0.50	0.60	0.600	-
USER-DEFINED	-	1.30	0.60	0.700	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.666  
 SUBAREA AREA (ACRES) = 15.20 SUBAREA RUNOFF (CFS) = 5.23  
 EFFECTIVE AREA (ACRES) = 38.50 AREA-AVERAGED Fm (INCH/HR) = 0.47  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.78  
 TOTAL AREA (ACRES) = 38.5 PEAK FLOW RATE (CFS) = 10.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50305.00 TO NODE 50306.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 510.00  
 FLOW LENGTH(FEET) = 813.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.46  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 10.88  
 PIPE TRAVEL TIME(MIN.) = 1.09 Tc(MIN.) = 18.49  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50306.00 = 3212.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.49  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.756  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	0.100	-
USER-DEFINED	-	2.80	0.60	0.600	-
USER-DEFINED	-	2.00	0.60	0.100	-
USER-DEFINED	-	10.00	0.60	0.600	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.536  
 SUBAREA AREA (ACRES) = 15.90 SUBAREA RUNOFF (CFS) = 6.22  
 EFFECTIVE AREA (ACRES) = 54.40 AREA-AVERAGED Fm (INCH/HR) = 0.43  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.71  
 TOTAL AREA (ACRES) = 54.4 PEAK FLOW RATE (CFS) = 16.19

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.49  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.756  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 0.25  
 EFFECTIVE AREA (ACRES) = 56.20 AREA-AVERAGED Fm (INCH/HR) = 0.43  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 56.2 PEAK FLOW RATE (CFS) = 16.44

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50306.00 TO NODE 50307.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 470.00  
 FLOW LENGTH(FEET) = 919.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.04  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 16.44  
 PIPE TRAVEL TIME(MIN.) = 1.17 Tc(MIN.) = 19.67  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50307.00 = 4131.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.67  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.728  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.60	0.600	-
USER-DEFINED	-	2.20	0.60	0.100	-
USER-DEFINED	-	1.50	0.60	0.400	-
USER-DEFINED	-	10.50	0.60	0.600	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.533  
 SUBAREA AREA (ACRES) = 17.90 SUBAREA RUNOFF (CFS) = 6.58  
 EFFECTIVE AREA (ACRES) = 74.10 AREA-AVERAGED Fm (INCH/HR) = 0.40  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.67  
 TOTAL AREA (ACRES) = 74.1 PEAK FLOW RATE (CFS) = 21.59

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.67  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.728  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.60	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 0.35

EFFECTIVE AREA(ACRES) = 77.10 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 77.1 PEAK FLOW RATE(CFS) = 21.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50307.00 TO NODE 50308.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 425.00  
FLOW LENGTH(FEET) = 1006.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.26  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 21.94  
PIPE TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 20.84  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50308.00 = 5137.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 20.84  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.705  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.60	0.100	-
USER-DEFINED	-	2.10	0.60	0.600	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	0.80	0.60	0.100	-
USER-DEFINED	-	2.50	0.60	0.400	-
USER-DEFINED	-	6.30	0.60	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.495  
SUBAREA AREA(ACRES) = 12.90 SUBAREA RUNOFF(CFS) = 4.73  
EFFECTIVE AREA(ACRES) = 90.00 AREA-AVERAGED Fm(INCH/HR) = 0.40  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.66  
TOTAL AREA(ACRES) = 90.0 PEAK FLOW RATE(CFS) = 25.07

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 20.84  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.705  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.893  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.11  
EFFECTIVE AREA(ACRES) = 90.70 AREA-AVERAGED Fm(INCH/HR) = 0.40

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.66  
TOTAL AREA(ACRES) = 90.7 PEAK FLOW RATE(CFS) = 25.17

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 20.84  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.705  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.60	0.60	0.400	-
USER-DEFINED	-	0.90	0.60	0.850	-
USER-DEFINED	-	5.20	0.60	0.100	-
USER-DEFINED	-	11.00	0.60	0.400	-
USER-DEFINED	-	8.80	0.60	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.419  
SUBAREA AREA(ACRES) = 26.80 SUBAREA RUNOFF(CFS) = 10.94  
EFFECTIVE AREA(ACRES) = 117.50 AREA-AVERAGED Fm(INCH/HR) = 0.36  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 117.5 PEAK FLOW RATE(CFS) = 36.11

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 20.84  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.705  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.60	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	2.80	0.60	0.400	-
USER-DEFINED	-	0.20	0.60	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.749  
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 3.15  
EFFECTIVE AREA(ACRES) = 131.20 AREA-AVERAGED Fm(INCH/HR) = 0.37  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 131.2 PEAK FLOW RATE(CFS) = 39.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50309.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 410.00  
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.13  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 39.26  
 PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 21.13  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 5433.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

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FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 15.1

>>>>DEFINE MEMORY BANK # 2 <<<<<

PEAK FLOWRATE TABLE FILE NAME: P502XX02.DNA

MEMORY BANK # 2 DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	139.80	16.91	0.60 ( 0.46)	0.76	440.1	50240.00
2	122.72	21.45	0.60 ( 0.46)	0.76	529.7	50280.00
3	95.69	26.14	0.60 ( 0.46)	0.77	593.2	50220.00
4	74.57	33.21	0.60 ( 0.46)	0.76	640.6	50260.00
5	70.57	35.98	0.60 ( 0.46)	0.76	645.2	50200.00
TOTAL AREA (ACRES) =						645.2

\*\*\*\*\*

FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 14.0

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<<

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	139.80	16.91	0.60 ( 0.46)	0.76	440.1	50240.00
2	122.72	21.45	0.60 ( 0.46)	0.76	529.7	50280.00
3	95.69	26.14	0.60 ( 0.46)	0.77	593.2	50220.00
4	74.57	33.21	0.60 ( 0.46)	0.76	640.6	50260.00
5	70.57	35.98	0.60 ( 0.46)	0.76	645.2	50200.00
TOTAL AREA (ACRES) =						645.2

\*\*\*\*\*

FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	139.80	16.91	0.794	0.60 ( 0.46)	0.76	440.1	50240.00

2	122.72	21.45	0.694	0.60 ( 0.46)	0.76	529.7	50280.00
3	95.69	26.14	0.616	0.60 ( 0.46)	0.77	593.2	50220.00
4	74.57	33.21	0.541	0.60 ( 0.46)	0.76	640.6	50260.00
5	70.57	35.98	0.516	0.60 ( 0.46)	0.76	645.2	50200.00

LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50309.00 = 11241.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	39.26	21.13	0.700	0.60 ( 0.37)	0.62	131.2	50300.00

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 5433.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	179.06	16.91	0.794	0.60 ( 0.44)	0.74	545.1	50240.00
2	163.17	21.13	0.700	0.60 ( 0.44)	0.74	654.7	50300.00
3	161.30	21.45	0.694	0.60 ( 0.44)	0.74	660.9	50280.00
4	124.95	26.14	0.616	0.60 ( 0.44)	0.74	724.4	50220.00
5	99.18	33.21	0.541	0.60 ( 0.44)	0.74	771.8	50260.00
6	94.05	35.98	0.516	0.60 ( 0.44)	0.74	776.4	50200.00
TOTAL AREA (ACRES) =						776.4	

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 179.06 Tc(MIN.) = 16.910  
 EFFECTIVE AREA(ACRES) = 545.10 AREA-AVERAGED Fm(INCH/HR) = 0.44  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.74  
 TOTAL AREA (ACRES) = 776.4  
 LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50309.00 = 11241.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 50309.00 TO NODE 50310.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 407.00  
 FLOW LENGTH(FEET) = 898.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 66.0 INCH PIPE IS 52.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.83  
 ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 179.06  
 PIPE TRAVEL TIME(MIN.) = 1.69 Tc(MIN.) = 18.60  
 LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50310.00 = 12139.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.60  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	4.60	0.60	0.400	-
USER-DEFINED	-	2.60	0.60	0.850	-
USER-DEFINED	-	1.00	0.60	0.100	-
USER-DEFINED	-	9.60	0.60	0.400	-
USER-DEFINED	-	0.50	0.60	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.446  
SUBAREA AREA(ACRES) = 18.50 SUBAREA RUNOFF(CFS) = 8.09  
EFFECTIVE AREA(ACRES) = 563.60 AREA-AVERAGED Fm(INCH/HR) = 0.44  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 794.9 PEAK FLOW RATE(CFS) = 179.06  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----  
MAINLINE Tc(MIN.) = 18.60  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.600	-
USER-DEFINED	-	10.70	0.60	0.850	-
USER-DEFINED	-	3.20	0.60	0.400	-
USER-DEFINED	-	0.50	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.749  
SUBAREA AREA(ACRES) = 14.50 SUBAREA RUNOFF(CFS) = 3.97  
EFFECTIVE AREA(ACRES) = 578.10 AREA-AVERAGED Fm(INCH/HR) = 0.44  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 809.4 PEAK FLOW RATE(CFS) = 179.06  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50345.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
-----  
ELEVATION DATA: UPSTREAM(FEET) = 407.00 DOWNSTREAM(FEET) = 403.00  
FLOW LENGTH(FEET) = 1487.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.16  
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 179.06  
PIPE TRAVEL TIME(MIN.) = 3.04 Tc(MIN.) = 21.64  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50345.00 = 13626.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 10  
-----  
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50320.00 TO NODE 50321.00 IS CODE = 21  
-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00  
ELEVATION DATA: UPSTREAM(FEET) = 1110.00 DOWNSTREAM(FEET) = 1035.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.517  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.094  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.60	0.60	1.000	0	9.52
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.60	1.000	0	9.52

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.40  
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 0.40

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50321.00 TO NODE 50322.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
-----  
ELEVATION DATA: UPSTREAM(FEET) = 1035.00 DOWNSTREAM(FEET) = 960.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 225.00 CHANNEL SLOPE = 0.3333  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.40  
FLOW VELOCITY(FEET/SEC.) = 4.11 FLOW DEPTH(FEET) = 0.18  
TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 10.43  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50322.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50322.00 TO NODE 50322.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----  
MAINLINE Tc(MIN.) = 10.43  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.038  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	1.00	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 0.43  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 0.79

\*\*\*\*\*

FLOW PROCESS FROM NODE 50322.00 TO NODE 50323.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 955.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 33.00 CHANNEL SLOPE = 0.1515
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 0.79
FLOW VELOCITY(FEET/SEC.) = 3.61 FLOW DEPTH(FEET) = 0.27
TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 10.58
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50323.00 = 580.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50323.00 TO NODE 50323.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.58
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.031
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.70 0.60 1.000 -
USER-DEFINED - 1.50 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 1.24
EFFECTIVE AREA(ACRES) = 5.20 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 5.2 PEAK FLOW RATE(CFS) = 2.02

\*\*\*\*\*

FLOW PROCESS FROM NODE 50323.00 TO NODE 50324.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 955.00 DOWNSTREAM(FEET) = 915.00
FLOW LENGTH(FEET) = 254.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 2.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.75
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.02
PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 10.94
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50324.00 = 834.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50324.00 TO NODE 50324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.94

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.013

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.00 0.60 0.800 -
USER-DEFINED - 0.20 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.818
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 1.03
EFFECTIVE AREA(ACRES) = 7.40 AREA-AVERAGED Fm(INCH/HR) = 0.57
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 7.4 PEAK FLOW RATE(CFS) = 2.97

\*\*\*\*\*

FLOW PROCESS FROM NODE 50324.00 TO NODE 50324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.94
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.013
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.80 0.60 0.800 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 2.00 0.60 0.800 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.804
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 2.34
EFFECTIVE AREA(ACRES) = 12.30 AREA-AVERAGED Fm(INCH/HR) = 0.53
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.89
TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 5.31

\*\*\*\*\*

FLOW PROCESS FROM NODE 50324.00 TO NODE 50325.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 880.00
FLOW LENGTH(FEET) = 548.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.30
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.31
PIPE TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 11.75
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50325.00 = 1382.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50325.00 TO NODE 50325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.75
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.972
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.90 0.60 0.800 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA(ACRES) = 3.90 SUBAREA RUNOFF(CFS) = 1.73  
 EFFECTIVE AREA(ACRES) = 16.20 AREA-AVERAGED Fm(INCH/HR) = 0.52  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.87  
 TOTAL AREA(ACRES) = 16.2 PEAK FLOW RATE(CFS) = 6.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 50325.00 TO NODE 50326.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 880.00 DOWNSTREAM(FEET) = 850.00  
 FLOW LENGTH(FEET) = 441.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.27  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 6.59  
 PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 12.35  
 LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50326.00 = 1823.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50326.00 TO NODE 50326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.35  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.946  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.30 0.60 0.800 -  
 USER-DEFINED - 1.20 0.60 0.800 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 1.89  
 EFFECTIVE AREA(ACRES) = 20.70 AREA-AVERAGED Fm(INCH/HR) = 0.51  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 20.7 PEAK FLOW RATE(CFS) = 8.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 50326.00 TO NODE 50327.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 810.00  
 FLOW LENGTH(FEET) = 616.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.77  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 8.09  
 PIPE TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 13.15

LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50327.00 = 2439.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50327.00 TO NODE 50327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.15  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.914  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.20 0.60 0.800 -  
 USER-DEFINED - 5.00 0.60 0.800 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 2.81  
 EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 10.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 50327.00 TO NODE 50328.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 760.00  
 FLOW LENGTH(FEET) = 724.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.94  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 10.30  
 PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 14.02  
 LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50328.00 = 3163.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50328.00 TO NODE 50328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.02  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.879  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.90 0.60 0.800 -  
 USER-DEFINED - 6.30 0.60 0.800 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA(ACRES) = 9.20 SUBAREA RUNOFF(CFS) = 3.31  
 EFFECTIVE AREA(ACRES) = 37.10 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 12.74

\*\*\*\*\*

FLOW PROCESS FROM NODE 50328.00 TO NODE 50328.00 IS CODE = 81



=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 14.02  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.879  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.90 0.60 0.800 -  
USER-DEFINED - 3.10 0.60 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 6.00 SUBAREA RUNOFF(CFS) = 2.16  
EFFECTIVE AREA(ACRES) = 43.10 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.83  
TOTAL AREA(ACRES) = 43.1 PEAK FLOW RATE(CFS) = 14.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50328.00 TO NODE 50329.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====  
ELEVATION DATA: UPSTREAM(FEET) = 760.00 DOWNSTREAM(FEET) = 700.00  
FLOW LENGTH(FEET) = 769.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.02  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 14.89  
PIPE TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 14.82  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50329.00 = 3932.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50329.00 TO NODE 50329.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 14.82  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.847  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.10 0.60 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 2.35  
EFFECTIVE AREA(ACRES) = 50.20 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 50.2 PEAK FLOW RATE(CFS) = 16.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50329.00 TO NODE 50340.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====  
ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 660.00

FLOW LENGTH(FEET) = 478.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.74  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 16.00  
PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 15.30  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50340.00 = 4410.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 15.30  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.833  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.70 0.60 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.70 SUBAREA RUNOFF(CFS) = 2.76  
EFFECTIVE AREA(ACRES) = 58.90 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 58.9 PEAK FLOW RATE(CFS) = 18.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 15.30  
RAINFALL INTENSITY(INCH/HR) = 0.83  
AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.82  
EFFECTIVE STREAM AREA(ACRES) = 58.90  
TOTAL STREAM AREA(ACRES) = 58.90  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 18.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50330.00 TO NODE 50331.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 294.00  
ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 965.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.457  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.264  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

RESIDENTIAL  
"1 DWELLING/ACRE" - 1.60 0.60 0.800 0 7.46  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA RUNOFF(CFS) = 1.13  
TOTAL AREA (ACRES) = 1.60 PEAK FLOW RATE (CFS) = 1.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50331.00 TO NODE 50332.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 965.00 DOWNSTREAM ELEVATION(FEET) = 960.00  
STREET LENGTH(FEET) = 285.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.86  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.25  
HALFSTREET FLOOD WIDTH(FEET) = 4.34  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.46  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.60  
STREET FLOW TRAVEL TIME(MIN.) = 1.93 Tc(MIN.) = 9.39

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.103

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.60	0.60	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 1.46  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 2.35

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 5.28  
FLOW VELOCITY(FEET/SEC.) = 2.51 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.66  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50332.00 = 579.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50332.00 TO NODE 50333.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 960.00 DOWNSTREAM ELEVATION(FEET) = 940.00

STREET LENGTH(FEET) = 364.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.62

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.32

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.25  
HALFSTREET FLOOD WIDTH(FEET) = 4.34  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.39  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.08  
STREET FLOW TRAVEL TIME(MIN.) = 1.38 Tc(MIN.) = 10.77

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.022

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.90	0.60	0.800	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.805  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 1.94  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 3.99

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 5.09  
FLOW VELOCITY(FEET/SEC.) = 4.44 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.15  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50333.00 = 943.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50333.00 TO NODE 50334.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 940.00 DOWNSTREAM ELEVATION(FEET) = 920.00  
STREET LENGTH(FEET) = 405.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.30  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.29  
HALFSTREET FLOOD WIDTH(FEET) = 6.41  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.42  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.27  
STREET FLOW TRAVEL TIME(MIN.) = 1.53 Tc(MIN.) = 12.30  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.948  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.50	0.60	0.800	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.831  
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 2.63  
EFFECTIVE AREA(ACRES) = 14.70 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 14.7 PEAK FLOW RATE(CFS) = 6.08

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 6.97  
FLOW VELOCITY(FEET/SEC.) = 4.50 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.34  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50334.00 = 1348.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50334.00 TO NODE 50335.00 IS CODE = 63  
-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 920.00 DOWNSTREAM ELEVATION(FEET) = 905.00  
STREET LENGTH(FEET) = 270.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.62

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.98  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.33  
HALFSTREET FLOOD WIDTH(FEET) = 8.78  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.20  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.73  
STREET FLOW TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 13.16  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.913  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	12.90	0.60	0.800	-

USER-DEFINED - 4.00 0.60 1.000 -  
USER-DEFINED - 5.40 0.60 1.000 -  
USER-DEFINED - 0.40 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.886  
SUBAREA AREA(ACRES) = 22.70 SUBAREA RUNOFF(CFS) = 7.80  
EFFECTIVE AREA(ACRES) = 37.40 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.86  
TOTAL AREA(ACRES) = 37.4 PEAK FLOW RATE(CFS) = 13.42

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 10.12  
FLOW VELOCITY(FEET/SEC.) = 5.53 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.99  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50335.00 = 1618.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50335.00 TO NODE 50336.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 870.00  
FLOW LENGTH(FEET) = 898.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.98  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 13.42  
PIPE TRAVEL TIME(MIN.) = 1.25 Tc(MIN.) = 14.41  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50336.00 = 2516.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50336.00 TO NODE 50336.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 14.41  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.863  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.40	0.60	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 2.21  
EFFECTIVE AREA(ACRES) = 43.80 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 43.8 PEAK FLOW RATE(CFS) = 13.95

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50336.00 TO NODE 50337.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 820.00  
FLOW LENGTH(FEET) = 799.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 14.50  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 13.95  
PIPE TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 15.33  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50337.00 = 3315.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50337.00 TO NODE 50337.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.33  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.832  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.00	0.60	0.800	-
USER-DEFINED	-	7.20	0.60	0.800	-
USER-DEFINED	-	1.50	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.839  
SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 3.38  
EFFECTIVE AREA(ACRES) = 55.20 AREA-AVERAGED Fm(INCH/HR) = 0.51  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 55.2 PEAK FLOW RATE(CFS) = 16.08

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50337.00 TO NODE 50338.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 750.00  
FLOW LENGTH(FEET) = 1063.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.29  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 16.08  
PIPE TRAVEL TIME(MIN.) = 1.16 Tc(MIN.) = 16.49  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50338.00 = 4378.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50338.00 TO NODE 50338.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.49  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.804  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.70	0.60	0.800	-
USER-DEFINED	-	4.20	0.60	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 2.60  
EFFECTIVE AREA(ACRES) = 64.10 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 64.1 PEAK FLOW RATE(CFS) = 17.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50338.00 TO NODE 50339.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 685.00  
FLOW LENGTH(FEET) = 1107.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.85  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 17.30  
PIPE TRAVEL TIME(MIN.) = 1.24 Tc(MIN.) = 17.73  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50339.00 = 5485.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50339.00 TO NODE 50339.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.73  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.774  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.10	0.60	0.800	-
USER-DEFINED	-	1.20	0.60	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 1.94  
EFFECTIVE AREA(ACRES) = 71.40 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 71.4 PEAK FLOW RATE(CFS) = 17.51

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50339.00 TO NODE 50340.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 685.00 DOWNSTREAM(FEET) = 660.00  
FLOW LENGTH(FEET) = 592.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.02  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 17.51  
PIPE TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 18.49  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50340.00 = 6077.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.49

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.756  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.00 0.60 0.800 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 1.24  
 EFFECTIVE AREA (ACRES) = 76.40 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA (ACRES) = 76.4 PEAK FLOW RATE (CFS) = 17.59

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

-----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 18.49  
 RAINFALL INTENSITY (INCH/HR) = 0.76  
 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.83  
 EFFECTIVE STREAM AREA (ACRES) = 76.40  
 TOTAL STREAM AREA (ACRES) = 76.40  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 17.59

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	18.12	15.30	0.833	0.60 ( 0.49)	0.82	58.9	50320.00
2	17.59	18.49	0.756	0.60 ( 0.50)	0.83	76.4	50330.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	35.71	15.30	0.833	0.60 ( 0.50)	0.83	122.1	50320.00
2	31.64	18.49	0.756	0.60 ( 0.50)	0.83	135.3	50330.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 35.71 Tc (MIN.) = 15.30  
 EFFECTIVE AREA (ACRES) = 122.11 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA (ACRES) = 135.3  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50340.00 = 6077.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50340.00 TO NODE 50341.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 660.00 DOWNSTREAM (FEET) = 575.00

FLOW LENGTH (FEET) = 1133.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.1 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 19.27  
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 35.71  
 PIPE TRAVEL TIME (MIN.) = 0.98 Tc (MIN.) = 16.28  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50341.00 = 7210.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50341.00 TO NODE 50341.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
 MAINLINE Tc (MIN.) = 16.28  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.809  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 4.30 0.60 0.600 -  
 USER-DEFINED - 3.10 0.60 0.800 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.684  
 SUBAREA AREA (ACRES) = 7.40 SUBAREA RUNOFF (CFS) = 2.66  
 EFFECTIVE AREA (ACRES) = 129.51 AREA-AVERAGED Fm (INCH/HR) = 0.49  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 142.7 PEAK FLOW RATE (CFS) = 37.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50341.00 TO NODE 50342.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 575.00 DOWNSTREAM (FEET) = 540.00  
 FLOW LENGTH (FEET) = 495.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.0 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 18.87  
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 37.10  
 PIPE TRAVEL TIME (MIN.) = 0.44 Tc (MIN.) = 16.71  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50342.00 = 7705.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50342.00 TO NODE 50342.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
 MAINLINE Tc (MIN.) = 16.71  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.799  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.90 0.60 0.600 -  
 USER-DEFINED - 0.20 0.60 0.600 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 0.83  
 EFFECTIVE AREA (ACRES) = 131.61 AREA-AVERAGED Fm (INCH/HR) = 0.49

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.82  
TOTAL AREA (ACRES) = 144.8 PEAK FLOW RATE (CFS) = 37.10  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50342.00 TO NODE 50342.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 16.71

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.799

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.10	0.60	0.600	-
USER-DEFINED	-	17.00	0.60	0.800	-
USER-DEFINED	-	0.90	0.60	0.600	-
USER-DEFINED	-	0.90	0.60	0.800	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.738

SUBAREA AREA (ACRES) = 25.90 SUBAREA RUNOFF (CFS) = 8.30

EFFECTIVE AREA (ACRES) = 157.51 AREA-AVERAGED Fm (INCH/HR) = 0.48

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80

TOTAL AREA (ACRES) = 170.7 PEAK FLOW RATE (CFS) = 45.01

\*\*\*\*\*

FLOW PROCESS FROM NODE 50342.00 TO NODE 50343.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 540.00 DOWNSTREAM (FEET) = 470.00

FLOW LENGTH (FEET) = 894.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.5 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 20.97

ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 45.01

PIPE TRAVEL TIME (MIN.) = 0.71 Tc (MIN.) = 17.42

LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50343.00 = 8599.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50343.00 TO NODE 50343.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.42

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.782

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.60	0.60	0.600	-
USER-DEFINED	-	0.10	0.60	0.800	-
USER-DEFINED	-	0.30	0.60	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.603

SUBAREA AREA (ACRES) = 7.00 SUBAREA RUNOFF (CFS) = 2.65

EFFECTIVE AREA (ACRES) = 164.51 AREA-AVERAGED Fm (INCH/HR) = 0.48

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.79

TOTAL AREA (ACRES) = 177.7 PEAK FLOW RATE (CFS) = 45.24

\*\*\*\*\*

FLOW PROCESS FROM NODE 50343.00 TO NODE 50343.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.42

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.782

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.500	-
USER-DEFINED	-	1.80	0.60	0.600	-
USER-DEFINED	-	17.90	0.60	0.800	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.779

SUBAREA AREA (ACRES) = 19.90 SUBAREA RUNOFF (CFS) = 5.63

EFFECTIVE AREA (ACRES) = 184.41 AREA-AVERAGED Fm (INCH/HR) = 0.48

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.79

TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 50.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 50343.00 TO NODE 50344.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 416.00

FLOW LENGTH (FEET) = 780.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.8 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 20.34

ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 50.87

PIPE TRAVEL TIME (MIN.) = 0.64 Tc (MIN.) = 18.06

LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50344.00 = 9379.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50344.00 TO NODE 50344.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 18.06

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.766

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.60	0.60	0.500	-
USER-DEFINED	-	0.20	0.60	0.600	-
USER-DEFINED	-	1.90	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.400	-
USER-DEFINED	-	14.70	0.60	0.500	-
USER-DEFINED	-	33.20	0.60	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.548

SUBAREA AREA (ACRES) = 53.70 SUBAREA RUNOFF (CFS) = 21.16

EFFECTIVE AREA (ACRES) = 238.11 AREA-AVERAGED Fm (INCH/HR) = 0.44

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.74

TOTAL AREA (ACRES) = 251.3 PEAK FLOW RATE (CFS) = 69.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 50344.00 TO NODE 50344.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 18.06

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.766

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.60	0.800	-
USER-DEFINED	-	0.40	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.773

SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 1.39

EFFECTIVE AREA (ACRES) = 243.21 AREA-AVERAGED Fm (INCH/HR) = 0.44

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.74

TOTAL AREA (ACRES) = 256.4 PEAK FLOW RATE (CFS) = 70.88

\*\*\*\*\*

FLOW PROCESS FROM NODE 50344.00 TO NODE 50345.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 416.00 DOWNSTREAM (FEET) = 403.00

FLOW LENGTH (FEET) = 526.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.4 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 15.03

ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 70.88

PIPE TRAVEL TIME (MIN.) = 0.58 Tc (MIN.) = 18.65

LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50345.00 = 9905.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	70.88	18.65	0.752	0.60 (0.44)	0.74	243.2	50320.00
2	57.68	21.98	0.684	0.60 (0.45)	0.74	256.4	50330.00

LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50345.00 = 9905.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	179.06	21.64	0.690	0.60 (0.44)	0.73	578.1	50240.00
2	163.17	25.97	0.618	0.60 (0.44)	0.73	687.7	50300.00
3	161.30	26.32	0.614	0.60 (0.44)	0.73	693.9	50280.00
4	124.95	31.30	0.558	0.60 (0.44)	0.73	757.4	50220.00
5	101.23	38.63	0.492	0.60 (0.44)	0.73	804.8	50260.00

6 96.71 41.51 0.471 0.60 (0.44) 0.73 809.4 50200.00  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50345.00 = 13626.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	249.94	18.65	0.752	0.60 (0.44)	0.73	741.3	50320.00
2	238.06	21.64	0.690	0.60 (0.44)	0.73	833.2	50240.00
3	235.51	21.98	0.684	0.60 (0.44)	0.73	842.9	50330.00
4	204.90	25.97	0.618	0.60 (0.44)	0.73	944.1	50300.00
5	202.00	26.32	0.614	0.60 (0.44)	0.73	950.3	50280.00
6	159.62	31.30	0.558	0.60 (0.44)	0.73	1013.8	50220.00
7	131.80	38.63	0.492	0.60 (0.44)	0.74	1061.2	50260.00
8	125.95	41.51	0.471	0.60 (0.44)	0.74	1065.8	50200.00

TOTAL AREA (ACRES) = 1065.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 249.94 Tc (MIN.) = 18.647

EFFECTIVE AREA (ACRES) = 741.29 AREA-AVERAGED Fm (INCH/HR) = 0.44

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73

TOTAL AREA (ACRES) = 1065.8

LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50345.00 = 13626.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 18.65

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.752

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	1.40	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	6.30	0.60	0.100	-
USER-DEFINED	-	8.70	0.60	0.400	-
USER-DEFINED	-	10.80	0.60	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.376

SUBAREA AREA (ACRES) = 27.40 SUBAREA RUNOFF (CFS) = 12.99

EFFECTIVE AREA (ACRES) = 768.69 AREA-AVERAGED Fm (INCH/HR) = 0.43

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.72

TOTAL AREA (ACRES) = 1093.2 PEAK FLOW RATE (CFS) = 249.94

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.65  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.752  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.60	0.600	-
USER-DEFINED	-	1.60	0.60	0.850	-
USER-DEFINED	-	1.80	0.60	0.100	-
USER-DEFINED	-	6.20	0.60	0.400	-
USER-DEFINED	-	2.80	0.60	0.500	-
USER-DEFINED	-	0.20	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.456  
 SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 5.90  
 EFFECTIVE AREA(ACRES) = 782.39 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.71  
 TOTAL AREA(ACRES) = 1106.9 PEAK FLOW RATE(CFS) = 249.94  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50345.00 TO NODE 50346.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 350.00  
 FLOW LENGTH(FEET) = 1031.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.82  
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 249.94  
 PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 19.29  
 LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50346.00 = 14657.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50346.00 TO NODE 50346.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 19.29  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.737  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	1.10	0.60	0.500	-
USER-DEFINED	-	0.20	0.60	0.600	-
USER-DEFINED	-	1.40	0.60	0.100	-
USER-DEFINED	-	0.50	0.60	0.500	-
USER-DEFINED	-	2.40	0.60	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.423  
 SUBAREA AREA(ACRES) = 6.00 SUBAREA RUNOFF(CFS) = 2.61  
 EFFECTIVE AREA(ACRES) = 788.39 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.71  
 TOTAL AREA(ACRES) = 1112.9 PEAK FLOW RATE(CFS) = 249.94  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50346.00 TO NODE 50347.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 313.00  
 FLOW LENGTH(FEET) = 240.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 26.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 41.30  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 249.94  
 PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 19.38  
 LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50347.00 = 14897.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50347.00 TO NODE 50347.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 19.38  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.735  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.80	0.60	0.500	-
USER-DEFINED	-	1.90	0.60	0.800	-
USER-DEFINED	-	1.00	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.749  
 SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 1.31  
 EFFECTIVE AREA(ACRES) = 793.49 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.71  
 TOTAL AREA(ACRES) = 1118.0 PEAK FLOW RATE(CFS) = 249.94  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50347.00 TO NODE 50347.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 19.38  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.735  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.60	0.500	-
USER-DEFINED	-	1.00	0.60	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 0.94  
 EFFECTIVE AREA(ACRES) = 795.89 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.71  
 TOTAL AREA(ACRES) = 1120.4 PEAK FLOW RATE(CFS) = 249.94  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE



\*\*\*\*\*

FLOW PROCESS FROM NODE 50347.00 TO NODE 50348.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 313.00 DOWNSTREAM(FEET) = 233.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1690.00 CHANNEL SLOPE = 0.0473
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 7.00
CHANNEL FLOW THRU SUBAREA(CFS) = 249.94
FLOW VELOCITY(FEET/SEC.) = 9.98 FLOW DEPTH(FEET) = 2.89
TRAVEL TIME(MIN.) = 2.82 Tc(MIN.) = 22.21
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50348.00 = 16587.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.21
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.680
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.60 0.100 -
USER-DEFINED - 0.30 0.60 0.500 -
USER-DEFINED - 0.10 0.60 0.600 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 1.10 0.60 1.000 -
USER-DEFINED - 5.50 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 0.73
EFFECTIVE AREA(ACRES) = 803.19 AREA-AVERAGED Fm(INCH/HR) = 0.43
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 1127.7 PEAK FLOW RATE(CFS) = 249.94
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.21
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.680
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.70 0.60 1.000 -
USER-DEFINED - 0.90 0.60 0.100 -
USER-DEFINED - 0.40 0.60 0.600 -
USER-DEFINED - 42.40 0.60 0.800 -
USER-DEFINED - 3.00 0.60 1.000 -
USER-DEFINED - 4.20 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.827

SUBAREA AREA(ACRES) = 54.60 SUBAREA RUNOFF(CFS) = 9.05
EFFECTIVE AREA(ACRES) = 857.79 AREA-AVERAGED Fm(INCH/HR) = 0.43
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 1182.3 PEAK FLOW RATE(CFS) = 249.94
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.21
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.680
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 9.90 0.60 1.000 -
USER-DEFINED - 3.70 0.60 1.000 -
USER-DEFINED - 0.30 0.60 0.100 -
USER-DEFINED - 4.10 0.60 0.800 -
USER-DEFINED - 2.30 0.60 1.000 -
USER-DEFINED - 0.80 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.948
SUBAREA AREA(ACRES) = 21.10 SUBAREA RUNOFF(CFS) = 2.12
EFFECTIVE AREA(ACRES) = 878.89 AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73
TOTAL AREA(ACRES) = 1203.4 PEAK FLOW RATE(CFS) = 249.94
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.21
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.680
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.01
EFFECTIVE AREA(ACRES) = 879.09 AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73
TOTAL AREA(ACRES) = 1203.6 PEAK FLOW RATE(CFS) = 249.94
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.21
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.680
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	1.40	0.60	1.000	-
USER-DEFINED	-	1.70	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.90	0.60	0.850	-
USER-DEFINED	-	4.50	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.944  
SUBAREA AREA (ACRES) = 8.90 SUBAREA RUNOFF (CFS) = 0.91  
EFFECTIVE AREA (ACRES) = 887.99 AREA-AVERAGED Fm (INCH/HR) = 0.44  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73  
TOTAL AREA (ACRES) = 1212.5 PEAK FLOW RATE (CFS) = 249.94  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 22.21  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.680  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 0.05  
EFFECTIVE AREA (ACRES) = 888.69 AREA-AVERAGED Fm (INCH/HR) = 0.44  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73  
TOTAL AREA (ACRES) = 1213.2 PEAK FLOW RATE (CFS) = 249.94  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 22.21  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.680  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.60 0.100 -  
USER-DEFINED - 0.10 0.60 0.500 -  
USER-DEFINED - 3.50 0.60 0.600 -  
USER-DEFINED - 0.20 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 0.100 -  
USER-DEFINED - 0.20 0.60 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.556  
SUBAREA AREA (ACRES) = 4.50 SUBAREA RUNOFF (CFS) = 1.41  
EFFECTIVE AREA (ACRES) = 893.19 AREA-AVERAGED Fm (INCH/HR) = 0.44  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73  
TOTAL AREA (ACRES) = 1217.7 PEAK FLOW RATE (CFS) = 249.94  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 22.21  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.680  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.80 0.60 0.600 -  
USER-DEFINED - 1.50 0.60 1.000 -  
USER-DEFINED - 2.50 0.60 1.000 -  
USER-DEFINED - 0.60 0.60 1.000 -  
USER-DEFINED - 0.10 0.60 0.100 -  
USER-DEFINED - 0.10 0.60 0.600 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.732  
SUBAREA AREA (ACRES) = 13.60 SUBAREA RUNOFF (CFS) = 2.96  
EFFECTIVE AREA (ACRES) = 906.79 AREA-AVERAGED Fm (INCH/HR) = 0.44  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73  
TOTAL AREA (ACRES) = 1231.3 PEAK FLOW RATE (CFS) = 249.94  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 22.21  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.680  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.40 0.60 1.000 -  
USER-DEFINED - 0.30 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.70 SUBAREA RUNOFF (CFS) = 0.12  
EFFECTIVE AREA (ACRES) = 908.49 AREA-AVERAGED Fm (INCH/HR) = 0.44  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73  
TOTAL AREA (ACRES) = 1233.0 PEAK FLOW RATE (CFS) = 249.94  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50349.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 233.00 DOWNSTREAM (FEET) = 214.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1010.00 CHANNEL SLOPE = 0.0188  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 8.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 249.94  
FLOW VELOCITY (FEET/SEC.) = 8.75 FLOW DEPTH (FEET) = 3.09  
TRAVEL TIME (MIN.) = 1.92 Tc (MIN.) = 24.13  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50349.00 = 17597.00 FEET.

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FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 24.13

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.646

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	1.40	0.60	1.000	-
USER-DEFINED	-	2.30	0.60	1.000	-
USER-DEFINED	-	1.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.817

SUBAREA AREA(ACRES) = 6.90 SUBAREA RUNOFF(CFS) = 0.96

EFFECTIVE AREA(ACRES) = 915.39 AREA-AVERAGED Fm(INCH/HR) = 0.44

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73

TOTAL AREA(ACRES) = 1239.9 PEAK FLOW RATE(CFS) = 249.94

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 24.13

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.646

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.60	1.000	-
USER-DEFINED	-	1.60	0.60	1.000	-
USER-DEFINED	-	5.10	0.60	0.850	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	7.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958

SUBAREA AREA(ACRES) = 18.40 SUBAREA RUNOFF(CFS) = 1.17

EFFECTIVE AREA(ACRES) = 933.79 AREA-AVERAGED Fm(INCH/HR) = 0.44

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73

TOTAL AREA(ACRES) = 1258.3 PEAK FLOW RATE(CFS) = 249.94

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 24.13

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.646

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	1.40	0.60	1.000	-
USER-DEFINED	-	2.30	0.60	1.000	-
USER-DEFINED	-	1.10	0.60	1.000	-

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.20 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.01  
 EFFECTIVE AREA(ACRES) = 933.99 AREA-AVERAGED Fm(INCH/HR) = 0.44  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 1258.5 PEAK FLOW RATE(CFS) = 249.94  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 24.13

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.646

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.70	0.60	0.100	-
USER-DEFINED	-	3.50	0.60	1.000	-
USER-DEFINED	-	0.80	0.60	1.000	-
USER-DEFINED	-	3.00	0.60	1.000	-
USER-DEFINED	-	11.70	0.60	1.000	-
USER-DEFINED	-	12.40	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.874

SUBAREA AREA(ACRES) = 34.10 SUBAREA RUNOFF(CFS) = 3.72

EFFECTIVE AREA(ACRES) = 968.09 AREA-AVERAGED Fm(INCH/HR) = 0.44

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.74

TOTAL AREA(ACRES) = 1292.6 PEAK FLOW RATE(CFS) = 249.94

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 24.13

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.646

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.00	0.60	1.000	-
USER-DEFINED	-	6.00	0.60	1.000	-
USER-DEFINED	-	6.00	0.60	1.000	-
USER-DEFINED	-	6.00	0.60	1.000	-
USER-DEFINED	-	6.00	0.60	1.000	-
USER-DEFINED	-	6.00	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 6.00 SUBAREA RUNOFF(CFS) = 0.25

EFFECTIVE AREA(ACRES) = 974.09 AREA-AVERAGED Fm(INCH/HR) = 0.44

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.74

TOTAL AREA(ACRES) = 1298.6 PEAK FLOW RATE(CFS) = 249.94

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1298.6 TC(MIN.) = 24.13

EFFECTIVE AREA(ACRES) = 974.09 AREA-AVERAGED Fm(INCH/HR) = 0.44

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.739

PEAK FLOW RATE(CFS) = 249.94

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	249.94	24.13	0.646	0.60 ( 0.44)	0.74	974.1	50320.00
2	238.06	27.18	0.604	0.60 ( 0.44)	0.74	1066.0	50240.00
3	235.51	27.54	0.600	0.60 ( 0.44)	0.74	1075.7	50330.00
4	204.90	31.73	0.554	0.60 ( 0.44)	0.74	1176.9	50300.00
5	202.00	32.10	0.551	0.60 ( 0.44)	0.74	1183.1	50280.00
6	159.62	37.43	0.503	0.60 ( 0.44)	0.74	1246.6	50220.00
7	136.90	45.01	0.450	0.60 ( 0.44)	0.74	1294.0	50260.00
8	132.00	47.96	0.432	0.60 ( 0.44)	0.74	1298.6	50200.00

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2013 Advanced Engineering Software (aes)  
Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

Michael Baker International  
5 Hutton Centre Drive, Suite 500  
Santa Ana, CA 92707

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PA3 & PA4 ROMP \*  
\* REGIONAL WATERSHED S29 - FREE DRAINING - ULTIMATE CONDITION \*  
\* 2-YR RM EV JULY 2018 ROKAMOTO \*  
\*\*\*\*\*

FILE NAME: P504XX02.DAT  
TIME/DATE OF STUDY: 09:03 03/27/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.00;	1.580
2)	6.00;	1.430
3)	7.00;	1.310
4)	8.00;	1.210
5)	9.00;	1.130
6)	10.00;	1.060
7)	11.00;	1.010
8)	12.00;	0.960
9)	13.00;	0.920
10)	14.00;	0.880
11)	15.00;	0.840
12)	20.00;	0.720
13)	25.00;	0.630
14)	30.00;	0.570
15)	40.00;	0.480
16)	50.00;	0.420
17)	60.00;	0.380
18)	90.00;	0.300
19)	120.00;	0.260
20)	180.00;	0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.963  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.314  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "1 DWELLING/ACRE"	-	0.50	0.60	0.800	0	6.96

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.800  
SUBAREA RUNOFF(CFS) = 0.38  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.38  
FLOW VELOCITY(FEET/SEC.) = 3.62 FLOW DEPTH(FEET) = 0.19  
TRAVEL TIME(MIN.) = 1.21  $T_c$ (MIN.) = 8.17  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN.) = 8.17

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.196  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	0.800	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.26  
 EFFECTIVE AREA (ACRES) = 0.90 AREA-AVERAGED Fm (INCH/HR) = 0.48  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 0.58

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 239.00 CHANNEL SLOPE = 0.4184  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 0.58  
 FLOW VELOCITY (FEET/SEC.) = 5.06 FLOW DEPTH (FEET) = 0.20  
 TRAVEL TIME (MIN.) = 0.79 Tc (MIN.) = 8.96  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50403.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 8.96  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.133  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.800	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.22  
 EFFECTIVE AREA (ACRES) = 1.30 AREA-AVERAGED Fm (INCH/HR) = 0.49  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 1.3 PEAK FLOW RATE (CFS) = 0.75

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00 CHANNEL SLOPE = 0.7042  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 0.75  
 FLOW VELOCITY (FEET/SEC.) = 6.57 FLOW DEPTH (FEET) = 0.20

TRAVEL TIME (MIN.) = 0.18 Tc (MIN.) = 9.14  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50404.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 9.14  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.120  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	0.800	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.862  
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 0.71  
 EFFECTIVE AREA (ACRES) = 2.60 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA (ACRES) = 2.6 PEAK FLOW RATE (CFS) = 1.44

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 145.00 CHANNEL SLOPE = 0.3448  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1.44  
 FLOW VELOCITY (FEET/SEC.) = 5.85 FLOW DEPTH (FEET) = 0.29  
 TRAVEL TIME (MIN.) = 0.41 Tc (MIN.) = 9.55  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50405.00 TO NODE 50405.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 9.55  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.092  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.800	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.80	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.964  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 0.51  
 EFFECTIVE AREA (ACRES) = 3.70 AREA-AVERAGED Fm (INCH/HR) = 0.53  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88  
 TOTAL AREA (ACRES) = 3.7 PEAK FLOW RATE (CFS) = 1.89

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*****
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.89
FLOW VELOCITY(FEET/SEC.) = 6.01 FLOW DEPTH(FEET) = 0.32
TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 9.99
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

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*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50406.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.99
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.061
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.60    1.000  -
USER-DEFINED        -         0.20    0.60    1.000  -
USER-DEFINED        -         0.80    0.60    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 0.50
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.54
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.91
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 2.28

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*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.2193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.28
FLOW VELOCITY(FEET/SEC.) = 5.53 FLOW DEPTH(FEET) = 0.37
TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 10.68
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50407.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.68
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.026
SUBAREA LOSS RATE DATA(AMC II):

```

```

DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.70    0.60    0.800  -
USER-DEFINED        -         1.00    0.60    1.000  -
USER-DEFINED        -         1.60    0.60    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.883
SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 2.82
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.54
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.89
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 4.95

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*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 325.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 490.00 CHANNEL SLOPE = 0.1531
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.95
FLOW VELOCITY(FEET/SEC.) = 5.84 FLOW DEPTH(FEET) = 0.53
TRAVEL TIME(MIN.) = 1.40 Tc(MIN.) = 12.07
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

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*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.07
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.957
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.60    1.000  -
USER-DEFINED        -         0.10    0.60    1.000  -
USER-DEFINED        -         0.60    0.60    1.000  -
USER-DEFINED        -         1.40    0.60    1.000  -
USER-DEFINED        -         0.50    0.60    1.000  -
USER-DEFINED        -         1.20    0.60    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90 SUBAREA RUNOFF(CFS) = 1.25
EFFECTIVE AREA(ACRES) = 15.10 AREA-AVERAGED Fm(INCH/HR) = 0.55
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 15.1 PEAK FLOW RATE(CFS) = 5.50

```

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*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.07
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.957
SUBAREA LOSS RATE DATA(AMC II):

```

```

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.07
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.957
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 0.29  
EFFECTIVE AREA(ACRES) = 16.00 AREA-AVERAGED Fm(INCH/HR) = 0.55  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.92  
TOTAL AREA(ACRES) = 16.0 PEAK FLOW RATE(CFS) = 5.79

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 5.79  
FLOW VELOCITY(FEET/SEC.) = 4.45 FLOW DEPTH(FEET) = 0.66  
TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 12.35  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.35  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.946  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	4.30	0.60	0.800	-
USER-DEFINED	-	1.60	0.60	1.000	-
USER-DEFINED	-	3.20	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.910  
SUBAREA AREA(ACRES) = 9.60 SUBAREA RUNOFF(CFS) = 3.46  
EFFECTIVE AREA(ACRES) = 25.60 AREA-AVERAGED Fm(INCH/HR) = 0.55  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.92  
TOTAL AREA(ACRES) = 25.6 PEAK FLOW RATE(CFS) = 9.09

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.35  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.946  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.30	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 5.90 SUBAREA RUNOFF(CFS) = 1.84  
EFFECTIVE AREA(ACRES) = 31.50 AREA-AVERAGED Fm(INCH/HR) = 0.56  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.93  
TOTAL AREA(ACRES) = 31.5 PEAK FLOW RATE(CFS) = 10.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.93  
FLOW VELOCITY(FEET/SEC.) = 5.50 FLOW DEPTH(FEET) = 0.81  
TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 12.66  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.66  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.934  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	2.50	0.60	1.000	-
USER-DEFINED	-	1.20	0.60	1.000	-
USER-DEFINED	-	1.80	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 1.92  
EFFECTIVE AREA(ACRES) = 37.90 AREA-AVERAGED Fm(INCH/HR) = 0.57  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 37.9 PEAK FLOW RATE(CFS) = 12.50

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.66  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.934  
SUBAREA LOSS RATE DATA(AMC II):



DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA (ACRES) = 0.60		SUBAREA RUNOFF (CFS) = 0.18			
EFFECTIVE AREA (ACRES) = 38.50		AREA-AVERAGED Fm (INCH/HR) = 0.57			
AREA-AVERAGED Fp (INCH/HR) = 0.60		AREA-AVERAGED Ap = 0.95			
TOTAL AREA (ACRES) = 38.5		PEAK FLOW RATE (CFS) = 12.68			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 312.00 DOWNSTREAM(FEET) = 282.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 566.00 CHANNEL SLOPE = 0.0530  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 12.68  
FLOW VELOCITY(FEET/SEC.) = 4.93 FLOW DEPTH(FEET) = 0.93  
TRAVEL TIME(MIN.) = 1.91 Tc(MIN.) = 14.57  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.57  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.857  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	1.60	0.60	1.000	-
USER-DEFINED	-	0.90	0.60	1.000	-
USER-DEFINED	-	1.50	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658					
SUBAREA AREA (ACRES) = 5.00		SUBAREA RUNOFF (CFS) = 2.08			
EFFECTIVE AREA (ACRES) = 43.50		AREA-AVERAGED Fm (INCH/HR) = 0.55			
AREA-AVERAGED Fp (INCH/HR) = 0.60		AREA-AVERAGED Ap = 0.91			
TOTAL AREA (ACRES) = 43.5		PEAK FLOW RATE (CFS) = 12.68			

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.57  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.857  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.80	0.60	1.000	-
USER-DEFINED	-	5.80	0.60	1.000	-
USER-DEFINED	-	0.50	0.60	1.000	-
USER-DEFINED	-	3.40	0.60	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA (ACRES) = 10.50		SUBAREA RUNOFF (CFS) = 2.43			
EFFECTIVE AREA (ACRES) = 54.00		AREA-AVERAGED Fm (INCH/HR) = 0.56			
AREA-AVERAGED Fp (INCH/HR) = 0.60		AREA-AVERAGED Ap = 0.93			
TOTAL AREA (ACRES) = 54.0		PEAK FLOW RATE (CFS) = 14.54			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 216.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 954.00 CHANNEL SLOPE = 0.0692  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 14.54  
FLOW VELOCITY(FEET/SEC.) = 6.96 FLOW DEPTH(FEET) = 0.83  
TRAVEL TIME(MIN.) = 2.28 Tc(MIN.) = 16.85  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.85  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.796  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	1.00	0.60	1.000	-
USER-DEFINED	-	1.10	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.100	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875					
SUBAREA AREA (ACRES) = 3.60		SUBAREA RUNOFF (CFS) = 0.88			
EFFECTIVE AREA (ACRES) = 57.60		AREA-AVERAGED Fm (INCH/HR) = 0.56			
AREA-AVERAGED Fp (INCH/HR) = 0.60		AREA-AVERAGED Ap = 0.93			
TOTAL AREA (ACRES) = 57.6		PEAK FLOW RATE (CFS) = 14.54			

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.85  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.796

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	1.30	0.60	1.000	-
USER-DEFINED	-	9.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
SUBAREA AREA (ACRES) = 10.60 SUBAREA RUNOFF (CFS) = 1.87  
EFFECTIVE AREA (ACRES) = 68.20 AREA-AVERAGED Fm (INCH/HR) = 0.56  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.94  
TOTAL AREA (ACRES) = 68.2 PEAK FLOW RATE (CFS) = 14.54  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 16.85

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.796

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	1.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.934  
SUBAREA AREA (ACRES) = 2.50 SUBAREA RUNOFF (CFS) = 0.53  
EFFECTIVE AREA (ACRES) = 70.70 AREA-AVERAGED Fm (INCH/HR) = 0.56  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.94  
TOTAL AREA (ACRES) = 70.7 PEAK FLOW RATE (CFS) = 14.83

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 70.7 TC (MIN.) = 16.85  
EFFECTIVE AREA (ACRES) = 70.70 AREA-AVERAGED Fm (INCH/HR) = 0.56  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.938  
PEAK FLOW RATE (CFS) = 14.83

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 5 \*  
\* HYDROLOGIC ANALYSIS - 2-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P505XX02.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	1.580
2)	6.000;	1.430
3)	7.000;	1.310
4)	8.000;	1.210
5)	9.000;	1.130
6)	10.000;	1.060
7)	11.000;	1.010
8)	12.000;	0.960
9)	13.000;	0.920
10)	14.000;	0.880
11)	15.000;	0.840
12)	20.000;	0.720
13)	25.000;	0.630
14)	30.000;	0.570
15)	40.000;	0.480
16)	50.000;	0.420
17)	60.000;	0.380
18)	90.000;	0.300
19)	120.000;	0.260
20)	180.000;	0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50500.00 TO NODE 50501.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 254.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 779.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.543  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.365  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "1 DWELLING/ACRE"	-	2.00	0.60	0.800	95	6.54

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.800  
SUBAREA RUNOFF(CFS) = 1.59  
TOTAL AREA(ACRES) = 2.00 PEAK FLOW RATE(CFS) = 1.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50501.00 TO NODE 50502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 779.00 DOWNSTREAM(FEET) = 765.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 382.00 CHANNEL SLOPE = 0.0366  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.59  
FLOW VELOCITY(FEET/SEC.) = 2.57 FLOW DEPTH(FEET) = 0.45  
TRAVEL TIME(MIN.) = 2.48  $T_c$ (MIN.) = 9.02  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50502.00 = 636.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50502.00 TO NODE 50502.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 9.02

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.128  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.60 0.60 0.800 -  
 USER-DEFINED - 0.30 0.60 1.000 -  
 USER-DEFINED - 0.10 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.840  
 SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 1.12  
 EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.49  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 2.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50502.00 TO NODE 50503.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 765.00 DOWNSTREAM (FEET) = 750.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 355.00 CHANNEL SLOPE = 0.0423  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 2.29  
 FLOW VELOCITY (FEET/SEC.) = 2.96 FLOW DEPTH (FEET) = 0.51  
 TRAVEL TIME (MIN.) = 2.00 Tc (MIN.) = 11.03  
 LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50503.00 = 991.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50503.00 TO NODE 50503.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----  
 MAINLINE Tc (MIN) = 11.03  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.009  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.70 0.60 0.800 -  
 USER-DEFINED - 1.30 0.60 1.000 -  
 USER-DEFINED - 0.10 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.890  
 SUBAREA AREA (ACRES) = 3.10 SUBAREA RUNOFF (CFS) = 1.32  
 EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.51  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 3.18

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50503.00 TO NODE 50504.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 750.00 DOWNSTREAM (FEET) = 712.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 261.00 CHANNEL SLOPE = 0.1456  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 3.18  
 FLOW VELOCITY (FEET/SEC.) = 5.13 FLOW DEPTH (FEET) = 0.45  
 TRAVEL TIME (MIN.) = 0.85 Tc (MIN.) = 11.87  
 LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50504.00 = 1252.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50504.00 TO NODE 50504.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----  
 MAINLINE Tc (MIN) = 11.87  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.966  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.90 0.60 1.000 -  
 USER-DEFINED - 0.40 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 2.08  
 EFFECTIVE AREA (ACRES) = 13.40 AREA-AVERAGED Fm (INCH/HR) = 0.55  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.92  
 TOTAL AREA (ACRES) = 13.4 PEAK FLOW RATE (CFS) = 4.99

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50504.00 TO NODE 50505.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 464.00 CHANNEL SLOPE = 0.2414  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 4.99  
 FLOW VELOCITY (FEET/SEC.) = 6.90 FLOW DEPTH (FEET) = 0.49  
 TRAVEL TIME (MIN.) = 1.12 Tc (MIN.) = 13.00  
 LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50505.00 = 1716.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50505.00 TO NODE 50505.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----  
 MAINLINE Tc (MIN) = 13.00  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.920  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.50 0.60 1.000 -  
 USER-DEFINED - 0.70 0.60 1.000 -  
 USER-DEFINED - 0.40 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.60 SUBAREA RUNOFF (CFS) = 0.75  
 EFFECTIVE AREA (ACRES) = 16.00 AREA-AVERAGED Fm (INCH/HR) = 0.56  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.93

TOTAL AREA (ACRES) = 16.0 PEAK FLOW RATE (CFS) = 5.18

\*\*\*\*\*

FLOW PROCESS FROM NODE 50505.00 TO NODE 50506.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 535.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 310.00 CHANNEL SLOPE = 0.2097
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 5.18
FLOW VELOCITY (FEET/SEC.) = 6.69 FLOW DEPTH (FEET) = 0.51
TRAVEL TIME (MIN.) = 0.77 Tc (MIN.) = 13.77
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50506.00 = 2026.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50506.00 TO NODE 50506.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 13.77
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.889
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.80 0.60 0.800 -
USER-DEFINED - 0.90 0.60 1.000 -
USER-DEFINED - 0.70 0.60 1.000 -
USER-DEFINED - 2.70 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.941
SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 1.78
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.56
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.94
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 6.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 50506.00 TO NODE 50507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 405.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.2658
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 6.52
FLOW VELOCITY (FEET/SEC.) = 7.71 FLOW DEPTH (FEET) = 0.53
TRAVEL TIME (MIN.) = 1.06 Tc (MIN.) = 14.83
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50507.00 = 2515.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50507.00 TO NODE 50507.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 14.83
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.847
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.60 0.800 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 1.30 0.60 1.000 -
USER-DEFINED - 2.80 0.60 1.000 -
USER-DEFINED - 5.20 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988
SUBAREA AREA (ACRES) = 10.00 SUBAREA RUNOFF (CFS) = 2.29
EFFECTIVE AREA (ACRES) = 32.10 AREA-AVERAGED Fm (INCH/HR) = 0.57
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95
TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 7.97

\*\*\*\*\*

FLOW PROCESS FROM NODE 50507.00 TO NODE 50508.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 285.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 706.00 CHANNEL SLOPE = 0.1700
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 7.97
FLOW VELOCITY (FEET/SEC.) = 6.85 FLOW DEPTH (FEET) = 0.62
TRAVEL TIME (MIN.) = 1.72 Tc (MIN.) = 16.54
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50508.00 = 3221.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50508.00 TO NODE 50508.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 16.54
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.803
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.40 0.60 0.100 -
USER-DEFINED - 0.90 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
USER-DEFINED - 5.10 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.945
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 1.40
EFFECTIVE AREA (ACRES) = 38.70 AREA-AVERAGED Fm (INCH/HR) = 0.57
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95
TOTAL AREA (ACRES) = 38.7 PEAK FLOW RATE (CFS) = 8.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 50508.00 TO NODE 50509.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 238.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1169.00 CHANNEL SLOPE = 0.0402  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 8.10  
FLOW VELOCITY(FEET/SEC.) = 4.97 FLOW DEPTH(FEET) = 0.74  
TRAVEL TIME(MIN.) = 3.92 Tc(MIN.) = 20.47  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50509.00 = 4390.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50509.00 TO NODE 50509.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 20.47  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.712  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 1.30 0.60 1.000 -  
USER-DEFINED - 6.90 0.60 1.000 -  
USER-DEFINED - 1.10 0.60 0.100 -  
USER-DEFINED - 0.80 0.60 1.000 -  
USER-DEFINED - 2.10 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.920  
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 1.77  
EFFECTIVE AREA(ACRES) = 51.00 AREA-AVERAGED Fm(INCH/HR) = 0.57  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.94  
TOTAL AREA(ACRES) = 51.0 PEAK FLOW RATE(CFS) = 8.10  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50509.00 TO NODE 50509.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 20.47  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.712  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.40 0.60 1.000 -  
USER-DEFINED - 0.70 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 10.10 SUBAREA RUNOFF(CFS) = 1.02  
EFFECTIVE AREA(ACRES) = 61.10 AREA-AVERAGED Fm(INCH/HR) = 0.57  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 61.1 PEAK FLOW RATE(CFS) = 8.10  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50509.00 TO NODE 50510.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 238.00 DOWNSTREAM(FEET) = 209.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1026.00 CHANNEL SLOPE = 0.0283  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 8.10  
FLOW VELOCITY(FEET/SEC.) = 4.32 FLOW DEPTH(FEET) = 0.79  
TRAVEL TIME(MIN.) = 3.96 Tc(MIN.) = 24.42  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50510.00 = 5416.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 24.42  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.640  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.60 1.000 -  
USER-DEFINED - 1.40 0.60 1.000 -  
USER-DEFINED - 4.40 0.60 1.000 -  
USER-DEFINED - 0.20 0.60 1.000 -  
USER-DEFINED - 1.50 0.60 1.000 -  
USER-DEFINED - 10.00 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 17.60 SUBAREA RUNOFF(CFS) = 0.64  
EFFECTIVE AREA(ACRES) = 78.70 AREA-AVERAGED Fm(INCH/HR) = 0.58  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96  
TOTAL AREA(ACRES) = 78.7 PEAK FLOW RATE(CFS) = 8.10  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 24.42  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.640  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.60 0.100 -  
USER-DEFINED - 13.10 0.60 1.000 -  
USER-DEFINED - 1.60 0.60 1.000 -  
USER-DEFINED - 12.70 0.60 1.000 -  
USER-DEFINED - 0.60 0.60 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.948  
SUBAREA AREA(ACRES) = 29.70 SUBAREA RUNOFF(CFS) = 1.91  
EFFECTIVE AREA(ACRES) = 108.40 AREA-AVERAGED Fm(INCH/HR) = 0.58  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96  
TOTAL AREA(ACRES) = 108.4 PEAK FLOW RATE(CFS) = 8.10  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 24.42
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.640
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.90      0.60      1.000    -
USER-DEFINED        -         1.70      0.60      1.000    -
USER-DEFINED        -         0.40      0.60      0.850    -
USER-DEFINED        -         3.40      0.60      1.000    -
USER-DEFINED        -         2.10      0.60      1.000    -
USER-DEFINED        -         1.10      0.60      1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.994
SUBAREA AREA(ACRES) = 10.60      SUBAREA RUNOFF(CFS) = 0.42
EFFECTIVE AREA(ACRES) = 119.00   AREA-AVERAGED Fm(INCH/HR) = 0.58
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 119.0      PEAK FLOW RATE(CFS) = 8.10
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 24.42
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.640
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50      0.60      0.100    -
USER-DEFINED        -         0.30      0.60      1.000    -
USER-DEFINED        -         4.80      0.60      1.000    -
USER-DEFINED        -         2.60      0.60      1.000    -
USER-DEFINED        -         0.90      0.60      1.000    -
USER-DEFINED        -         7.50      0.60      0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA AREA(ACRES) = 16.60      SUBAREA RUNOFF(CFS) = 1.46
EFFECTIVE AREA(ACRES) = 135.60   AREA-AVERAGED Fm(INCH/HR) = 0.57
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 135.6      PEAK FLOW RATE(CFS) = 8.21

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 24.42
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.640
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         8.00      0.60      1.000    -

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USER-DEFINED        -         2.80      0.60      1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.80      SUBAREA RUNOFF(CFS) = 0.39
EFFECTIVE AREA(ACRES) = 146.40   AREA-AVERAGED Fm(INCH/HR) = 0.58
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 146.4      PEAK FLOW RATE(CFS) = 8.61
=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 146.4 TC(MIN.) = 24.42
EFFECTIVE AREA(ACRES) = 146.40   AREA-AVERAGED Fm(INCH/HR) = 0.58
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.959
PEAK FLOW RATE(CFS) = 8.61
=====
END OF RATIONAL METHOD ANALYSIS

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 6 \*  
\* HYDROLOGIC ANALYSIS - 2-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P506XX02.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	1.580
2)	6.000;	1.430
3)	7.000;	1.310
4)	8.000;	1.210
5)	9.000;	1.130
6)	10.000;	1.060
7)	11.000;	1.010
8)	12.000;	0.960
9)	13.000;	0.920
10)	14.000;	0.880
11)	15.000;	0.840
12)	20.000;	0.720
13)	25.000;	0.630
14)	30.000;	0.570
15)	40.000;	0.480
16)	50.000;	0.420
17)	60.000;	0.380
18)	90.000;	0.300
19)	120.000;	0.260
20)	180.000;	0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50600.00 TO NODE 50601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00  
ELEVATION DATA: UPSTREAM(FEET) = 780.00 DOWNSTREAM(FEET) = 730.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.166  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.052  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	1.40	0.60	1.000	95	10.17

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.57  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 0.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50601.00 TO NODE 50602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.1541  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.57  
FLOW VELOCITY(FEET/SEC.) = 3.31 FLOW DEPTH(FEET) = 0.24  
TRAVEL TIME(MIN.) = 1.80  $T_c$ (MIN.) = 11.96  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50602.00 = 671.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50602.00 TO NODE 50602.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.96

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.962  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.30 0.60 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 0.42  
 EFFECTIVE AREA (ACRES) = 2.70 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.7 PEAK FLOW RATE (CFS) = 0.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50602.00 TO NODE 50603.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 258.00 CHANNEL SLOPE = 0.2907  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 0.88  
 FLOW VELOCITY (FEET/SEC.) = 4.81 FLOW DEPTH (FEET) = 0.25  
 TRAVEL TIME (MIN.) = 0.89 Tc (MIN.) = 12.86  
 LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50603.00 = 929.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50603.00 TO NODE 50603.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.86  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.926  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.30 0.60 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 0.38  
 EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 1.17

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50603.00 TO NODE 50604.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 585.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 116.00 CHANNEL SLOPE = 0.1293  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1.17  
 FLOW VELOCITY (FEET/SEC.) = 3.74 FLOW DEPTH (FEET) = 0.32  
 TRAVEL TIME (MIN.) = 0.52 Tc (MIN.) = 13.37

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50604.00 = 1045.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50604.00 TO NODE 50604.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 13.37  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.905  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.60 0.60 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 0.44  
 EFFECTIVE AREA (ACRES) = 5.60 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.6 PEAK FLOW RATE (CFS) = 1.54

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50604.00 TO NODE 50605.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 585.00 DOWNSTREAM (FEET) = 584.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 16.00 CHANNEL SLOPE = 0.0625  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1.54  
 FLOW VELOCITY (FEET/SEC.) = 3.09 FLOW DEPTH (FEET) = 0.41  
 TRAVEL TIME (MIN.) = 0.09 Tc (MIN.) = 13.46  
 LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50605.00 = 1061.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50605.00 TO NODE 50605.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 13.46  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.902  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.00 0.60 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 1.36  
 EFFECTIVE AREA (ACRES) = 10.60 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 10.6 PEAK FLOW RATE (CFS) = 2.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50605.00 TO NODE 50606.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 584.00 DOWNSTREAM(FEET) = 579.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 122.00 CHANNEL SLOPE = 0.0410
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.88
FLOW VELOCITY(FEET/SEC.) = 3.13 FLOW DEPTH(FEET) = 0.55
TRAVEL TIME(MIN.) = 0.65 Tc(MIN.) = 14.11
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50606.00 = 1183.00 FEET.

*****
FLOW PROCESS FROM NODE 50606.00 TO NODE 50606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.11
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.876
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 5.20 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 1.29
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 3.92

*****
FLOW PROCESS FROM NODE 50606.00 TO NODE 50607.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 579.00 DOWNSTREAM(FEET) = 528.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 637.00 CHANNEL SLOPE = 0.0801
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.92
FLOW VELOCITY(FEET/SEC.) = 4.29 FLOW DEPTH(FEET) = 0.55
TRAVEL TIME(MIN.) = 2.48 Tc(MIN.) = 16.59
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50607.00 = 1820.00 FEET.

*****
FLOW PROCESS FROM NODE 50607.00 TO NODE 50607.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 16.59
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.802
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.30 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 1.33
EFFECTIVE AREA(ACRES) = 23.10 AREA-AVERAGED Fm(INCH/HR) = 0.60

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AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 23.1 PEAK FLOW RATE(CFS) = 4.20

*****
FLOW PROCESS FROM NODE 50607.00 TO NODE 50608.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 422.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 529.00 CHANNEL SLOPE = 0.2004
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.20
FLOW VELOCITY(FEET/SEC.) = 6.18 FLOW DEPTH(FEET) = 0.48
TRAVEL TIME(MIN.) = 1.43 Tc(MIN.) = 18.02
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50608.00 = 2349.00 FEET.

*****
FLOW PROCESS FROM NODE 50608.00 TO NODE 50608.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 18.02
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.768
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.30 0.60 1.000 -
USER-DEFINED - 0.70 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 0.45
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 4.20
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

*****
FLOW PROCESS FROM NODE 50608.00 TO NODE 50609.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 422.00 DOWNSTREAM(FEET) = 297.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 708.00 CHANNEL SLOPE = 0.1766
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.20
FLOW VELOCITY(FEET/SEC.) = 5.94 FLOW DEPTH(FEET) = 0.49
TRAVEL TIME(MIN.) = 1.99 Tc(MIN.) = 20.00
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50609.00 = 3057.00 FEET.

*****
FLOW PROCESS FROM NODE 50609.00 TO NODE 50609.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.720
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
  LAND USE           GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED         -         1.60     0.60     0.100     -
USER-DEFINED         -         7.90     0.60     1.000     -
USER-DEFINED         -         2.50     0.60     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.880
SUBAREA AREA(ACRES) = 12.00    SUBAREA RUNOFF(CFS) = 2.07
EFFECTIVE AREA(ACRES) = 38.10  AREA-AVERAGED Fm(INCH/HR) = 0.58
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 38.1    PEAK FLOW RATE(CFS) = 4.90

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*****
FLOW PROCESS FROM NODE 50609.00 TO NODE 50610.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 297.00  DOWNSTREAM(FEET) = 207.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1321.00  CHANNEL SLOPE = 0.0681
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.90
FLOW VELOCITY(FEET/SEC.) = 5.32  FLOW DEPTH(FEET) = 0.55
TRAVEL TIME(MIN.) = 4.14  Tc(MIN.) = 24.14
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50610.00 = 4378.00 FEET.

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FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 24.14
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.645
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
  LAND USE           GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED         -         0.60     0.60     1.000     -
USER-DEFINED         -         0.70     0.60     1.000     -
USER-DEFINED         -         0.60     0.60     1.000     -
USER-DEFINED         -         0.30     0.60     0.100     -
USER-DEFINED         -         4.40     0.60     1.000     -
USER-DEFINED         -         3.60     0.60     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.974
SUBAREA AREA(ACRES) = 10.20    SUBAREA RUNOFF(CFS) = 0.56
EFFECTIVE AREA(ACRES) = 48.30  AREA-AVERAGED Fm(INCH/HR) = 0.58
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 48.3    PEAK FLOW RATE(CFS) = 4.90
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 24.14
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.645
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
  LAND USE           GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED         -         0.10     0.60     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.10    SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 48.40  AREA-AVERAGED Fm(INCH/HR) = 0.58
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 48.4    PEAK FLOW RATE(CFS) = 4.90
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 24.14
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.645
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
  LAND USE           GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED         -         1.10     0.60     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.10    SUBAREA RUNOFF(CFS) = 0.05
EFFECTIVE AREA(ACRES) = 49.50  AREA-AVERAGED Fm(INCH/HR) = 0.58
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 49.5    PEAK FLOW RATE(CFS) = 4.90
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 49.5  TC(MIN.) = 24.14
EFFECTIVE AREA(ACRES) = 49.50  AREA-AVERAGED Fm(INCH/HR) = 0.58
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.965
PEAK FLOW RATE(CFS) = 4.90
=====

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=====
END OF RATIONAL METHOD ANALYSIS

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\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 7 \*  
\* HYDROLOGIC ANALYSIS - 2-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P507XX02.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	1.580
2)	6.000;	1.430
3)	7.000;	1.310
4)	8.000;	1.210
5)	9.000;	1.130
6)	10.000;	1.060
7)	11.000;	1.010
8)	12.000;	0.960
9)	13.000;	0.920
10)	14.000;	0.880
11)	15.000;	0.840
12)	20.000;	0.720
13)	25.000;	0.630
14)	30.000;	0.570
15)	40.000;	0.480
16)	50.000;	0.420
17)	60.000;	0.380
18)	90.000;	0.300
19)	120.000;	0.260
20)	180.000;	0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50700.00 TO NODE 50701.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 925.00 DOWNSTREAM(FEET) = 815.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.946  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.134  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"OPEN BRUSH"	-	0.20	0.60	1.000	95	8.95
NATURAL FAIR COVER						
"GRASS"	-	0.20	0.60	1.000	95	8.95
NATURAL FAIR COVER						
"OPEN BRUSH"	-	0.20	0.60	1.000	95	8.95

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.29  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50701.00 TO NODE 50702.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 815.00 DOWNSTREAM(FEET) = 800.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 169.00 CHANNEL SLOPE = 0.0888  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.29  
FLOW VELOCITY(FEET/SEC.) = 2.33 FLOW DEPTH(FEET) = 0.20  
TRAVEL TIME(MIN.) = 1.21  $T_c$ (MIN.) = 10.15  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50702.00 = 499.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50702.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.15

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.052

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 0.41

EFFECTIVE AREA(ACRES) = 1.60 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 0.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50703.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====  
ELEVATION DATA: UPSTREAM(FEET) = 800.00 DOWNSTREAM(FEET) = 785.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 128.00 CHANNEL SLOPE = 0.1172

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00

CHANNEL FLOW THRU SUBAREA(CFS) = 0.65

FLOW VELOCITY(FEET/SEC.) = 3.16 FLOW DEPTH(FEET) = 0.26

TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 10.83

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50703.00 = 627.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50703.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====  
MAINLINE Tc(MIN) = 10.83

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.019

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 0.60

EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 1.21

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50704.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

=====  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 775.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.0588

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00

CHANNEL FLOW THRU SUBAREA(CFS) = 1.21

FLOW VELOCITY(FEET/SEC.) = 2.83 FLOW DEPTH(FEET) = 0.38

TRAVEL TIME(MIN.) = 1.00 Tc(MIN.) = 11.83

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50704.00 = 797.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50704.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====  
MAINLINE Tc(MIN) = 11.83

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.968

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	1.80	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 1.03

EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 2.09

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50705.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====  
ELEVATION DATA: UPSTREAM(FEET) = 775.00 DOWNSTREAM(FEET) = 772.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 162.00 CHANNEL SLOPE = 0.0185

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00

CHANNEL FLOW THRU SUBAREA(CFS) = 2.09

FLOW VELOCITY(FEET/SEC.) = 2.11 FLOW DEPTH(FEET) = 0.58

TRAVEL TIME(MIN.) = 1.28 Tc(MIN.) = 13.11

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50705.00 = 959.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50705.00 TO NODE 50705.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====  
MAINLINE Tc(MIN) = 13.11

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.916

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-

USER-DEFINED - 2.50 0.60 1.000 -  
 USER-DEFINED - 0.10 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 1.22  
 EFFECTIVE AREA(ACRES) = 10.60 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 10.6 PEAK FLOW RATE(CFS) = 3.01

\*\*\*\*\*

FLOW PROCESS FROM NODE 50705.00 TO NODE 50706.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 772.00 DOWNSTREAM(FEET) = 745.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.0756  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 3.01  
 FLOW VELOCITY(FEET/SEC.) = 3.91 FLOW DEPTH(FEET) = 0.51  
 TRAVEL TIME(MIN.) = 1.52 Tc(MIN.) = 14.63  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50706.00 = 1316.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50706.00 TO NODE 50706.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 14.63  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.855

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	1.80	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 0.80  
 EFFECTIVE AREA(ACRES) = 14.10 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 14.1 PEAK FLOW RATE(CFS) = 3.23

\*\*\*\*\*

FLOW PROCESS FROM NODE 50706.00 TO NODE 50707.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 733.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 444.00 CHANNEL SLOPE = 0.0270  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 3.23  
 FLOW VELOCITY(FEET/SEC.) = 2.73 FLOW DEPTH(FEET) = 0.63  
 TRAVEL TIME(MIN.) = 2.71 Tc(MIN.) = 17.34

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50707.00 = 1760.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50707.00 TO NODE 50707.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 17.34

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.784

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.40	0.60	1.000	-
USER-DEFINED	-	0.90	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 5.50 SUBAREA RUNOFF(CFS) = 0.91  
 EFFECTIVE AREA(ACRES) = 19.60 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 19.6 PEAK FLOW RATE(CFS) = 3.24

\*\*\*\*\*

FLOW PROCESS FROM NODE 50707.00 TO NODE 50708.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 733.00 DOWNSTREAM(FEET) = 675.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 467.00 CHANNEL SLOPE = 0.1242  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 3.24  
 FLOW VELOCITY(FEET/SEC.) = 4.89 FLOW DEPTH(FEET) = 0.47  
 TRAVEL TIME(MIN.) = 1.59 Tc(MIN.) = 18.93  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50708.00 = 2227.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50708.00 TO NODE 50708.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 18.93

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.746

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.60	1.000	-
USER-DEFINED	-	1.00	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 0.55  
 EFFECTIVE AREA(ACRES) = 23.80 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 23.8 PEAK FLOW RATE(CFS) = 3.24

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*



FLOW PROCESS FROM NODE 50708.00 TO NODE 50709.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 619.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 516.00 CHANNEL SLOPE = 0.1085
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.24
FLOW VELOCITY(FEET/SEC.) = 4.59 FLOW DEPTH(FEET) = 0.49
TRAVEL TIME(MIN.) = 1.87 Tc(MIN.) = 20.81
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50709.00 = 2743.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 50709.00 TO NODE 50709.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 20.81
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.705
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 17.70 0.60 1.000 -
USER-DEFINED - 2.00 0.60 1.000 -
USER-DEFINED - 0.30 0.60 1.000 -
USER-DEFINED - 0.20 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.20 SUBAREA RUNOFF(CFS) = 1.92
EFFECTIVE AREA(ACRES) = 44.00 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 44.0 PEAK FLOW RATE(CFS) = 4.18

\*\*\*\*\*
FLOW PROCESS FROM NODE 50709.00 TO NODE 50710.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 619.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 650.00 CHANNEL SLOPE = 0.0292
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.18
FLOW VELOCITY(FEET/SEC.) = 3.71 FLOW DEPTH(FEET) = 0.61
TRAVEL TIME(MIN.) = 2.92 Tc(MIN.) = 23.73
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50710.00 = 3393.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 50710.00 TO NODE 50710.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 23.73
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.653
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.60 0.60 1.000 -
USER-DEFINED - 0.90 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 0.36
EFFECTIVE AREA(ACRES) = 51.50 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 51.5 PEAK FLOW RATE(CFS) = 4.18
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 50710.00 TO NODE 50711.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 528.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 794.00 CHANNEL SLOPE = 0.0907
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.18
FLOW VELOCITY(FEET/SEC.) = 5.73 FLOW DEPTH(FEET) = 0.49
TRAVEL TIME(MIN.) = 2.31 Tc(MIN.) = 26.04
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50711.00 = 4187.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 50711.00 TO NODE 50711.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 26.04
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.618
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 33.10 0.60 1.000 -
USER-DEFINED - 0.30 0.60 1.000 -
USER-DEFINED - 1.50 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 34.90 SUBAREA RUNOFF(CFS) = 0.55
EFFECTIVE AREA(ACRES) = 86.40 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 86.4 PEAK FLOW RATE(CFS) = 4.18
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 50711.00 TO NODE 50712.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 423.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1215.00 CHANNEL SLOPE = 0.0864
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00

CHANNEL FLOW THRU SUBAREA(CFS) = 4.18  
FLOW VELOCITY(FEET/SEC.) = 5.56 FLOW DEPTH(FEET) = 0.50  
TRAVEL TIME(MIN.) = 3.64 Tc(MIN.) = 29.68  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50712.00 = 5402.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50712.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 29.68

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.574

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.900	-
USER-DEFINED	-	18.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.998

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 18.60 SUBAREA RUNOFF(CFS) = 0.02

EFFECTIVE AREA(ACRES) = 105.00 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 105.0 PEAK FLOW RATE(CFS) = 4.18

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50713.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 319.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 768.00 CHANNEL SLOPE = 0.1354  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.18  
FLOW VELOCITY(FEET/SEC.) = 6.57 FLOW DEPTH(FEET) = 0.46  
TRAVEL TIME(MIN.) = 1.95 Tc(MIN.) = 31.63  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50713.00 = 6170.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50713.00 TO NODE 50713.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 31.63

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.555

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	4.60	0.60	1.000	-
USER-DEFINED	-	0.50	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.966

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 5.30 SUBAREA RUNOFF(CFS) = 0.09

EFFECTIVE AREA(ACRES) = 110.30 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 110.3 PEAK FLOW RATE(CFS) = 4.18

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50713.00 TO NODE 50714.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 319.00 DOWNSTREAM(FEET) = 182.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1513.00 CHANNEL SLOPE = 0.0905  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.18  
FLOW VELOCITY(FEET/SEC.) = 5.73 FLOW DEPTH(FEET) = 0.49  
TRAVEL TIME(MIN.) = 4.40 Tc(MIN.) = 36.03  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50714.00 = 7683.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 36.03

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.516

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	1.60	0.60	1.000	-
USER-DEFINED	-	5.20	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	7.70	0.60	1.000	-
USER-DEFINED	-	2.60	0.60	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.867

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 17.60 SUBAREA RUNOFF(CFS) = 1.09

EFFECTIVE AREA(ACRES) = 127.90 AREA-AVERAGED Fm(INCH/HR) = 0.59

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.98

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 127.9 PEAK FLOW RATE(CFS) = 4.18

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 36.03

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.516

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	0.900	-
USER-DEFINED	-	52.70	0.60	1.000	-
USER-DEFINED	-	7.00	0.60	1.000	-
USER-DEFINED	-	0.80	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 61.30 SUBAREA RUNOFF(CFS) = 0.03

EFFECTIVE AREA(ACRES) = 189.20 AREA-AVERAGED Fm(INCH/HR) = 0.59

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 189.2 PEAK FLOW RATE(CFS) = 4.18

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 36.03

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.516

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.80	0.60	1.000	-
USER-DEFINED	-	6.20	0.60	1.000	-
USER-DEFINED	-	3.40	0.60	1.000	-
USER-DEFINED	-	2.00	0.60	1.000	-
USER-DEFINED	-	3.50	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 0.00

EFFECTIVE AREA(ACRES) = 205.50 AREA-AVERAGED Fm(INCH/HR) = 0.59

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 205.5 PEAK FLOW RATE(CFS) = 4.18

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 36.03

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.516

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	7.60	0.60	1.000	-
USER-DEFINED	-	10.40	0.60	1.000	-
USER-DEFINED	-	7.80	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 25.90 SUBAREA RUNOFF(CFS) = 0.04

EFFECTIVE AREA(ACRES) = 231.40 AREA-AVERAGED Fm(INCH/HR) = 0.59

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 231.4 PEAK FLOW RATE(CFS) = 4.18

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 231.4 TC(MIN.) = 36.03

EFFECTIVE AREA(ACRES) = 231.40 AREA-AVERAGED Fm(INCH/HR) = 0.59

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.988

PEAK FLOW RATE(CFS) = 4.18

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 8 \*  
\* HYDROLOGIC ANALYSIS - 2-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P508XX02.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	1.580
2)	6.000;	1.430
3)	7.000;	1.310
4)	8.000;	1.210
5)	9.000;	1.130
6)	10.000;	1.060
7)	11.000;	1.010
8)	12.000;	0.960
9)	13.000;	0.920
10)	14.000;	0.880
11)	15.000;	0.840
12)	20.000;	0.720
13)	25.000;	0.630
14)	30.000;	0.570
15)	40.000;	0.480
16)	50.000;	0.420
17)	60.000;	0.380
18)	90.000;	0.300
19)	120.000;	0.260
20)	180.000;	0.200

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50800.00 TO NODE 50801.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00  
ELEVATION DATA: UPSTREAM(FEET) = 795.00 DOWNSTREAM(FEET) = 745.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.302  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.045  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.60	0.60	1.000	95	10.30

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.60  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.24  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.24

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50801.00 TO NODE 50802.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 725.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 245.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.24  
FLOW VELOCITY(FEET/SEC.) = 2.14 FLOW DEPTH(FEET) = 0.19  
TRAVEL TIME(MIN.) = 1.91  $T_c$ (MIN.) = 12.21  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50802.00 = 566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50802.00 TO NODE 50802.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 12.21

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.952  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.20 0.60 1.000 -  
 USER-DEFINED - 0.10 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 1.04  
 EFFECTIVE AREA (ACRES) = 3.90 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.9 PEAK FLOW RATE (CFS) = 1.23

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50802.00 TO NODE 50803.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 725.00 DOWNSTREAM (FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 325.00 CHANNEL SLOPE = 0.0769  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1.23  
 FLOW VELOCITY (FEET/SEC.) = 3.15 FLOW DEPTH (FEET) = 0.36  
 TRAVEL TIME (MIN.) = 1.72 Tc (MIN.) = 13.93  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50803.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50803.00 TO NODE 50803.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----  
 MAINLINE Tc (MIN) = 13.93  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.883  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.50 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.50 SUBAREA RUNOFF (CFS) = 0.38  
 EFFECTIVE AREA (ACRES) = 5.40 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.4 PEAK FLOW RATE (CFS) = 1.37

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50803.00 TO NODE 50804.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 652.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 594.00 CHANNEL SLOPE = 0.0808  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1.37  
 FLOW VELOCITY (FEET/SEC.) = 3.33 FLOW DEPTH (FEET) = 0.37

TRAVEL TIME (MIN.) = 2.97 Tc (MIN.) = 16.91  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50804.00 = 1485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50804.00 TO NODE 50804.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----  
 MAINLINE Tc (MIN) = 16.91  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.794  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.10 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 1.07  
 EFFECTIVE AREA (ACRES) = 11.50 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 11.5 PEAK FLOW RATE (CFS) = 2.01

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50804.00 TO NODE 50805.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 652.00 DOWNSTREAM (FEET) = 542.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 499.00 CHANNEL SLOPE = 0.2204  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 2.01  
 FLOW VELOCITY (FEET/SEC.) = 5.30 FLOW DEPTH (FEET) = 0.36  
 TRAVEL TIME (MIN.) = 1.57 Tc (MIN.) = 18.47  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50805.00 = 1984.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50805.00 TO NODE 50805.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----  
 MAINLINE Tc (MIN) = 18.47  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.757  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.70 0.60 1.000 -  
 USER-DEFINED - 1.10 0.60 1.000 -  
 USER-DEFINED - 0.40 0.60 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 5.20 SUBAREA RUNOFF (CFS) = 0.73  
 EFFECTIVE AREA (ACRES) = 16.70 AREA-AVERAGED Fm (INCH/HR) = 0.60  
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 16.7 PEAK FLOW RATE (CFS) = 2.36

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50805.00 TO NODE 50806.00 IS CODE = 51

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-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 542.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 650.00 CHANNEL SLOPE = 0.1415
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.36
FLOW VELOCITY(FEET/SEC.) = 4.69 FLOW DEPTH(FEET) = 0.41
TRAVEL TIME(MIN.) = 2.31 Tc(MIN.) = 20.78
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50806.00 = 2634.00 FEET.

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*****
FLOW PROCESS FROM NODE 50806.00 TO NODE 50806.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 20.78
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.706
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.20 0.60 1.000 -
USER-DEFINED - 1.50 0.60 1.000 -
USER-DEFINED - 0.50 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 0.50
EFFECTIVE AREA(ACRES) = 21.90 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 21.9 PEAK FLOW RATE(CFS) = 2.36
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 50806.00 TO NODE 50807.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 639.00 CHANNEL SLOPE = 0.0782
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.36
FLOW VELOCITY(FEET/SEC.) = 3.79 FLOW DEPTH(FEET) = 0.45
TRAVEL TIME(MIN.) = 2.81 Tc(MIN.) = 23.59
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50807.00 = 3273.00 FEET.

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*****
FLOW PROCESS FROM NODE 50807.00 TO NODE 50807.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 23.59
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.655
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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```

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 15.50 0.60 1.000 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 0.30 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 0.79
EFFECTIVE AREA(ACRES) = 37.80 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 2.36
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 50807.00 TO NODE 50808.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 350.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 448.00 CHANNEL SLOPE = 0.1116
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.36
FLOW VELOCITY(FEET/SEC.) = 4.24 FLOW DEPTH(FEET) = 0.43
TRAVEL TIME(MIN.) = 1.76 Tc(MIN.) = 25.35
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50808.00 = 3721.00 FEET.

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*****
FLOW PROCESS FROM NODE 50808.00 TO NODE 50808.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 25.35
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.626
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.90 0.60 1.000 -
USER-DEFINED - 0.60 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 0.18
EFFECTIVE AREA(ACRES) = 45.30 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 45.3 PEAK FLOW RATE(CFS) = 2.36
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 50808.00 TO NODE 50809.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 283.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 438.00 CHANNEL SLOPE = 0.1530
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.36

```

FLOW VELOCITY (FEET/SEC.) = 4.87 FLOW DEPTH (FEET) = 0.40  
TRAVEL TIME (MIN.) = 1.50 Tc (MIN.) = 26.85  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50809.00 = 4159.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50809.00 TO NODE 50809.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 26.85

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.608

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	5.70	0.60	1.000	-
USER-DEFINED	-	1.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.975

SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 0.15

EFFECTIVE AREA (ACRES) = 52.50 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 52.5 PEAK FLOW RATE (CFS) = 2.36

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50809.00 TO NODE 50810.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 283.00 DOWNSTREAM (FEET) = 243.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 665.00 CHANNEL SLOPE = 0.0602

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00

CHANNEL FLOW THRU SUBAREA (CFS) = 2.36

FLOW VELOCITY (FEET/SEC.) = 4.21 FLOW DEPTH (FEET) = 0.43

TRAVEL TIME (MIN.) = 2.63 Tc (MIN.) = 29.48

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50810.00 = 4824.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50810.00 TO NODE 50810.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 29.48

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.576

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.60	0.100	-
USER-DEFINED	-	41.90	0.60	1.000	-
USER-DEFINED	-	4.90	0.60	1.000	-
USER-DEFINED	-	4.40	0.60	1.000	-
USER-DEFINED	-	9.90	0.60	1.000	-
USER-DEFINED	-	1.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.983

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA (ACRES) = 63.50 SUBAREA RUNOFF (CFS) = 0.56

EFFECTIVE AREA (ACRES) = 116.00 AREA-AVERAGED Fm (INCH/HR) = 0.59

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 116.0 PEAK FLOW RATE (CFS) = 2.36

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50810.00 TO NODE 50811.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 243.00 DOWNSTREAM (FEET) = 173.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 1122.00 CHANNEL SLOPE = 0.0624

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00

CHANNEL FLOW THRU SUBAREA (CFS) = 2.36

FLOW VELOCITY (FEET/SEC.) = 3.44 FLOW DEPTH (FEET) = 0.48

TRAVEL TIME (MIN.) = 5.44 Tc (MIN.) = 34.92

LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50811.00 = 5946.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 34.92

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.526

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	2.70	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	3.00	0.60	1.000	-
USER-DEFINED	-	1.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.977

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA (ACRES) = 11.50 SUBAREA RUNOFF (CFS) = 0.13

EFFECTIVE AREA (ACRES) = 127.50 AREA-AVERAGED Fm (INCH/HR) = 0.59

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 127.5 PEAK FLOW RATE (CFS) = 2.36

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<



MAINLINE Tc(MIN) = 34.92

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.526

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	1.90	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.80	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 0.00

EFFECTIVE AREA(ACRES) = 130.90 AREA-AVERAGED Fm(INCH/HR) = 0.59

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 130.9 PEAK FLOW RATE(CFS) = 2.36

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 34.92

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.526

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.00

EFFECTIVE AREA(ACRES) = 131.30 AREA-AVERAGED Fm(INCH/HR) = 0.59

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 131.3 PEAK FLOW RATE(CFS) = 2.36

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 131.3 TC(MIN.) = 34.92

EFFECTIVE AREA(ACRES) = 131.30 AREA-AVERAGED Fm(INCH/HR) = 0.59

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.988

PEAK FLOW RATE(CFS) = 2.36

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2013 Advanced Engineering Software (aes)  
Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S31 \*  
\* Rational Method Hydrology Analysis - 2-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S31.DAT  
TIME/DATE OF STUDY: 09:24 04/03/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.596
- 2) 10.00; 1.064
- 3) 15.00; 0.843
- 4) 20.00; 0.715
- 5) 25.00; 0.629
- 6) 30.00; 0.560
- 7) 40.00; 0.480
- 8) 50.00; 0.423
- 9) 60.00; 0.371
- 10) 90.00; 0.302
- 11) 120.00; 0.256
- 12) 180.00; 0.208
- 13) 360.00; 0.142
- 14) 1440.00; 0.060

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13100.00 TO NODE 13101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.58  
ELEVATION DATA: UPSTREAM(FEET) = 1069.66 DOWNSTREAM(FEET) = 969.92

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.312  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.244  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.94	0.60	1.000	0	8.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.54  
TOTAL AREA(ACRES) = 0.94 PEAK FLOW RATE(CFS) = 0.54

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13101.00 TO NODE 13102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 969.92 DOWNSTREAM(FEET) = 807.20  
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.89 CHANNEL SLOPE = 0.2444  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.019  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.67	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.03  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.07  
AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 2.73  
Tc(MIN.) = 11.04  
SUBAREA AREA(ACRES) = 7.67 SUBAREA RUNOFF(CFS) = 2.89  
EFFECTIVE AREA(ACRES) = 8.61 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 3.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.49 FLOW VELOCITY(FEET/SEC.) = 4.59  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13102.00 = 948.47 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13102.00 TO NODE 13103.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 807.20 DOWNSTREAM(FEET) = 769.94
CHANNEL LENGTH THRU SUBAREA(FEET) = 691.01 CHANNEL SLOPE = 0.0539
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.850

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.65 0.60 0.999 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.65

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.01

AVERAGE FLOW DEPTH(FEET) = 0.79 TRAVEL TIME(MIN.) = 3.82

Tc(MIN.) = 14.86

SUBAREA AREA(ACRES) = 20.65 SUBAREA RUNOFF(CFS) = 4.66

EFFECTIVE AREA(ACRES) = 29.26 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 29.3 PEAK FLOW RATE(CFS) = 6.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.84 FLOW VELOCITY(FEET/SEC.) = 3.10

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13103.00 = 1639.48 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 769.94 DOWNSTREAM(FEET) = 693.88
FLOW LENGTH(FEET) = 1563.10 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 5.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.12

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 6.59

PIPE TRAVEL TIME(MIN.) = 2.57 Tc(MIN.) = 17.43

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13104.00 = 3202.58 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.43

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.781

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 28.00 0.60 0.750 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750

SUBAREA AREA(ACRES) = 28.00 SUBAREA RUNOFF(CFS) = 8.34
EFFECTIVE AREA(ACRES) = 57.26 AREA-AVERAGED Fm(INCH/HR) = 0.53
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 57.3 PEAK FLOW RATE(CFS) = 13.13

\*\*\*\*\*
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 693.88 DOWNSTREAM(FEET) = 645.69
FLOW LENGTH(FEET) = 1068.98 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 7.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 12.07

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 13.13

PIPE TRAVEL TIME(MIN.) = 1.48 Tc(MIN.) = 18.91

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13105.00 = 4271.56 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.91

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.743

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 35.28 0.60 0.867 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867

SUBAREA AREA(ACRES) = 35.28 SUBAREA RUNOFF(CFS) = 7.08

EFFECTIVE AREA(ACRES) = 92.54 AREA-AVERAGED Fm(INCH/HR) = 0.52

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.87

TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 18.25

\*\*\*\*\*
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 645.69 DOWNSTREAM(FEET) = 608.48
FLOW LENGTH(FEET) = 1127.55 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 9.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.89

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 18.25

PIPE TRAVEL TIME(MIN.) = 1.58 Tc(MIN.) = 20.49

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 20.49
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.707
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      37.68  0.60    0.889   -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.889
SUBAREA AREA(ACRES) = 37.68      SUBAREA RUNOFF(CFS) = 5.88
EFFECTIVE AREA(ACRES) = 130.22   AREA-AVERAGED Fm(INCH/HR) = 0.53
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 130.2      PEAK FLOW RATE(CFS) = 21.10

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*****
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 10
-----

```

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<

```

*****
FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 15.1
-----

```

>>>>DEFINE MEMORY BANK # 2<<<<

```

=====
PEAK FLOWRATE TABLE FILE NAME: S30.DNA
MEMORY BANK # 2 DEFINED AS FOLLOWS:
STREAM   Q      Tc      Fp(Fm)   Ap      Ae      HEADWATER
NUMBER  (CFS)  (MIN.) (INCH/HR) (ACRES)  NODE
1      141.43  53.48  0.60( 0.48) 0.81  1996.2  13000.00
2      137.37  56.64  0.60( 0.48) 0.81  2016.1  13010.00
TOTAL AREA(ACRES) = 2016.1

```

```

*****
FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 14.0
-----

```

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<

```

=====
MAIN-STREAM MEMORY DEFINED AS FOLLOWS:
STREAM   Q      Tc      Fp(Fm)   Ap      Ae      HEADWATER
NUMBER  (CFS)  (MIN.) (INCH/HR) (ACRES)  NODE
1      141.43  53.48  0.60( 0.48) 0.81  1996.2  13000.00
2      137.37  56.64  0.60( 0.48) 0.81  2016.1  13010.00
TOTAL AREA(ACRES) = 2016.1

```

```

*****
FLOW PROCESS FROM NODE 13026.00 TO NODE 13106.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 662.66 DOWNSTREAM(FEET) = 608.48
CHANNEL LENGTH THRU SUBAREA(FEET) = 3098.88 CHANNEL SLOPE = 0.0175
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.370

```

SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      75.28  0.60    0.755   -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.755
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 144.50
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.43
AVERAGE FLOW DEPTH(FEET) = 2.55 TRAVEL TIME(MIN.) = 6.95
Tc(MIN.) = 60.43
SUBAREA AREA(ACRES) = 75.28      SUBAREA RUNOFF(CFS) = 6.14
EFFECTIVE AREA(ACRES) = 2071.44 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 2091.4      PEAK FLOW RATE(CFS) = 141.43
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

```

DEPTH(FEET) = 2.53 FLOW VELOCITY(FEET/SEC.) = 7.38
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

```

```

*****
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 11
-----

```

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

```

** MAIN STREAM CONFLUENCE DATA **
STREAM   Q      Tc      Intensity  Fp(Fm)   Ap      Ae      HEADWATER
NUMBER  (CFS)  (MIN.) (INCH/HR) (INCH/HR) (ACRES)  NODE
1      141.43  60.43  0.370  0.60( 0.48) 0.80  2071.4  13000.00
2      137.37  63.65  0.363  0.60( 0.48) 0.80  2091.4  13010.00
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

```

```

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM   Q      Tc      Intensity  Fp(Fm)   Ap      Ae      HEADWATER
NUMBER  (CFS)  (MIN.) (INCH/HR) (INCH/HR) (ACRES)  NODE
1      21.10  20.49  0.707  0.60( 0.53) 0.88  130.2  13100.00
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

```

```

** PEAK FLOW RATE TABLE **
STREAM   Q      Tc      Intensity  Fp(Fm)   Ap      Ae      HEADWATER
NUMBER  (CFS)  (MIN.) (INCH/HR) (INCH/HR) (ACRES)  NODE
1      162.53  20.49  0.707  0.60( 0.49) 0.82  832.5  13100.00
2      146.72  60.43  0.370  0.60( 0.48) 0.81  2201.7  13000.00
3      142.56  63.65  0.363  0.60( 0.48) 0.81  2221.6  13010.00
TOTAL AREA(ACRES) = 2221.6

```

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 162.53 Tc(MIN.) = 20.488
EFFECTIVE AREA(ACRES) = 832.54 AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 2221.6
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

```

```

*****
FLOW PROCESS FROM NODE 13106.00 TO NODE 13107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 608.48 DOWNSTREAM(FEET) = 584.29
CHANNEL LENGTH THRU SUBAREA(FEET) = 1650.20 CHANNEL SLOPE = 0.0147
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.642
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 190.45 0.60 0.755 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 178.77
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.33
AVERAGE FLOW DEPTH(FEET) = 2.85 TRAVEL TIME(MIN.) = 3.75
Tc(MIN.) = 24.24
SUBAREA AREA(ACRES) = 190.45 SUBAREA RUNOFF(CFS) = 32.44
EFFECTIVE AREA(ACRES) = 1022.99 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 2412.1 PEAK FLOW RATE(CFS) = 162.53
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.75 FLOW VELOCITY(FEET/SEC.) = 7.16
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13107.00 = 20924.84 FEET.

```

```

*****
FLOW PROCESS FROM NODE 13107.00 TO NODE 13108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 584.29 DOWNSTREAM(FEET) = 563.78
CHANNEL LENGTH THRU SUBAREA(FEET) = 1061.67 CHANNEL SLOPE = 0.0193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.609
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 314.12 0.60 0.939 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.939
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 169.11
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.03
AVERAGE FLOW DEPTH(FEET) = 2.65 TRAVEL TIME(MIN.) = 2.20
Tc(MIN.) = 26.44
SUBAREA AREA(ACRES) = 314.12 SUBAREA RUNOFF(CFS) = 12.97
EFFECTIVE AREA(ACRES) = 1337.11 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 2726.2 PEAK FLOW RATE(CFS) = 162.53
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.61 FLOW VELOCITY(FEET/SEC.) = 7.94
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13108.00 = 21986.51 FEET.

```

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*****
FLOW PROCESS FROM NODE 13108.00 TO NODE 13109.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 563.78 DOWNSTREAM(FEET) = 541.61
CHANNEL LENGTH THRU SUBAREA(FEET) = 1657.28 CHANNEL SLOPE = 0.0134
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.557
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 203.63 0.60 0.785 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 173.50
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.04
AVERAGE FLOW DEPTH(FEET) = 2.87 TRAVEL TIME(MIN.) = 3.92
Tc(MIN.) = 30.37
SUBAREA AREA(ACRES) = 203.63 SUBAREA RUNOFF(CFS) = 21.95
EFFECTIVE AREA(ACRES) = 1540.74 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.83
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 2929.8 PEAK FLOW RATE(CFS) = 162.53
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.80 FLOW VELOCITY(FEET/SEC.) = 6.92
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13109.00 = 23643.79 FEET.

```

```

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 162.53 30.37 0.557 0.60( 0.50) 0.83 1540.7 13100.00
2 166.03 70.56 0.347 0.60( 0.49) 0.82 2909.9 13000.00
3 163.84 73.82 0.339 0.60( 0.49) 0.82 2929.8 13010.00
NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 166.03 Tc(MIN.) = 70.56
AREA-AVERAGED Fm(INCH/HR) = 0.49 AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA(ACRES) = 2909.86

```

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*****
FLOW PROCESS FROM NODE 13109.00 TO NODE 13110.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 541.61 DOWNSTREAM(FEET) = 509.94
CHANNEL LENGTH THRU SUBAREA(FEET) = 2016.96 CHANNEL SLOPE = 0.0157

```

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.336  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 283.06 0.60 0.791 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.791  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 174.98  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.50  
AVERAGE FLOW DEPTH (FEET) = 2.79 TRAVEL TIME (MIN.) = 4.48  
Tc (MIN.) = 75.04  
SUBAREA AREA (ACRES) = 283.06 SUBAREA RUNOFF (CFS) = 17.90  
EFFECTIVE AREA (ACRES) = 3192.92 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 3212.9 PEAK FLOW RATE (CFS) = 178.96  
END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.81 FLOW VELOCITY (FEET/SEC.) = 7.54  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13110.00 = 25660.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	162.53	34.86	0.521	0.60 (0.49)	0.82	1823.8	13100.00
2	178.96	75.04	0.336	0.60 (0.49)	0.81	3192.9	13000.00
3	176.28	78.34	0.329	0.60 (0.49)	0.81	3212.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 178.96 Tc (MIN.) = 75.04  
AREA-AVERAGED Fm (INCH/HR) = 0.49 AREA-AVERAGED Fp (INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA (ACRES) = 3192.92

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13110.00 TO NODE 13111.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 509.94 DOWNSTREAM (FEET) = 461.07  
CHANNEL LENGTH THRU SUBAREA (FEET) = 3058.95 CHANNEL SLOPE = 0.0160  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.321

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	248.05	0.60	0.783	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 186.73

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.66

AVERAGE FLOW DEPTH (FEET) = 2.85 TRAVEL TIME (MIN.) = 6.66  
Tc (MIN.) = 81.70  
SUBAREA AREA (ACRES) = 248.05 SUBAREA RUNOFF (CFS) = 15.54  
EFFECTIVE AREA (ACRES) = 3440.97 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 3460.9 PEAK FLOW RATE (CFS) = 186.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.85 FLOW VELOCITY (FEET/SEC.) = 7.65  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13111.00 = 28719.70 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	162.53	41.62	0.471	0.60 (0.49)	0.82	2071.8	13100.00
2	186.30	81.70	0.321	0.60 (0.49)	0.81	3441.0	13000.00
3	183.15	85.02	0.313	0.60 (0.49)	0.81	3460.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 186.30 Tc (MIN.) = 81.70  
AREA-AVERAGED Fm (INCH/HR) = 0.49 AREA-AVERAGED Fp (INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA (ACRES) = 3440.97

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13111.00 TO NODE 13112.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 461.07 DOWNSTREAM (FEET) = 452.77  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1781.78 CHANNEL SLOPE = 0.0047  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.307

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	179.91	0.60	0.694	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.694

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 193.89

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.87

AVERAGE FLOW DEPTH (FEET) = 3.64 TRAVEL TIME (MIN.) = 6.10

Tc (MIN.) = 87.80

SUBAREA AREA (ACRES) = 179.91 SUBAREA RUNOFF (CFS) = 15.19

EFFECTIVE AREA (ACRES) = 3620.88 AREA-AVERAGED Fm (INCH/HR) = 0.48

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 3640.9 PEAK FLOW RATE (CFS) = 193.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 3.64 FLOW VELOCITY (FEET/SEC.) = 4.87

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13112.00 = 30501.48 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	168.83	47.89	0.435	0.60 ( 0.48)	0.81	2251.8	13100.00
2	193.29	87.80	0.307	0.60 ( 0.48)	0.81	3620.9	13000.00
3	190.24	91.15	0.300	0.60 ( 0.48)	0.81	3640.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 193.29 Tc(MIN.) = 87.80  
 AREA-AVERAGED Fm(INCH/HR) = 0.48 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3620.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13112.00 TO NODE 13222.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 452.77 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1625.01 CHANNEL SLOPE = 0.0155  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.300

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	155.96	0.60	0.836	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.836

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 196.74

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.67

AVERAGE FLOW DEPTH(FEET) = 2.92 TRAVEL TIME(MIN.) = 3.53

Tc(MIN.) = 91.33

SUBAREA AREA(ACRES) = 155.96 SUBAREA RUNOFF(CFS) = 6.90

EFFECTIVE AREA(ACRES) = 3776.84 AREA-AVERAGED Fm(INCH/HR) = 0.48

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 3796.8 PEAK FLOW RATE(CFS) = 195.69

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.92 FLOW VELOCITY(FEET/SEC.) = 7.66

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13222.00 = 32126.49 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	170.57	51.53	0.415	0.60 ( 0.49)	0.81	2407.7	13100.00
2	195.69	91.33	0.300	0.60 ( 0.48)	0.81	3776.8	13000.00
3	193.58	94.68	0.294	0.60 ( 0.48)	0.81	3796.8	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 195.69 Tc(MIN.) = 91.33  
 AREA-AVERAGED Fm(INCH/HR) = 0.48 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3776.84

=====  
 END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 3796.8 TC(MIN.) = 91.33

EFFECTIVE AREA(ACRES) = 3776.84 AREA-AVERAGED Fm(INCH/HR)= 0.48  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.808  
 PEAK FLOW RATE(CFS) = 195.69

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	170.57	51.53	0.415	0.60 ( 0.49)	0.81	2407.7	13100.00
2	195.69	91.33	0.300	0.60 ( 0.48)	0.81	3776.8	13000.00
3	193.58	94.68	0.294	0.60 ( 0.48)	0.81	3796.8	13010.00

=====  
 END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S32 \*  
\* Rational Method Hydrology Analysis - 2-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S32.DAT  
TIME/DATE OF STUDY: 16:24 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.596
- 2) 10.00; 1.064
- 3) 15.00; 0.843
- 4) 20.00; 0.715
- 5) 25.00; 0.629
- 6) 30.00; 0.560
- 7) 40.00; 0.480
- 8) 50.00; 0.423
- 9) 60.00; 0.371
- 10) 90.00; 0.302
- 11) 120.00; 0.256
- 12) 180.00; 0.208
- 13) 360.00; 0.142
- 14) 1440.00; 0.060

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13200.00 TO NODE 13201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 298.57  
ELEVATION DATA: UPSTREAM(FEET) = 1069.04 DOWNSTREAM(FEET) = 1005.76

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.127  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.67	0.60	1.000	0	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.32  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 0.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13201.00 TO NODE 13202.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.76 DOWNSTREAM(FEET) = 896.98  
CHANNEL LENGTH THRU SUBAREA(FEET) = 747.55 CHANNEL SLOPE = 0.1455  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.911  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.42	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.41  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.06  
AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 4.07  
Tc(MIN.) = 13.48  
SUBAREA AREA(ACRES) = 7.42 SUBAREA RUNOFF(CFS) = 2.08  
EFFECTIVE AREA(ACRES) = 8.09 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.1 PEAK FLOW RATE(CFS) = 2.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.47 FLOW VELOCITY(FEET/SEC.) = 3.44  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13202.00 = 1046.12 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 896.98 DOWNSTREAM(FEET) = 840.27
FLOW LENGTH(FEET) = 1789.59 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 3.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.32
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.26
PIPE TRAVEL TIME(MIN.) = 4.72 Tc(MIN.) = 18.20
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13203.00 = 2835.71 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 18.20
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.761
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 38.89 0.60 0.731 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.731
SUBAREA AREA(ACRES) = 38.89 SUBAREA RUNOFF(CFS) = 11.30
EFFECTIVE AREA(ACRES) = 46.98 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.78
TOTAL AREA(ACRES) = 47.0 PEAK FLOW RATE(CFS) = 12.48

\*\*\*\*\*
FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 840.27 DOWNSTREAM(FEET) = 782.97
FLOW LENGTH(FEET) = 992.54 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 7.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.98
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 12.48
PIPE TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 19.47
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13204.00 = 3828.25 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 19.47
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.729
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 163.73 0.60 0.858 -

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 83.09 0.60 0.645 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645
SUBAREA AREA(ACRES) = 83.09 SUBAREA RUNOFF(CFS) = 25.55
EFFECTIVE AREA(ACRES) = 130.07 AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 130.1 PEAK FLOW RATE(CFS) = 36.65

\*\*\*\*\*
FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 782.97 DOWNSTREAM(FEET) = 692.52
FLOW LENGTH(FEET) = 2046.57 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 12.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.07
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 36.65
PIPE TRAVEL TIME(MIN.) = 2.12 Tc(MIN.) = 21.59
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13205.00 = 5874.82 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 21.59
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.688
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 88.51 0.60 0.679 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.679
SUBAREA AREA(ACRES) = 88.51 SUBAREA RUNOFF(CFS) = 22.33
EFFECTIVE AREA(ACRES) = 218.58 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 218.6 PEAK FLOW RATE(CFS) = 54.18

\*\*\*\*\*
FLOW PROCESS FROM NODE 13205.00 TO NODE 13206.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 692.52 DOWNSTREAM(FEET) = 605.24
CHANNEL LENGTH THRU SUBAREA(FEET) = 2704.69 CHANNEL SLOPE = 0.0323
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.573
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 163.73 0.60 0.858 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.858  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 60.24  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.06  
AVERAGE FLOW DEPTH(FEET) = 1.82 TRAVEL TIME(MIN.) = 7.44  
Tc(MIN.) = 29.03  
SUBAREA AREA(ACRES) = 163.73 SUBAREA RUNOFF(CFS) = 12.00  
EFFECTIVE AREA(ACRES) = 382.31 AREA-AVERAGED Fm(INCH/HR) = 0.46  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.76  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 382.3 PEAK FLOW RATE(CFS) = 54.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.75 FLOW VELOCITY(FEET/SEC.) = 5.90  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13206.00 = 8579.51 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13206.00 TO NODE 13207.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 605.24 DOWNSTREAM(FEET) = 555.41  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2479.15 CHANNEL SLOPE = 0.0201  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.502  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.60	0.888	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.888  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 57.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.03  
AVERAGE FLOW DEPTH(FEET) = 1.96 TRAVEL TIME(MIN.) = 8.22  
Tc(MIN.) = 37.25  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 7.26  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 54.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.91 FLOW VELOCITY(FEET/SEC.) = 4.94  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13207.00 = 11058.66 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 555.41 DOWNSTREAM(FEET) = 505.65  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1734.55 CHANNEL SLOPE = 0.0287  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.467  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.60	0.858	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.858  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 57.87  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.74  
AVERAGE FLOW DEPTH(FEET) = 1.83 TRAVEL TIME(MIN.) = 5.04  
Tc(MIN.) = 42.29  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 7.38  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 54.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.79 FLOW VELOCITY(FEET/SEC.) = 5.64  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 42.29  
RAINFALL INTENSITY(INCH/HR) = 0.47  
AREA-AVERAGED Fm(INCH/HR) = 0.48  
AREA-AVERAGED Fp(INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.81  
EFFECTIVE STREAM AREA(ACRES) = 649.28  
TOTAL STREAM AREA(ACRES) = 649.28  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 54.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13210.00 TO NODE 13211.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.51  
ELEVATION DATA: UPSTREAM(FEET) = 949.80 DOWNSTREAM(FEET) = 828.64

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.525  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.221  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	1.96	0.60	1.000	0	8.53

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 1.10  
 TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 1.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13211.00 TO NODE 13212.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 828.64 DOWNSTREAM(FEET) = 767.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 652.49 CHANNEL SLOPE = 0.0930  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.980  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.95	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.20  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.20  
 AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 3.39  
 Tc(MIN.) = 11.92  
 SUBAREA AREA(ACRES) = 11.95 SUBAREA RUNOFF(CFS) = 4.08  
 EFFECTIVE AREA(ACRES) = 13.91 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 4.75

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.67 FLOW VELOCITY(FEET/SEC.) = 3.55  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13212.00 = 967.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13212.00 TO NODE 13213.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 767.94 DOWNSTREAM(FEET) = 706.43  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 967.91 CHANNEL SLOPE = 0.0635  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.801  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	27.07	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.29  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.41  
 AVERAGE FLOW DEPTH(FEET) = 0.84 TRAVEL TIME(MIN.) = 4.73  
 Tc(MIN.) = 16.65  
 SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 4.90  
 EFFECTIVE AREA(ACRES) = 40.98 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 41.0 PEAK FLOW RATE(CFS) = 7.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.85 FLOW VELOCITY(FEET/SEC.) = 3.41  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13213.00 = 1934.91 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13213.00 TO NODE 13214.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 706.43 DOWNSTREAM(FEET) = 659.31  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 948.11 CHANNEL SLOPE = 0.0497  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.687  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	18.09	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.16  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.17  
 AVERAGE FLOW DEPTH(FEET) = 0.93 TRAVEL TIME(MIN.) = 4.98  
 Tc(MIN.) = 21.63  
 SUBAREA AREA(ACRES) = 18.09 SUBAREA RUNOFF(CFS) = 1.42  
 EFFECTIVE AREA(ACRES) = 59.07 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 7.42  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.89 FLOW VELOCITY(FEET/SEC.) = 3.13  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13214.00 = 2883.02 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13214.00 TO NODE 13215.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 659.31 DOWNSTREAM(FEET) = 628.91  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 970.24 CHANNEL SLOPE = 0.0313  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.590  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	27.07	0.60	1.000	-

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        71.42    0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.42
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.62
AVERAGE FLOW DEPTH(FEET) = 0.97 TRAVEL TIME(MIN.) = 6.17
Tc(MIN.) = 27.80
SUBAREA AREA(ACRES) = 71.42 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 130.49 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 130.5 PEAK FLOW RATE(CFS) = 7.42
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.97 FLOW VELOCITY(FEET/SEC.) = 2.62
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13215.00 = 3853.26 FEET.

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FLOW PROCESS FROM NODE 13215.00 TO NODE 13216.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 628.91 DOWNSTREAM(FEET) = 598.39
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.63 CHANNEL SLOPE = 0.0331
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.532
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 36.33 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.42
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.66
AVERAGE FLOW DEPTH(FEET) = 0.96 TRAVEL TIME(MIN.) = 5.78
Tc(MIN.) = 33.58
SUBAREA AREA(ACRES) = 36.33 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 166.82 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 166.8 PEAK FLOW RATE(CFS) = 7.42
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.96 FLOW VELOCITY(FEET/SEC.) = 2.66
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13216.00 = 4775.89 FEET.

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FLOW PROCESS FROM NODE 13216.00 TO NODE 13217.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 598.39 DOWNSTREAM(FEET) = 568.48
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.40 CHANNEL SLOPE = 0.0470
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.504
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 42.51 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.42
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.03
AVERAGE FLOW DEPTH(FEET) = 0.90 TRAVEL TIME(MIN.) = 3.50
Tc(MIN.) = 37.07
SUBAREA AREA(ACRES) = 42.51 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 209.33 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 209.3 PEAK FLOW RATE(CFS) = 7.42
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.90 FLOW VELOCITY(FEET/SEC.) = 3.03
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13217.00 = 5412.29 FEET.

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FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 568.48 DOWNSTREAM(FEET) = 505.65
CHANNEL LENGTH THRU SUBAREA(FEET) = 1896.50 CHANNEL SLOPE = 0.0331
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.431
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 73.24 0.60 0.951 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.951
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.12
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.74
AVERAGE FLOW DEPTH(FEET) = 0.99 TRAVEL TIME(MIN.) = 11.55
Tc(MIN.) = 48.63
SUBAREA AREA(ACRES) = 73.24 SUBAREA RUNOFF(CFS) = 1.39

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EFFECTIVE AREA(ACRES) = 282.57 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 282.6 PEAK FLOW RATE(CFS) = 7.42  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.96 FLOW VELOCITY(FEET/SEC.) = 2.66  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13220.00 = 7308.79 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 48.63  
 RAINFALL INTENSITY(INCH/HR) = 0.43  
 AREA-AVERAGED Fm(INCH/HR) = 0.59  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.99  
 EFFECTIVE STREAM AREA(ACRES) = 282.57  
 TOTAL STREAM AREA(ACRES) = 282.57  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.42

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	54.18	42.29	0.467	0.60( 0.48)	0.81	649.3	13200.00
2	7.42	48.63	0.431	0.60( 0.59)	0.99	282.6	13210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	61.19	42.29	0.467	0.60( 0.51)	0.86	895.0	13200.00
2	57.36	48.63	0.431	0.60( 0.52)	0.86	931.8	13210.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 61.19 Tc(MIN.) = 42.29  
 EFFECTIVE AREA(ACRES) = 895.05 AREA-AVERAGED Fm(INCH/HR) = 0.51  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA(ACRES) = 931.8  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13220.00 TO NODE 13221.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 505.65 DOWNSTREAM(FEET) = 478.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1949.14 CHANNEL SLOPE = 0.0137

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.434

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	108.50	0.60	0.637	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.637

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 68.87  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.63  
 AVERAGE FLOW DEPTH(FEET) = 2.02 TRAVEL TIME(MIN.) = 5.77  
 Tc(MIN.) = 48.06

SUBAREA AREA(ACRES) = 108.50 SUBAREA RUNOFF(CFS) = 15.38  
 EFFECTIVE AREA(ACRES) = 1003.55 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.83  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 1040.3 PEAK FLOW RATE(CFS) = 65.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.98 FLOW VELOCITY(FEET/SEC.) = 5.56  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13221.00 = 14742.35 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	65.48	48.06	0.434	0.60( 0.50)	0.83	1003.5	13200.00
2	60.46	54.50	0.399	0.60( 0.50)	0.84	1040.3	13210.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 65.48 Tc(MIN.) = 48.06  
 AREA-AVERAGED Fm(INCH/HR) = 0.50 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.83 EFFECTIVE AREA(ACRES) = 1003.55

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13221.00 TO NODE 13222.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 478.94 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2078.70 CHANNEL SLOPE = 0.0247

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.407

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	87.26	0.60	0.699	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.699

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 70.30  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.07  
 AVERAGE FLOW DEPTH(FEET) = 1.82 TRAVEL TIME(MIN.) = 4.90

Tc(MIN.) = 52.96  
 SUBAREA AREA(ACRES) = 87.26 SUBAREA RUNOFF(CFS) = 9.63  
 EFFECTIVE AREA(ACRES) = 1090.81 AREA-AVERAGED Fm(INCH/HR) = 0.49  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.82  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 1127.6 PEAK FLOW RATE(CFS) = 71.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.83 FLOW VELOCITY(FEET/SEC.) = 7.09  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13222.00 = 16821.05 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	71.12	52.96	0.407	0.60 ( 0.49)	0.82	1090.8	13200.00
2	65.38	59.51	0.374	0.60 ( 0.50)	0.83	1127.6	13210.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 71.12 Tc(MIN.) = 52.96  
 AREA-AVERAGED Fm(INCH/HR) = 0.49 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA(ACRES) = 1090.81

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1127.6 TC(MIN.) = 52.96  
 EFFECTIVE AREA(ACRES) = 1090.81 AREA-AVERAGED Fm(INCH/HR)= 0.49  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.822  
 PEAK FLOW RATE(CFS) = 71.12

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	71.12	52.96	0.407	0.60 ( 0.49)	0.82	1090.8	13200.00
2	65.38	59.51	0.374	0.60 ( 0.50)	0.83	1127.6	13210.00

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S35 \*  
\* Rational Method Hydrology Analysis - 2-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S35.DAT  
TIME/DATE OF STUDY: 16:24 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.596
- 2) 10.00; 1.064
- 3) 15.00; 0.843
- 4) 20.00; 0.715
- 5) 25.00; 0.629
- 6) 30.00; 0.560
- 7) 40.00; 0.480
- 8) 50.00; 0.423
- 9) 60.00; 0.371
- 10) 90.00; 0.302
- 11) 120.00; 0.256
- 12) 180.00; 0.208
- 13) 360.00; 0.142
- 14) 1440.00; 0.060

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.00 TO NODE 13500.50 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 548.43  
ELEVATION DATA: UPSTREAM(FEET) = 1183.47 DOWNSTREAM(FEET) = 1065.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.978  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	5.11	0.60	1.000	0	11.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.74  
TOTAL AREA(ACRES) = 5.11 PEAK FLOW RATE(CFS) = 1.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.50 TO NODE 13501.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1033.15  
CHANNEL LENGTH THRU SUBAREA(FEET) = 431.71 CHANNEL SLOPE = 0.0738  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.866  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.87	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.84  
AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 2.53  
Tc(MIN.) = 14.49  
SUBAREA AREA(ACRES) = 8.87 SUBAREA RUNOFF(CFS) = 2.12  
EFFECTIVE AREA(ACRES) = 13.98 AREA-AVERAGED Fm(INCH/HR) = 0.60  
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 3.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 2.95  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13501.00 = 980.14 FEET.

\*\*\*\*\*



FLOW PROCESS FROM NODE 13501.00 TO NODE 13502.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1033.15 DOWNSTREAM(FEET) = 990.26
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.63 CHANNEL SLOPE = 0.0452
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.705

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 16.82 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.19

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.59

AVERAGE FLOW DEPTH(FEET) = 0.74 TRAVEL TIME(MIN.) = 6.12

Tc(MIN.) = 20.61

SUBAREA AREA(ACRES) = 16.82 SUBAREA RUNOFF(CFS) = 1.59

EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 3.35

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.67 FLOW VELOCITY(FEET/SEC.) = 2.45

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13502.00 = 1928.77 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13502.00 TO NODE 13503.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.26 DOWNSTREAM(FEET) = 956.06
CHANNEL LENGTH THRU SUBAREA(FEET) = 940.98 CHANNEL SLOPE = 0.0363
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.595

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 46.02 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.49

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.29

AVERAGE FLOW DEPTH(FEET) = 0.71 TRAVEL TIME(MIN.) = 6.84

Tc(MIN.) = 27.45

SUBAREA AREA(ACRES) = 46.02 SUBAREA RUNOFF(CFS) = 0.00

EFFECTIVE AREA(ACRES) = 76.82 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 76.8 PEAK FLOW RATE(CFS) = 3.35

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.70 FLOW VELOCITY(FEET/SEC.) = 2.28

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13503.00 = 2869.75 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13503.00 TO NODE 13504.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 956.06 DOWNSTREAM(FEET) = 889.48
CHANNEL LENGTH THRU SUBAREA(FEET) = 2131.31 CHANNEL SLOPE = 0.0312
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.457

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 58.46 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.35

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.14

AVERAGE FLOW DEPTH(FEET) = 0.72 TRAVEL TIME(MIN.) = 16.59

Tc(MIN.) = 44.04

SUBAREA AREA(ACRES) = 58.46 SUBAREA RUNOFF(CFS) = 0.00

EFFECTIVE AREA(ACRES) = 135.28 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 135.3 PEAK FLOW RATE(CFS) = 3.35

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.72 FLOW VELOCITY(FEET/SEC.) = 2.14

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13504.00 = 5001.06 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13504.00 TO NODE 13505.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 889.48 DOWNSTREAM(FEET) = 848.10
CHANNEL LENGTH THRU SUBAREA(FEET) = 1661.97 CHANNEL SLOPE = 0.0249
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00

\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.381

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 49.30 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.35  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.97  
 AVERAGE FLOW DEPTH(FEET) = 0.75 TRAVEL TIME(MIN.) = 14.05  
 Tc(MIN.) = 58.09  
 SUBAREA AREA(ACRES) = 49.30 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 184.58 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 184.6 PEAK FLOW RATE(CFS) = 3.35  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.75 FLOW VELOCITY(FEET/SEC.) = 1.97  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.00 = 6663.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13505.00 TO NODE 13505.50 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 848.10 DOWNSTREAM(FEET) = 811.10  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1234.61 CHANNEL SLOPE = 0.0300  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.355  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.35	0.60	0.811	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.811  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.53  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.28  
 AVERAGE FLOW DEPTH(FEET) = 0.81 TRAVEL TIME(MIN.) = 9.02  
 Tc(MIN.) = 67.11  
 SUBAREA AREA(ACRES) = 39.35 SUBAREA RUNOFF(CFS) = 2.37  
 EFFECTIVE AREA(ACRES) = 223.93 AREA-AVERAGED Fm(INCH/HR) = 0.58  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.97  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 223.9 PEAK FLOW RATE(CFS) = 3.35  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.73 FLOW VELOCITY(FEET/SEC.) = 2.11  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.50 = 7897.64 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13505.50 TO NODE 13506.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 811.10 DOWNSTREAM(FEET) = 781.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1415.98 CHANNEL SLOPE = 0.0213  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.329  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	54.33	0.60	0.738	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.738  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.44  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.10  
 AVERAGE FLOW DEPTH(FEET) = 0.93 TRAVEL TIME(MIN.) = 11.22  
 Tc(MIN.) = 78.33

SUBAREA AREA(ACRES) = 54.33 SUBAREA RUNOFF(CFS) = 4.21  
 EFFECTIVE AREA(ACRES) = 278.26 AREA-AVERAGED Fm(INCH/HR) = 0.55  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.92  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA(ACRES) = 278.3 PEAK FLOW RATE(CFS) = 6.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.99 FLOW VELOCITY(FEET/SEC.) = 2.18  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.00 = 9313.62 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13506.50 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 781.00 DOWNSTREAM(FEET) = 743.17  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1542.62 CHANNEL SLOPE = 0.0245  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.304  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	61.33	0.60	0.783	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.23  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.45  
 AVERAGE FLOW DEPTH(FEET) = 1.06 TRAVEL TIME(MIN.) = 10.49  
 Tc(MIN.) = 88.81

SUBAREA AREA(ACRES) = 61.33 SUBAREA RUNOFF(CFS) = 3.65  
 EFFECTIVE AREA(ACRES) = 339.59 AREA-AVERAGED Fm(INCH/HR) = 0.54  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.90  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 339.6 PEAK FLOW RATE (CFS) = 9.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.12 FLOW VELOCITY (FEET/SEC.) = 2.55  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.50 = 10856.24 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13506.50 TO NODE 13520.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 743.17 DOWNSTREAM (FEET) = 717.04  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1370.93 CHANNEL SLOPE = 0.0191  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.289  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.86	0.60	0.848	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.848  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.37  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.36  
AVERAGE FLOW DEPTH (FEET) = 1.21 TRAVEL TIME (MIN.) = 9.68  
Tc (MIN.) = 98.50

SUBAREA AREA (ACRES) = 39.86 SUBAREA RUNOFF (CFS) = 1.57  
EFFECTIVE AREA (ACRES) = 379.45 AREA-AVERAGED Fm (INCH/HR) = 0.53  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.89  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 379.5 PEAK FLOW RATE (CFS) = 10.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.22 FLOW VELOCITY (FEET/SEC.) = 2.37  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13506.00 TO NODE 13520.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 98.50  
RAINFALL INTENSITY (INCH/HR) = 0.29  
AREA-AVERAGED Fm (INCH/HR) = 0.53  
AREA-AVERAGED Fp (INCH/HR) = 0.60  
AREA-AVERAGED Ap = 0.89  
EFFECTIVE STREAM AREA (ACRES) = 379.45  
TOTAL STREAM AREA (ACRES) = 379.45  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 10.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13510.00 TO NODE 13511.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 903.68  
ELEVATION DATA: UPSTREAM (FEET) = 1216.90 DOWNSTREAM (FEET) = 1022.78

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.615  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.860  
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	6.66	0.60	1.000	0	14.62

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF (CFS) = 1.56  
TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 1.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13511.00 TO NODE 13512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1022.78 DOWNSTREAM (FEET) = 954.27  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1027.63 CHANNEL SLOPE = 0.0667  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.699  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.83  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.71  
AVERAGE FLOW DEPTH (FEET) = 0.59 TRAVEL TIME (MIN.) = 6.32  
Tc (MIN.) = 20.94  
SUBAREA AREA (ACRES) = 25.40 SUBAREA RUNOFF (CFS) = 2.26

EFFECTIVE AREA (ACRES) = 32.06 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 2.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.59 FLOW VELOCITY (FEET/SEC.) = 2.73  
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13512.00 = 1931.31 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13512.00 TO NODE 13513.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 954.27 DOWNSTREAM (FEET) = 872.45  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1926.42 CHANNEL SLOPE = 0.0425

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.521  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	90.23	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.30  
AVERAGE FLOW DEPTH (FEET) = 0.64 TRAVEL TIME (MIN.) = 13.96  
Tc (MIN.) = 34.90  
SUBAREA AREA (ACRES) = 90.23 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 122.29 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 122.3 PEAK FLOW RATE (CFS) = 2.86  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.64 FLOW VELOCITY (FEET/SEC.) = 2.30  
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13513.00 = 3857.73 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13513.00 TO NODE 13514.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 872.45 DOWNSTREAM (FEET) = 813.12  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1895.66 CHANNEL SLOPE = 0.0313  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.421  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	135.65	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.05  
AVERAGE FLOW DEPTH (FEET) = 0.68 TRAVEL TIME (MIN.) = 15.42  
Tc (MIN.) = 50.32  
SUBAREA AREA (ACRES) = 135.65 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 257.94 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
TOTAL AREA (ACRES) = 257.9 PEAK FLOW RATE (CFS) = 2.86  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.68 FLOW VELOCITY (FEET/SEC.) = 2.05  
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13514.00 = 5753.39 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13514.00 TO NODE 13515.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 813.12 DOWNSTREAM (FEET) = 773.74  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1926.15 CHANNEL SLOPE = 0.0204  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.351  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	109.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 1.75  
AVERAGE FLOW DEPTH (FEET) = 0.74 TRAVEL TIME (MIN.) = 18.31  
Tc (MIN.) = 68.63  
SUBAREA AREA (ACRES) = 109.30 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 367.24 AREA-AVERAGED Fm (INCH/HR) = 0.60  
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 367.2 PEAK FLOW RATE (CFS) = 2.86  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 0.74 FLOW VELOCITY (FEET/SEC.) = 1.75  
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13515.00 = 7679.54 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 773.74 DOWNSTREAM (FEET) = 717.04  
CHANNEL LENGTH THRU SUBAREA (FEET) = 2279.49 CHANNEL SLOPE = 0.0249  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.304  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	231.44	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.86  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.88  
 AVERAGE FLOW DEPTH(FEET) = 0.71 TRAVEL TIME(MIN.) = 20.24  
 Tc(MIN.) = 88.87  
 SUBAREA AREA(ACRES) = 231.44 SUBAREA RUNOFF(CFS) = 0.00  
 EFFECTIVE AREA(ACRES) = 598.68 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 598.7 PEAK FLOW RATE(CFS) = 2.86  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.71 FLOW VELOCITY(FEET/SEC.) = 1.88  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13520.00 = 9959.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

-----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 88.87  
 RAINFALL INTENSITY(INCH/HR) = 0.30  
 AREA-AVERAGED Fm(INCH/HR) = 0.60  
 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 598.68  
 TOTAL STREAM AREA(ACRES) = 598.68  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.86

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	10.66	98.50	0.289	0.60( 0.53)	0.89	379.5	13500.00
2	2.86	88.87	0.304	0.60( 0.60)	1.00	598.7	13510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	13.00	88.87	0.304	0.60( 0.58)	0.96	941.0	13510.00
2	13.37	98.50	0.289	0.60( 0.57)	0.96	978.1	13500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 13.37 Tc(MIN.) = 98.50  
 EFFECTIVE AREA(ACRES) = 978.13 AREA-AVERAGED Fm(INCH/HR) = 0.57  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 978.1  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.00 TO NODE 13520.50 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM(FEET) = 717.04 DOWNSTREAM(FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2019.22 CHANNEL SLOPE = 0.0084  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.268

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 193.31 0.60 0.965 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.19  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.55  
 AVERAGE FLOW DEPTH(FEET) = 1.36 TRAVEL TIME(MIN.) = 13.18  
 Tc(MIN.) = 111.68

SUBAREA AREA(ACRES) = 193.31 SUBAREA RUNOFF(CFS) = 1.63  
 EFFECTIVE AREA(ACRES) = 1171.44 AREA-AVERAGED Fm(INCH/HR) = 0.58  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 1171.4 PEAK FLOW RATE(CFS) = 13.37  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.33 FLOW VELOCITY(FEET/SEC.) = 2.51  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.50 = 14246.39 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	13.00	102.10	0.283	0.60( 0.58)	0.96	1134.3	13510.00
2	13.37	111.68	0.268	0.60( 0.58)	0.96	1171.4	13500.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 13.37 Tc(MIN.) = 111.68  
 AREA-AVERAGED Fm(INCH/HR) = 0.58 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 1171.44

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.50 TO NODE 13521.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
 ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 661.95  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1622.36 CHANNEL SLOPE = 0.0235  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.257

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 129.79 0.60 0.897 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.92  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.78  
 AVERAGE FLOW DEPTH(FEET) = 1.15 TRAVEL TIME(MIN.) = 7.16  
 Tc(MIN.) = 118.83  
 SUBAREA AREA(ACRES) = 129.79 SUBAREA RUNOFF(CFS) = 3.10  
 EFFECTIVE AREA(ACRES) = 1301.23 AREA-AVERAGED Fm(INCH/HR) = 0.57  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 1301.2 PEAK FLOW RATE(CFS) = 14.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.12 FLOW VELOCITY(FEET/SEC.) = 3.74  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13521.00 = 15868.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	13.99	109.30	0.272	0.60( 0.57)	0.95	1264.1	13510.00
2	14.17	118.83	0.257	0.60( 0.57)	0.95	1301.2	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 14.17 Tc(MIN.) = 118.83  
 AREA-AVERAGED Fm(INCH/HR) = 0.57 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.95 EFFECTIVE AREA(ACRES) = 1301.23

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FLOW PROCESS FROM NODE 13521.00 TO NODE 13522.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 661.95 DOWNSTREAM(FEET) = 632.19  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2746.01 CHANNEL SLOPE = 0.0108  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.244  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	278.60	0.60	0.905	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.08  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.93  
 AVERAGE FLOW DEPTH(FEET) = 1.39 TRAVEL TIME(MIN.) = 15.61  
 Tc(MIN.) = 134.44  
 SUBAREA AREA(ACRES) = 278.60 SUBAREA RUNOFF(CFS) = 5.81  
 EFFECTIVE AREA(ACRES) = 1579.83 AREA-AVERAGED Fm(INCH/HR) = 0.57  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.94  
 \* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;  
 \* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.  
 TOTAL AREA(ACRES) = 1579.8 PEAK FLOW RATE(CFS) = 19.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.45 FLOW VELOCITY(FEET/SEC.) = 3.03  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13522.00 = 18614.76 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	18.94	124.94	0.252	0.60( 0.57)	0.95	1542.7	13510.00
2	19.25	134.44	0.244	0.60( 0.57)	0.94	1579.8	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 19.25 Tc(MIN.) = 134.44  
 AREA-AVERAGED Fm(INCH/HR) = 0.57 AREA-AVERAGED Fp(INCH/HR) = 0.60  
 AREA-AVERAGED Ap = 0.94 EFFECTIVE AREA(ACRES) = 1579.83

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1579.8 TC(MIN.) = 134.44  
 EFFECTIVE AREA(ACRES) = 1579.83 AREA-AVERAGED Fm(INCH/HR) = 0.57  
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.945  
 PEAK FLOW RATE(CFS) = 19.25

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	18.94	124.94	0.252	0.60( 0.57)	0.95	1542.7	13510.00
2	19.25	134.44	0.244	0.60( 0.57)	0.94	1579.8	13500.00

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2012 Advanced Engineering Software (aes)  
Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 5-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P05EVAA.DAT  
TIME/DATE OF STUDY: 14:42 11/14/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.604
- 2) 10.00; 1.741
- 3) 15.00; 1.296
- 4) 20.00; 1.108
- 5) 25.00; 0.968
- 6) 30.00; 0.871
- 7) 40.00; 0.743
- 8) 50.00; 0.660
- 9) 60.00; 0.598
- 10) 90.00; 0.495
- 11) 120.00; 0.435
- 12) 180.00; 0.364
- 13) 360.00; 0.267
- 14) 1200.00; 0.116

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE/ WAY		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 571.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.305  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.206  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	-	0.80	0.50	0.200	0	7.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 1.52  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 1.52

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.206  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.50	0.200	-
USER-DEFINED	-	1.00	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.170  
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 6.30  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.09  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 7.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.206  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.50	0.200	-
USER-DEFINED	-	1.00	0.50	0.100	-



USER-DEFINED - 2.60 0.50 0.200 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA (ACRES) = 2.60 SUBAREA RUNOFF (CFS) = 4.93  
 EFFECTIVE AREA (ACRES) = 6.70 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.19  
 TOTAL AREA (ACRES) = 6.7 PEAK FLOW RATE (CFS) = 12.74

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 571.00 DOWNSTREAM ELEVATION (FEET) = 530.50  
 STREET LENGTH (FEET) = 1215.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.28  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.39  
 HALFSTREET FLOOD WIDTH (FEET) = 12.93  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.53  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.78  
 STREET FLOW TRAVEL TIME (MIN.) = 4.47 Tc (MIN.) = 11.78

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.583

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.50	0.200	-
USER-DEFINED	-	0.10	0.50	0.200	-
USER-DEFINED	-	2.40	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.135  
 SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 5.05  
 EFFECTIVE AREA (ACRES) = 10.40 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA (ACRES) = 10.4 PEAK FLOW RATE (CFS) = 14.03

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.39 HALFSTREET FLOOD WIDTH (FEET) = 12.46  
 FLOW VELOCITY (FEET/SEC.) = 4.44 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.71  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1542.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 11.78  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.583  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.40	0.50	0.200	-
USER-DEFINED	-	18.20	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.119  
 SUBAREA AREA (ACRES) = 22.60 SUBAREA RUNOFF (CFS) = 30.98  
 EFFECTIVE AREA (ACRES) = 33.00 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.13  
 TOTAL AREA (ACRES) = 33.0 PEAK FLOW RATE (CFS) = 45.01

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 11.78  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.583  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.20	0.50	0.200	-
USER-DEFINED	-	0.10	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198  
 SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 8.41  
 EFFECTIVE AREA (ACRES) = 39.30 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA (ACRES) = 39.3 PEAK FLOW RATE (CFS) = 53.43

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 530.50 DOWNSTREAM (FEET) = 522.00  
 FLOW LENGTH (FEET) = 837.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.2 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.10  
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 53.43  
 PIPE TRAVEL TIME (MIN.) = 1.38 Tc (MIN.) = 13.16  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2379.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 13.16  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.460  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED - 15.30 0.50 0.100 -  
 USER-DEFINED - 0.70 0.50 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.133  
 SUBAREA AREA (ACRES) = 16.00 SUBAREA RUNOFF (CFS) = 20.07  
 EFFECTIVE AREA (ACRES) = 55.30 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA (ACRES) = 55.3 PEAK FLOW RATE (CFS) = 69.15

\*\*\*\*\*

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 522.00 DOWNSTREAM (FEET) = 473.00  
 FLOW LENGTH (FEET) = 568.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 24.12  
 ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 69.15  
 PIPE TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 13.55  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2947.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.55  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.425

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.50	0.850	-
USER-DEFINED	-	0.30	0.50	0.500	-
USER-DEFINED	-	0.50	0.50	0.100	-
USER-DEFINED	-	13.00	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.820  
 SUBAREA AREA (ACRES) = 15.90 SUBAREA RUNOFF (CFS) = 14.53  
 EFFECTIVE AREA (ACRES) = 71.20 AREA-AVERAGED Fm (INCH/HR) = 0.15  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA (ACRES) = 71.2 PEAK FLOW RATE (CFS) = 81.94

\*\*\*\*\*

FLOW PROCESS FROM NODE 104.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 473.00 DOWNSTREAM (FEET) = 435.00  
 FLOW LENGTH (FEET) = 588.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.8 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 22.52  
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 81.94  
 PIPE TRAVEL TIME (MIN.) = 0.44 Tc (MIN.) = 13.98

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 100.00 TO NODE 121.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 577.00 DOWNSTREAM (FEET) = 574.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.438  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.011

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	-	0.60	0.50	0.200	0	8.44

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200

SUBAREA RUNOFF (CFS) = 1.03  
 TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 1.03

\*\*\*\*\*

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 574.00 DOWNSTREAM ELEVATION (FEET) = 557.00  
 STREET LENGTH (FEET) = 221.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.47  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.34  
 HALFSTREET FLOOD WIDTH (FEET) = 9.72  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.01  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.02  
 STREET FLOW TRAVEL TIME (MIN.) = 0.61 Tc (MIN.) = 9.05  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.905

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.200	-
USER-DEFINED	-	7.90	0.50	0.200	-
USER-DEFINED	-	4.10	0.50	0.400	-
USER-DEFINED	-	2.20	0.50	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.257  
SUBAREA AREA (ACRES) = 14.30 SUBAREA RUNOFF (CFS) = 22.86  
EFFECTIVE AREA (ACRES) = 14.90 AREA-AVERAGED Fm (INCH/HR) = 0.13  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.26  
TOTAL AREA (ACRES) = 14.9 PEAK FLOW RATE (CFS) = 23.83

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.40 HALFSTREET FLOOD WIDTH (FEET) = 13.09  
FLOW VELOCITY (FEET/SEC.) = 6.92 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.74  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 551.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 557.00 DOWNSTREAM ELEVATION (FEET) = 527.00  
STREET LENGTH (FEET) = 317.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 30.59

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.41  
HALFSTREET FLOOD WIDTH (FEET) = 13.87  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 8.00  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.28

STREET FLOW TRAVEL TIME (MIN.) = 0.66 Tc (MIN.) = 9.71

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.791

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.320	-
USER-DEFINED	-	4.50	0.50	0.400	-
USER-DEFINED	-	0.70	0.50	0.200	-
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	3.50	0.50	0.350	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.352

SUBAREA AREA (ACRES) = 9.30 SUBAREA RUNOFF (CFS) = 13.52

EFFECTIVE AREA (ACRES) = 24.20 AREA-AVERAGED Fm (INCH/HR) = 0.15

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.29

TOTAL AREA (ACRES) = 24.2 PEAK FLOW RATE (CFS) = 35.82

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.43 HALFSTREET FLOOD WIDTH (FEET) = 14.88

FLOW VELOCITY (FEET/SEC.) = 8.25 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.53

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 123.00 = 868.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 527.00 DOWNSTREAM ELEVATION (FEET) = 496.00  
STREET LENGTH (FEET) = 315.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 43.62

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.45

HALFSTREET FLOOD WIDTH (FEET) = 15.98

AVERAGE FLOW VELOCITY (FEET/SEC.) = 8.82

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.95

STREET FLOW TRAVEL TIME (MIN.) = 0.60 Tc (MIN.) = 10.31

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.714

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.50	0.400	-
USER-DEFINED	-	1.40	0.50	0.350	-
USER-DEFINED	-	4.00	0.50	0.400	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	2.70	0.50	0.350	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387

SUBAREA AREA (ACRES) = 11.40 SUBAREA RUNOFF (CFS) = 15.60

EFFECTIVE AREA (ACRES) = 35.60 AREA-AVERAGED Fm (INCH/HR) = 0.16

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.32

TOTAL AREA (ACRES) = 35.6 PEAK FLOW RATE (CFS) = 49.74

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.46 HALFSTREET FLOOD WIDTH (FEET) = 16.91

FLOW VELOCITY (FEET/SEC.) = 9.05 DEPTH\*VELOCITY (FT\*FT/SEC.) = 4.20

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 124.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 10.31

RAINFALL INTENSITY(INCH/HR) = 1.71

AREA-AVERAGED Fm(INCH/HR) = 0.16

AREA-AVERAGED Fp(INCH/HR) = 0.50

AREA-AVERAGED Ap = 0.32

EFFECTIVE STREAM AREA(ACRES) = 35.60

TOTAL STREAM AREA(ACRES) = 35.60

PEAK FLOW RATE(CFS) AT CONFLUENCE = 49.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 317.00

ELEVATION DATA: UPSTREAM(FEET) = 699.00 DOWNSTREAM(FEET) = 610.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.111

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.894

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"OPEN BRUSH"	-	1.50	0.50	1.000	0	9.11
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000						
SUBAREA RUNOFF(CFS) = 1.88						
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 1.88						

\*\*\*\*\*  
FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 575.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 206.00 CHANNEL SLOPE = 0.1699

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.787

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.80	0.50	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.50					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.50					
AVERAGE FLOW DEPTH(FEET) = 0.46 TRAVEL TIME(MIN.) = 0.62					
Tc(MIN.) = 9.73					
SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 3.24					
EFFECTIVE AREA(ACRES) = 4.30 AREA-AVERAGED Fm(INCH/HR) = 0.50					

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 4.3 PEAK FLOW RATE(CFS) = 4.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.52 FLOW VELOCITY(FEET/SEC.) = 6.05

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 523.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 548.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.1350

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.715

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.30	0.50	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.78					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.01					
AVERAGE FLOW DEPTH(FEET) = 0.61 TRAVEL TIME(MIN.) = 0.55					
Tc(MIN.) = 10.29					
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 3.61					
EFFECTIVE AREA(ACRES) = 7.60 AREA-AVERAGED Fm(INCH/HR) = 0.50					
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 7.6 PEAK FLOW RATE(CFS) = 8.31					

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.66 FLOW VELOCITY(FEET/SEC.) = 6.34

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 723.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 548.00 DOWNSTREAM(FEET) = 524.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 318.00 CHANNEL SLOPE = 0.0755

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.626

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.50	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.48					
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.25					
AVERAGE FLOW DEPTH(FEET) = 0.78 TRAVEL TIME(MIN.) = 1.01					
Tc(MIN.) = 11.30					

SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 2.33  
EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 10.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.79 FLOW VELOCITY (FEET/SEC.) = 5.35  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 1041.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 524.00 DOWNSTREAM (FEET) = 515.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 94.00 CHANNEL SLOPE = 0.0957  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.603

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.86

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.09

AVERAGE FLOW DEPTH (FEET) = 0.81 TRAVEL TIME (MIN.) = 0.26

Tc (MIN.) = 11.55

SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 3.67

EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 13.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.85 FLOW VELOCITY (FEET/SEC.) = 6.23  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 1135.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 507.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 207.00 CHANNEL SLOPE = 0.0386  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.538

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.30	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.37

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.76

AVERAGE FLOW DEPTH (FEET) = 1.10 TRAVEL TIME (MIN.) = 0.73  
Tc (MIN.) = 12.28  
SUBAREA AREA (ACRES) = 8.30 SUBAREA RUNOFF (CFS) = 7.75  
EFFECTIVE AREA (ACRES) = 21.90 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 21.9 PEAK FLOW RATE (CFS) = 20.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.17 FLOW VELOCITY (FEET/SEC.) = 4.96  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 1342.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 507.00 DOWNSTREAM (FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 338.00 CHANNEL SLOPE = 0.0207  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.417

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	0.400	-
USER-DEFINED	-	13.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 26.32

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.16

AVERAGE FLOW DEPTH (FEET) = 1.45 TRAVEL TIME (MIN.) = 1.35

Tc (MIN.) = 13.63

SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 11.72

EFFECTIVE AREA (ACRES) = 36.00 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 36.0 PEAK FLOW RATE (CFS) = 29.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.52 FLOW VELOCITY (FEET/SEC.) = 4.29  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 1680.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 137.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 500.00 DOWNSTREAM (FEET) = 496.00  
FLOW LENGTH (FEET) = 726.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.3 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 6.97

ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 29.80

PIPE TRAVEL TIME (MIN.) = 1.74 Tc (MIN.) = 15.37

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

```

*****
FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 15.37
RAINFALL INTENSITY(INCH/HR) = 1.28
AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 36.00
TOTAL STREAM AREA(ACRES) = 36.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 29.80

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 49.74 10.31 1.714 0.50( 0.16) 0.32 35.6 100.00
2 29.80 15.37 1.282 0.50( 0.50) 1.00 36.0 130.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 79.54 10.31 1.714 0.50( 0.30) 0.59 59.7 100.00
2 65.71 15.37 1.282 0.50( 0.33) 0.66 71.6 130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 79.54 Tc(MIN.) = 10.31
EFFECTIVE AREA(ACRES) = 59.74 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59
TOTAL AREA(ACRES) = 71.6
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

*****
FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 444.00
FLOW LENGTH(FEET) = 888.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.51
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 79.54
PIPE TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 10.99
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 125.00 = 3294.00 FEET.

*****
FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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*****
MAINLINE Tc(MIN.) = 10.99
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.653
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.50 0.400 -
USER-DEFINED - 7.50 0.50 0.400 -
USER-DEFINED - 0.10 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.407
SUBAREA AREA(ACRES) = 8.60 SUBAREA RUNOFF(CFS) = 11.22
EFFECTIVE AREA(ACRES) = 68.34 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.57
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 84.08

*****
FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 444.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.74
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 84.08
PIPE TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 12.02
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 12.02
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.561
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.30 0.50 0.200 -
USER-DEFINED - 0.70 0.50 0.400 -
USER-DEFINED - 0.90 0.50 0.100 -
USER-DEFINED - 0.60 0.50 0.350 -
USER-DEFINED - 0.40 0.50 0.200 -
USER-DEFINED - 0.20 0.50 0.400 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.225
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 9.26
EFFECTIVE AREA(ACRES) = 75.44 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 87.3 PEAK FLOW RATE(CFS) = 87.73

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN.) = 12.02
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.561
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.50     0.100   -
USER-DEFINED        -         0.10     0.50     0.350   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225
SUBAREA AREA(ACRES) = 0.20   SUBAREA RUNOFF(CFS) = 0.26
EFFECTIVE AREA(ACRES) = 75.64   AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 87.5     PEAK FLOW RATE(CFS) = 87.99

```

```

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1
-----

```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

```

=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.02
RAINFALL INTENSITY(INCH/HR) = 1.56
AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.54
EFFECTIVE STREAM AREA(ACRES) = 75.64
TOTAL STREAM AREA(ACRES) = 87.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 87.99

```

```

*****
FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21
-----

```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

```

=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 557.00   DOWNSTREAM(FEET) = 546.00

```

```

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.105
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.413
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS   Tc
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          -         0.50     0.50     0.100   0    6.11
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 1.06
TOTAL AREA(ACRES) = 0.50   PEAK FLOW RATE(CFS) = 1.06

```

```

*****
FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62
-----

```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

```

UPSTREAM ELEVATION(FEET) = 546.00   DOWNSTREAM ELEVATION(FEET) = 488.00
STREET LENGTH(FEET) = 671.00   CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

```

```

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

```

```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

```

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.65

```

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.27
HALFSTREET FLOOD WIDTH(FEET) = 5.97
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.52
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.48
STREET FLOW TRAVEL TIME(MIN.) = 2.03   Tc(MIN.) = 8.13

```

```

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.063
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50     0.50     0.200   -
USER-DEFINED        -         0.90     0.50     0.100   -
USER-DEFINED        -         3.90     0.50     0.350   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
SUBAREA AREA(ACRES) = 5.30   SUBAREA RUNOFF(CFS) = 9.14
EFFECTIVE AREA(ACRES) = 5.80   AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 5.8     PEAK FLOW RATE(CFS) = 10.05

```

```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) = 8.47
FLOW VELOCITY(FEET/SEC.) = 6.02   DEPTH*VELOCITY(FT*FT/SEC.) = 1.89
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1001.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 8.13
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.063
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         14.60    0.50     0.200   -
USER-DEFINED        -         1.10     0.50     0.100   -
USER-DEFINED        -         4.30     0.50     0.350   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.227
SUBAREA AREA(ACRES) = 20.00   SUBAREA RUNOFF(CFS) = 35.10
EFFECTIVE AREA(ACRES) = 25.80   AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 25.8     PEAK FLOW RATE(CFS) = 45.15

```

```

*****
FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 488.00 DOWNSTREAM ELEVATION(FEET) = 460.00
STREET LENGTH(FEET) = 371.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 56.45
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.50
HALFSTREET FLOOD WIDTH(FEET) = 18.79
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.43
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 4.20
STREET FLOW TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 8.87
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.937
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.50 0.200 -
USER-DEFINED - 10.00 0.50 0.200 -
USER-DEFINED - 1.70 0.50 0.200 -
USER-DEFINED - 0.50 0.50 0.100 -
USER-DEFINED - 1.00 0.50 0.350 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.207
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 22.60
EFFECTIVE AREA(ACRES) = 39.50 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 39.5 PEAK FLOW RATE(CFS) = 64.81

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 19.80
FLOW VELOCITY(FEET/SEC.) = 8.77 DEPTH*VELOCITY(FT*FT/SEC.) = 4.53
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1372.00 FEET.

*****
FLOW PROCESS FROM NODE 113.00 TO NODE 126.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.45

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ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 64.81
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 9.32
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 1872.00 FEET.

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 9.32
RAINFALL INTENSITY(INCH/HR) = 1.86
AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.23
EFFECTIVE STREAM AREA(ACRES) = 39.50
TOTAL STREAM AREA(ACRES) = 39.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 64.81

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 87.99 12.02 1.561 0.50( 0.27) 0.54 75.6 100.00
1 71.99 17.18 1.214 0.50( 0.30) 0.60 87.5 130.00
2 64.81 9.32 1.859 0.50( 0.11) 0.23 39.5 110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 148.72 9.32 1.859 0.50( 0.21) 0.41 98.1 110.00
2 141.75 12.02 1.561 0.50( 0.22) 0.43 115.1 100.00
3 112.86 17.18 1.214 0.50( 0.24) 0.48 127.0 130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 148.72 Tc(MIN.) = 9.32
EFFECTIVE AREA(ACRES) = 98.14 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41
TOTAL AREA(ACRES) = 127.0
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

*****
FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 435.00
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.90
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 148.72

```



PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 9.70  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.70  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.793  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 0.200 -  
USER-DEFINED - 5.10 0.50 0.400 -  
USER-DEFINED - 0.30 0.50 0.100 -  
USER-DEFINED - 0.10 0.50 0.850 -  
USER-DEFINED - 0.80 0.50 0.200 -  
USER-DEFINED - 0.80 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.366  
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 11.30  
EFFECTIVE AREA(ACRES) = 105.94 AREA-AVERAGED Fm(INCH/HR) = 0.20  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 134.8 PEAK FLOW RATE(CFS) = 151.42

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.70  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.793  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.10 0.50 0.400 -  
USER-DEFINED - 0.30 0.50 0.100 -  
USER-DEFINED - 1.50 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 6.76  
EFFECTIVE AREA(ACRES) = 110.84 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 139.7 PEAK FLOW RATE(CFS) = 158.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\*\*\*\* MAIN STREAM CONFLUENCE DATA \*\*\*\*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 158.18 9.70 1.793 0.50( 0.21) 0.41 110.8 110.00  
2 150.93 12.40 1.527 0.50( 0.22) 0.43 127.8 100.00  
3 120.60 17.59 1.198 0.50( 0.24) 0.48 139.7 130.00

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 81.94 13.98 1.386 0.50( 0.15) 0.29 71.2 100.00  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 233.64 9.70 1.793 0.50( 0.19) 0.38 160.2 110.00  
2 231.85 12.40 1.527 0.50( 0.19) 0.38 191.0 100.00  
3 223.62 13.98 1.386 0.50( 0.20) 0.39 202.6 100.00  
4 190.12 17.59 1.198 0.50( 0.21) 0.42 210.9 130.00  
TOTAL AREA(ACRES) = 210.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 233.64 Tc(MIN.) = 9.700  
EFFECTIVE AREA(ACRES) = 160.22 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.38  
TOTAL AREA(ACRES) = 210.9  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 370.00  
FLOW LENGTH(FEET) = 500.20 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 38.04  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 233.64  
PIPE TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 9.92  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.10 = 4750.20 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.10 TO NODE 127.20 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 353.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 595.30 CHANNEL SLOPE = 0.0218  
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.601  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.50 0.100 -  
USER-DEFINED - 0.10 0.50 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 236.16

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.98  
 AVERAGE FLOW DEPTH (FEET) = 0.77 TRAVEL TIME (MIN.) = 1.66  
 Tc (MIN.) = 11.58  
 SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 5.02  
 EFFECTIVE AREA (ACRES) = 163.82 AREA-AVERAGED Fm (INCH/HR) = 0.19  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA (ACRES) = 214.5 PEAK FLOW RATE (CFS) = 233.64  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.76 FLOW VELOCITY (FEET/SEC.) = 5.97  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.20 = 5345.50 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.20 TO NODE 127.30 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 353.00 DOWNSTREAM (FEET) = 340.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 476.00 CHANNEL SLOPE = 0.0273  
 CHANNEL BASE (FEET) = 50.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.50  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.491

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.10	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 235.72  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.42  
 AVERAGE FLOW DEPTH (FEET) = 0.71 TRAVEL TIME (MIN.) = 1.24  
 Tc (MIN.) = 12.81

SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 4.15  
 EFFECTIVE AREA (ACRES) = 167.02 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37  
 TOTAL AREA (ACRES) = 217.7 PEAK FLOW RATE (CFS) = 233.64  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.71 FLOW VELOCITY (FEET/SEC.) = 6.38  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.30 = 5821.50 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.30 TO NODE 13569.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 340.00 DOWNSTREAM (FEET) = 338.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 506.00 CHANNEL SLOPE = 0.0040  
 CHANNEL BASE (FEET) = 150.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.50  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.244

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.10	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.100	-

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.80 0.50 0.100 -  
 USER-DEFINED - 0.60 0.50 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 235.47  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.35  
 AVERAGE FLOW DEPTH (FEET) = 0.66 TRAVEL TIME (MIN.) = 3.58  
 Tc (MIN.) = 16.39

SUBAREA AREA (ACRES) = 3.40 SUBAREA RUNOFF (CFS) = 3.65  
 EFFECTIVE AREA (ACRES) = 170.42 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36  
 TOTAL AREA (ACRES) = 221.1 PEAK FLOW RATE (CFS) = 233.64  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.66 FLOW VELOCITY (FEET/SEC.) = 2.34  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 13569.00 = 6327.50 FEET.

END OF STUDY SUMMARY:  
 TOTAL AREA (ACRES) = 221.1 TC (MIN.) = 16.39  
 EFFECTIVE AREA (ACRES) = 170.42 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.360  
 PEAK FLOW RATE (CFS) = 233.64

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	233.64	16.39	1.244	0.50 ( 0.18)	0.36	170.4	110.00
2	231.85	19.13	1.141	0.50 ( 0.19)	0.37	201.2	100.00
3	223.62	20.82	1.085	0.50 ( 0.19)	0.38	212.8	100.00
4	190.12	24.85	0.972	0.50 ( 0.20)	0.40	221.1	130.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 5-YR ULTIMATE EV DECEMBER 2013 MCHANDOO/TMULI \*  
\*\*\*\*\*

FILE NAME: 2P05EVBB.DAT  
TIME/DATE OF STUDY: 16:37 12/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.630
- 2) 10.00; 1.755
- 3) 15.00; 1.301
- 4) 20.00; 1.113
- 5) 25.00; 0.972
- 6) 30.00; 0.874
- 7) 40.00; 0.746
- 8) 50.00; 0.664
- 9) 60.00; 0.602
- 10) 90.00; 0.498
- 11) 120.00; 0.439
- 12) 180.00; 0.368
- 13) 360.00; 0.270
- 14) 1200.00; 0.118

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00  
ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 543.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.596  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.176  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.80	0.50	0.100	56	7.60

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 1.53  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 1.53

\*\*\*\*\*  
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 543.00 DOWNSTREAM ELEVATION(FEET) = 523.00  
STREET LENGTH(FEET) = 502.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.87  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.25  
HALFSTREET FLOOD WIDTH(FEET) = 4.43  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.72  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.92  
STREET FLOW TRAVEL TIME(MIN.) = 2.25 Tc(MIN.) = 9.85  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.782

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.200	-
USER-DEFINED	-	1.30	0.50	0.100	-

USER-DEFINED - 0.30 0.50 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.261  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 2.68  
 EFFECTIVE AREA(ACRES) = 2.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 3.92  
  
 END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 5.66  
 FLOW VELOCITY(FEET/SEC.) = 3.84 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.04  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 810.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.85  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.782  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	1.40	0.50	0.100	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.18  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 6.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 523.00 DOWNSTREAM ELEVATION(FEET) = 468.00  
 STREET LENGTH(FEET) = 987.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 32.00  
  
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.49  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.32  
 HALFSTREET FLOOD WIDTH(FEET) = 8.06  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.06  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.62  
 STREET FLOW TRAVEL TIME(MIN.) = 3.25 Tc(MIN.) = 13.10  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.474  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	0.500	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	0.500	-
USER-DEFINED	-	1.90	0.50	0.100	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 3.19  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.14  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 11.36

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.50 0.50 0.500 -  
 USER-DEFINED - 2.40 0.50 0.100 -  
 USER-DEFINED - 1.30 0.50 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.426  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 4.76  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.15  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 9.76

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.65  
 FLOW VELOCITY(FEET/SEC.) = 5.20 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.72  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 1797.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 468.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.35  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.34  
 HALFSTREET FLOOD WIDTH(FEET) = 9.84  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.36  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.81  
 STREET FLOW TRAVEL TIME(MIN.) = 3.04 Tc(MIN.) = 16.14  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.258

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	0.500	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	0.500	-
USER-DEFINED	-	1.90	0.50	0.100	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 3.19  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.14  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 11.36

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 9.91
FLOW VELOCITY(FEET/SEC.) = 5.31 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.80
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2774.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.14
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.258
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.30 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 0.89
EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 12.24

\*\*\*\*\*
FLOW PROCESS FROM NODE 204.00 TO NODE 218.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 343.00
STREET LENGTH(FEET) = 1228.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.85
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.36
HALFSTREET FLOOD WIDTH(FEET) = 11.05
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.39
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.94
STREET FLOW TRAVEL TIME(MIN.) = 3.80 Tc(MIN.) = 19.94
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.115

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.50 0.500 -
USER-DEFINED - 0.50 0.50 0.100 -
USER-DEFINED - 0.40 0.50 1.000 -
USER-DEFINED - 0.70 0.50 0.500 -

USER-DEFINED - 1.50 0.50 0.100 -
USER-DEFINED - 0.80 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 3.20
EFFECTIVE AREA(ACRES) = 16.60 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 16.6 PEAK FLOW RATE(CFS) = 13.83

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.05
FLOW VELOCITY(FEET/SEC.) = 5.38 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.94
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.94
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.115
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.20 0.50 0.500 -
USER-DEFINED - 0.10 0.50 0.100 -
USER-DEFINED - 0.20 0.50 0.500 -
USER-DEFINED - 0.10 0.50 0.100 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450
SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 1.28
EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 15.11

\*\*\*\*\*
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 19.94
RAINFALL INTENSITY(INCH/HR) = 1.12
AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.39
EFFECTIVE STREAM AREA(ACRES) = 18.20
TOTAL STREAM AREA(ACRES) = 18.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 15.11

\*\*\*\*\*
FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
INITIAL SUBAREA FLOW-LENGTH(FEET) = 268.00

ELEVATION DATA: UPSTREAM(FEET) = 514.00 DOWNSTREAM(FEET) = 511.50

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.724  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.153

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	-	2.30	0.50	0.500	56	9.27
APARTMENTS	-	0.40	0.50	0.200	56	7.72

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.456  
SUBAREA RUNOFF(CFS) = 4.68  
TOTAL AREA(ACRES) = 2.70 PEAK FLOW RATE(CFS) = 4.68

\*\*\*\*\*  
FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 511.50 DOWNSTREAM ELEVATION(FEET) = 503.00  
STREET LENGTH(FEET) = 503.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.50  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 12.15  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.14  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.19  
STREET FLOW TRAVEL TIME(MIN.) = 2.67 Tc(MIN.) = 10.39  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.719

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	0.500	-
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	0.60	0.50	0.200	-
USER-DEFINED	-	6.20	0.50	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.475  
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 9.60  
EFFECTIVE AREA(ACRES) = 9.90 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.47  
TOTAL AREA(ACRES) = 9.9 PEAK FLOW RATE(CFS) = 13.23

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 14.02  
FLOW VELOCITY(FEET/SEC.) = 3.39 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.40  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 771.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.39  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.719

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.50	0.200	-
USER-DEFINED	-	0.30	0.50	0.500	-
USER-DEFINED	-	0.10	0.50	0.350	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.281  
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 1.85  
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 15.07

\*\*\*\*\*

FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 503.00 DOWNSTREAM ELEVATION(FEET) = 476.00  
STREET LENGTH(FEET) = 423.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.82

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 11.37  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.87  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.15  
STREET FLOW TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 11.59  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.610

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.50	0.500	-
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.350	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.454  
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 1.49  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 15.47

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.21  
FLOW VELOCITY(FEET/SEC.) = 5.88 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.13  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.59  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.610  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.50 0.200 -  
USER-DEFINED - 0.20 0.50 0.500 -  
USER-DEFINED - 0.30 0.50 0.100 -  
USER-DEFINED - 3.30 0.50 0.350 -  
USER-DEFINED - 0.20 0.50 0.200 -  
USER-DEFINED - 0.40 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.332  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 6.37  
EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 21.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.59  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.610  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.40 0.50 0.100 -  
USER-DEFINED - 8.10 0.50 0.350 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.276  
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 15.24  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 37.08

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 476.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
STREET LENGTH(FEET) = 789.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.08

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.53  
HALFSTREET FLOOD WIDTH(FEET) = 20.66  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.63  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.46  
STREET FLOW TRAVEL TIME(MIN.) = 2.84 Tc(MIN.) = 14.43  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.352  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 37.08  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.53 HALFSTREET FLOOD WIDTH(FEET) = 20.66  
FLOW VELOCITY(FEET/SEC.) = 4.63 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.46  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1983.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.43  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.352  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.00 0.50 0.500 -  
USER-DEFINED - 6.40 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 14.29  
EFFECTIVE AREA(ACRES) = 43.20 AREA-AVERAGED Fm(INCH/HR) = 0.20  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 43.2 PEAK FLOW RATE(CFS) = 44.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<



UPSTREAM ELEVATION (FEET) = 460.00 DOWNSTREAM ELEVATION (FEET) = 419.00  
STREET LENGTH (FEET) = 529.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 46.53  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.47  
HALFSTREET FLOOD WIDTH (FEET) = 17.23  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 8.18  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.85  
STREET FLOW TRAVEL TIME (MIN.) = 1.08 Tc (MIN.) = 15.51

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.282  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.20 0.50 0.500 -  
USER-DEFINED - 2.80 0.50 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 3.71  
EFFECTIVE AREA (ACRES) = 47.20 AREA-AVERAGED Fm (INCH/HR) = 0.21  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41  
TOTAL AREA (ACRES) = 47.2 PEAK FLOW RATE (CFS) = 45.64

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.47 HALFSTREET FLOOD WIDTH (FEET) = 17.15  
FLOW VELOCITY (FEET/SEC.) = 8.09 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.79  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 2512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 15.51  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.282  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.50 0.500 -  
USER-DEFINED - 4.10 0.50 0.500 -  
USER-DEFINED - 0.70 0.50 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 5.20  
EFFECTIVE AREA (ACRES) = 52.80 AREA-AVERAGED Fm (INCH/HR) = 0.21  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.42  
TOTAL AREA (ACRES) = 52.8 PEAK FLOW RATE (CFS) = 50.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 15.51  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.282  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.50 0.500 -  
USER-DEFINED - 4.10 0.50 0.500 -  
USER-DEFINED - 2.50 0.50 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 6.96  
EFFECTIVE AREA (ACRES) = 60.30 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43  
TOTAL AREA (ACRES) = 60.3 PEAK FLOW RATE (CFS) = 57.81

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 419.00 DOWNSTREAM ELEVATION (FEET) = 405.00  
STREET LENGTH (FEET) = 174.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 57.81  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.50  
HALFSTREET FLOOD WIDTH (FEET) = 18.71  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 8.71  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 4.32  
STREET FLOW TRAVEL TIME (MIN.) = 0.33 Tc (MIN.) = 15.85

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.269  
SUBAREA AREA (ACRES) = 0.00 SUBAREA RUNOFF (CFS) = 0.00  
EFFECTIVE AREA (ACRES) = 60.30 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43  
TOTAL AREA (ACRES) = 60.3 PEAK FLOW RATE (CFS) = 57.81  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.50 HALFSTREET FLOOD WIDTH (FEET) = 18.71  
FLOW VELOCITY (FEET/SEC.) = 8.71 DEPTH\*VELOCITY (FT\*FT/SEC.) = 4.32  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 2686.00 FEET.

```

*****
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 372.00
FLOW LENGTH(FEET) = 395.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.43
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 57.81
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 16.14
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 3081.00 FEET.
*****
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.14
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.258
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.50 0.500 -
USER-DEFINED - 1.00 0.50 0.500 -
USER-DEFINED - 1.00 0.50 0.500 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 2.00
EFFECTIVE AREA(ACRES) = 62.50 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 62.5 PEAK FLOW RATE(CFS) = 58.52
*****
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.14
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.258
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.50 0.500 -
USER-DEFINED - 6.90 0.50 0.500 -
USER-DEFINED - 0.20 0.50 0.500 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 9.62
EFFECTIVE AREA(ACRES) = 73.10 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 73.1 PEAK FLOW RATE(CFS) = 68.14
*****
FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31
-----

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 343.00
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.25
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 68.14
PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 16.66
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 3688.00 FEET.
*****
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.66
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.238
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.50 0.500 -
USER-DEFINED - 0.40 0.50 0.400 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.443
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.64
EFFECTIVE AREA(ACRES) = 73.80 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 73.8 PEAK FLOW RATE(CFS) = 68.14
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 16.66
RAINFALL INTENSITY(INCH/HR) = 1.24
AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.44
EFFECTIVE STREAM AREA(ACRES) = 73.80
TOTAL STREAM AREA(ACRES) = 73.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 68.14

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 15.11 19.94 1.115 0.50( 0.19) 0.39 18.2 200.00
2 68.14 16.66 1.238 0.50( 0.22) 0.44 73.8 210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

```

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	82.45	16.66	1.238	0.50( 0.22)	0.43	89.0	210.00
2	75.00	19.94	1.115	0.50( 0.22)	0.43	92.0	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 82.45 Tc(MIN.) = 16.66  
EFFECTIVE AREA(ACRES) = 89.01 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 92.0  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 343.00 DOWNSTREAM(FEET) = 326.50  
FLOW LENGTH(FEET) = 734.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.12  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 82.45  
PIPE TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 17.47  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 219.00 = 4736.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.47  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.208  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	0.30	0.50	0.400	-
USER-DEFINED	-	0.60	0.50	0.100	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 2.44  
EFFECTIVE AREA(ACRES) = 91.91 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 94.9 PEAK FLOW RATE(CFS) = 82.45  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.47

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.208

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.54  
EFFECTIVE AREA(ACRES) = 92.51 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 95.5 PEAK FLOW RATE(CFS) = 82.45  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 326.50 DOWNSTREAM(FEET) = 325.00  
FLOW LENGTH(FEET) = 161.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.83  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 82.45  
PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 17.72  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 220.00 = 4897.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.72  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.199  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.90	0.50	0.500	-
USER-DEFINED	-	3.60	0.50	0.400	-
USER-DEFINED	-	18.40	0.50	0.500	-
USER-DEFINED	-	4.30	0.50	0.400	-
USER-DEFINED	-	0.50	0.50	0.500	-
USER-DEFINED	-	6.90	0.50	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462  
SUBAREA AREA(ACRES) = 38.60 SUBAREA RUNOFF(CFS) = 33.62  
EFFECTIVE AREA(ACRES) = 131.11 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 134.1 PEAK FLOW RATE(CFS) = 115.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 220.00 TO NODE 245.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 315.00  
FLOW LENGTH(FEET) = 1019.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.07  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 115.18  
PIPE TRAVEL TIME(MIN.) = 1.41 Tc(MIN.) = 19.13  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 19.13  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.146  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 0.400 -  
USER-DEFINED - 0.40 0.50 0.100 -  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 0.40 0.50 0.400 -  
USER-DEFINED - 0.40 0.50 0.100 -  
USER-DEFINED - 1.00 0.50 0.400 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379  
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 2.50  
EFFECTIVE AREA(ACRES) = 134.01 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 137.0 PEAK FLOW RATE(CFS) = 115.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 19.13  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.146  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.50 0.100 -  
USER-DEFINED - 0.20 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.264  
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 1.00  
EFFECTIVE AREA(ACRES) = 135.11 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 138.1 PEAK FLOW RATE(CFS) = 115.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.13  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.146  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.50 0.500 -  
USER-DEFINED - 0.30 0.50 0.400 -  
USER-DEFINED - 0.10 0.50 0.100 -  
USER-DEFINED - 0.30 0.50 0.500 -  
USER-DEFINED - 1.40 0.50 0.400 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.434  
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 2.67  
EFFECTIVE AREA(ACRES) = 138.31 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 141.3 PEAK FLOW RATE(CFS) = 115.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 10  
-----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 220.50 TO NODE 221.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 251.00  
ELEVATION DATA: UPSTREAM(FEET) = 551.00 DOWNSTREAM(FEET) = 547.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.785  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.793  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
RESIDENTIAL  
"1 DWELLING/ACRE" - 3.10 0.50 0.200 56 9.79  
RESIDENTIAL  
"1 DWELLING/ACRE" - 3.10 0.50 0.100 56 9.79  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.150  
SUBAREA RUNOFF(CFS) = 9.58  
TOTAL AREA(ACRES) = 6.20 PEAK FLOW RATE(CFS) = 9.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 542.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0130  
CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.000  
MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.646  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.50 0.200 -  
 USER-DEFINED - 0.10 0.50 0.200 -  
 USER-DEFINED - 3.70 0.50 0.100 -  
 USER-DEFINED - 0.30 0.50 0.850 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.163  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.90  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.53  
 AVERAGE FLOW DEPTH (FEET) = 0.27 TRAVEL TIME (MIN.) = 1.42  
 Tc (MIN.) = 11.20  
 SUBAREA AREA (ACRES) = 4.70 SUBAREA RUNOFF (CFS) = 6.62  
 EFFECTIVE AREA (ACRES) = 10.90 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.16  
 TOTAL AREA (ACRES) = 10.9 PEAK FLOW RATE (CFS) = 15.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.30 FLOW VELOCITY (FEET/SEC.) = 4.83  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 222.00 = 637.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<<  
 -----

UPSTREAM ELEVATION (FEET) = 542.00 DOWNSTREAM ELEVATION (FEET) = 531.00  
 STREET LENGTH (FEET) = 1146.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.97  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.52  
 HALFSTREET FLOOD WIDTH (FEET) = 20.12  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.15  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.64  
 STREET FLOW TRAVEL TIME (MIN.) = 6.07 Tc (MIN.) = 17.27

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.216  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 11.50 0.50 0.200 -  
 USER-DEFINED - 2.90 0.50 0.200 -  
 USER-DEFINED - 0.70 0.50 0.100 -  
 USER-DEFINED - 2.60 0.50 0.850 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.292  
 SUBAREA AREA (ACRES) = 17.70 SUBAREA RUNOFF (CFS) = 17.04  
 EFFECTIVE AREA (ACRES) = 28.60 AREA-AVERAGED Fm (INCH/HR) = 0.12  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 28.6 PEAK FLOW RATE (CFS) = 28.20

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.55 HALFSTREET FLOOD WIDTH (FEET) = 21.45  
 FLOW VELOCITY (FEET/SEC.) = 3.28 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.79  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 223.00 = 1783.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 62

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<<  
 -----

UPSTREAM ELEVATION (FEET) = 531.00 DOWNSTREAM ELEVATION (FEET) = 520.00  
 STREET LENGTH (FEET) = 702.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 33.72  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.54  
 HALFSTREET FLOOD WIDTH (FEET) = 20.90  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.12  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.21  
 STREET FLOW TRAVEL TIME (MIN.) = 2.84 Tc (MIN.) = 20.11

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.110  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.90 0.50 0.200 -  
 USER-DEFINED - 0.30 0.50 0.100 -  
 USER-DEFINED - 6.40 0.50 0.200 -  
 USER-DEFINED - 3.70 0.50 0.100 -  
 USER-DEFINED - 0.70 0.50 0.350 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175  
 SUBAREA AREA (ACRES) = 12.00 SUBAREA RUNOFF (CFS) = 11.04  
 EFFECTIVE AREA (ACRES) = 40.60 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.22  
 TOTAL AREA (ACRES) = 40.6 PEAK FLOW RATE (CFS) = 36.52

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.55 HALFSTREET FLOOD WIDTH (FEET) = 21.60  
 FLOW VELOCITY (FEET/SEC.) = 4.19 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.30  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 224.00 = 2485.00 FEET.

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*****
FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 463.00
FLOW LENGTH(FEET) = 1760.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.99
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 36.52
PIPE TRAVEL TIME(MIN.) = 2.10 Tc(MIN.) = 22.21
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 225.00 = 4245.00 FEET.

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*****
FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.21
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.051
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.20 0.50 0.200 -
USER-DEFINED - 0.10 0.50 0.500 -
USER-DEFINED - 0.30 0.50 0.350 -
USER-DEFINED - 6.80 0.50 0.200 -
USER-DEFINED - 0.10 0.50 0.500 -
USER-DEFINED - 2.00 0.50 0.350 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.235
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 9.66
EFFECTIVE AREA(ACRES) = 52.10 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 52.1 PEAK FLOW RATE(CFS) = 44.01

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*****
FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.21
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.051
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.40 0.50 0.500 -
USER-DEFINED - 0.90 0.50 0.350 -
USER-DEFINED - 5.20 0.50 0.500 -
USER-DEFINED - 0.80 0.50 0.350 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.481
SUBAREA AREA(ACRES) = 13.30 SUBAREA RUNOFF(CFS) = 9.70
EFFECTIVE AREA(ACRES) = 65.40 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 65.4 PEAK FLOW RATE(CFS) = 53.71

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*****
FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 425.00
FLOW LENGTH(FEET) = 639.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.77
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 53.71
PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 22.75
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 226.00 = 4884.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 226.00 TO NODE 226.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.75
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.035
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.90 0.50 0.200 -
USER-DEFINED - 2.90 0.50 0.500 -
USER-DEFINED - 6.30 0.50 0.200 -
USER-DEFINED - 6.00 0.50 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 14.04
EFFECTIVE AREA(ACRES) = 83.50 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.29
TOTAL AREA(ACRES) = 83.5 PEAK FLOW RATE(CFS) = 66.85

```

```

*****
FLOW PROCESS FROM NODE 226.00 TO NODE 243.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 653.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.14
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 66.85
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 23.32
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 243.00 = 5537.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 23.32

```

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.019  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.90 0.50 0.200 -  
 USER-DEFINED - 1.60 0.50 0.500 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
 SUBAREA AREA (ACRES) = 4.50 SUBAREA RUNOFF (CFS) = 3.51  
 EFFECTIVE AREA (ACRES) = 88.00 AREA-AVERAGED Fm (INCH/HR) = 0.15  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA (ACRES) = 88.0 PEAK FLOW RATE (CFS) = 69.15

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 23.32  
 RAINFALL INTENSITY (INCH/HR) = 1.02  
 AREA-AVERAGED Fm (INCH/HR) = 0.15  
 AREA-AVERAGED Fp (INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.29  
 EFFECTIVE STREAM AREA (ACRES) = 88.00  
 TOTAL STREAM AREA (ACRES) = 88.00  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 69.15

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 547.50

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.751  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.974  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 APARTMENTS - 0.60 0.50 0.200 56 8.75  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF (CFS) = 1.01  
 TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 1.01

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 547.50 DOWNSTREAM (FEET) = 541.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 802.00 CHANNEL SLOPE = 0.0081

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 3.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.593  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.20 0.50 0.200 -  
 USER-DEFINED - 5.90 0.50 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.27  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.40  
 AVERAGE FLOW DEPTH (FEET) = 0.77 TRAVEL TIME (MIN.) = 3.04  
 Tc (MIN.) = 11.79  
 SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 8.46  
 EFFECTIVE AREA (ACRES) = 6.70 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA (ACRES) = 6.7 PEAK FLOW RATE (CFS) = 9.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.96 FLOW VELOCITY (FEET/SEC.) = 5.06  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1132.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 541.00 DOWNSTREAM (FEET) = 533.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 849.00 CHANNEL SLOPE = 0.0094  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 5.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.390  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 14.90 0.50 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.28  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.34  
 AVERAGE FLOW DEPTH (FEET) = 1.20 TRAVEL TIME (MIN.) = 2.23  
 Tc (MIN.) = 14.02  
 SUBAREA AREA (ACRES) = 14.90 SUBAREA RUNOFF (CFS) = 17.97  
 EFFECTIVE AREA (ACRES) = 21.60 AREA-AVERAGED Fm (INCH/HR) = 0.05  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 21.6 PEAK FLOW RATE (CFS) = 26.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.37 FLOW VELOCITY (FEET/SEC.) = 6.93  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1981.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.02  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.390  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.50 0.400 -  
 USER-DEFINED - 0.20 0.50 0.200 -  
 USER-DEFINED - 1.80 0.50 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124  
 SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 2.51  
 EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 28.53

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.02  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.390  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.50 0.100 -  
 USER-DEFINED - 0.10 0.50 0.400 -  
 USER-DEFINED - 1.30 0.50 0.100 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.117  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 2.16  
 EFFECTIVE AREA(ACRES) = 25.50 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 25.5 PEAK FLOW RATE(CFS) = 30.68

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 537.00 DOWNSTREAM(FEET) = 510.00  
 FLOW LENGTH(FEET) = 513.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.20  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 30.68  
 PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 14.55  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2494.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.55  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.342  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 9.40 0.50 0.400 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 9.66  
 EFFECTIVE AREA(ACRES) = 34.90 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.19  
 TOTAL AREA(ACRES) = 34.9 PEAK FLOW RATE(CFS) = 39.25

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.55  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.342  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.70 0.50 0.200 -  
 USER-DEFINED - 2.50 0.50 0.400 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356  
 SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 3.35  
 EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.20  
 TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 42.60

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 478.00  
 FLOW LENGTH(FEET) = 474.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.55  
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 42.60  
 PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 14.95  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 2968.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.95  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.305  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.70 0.50 0.200 -  
 USER-DEFINED - 1.60 0.50 0.400 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297



SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 3.44  
EFFECTIVE AREA (ACRES) = 41.40 AREA-AVERAGED Fm (INCH/HR) = 0.10  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.21  
TOTAL AREA (ACRES) = 41.4 PEAK FLOW RATE (CFS) = 44.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	478.00	DOWNSTREAM (FEET) =	471.00
FLOW LENGTH (FEET) =	473.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	30.0 INCH PIPE IS	23.2 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	10.97		
ESTIMATED PIPE DIAMETER (INCH) =	30.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	44.78		
PIPE TRAVEL TIME (MIN.) =	0.72	Tc (MIN.) =	15.67
LONGEST FLOWPATH FROM NODE	230.00 TO NODE	236.00 =	3441.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 15.67  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.276  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.50	0.200	-
USER-DEFINED	-	7.10	0.50	0.400	-
USER-DEFINED	-	2.70	0.50	0.200	-
USER-DEFINED	-	1.10	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
SUBAREA AREA (ACRES) = 12.30 SUBAREA RUNOFF (CFS) = 12.43  
EFFECTIVE AREA (ACRES) = 53.70 AREA-AVERAGED Fm (INCH/HR) = 0.12  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.23  
TOTAL AREA (ACRES) = 53.7 PEAK FLOW RATE (CFS) = 56.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 15.67  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.276  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.50	0.200	-
USER-DEFINED	-	5.40	0.50	0.500	-
USER-DEFINED	-	1.00	0.50	0.400	-
USER-DEFINED	-	0.60	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.378  
SUBAREA AREA (ACRES) = 9.90 SUBAREA RUNOFF (CFS) = 9.68

EFFECTIVE AREA (ACRES) = 63.60 AREA-AVERAGED Fm (INCH/HR) = 0.13  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.25  
TOTAL AREA (ACRES) = 63.6 PEAK FLOW RATE (CFS) = 65.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	471.00	DOWNSTREAM (FEET) =	468.00
FLOW LENGTH (FEET) =	283.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	39.0 INCH PIPE IS	26.8 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	10.84		
ESTIMATED PIPE DIAMETER (INCH) =	39.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	65.78		
PIPE TRAVEL TIME (MIN.) =	0.44	Tc (MIN.) =	16.10
LONGEST FLOWPATH FROM NODE	230.00 TO NODE	237.00 =	3724.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.10  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.259  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.10	0.50	0.200	-
USER-DEFINED	-	0.60	0.50	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.218  
SUBAREA AREA (ACRES) = 6.70 SUBAREA RUNOFF (CFS) = 6.94  
EFFECTIVE AREA (ACRES) = 70.30 AREA-AVERAGED Fm (INCH/HR) = 0.12  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.25  
TOTAL AREA (ACRES) = 70.3 PEAK FLOW RATE (CFS) = 71.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	468.00	DOWNSTREAM (FEET) =	461.00
FLOW LENGTH (FEET) =	698.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	39.0 INCH PIPE IS	29.3 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	10.72		
ESTIMATED PIPE DIAMETER (INCH) =	39.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	71.78		
PIPE TRAVEL TIME (MIN.) =	1.08	Tc (MIN.) =	17.19
LONGEST FLOWPATH FROM NODE	230.00 TO NODE	238.00 =	4422.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.19  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.219  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.40	0.50	0.200	-
USER-DEFINED	-	0.60	0.50	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.220  
 SUBAREA AREA(ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 8.98  
 EFFECTIVE AREA(ACRES) = 79.30 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 79.3 PEAK FLOW RATE(CFS) = 78.18

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.19  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.219  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.50	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 2.11  
 EFFECTIVE AREA(ACRES) = 81.40 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 81.4 PEAK FLOW RATE(CFS) = 80.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 461.00 DOWNSTREAM(FEET) = 440.00  
 FLOW LENGTH(FEET) = 582.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.99  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 80.29  
 PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 17.73  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 5004.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.73  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.198  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.00	0.50	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 4.94  
 EFFECTIVE AREA(ACRES) = 86.40 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 86.4 PEAK FLOW RATE(CFS) = 83.75

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 418.00  
 FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.60  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 83.75  
 PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 18.34  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 5654.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.34  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.175  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.30	0.50	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA(ACRES) = 5.30 SUBAREA RUNOFF(CFS) = 5.13  
 EFFECTIVE AREA(ACRES) = 91.70 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 91.7 PEAK FLOW RATE(CFS) = 87.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.34  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.175  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.50	0.200	-
USER-DEFINED	-	0.20	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.36  
 EFFECTIVE AREA(ACRES) = 93.10 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 93.1 PEAK FLOW RATE(CFS) = 88.45

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*****
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.34
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.175
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.20 0.50 0.200 -
USER-DEFINED - 0.70 0.50 0.600 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 1.71
EFFECTIVE AREA(ACRES) = 95.00 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24
TOTAL AREA(ACRES) = 95.0 PEAK FLOW RATE(CFS) = 90.16

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*****
FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 418.00 DOWNSTREAM(FEET) = 404.00
FLOW LENGTH(FEET) = 1279.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.75
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.16
PIPE TRAVEL TIME(MIN.) = 1.81 Tc(MIN.) = 20.16
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 241.00 = 6933.00 FEET.

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*****
FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.16
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.109
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.10 0.50 0.200 -
USER-DEFINED - 1.20 0.50 0.100 -
USER-DEFINED - 6.30 0.50 0.850 -
USER-DEFINED - 4.60 0.50 0.600 -
USER-DEFINED - 1.60 0.50 0.200 -
USER-DEFINED - 4.00 0.50 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 18.80 SUBAREA RUNOFF(CFS) = 14.63
EFFECTIVE AREA(ACRES) = 113.80 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 113.8 PEAK FLOW RATE(CFS) = 99.08

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*****
FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.16
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.109
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.90 0.50 0.850 -
USER-DEFINED - 10.80 0.50 0.600 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.666
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 10.26
EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 109.34

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*****
FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 403.00
FLOW LENGTH(FEET) = 66.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.87
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 109.34
PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 20.24
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 6999.00 FEET.

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*****
FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.24
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.106
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.50 0.200 -
USER-DEFINED - 16.40 0.50 0.200 -
USER-DEFINED - 1.30 0.50 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.193
SUBAREA AREA(ACRES) = 19.10 SUBAREA RUNOFF(CFS) = 17.36
EFFECTIVE AREA(ACRES) = 147.60 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 147.6 PEAK FLOW RATE(CFS) = 126.43

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*****
FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

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>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 1270.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 39.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.80
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 126.43
PIPE TRAVEL TIME(MIN.) = 1.96 Tc(MIN.) = 22.20
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.20
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.051
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.50 0.200 -
USER-DEFINED - 2.00 0.50 0.850 -
USER-DEFINED - 2.80 0.50 0.200 -
USER-DEFINED - 1.50 0.50 0.100 -
USER-DEFINED - 0.10 0.50 0.350 -
USER-DEFINED - 1.10 0.50 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.421
SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 6.43
EFFECTIVE AREA(ACRES) = 156.10 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 156.1 PEAK FLOW RATE(CFS) = 126.43
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 22.20
RAINFALL INTENSITY(INCH/HR) = 1.05
AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA(ACRES) = 156.10
TOTAL STREAM AREA(ACRES) = 156.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 126.43

\*\* CONFLUENCE DATA \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 69.15 23.32 1.019 0.50( 0.15) 0.29 88.0 220.50
2 126.43 22.20 1.051 0.50( 0.16) 0.32 156.1 230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 194.64 22.20 1.051 0.50( 0.15) 0.31 239.9 230.00
2 191.11 23.32 1.019 0.50( 0.15) 0.31 244.1 220.50

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 194.64 Tc(MIN.) = 22.20
EFFECTIVE AREA(ACRES) = 239.86 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 244.1
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 243.00 TO NODE 244.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 394.00 DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 849.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.15
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 194.64
PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 22.72
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 244.00 = 9118.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 244.00 TO NODE 244.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.72
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.50 0.200 -
USER-DEFINED - 1.70 0.50 0.500 -
USER-DEFINED - 0.30 0.50 0.850 -
USER-DEFINED - 0.80 0.50 0.500 -
USER-DEFINED - 0.10 0.50 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.537
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 2.07
EFFECTIVE AREA(ACRES) = 242.86 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 247.1 PEAK FLOW RATE(CFS) = 194.64
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 244.00 TO NODE 245.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 315.00
FLOW LENGTH(FEET) = 777.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.20
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 194.64
PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 23.33
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.33
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.019
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.50 0.500 -
USER-DEFINED - 0.20 0.50 0.850 -
USER-DEFINED - 0.20 0.50 0.500 -
USER-DEFINED - 0.10 0.50 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631
SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 0.51
EFFECTIVE AREA(ACRES) = 243.66 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 247.9 PEAK FLOW RATE(CFS) = 194.64
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 194.64 23.33 1.019 0.50( 0.16) 0.31 243.7 230.00
2 191.11 24.45 0.987 0.50( 0.16) 0.31 247.9 220.50
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 115.18 19.13 1.146 0.50( 0.22) 0.44 138.3 210.00
2 104.55 22.50 1.043 0.50( 0.22) 0.44 141.3 200.00
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 298.19 19.13 1.146 0.50( 0.18) 0.36 338.1 210.00
2 297.35 22.50 1.043 0.50( 0.18) 0.36 376.3 200.00

3 296.21 23.33 1.019 0.50( 0.18) 0.36 385.0 230.00
4 288.64 24.45 0.987 0.50( 0.18) 0.36 389.2 220.50
TOTAL AREA(ACRES) = 389.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 298.19 Tc(MIN.) = 19.129
EFFECTIVE AREA(ACRES) = 338.11 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 389.2
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 3 <<<<

\*\*\*\*\*
FLOW PROCESS FROM NODE 245.00 TO NODE 246.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 306.00
FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 45.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.68
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 298.19
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 19.71
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 246.00 = 10514.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.71
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.124
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.90 0.50 0.500 -
USER-DEFINED - 0.30 0.50 0.400 -
USER-DEFINED - 2.50 0.50 0.500 -
USER-DEFINED - 0.70 0.50 0.400 -
USER-DEFINED - 9.10 0.50 0.350 -
USER-DEFINED - 2.80 0.50 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.410
SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 13.48
EFFECTIVE AREA(ACRES) = 354.41 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 405.5 PEAK FLOW RATE(CFS) = 299.96

\*\*\*\*\*
FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 19.71
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.124
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap      SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         1.60     0.50     0.400     -
USER-DEFINED        -         7.40     0.50     0.350     -
USER-DEFINED        -         0.30     0.50     0.850     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.375
SUBAREA AREA(ACRES) = 9.30      SUBAREA RUNOFF(CFS) = 7.84
EFFECTIVE AREA(ACRES) = 363.71  AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 414.8      PEAK FLOW RATE(CFS) = 307.80

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\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 247.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 306.00  DOWNSTREAM(FEET) = 300.00
FLOW LENGTH(FEET) = 185.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.96
ESTIMATED PIPE DIAMETER(INCH) = 54.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 307.80
PIPE TRAVEL TIME(MIN.) = 0.13  Tc(MIN.) = 19.84
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 247.00 = 10699.00 FEET.

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FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 19.84
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.119
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap      SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.10     0.50     0.400     -
USER-DEFINED        -         0.30     0.50     0.100     -
USER-DEFINED        -         0.10     0.50     1.000     -
USER-DEFINED        -         0.10     0.50     0.850     -
USER-DEFINED        -         0.10     0.50     0.500     -
USER-DEFINED        -         1.30     0.50     0.400     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.413
SUBAREA AREA(ACRES) = 2.00      SUBAREA RUNOFF(CFS) = 1.64
EFFECTIVE AREA(ACRES) = 365.71  AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 416.8      PEAK FLOW RATE(CFS) = 307.86

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FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 19.84
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.119
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap      SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.90     0.50     0.100     -
USER-DEFINED        -         0.40     0.50     1.000     -
USER-DEFINED        -         0.80     0.50     0.400     -
USER-DEFINED        -         0.40     0.50     0.100     -
USER-DEFINED        -         0.10     0.50     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.365
SUBAREA AREA(ACRES) = 2.60      SUBAREA RUNOFF(CFS) = 2.19
EFFECTIVE AREA(ACRES) = 368.31  AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 419.4      PEAK FLOW RATE(CFS) = 310.05

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\*\*\*\*\*

FLOW PROCESS FROM NODE 247.00 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 300.00  DOWNSTREAM(FEET) = 271.00
FLOW LENGTH(FEET) = 859.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.41
ESTIMATED PIPE DIAMETER(INCH) = 54.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 310.05
PIPE TRAVEL TIME(MIN.) = 0.59  Tc(MIN.) = 20.43
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

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FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 20.43
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.101
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap      SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.60     0.50     0.400     -
USER-DEFINED        -         0.30     0.50     0.100     -
USER-DEFINED        -         0.10     0.50     1.000     -
USER-DEFINED        -         2.60     0.50     0.400     -
USER-DEFINED        -         1.00     0.50     0.100     -
USER-DEFINED        -         0.20     0.50     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356
SUBAREA AREA(ACRES) = 4.80      SUBAREA RUNOFF(CFS) = 3.99
EFFECTIVE AREA(ACRES) = 373.11  AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 424.2      PEAK FLOW RATE(CFS) = 310.05
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.43
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.101
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.50     0.50      0.400     -
USER-DEFINED        -         0.30     0.50      0.100     -
USER-DEFINED        -         0.10     0.50      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367
SUBAREA AREA(ACRES) = 0.90   SUBAREA RUNOFF(CFS) = 0.74
EFFECTIVE AREA(ACRES) = 374.01  AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 425.1   PEAK FLOW RATE(CFS) = 310.05
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.43
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.101
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.10     0.50      0.500     -
USER-DEFINED        -         0.70     0.50      0.400     -
USER-DEFINED        -         2.20     0.50      0.500     -
USER-DEFINED        -         1.80     0.50      0.400     -
USER-DEFINED        -         0.20     0.50      0.350     -
USER-DEFINED        -         3.20     0.50      0.500     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.466
SUBAREA AREA(ACRES) = 8.20   SUBAREA RUNOFF(CFS) = 6.41
EFFECTIVE AREA(ACRES) = 382.21  AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 433.3   PEAK FLOW RATE(CFS) = 315.20

*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.43
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.101
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         5.70     0.50      0.400     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 5.70   SUBAREA RUNOFF(CFS) = 4.62

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EFFECTIVE AREA(ACRES) = 387.91  AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 439.0   PEAK FLOW RATE(CFS) = 319.83

*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.43
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.101
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         6.40     0.50      1.000     -
USER-DEFINED        -         1.40     0.50      1.000     -
USER-DEFINED        -         0.60     0.50      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 8.40   SUBAREA RUNOFF(CFS) = 4.54
EFFECTIVE AREA(ACRES) = 396.31  AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 447.4   PEAK FLOW RATE(CFS) = 324.37

*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====
*****
FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 413.04  DOWNSTREAM(FEET) = 405.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.928
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.293
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS   Tc
LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN   (MIN.)
CONDOMINIUMS        -         0.20     0.50      0.350     56   7.70
RESIDENTIAL
"11+ DWELLINGS/ACRE"  -         0.10     0.50      0.200     56   6.93
CONDOMINIUMS        -         0.10     0.50      0.350     56   7.70
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.312
SUBAREA RUNOFF(CFS) = 0.77
TOTAL AREA(ACRES) = 0.40   PEAK FLOW RATE(CFS) = 0.77

*****
FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

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>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 405.00 DOWNSTREAM ELEVATION(FEET) = 385.00  
STREET LENGTH(FEET) = 587.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.81

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.25  
HALFSTREET FLOOD WIDTH(FEET) = 5.03  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.35  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.84  
STREET FLOW TRAVEL TIME(MIN.) = 2.92 Tc(MIN.) = 9.85

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.781

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	0.350	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	0.200	-
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	0.40	0.50	0.350	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.224  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 4.06  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 4.64

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 7.16  
FLOW VELOCITY(FEET/SEC.) = 3.56 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.03  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 917.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 385.00 DOWNSTREAM(FEET) = 378.50  
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.20  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 4.64  
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 10.14

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1079.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.14  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.742  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.50 0.100 -  
USER-DEFINED - 1.30 0.50 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 3.65  
EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.09  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 8.19

\*\*\*\*\*  
FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 378.50 DOWNSTREAM(FEET) = 348.50  
FLOW LENGTH(FEET) = 637.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.39  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 8.19  
PIPE TRAVEL TIME(MIN.) = 0.93 Tc(MIN.) = 11.08  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 1716.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.08  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.657  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.50 0.500 -  
USER-DEFINED - 1.70 0.50 0.100 -  
USER-DEFINED - 1.00 0.50 0.350 -  
USER-DEFINED - 0.10 0.50 0.500 -  
USER-DEFINED - 0.70 0.50 0.100 -  
USER-DEFINED - 0.40 0.50 0.350 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.240  
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 6.23  
EFFECTIVE AREA(ACRES) = 10.00 AREA-AVERAGED Fm(INCH/HR) = 0.10  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.20



TOTAL AREA (ACRES) = 10.0 PEAK FLOW RATE (CFS) = 13.99

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 348.50 DOWNSTREAM(FEET) = 306.00
FLOW LENGTH(FEET) = 944.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.79
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.99
PIPE TRAVEL TIME(MIN.) = 1.23 Tc(MIN.) = 12.31
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.31
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.546
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.30 0.50 0.500 -
USER-DEFINED - 0.40 0.50 0.400 -
USER-DEFINED - 0.20 0.50 0.100 -
USER-DEFINED - 1.50 0.50 0.500 -
USER-DEFINED - 1.90 0.50 0.400 -
USER-DEFINED - 2.00 0.50 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 9.01
EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.27
TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 22.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.31
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.546
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.40 0.50 0.200 -
USER-DEFINED - 0.10 0.50 0.100 -
USER-DEFINED - 6.70 0.50 0.200 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.199
SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 14.57
EFFECTIVE AREA(ACRES) = 28.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.24

TOTAL AREA (ACRES) = 28.5 PEAK FLOW RATE (CFS) = 36.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.31
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.546
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.10 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 2.92
EFFECTIVE AREA(ACRES) = 31.60 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 39.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.31
RAINFALL INTENSITY(INCH/HR) = 1.55
AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 31.60
TOTAL STREAM AREA(ACRES) = 31.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 39.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 400.00 TO NODE 420.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
INITIAL SUBAREA FLOW-LENGTH(FEET) = 300.40
ELEVATION DATA: UPSTREAM(FEET) = 312.80 DOWNSTREAM(FEET) = 310.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.115
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.085
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL - 0.50 0.50 0.100 56 8.11
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 0.92
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.92

\*\*\*\*\*

FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 307.00
STREET LENGTH(FEET) = 266.50 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 67.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 62.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.37
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 6.97
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.26
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.64
STREET FLOW TRAVEL TIME(MIN.) = 1.97 Tc(MIN.) = 10.08

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.748

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.50 0.100 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.92

EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.05

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 1.68

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.88

FLOW VELOCITY(FEET/SEC.) = 2.33 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.69

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.00 = 566.90 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 421.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 307.00 DOWNSTREAM(FEET) = 305.50
FLOW LENGTH(FEET) = 105.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 4.76

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 1.68

PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 10.45

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.10 = 671.90 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 10.45

RAINFALL INTENSITY(INCH/HR) = 1.71

AREA-AVERAGED Fm(INCH/HR) = 0.05

AREA-AVERAGED Fp(INCH/HR) = 0.50

AREA-AVERAGED Ap = 0.10

EFFECTIVE STREAM AREA(ACRES) = 1.10

TOTAL STREAM AREA(ACRES) = 1.10

PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.68

\*\* CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 39.49 12.31 1.546 0.50( 0.16) 0.31 31.6 300.00
2 1.68 10.45 1.714 0.50( 0.05) 0.10 1.1 400.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 39.28 10.45 1.714 0.50( 0.15) 0.31 27.9 400.00
2 41.00 12.31 1.546 0.50( 0.15) 0.31 32.7 300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 41.00 Tc(MIN.) = 12.31

EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31

TOTAL AREA(ACRES) = 32.7

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 421.10 TO NODE 426.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 305.50 DOWNSTREAM(FEET) = 301.00

FLOW LENGTH(FEET) = 261.40 MANNING'S N = 0.013

DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.56

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 41.00

PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 12.68

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.10 = 2921.40 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 426.10 TO NODE 426.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN.) = 12.68
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.511
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.50    0.400    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.20     SUBAREA RUNOFF(CFS) = 0.24
EFFECTIVE AREA(ACRES) = 32.90   AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.9     PEAK FLOW RATE(CFS) = 41.00
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 426.10 TO NODE 426.20 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 289.00
FLOW LENGTH(FEET) = 448.56 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.57
ESTIMATED PIPE DIAMETER(INCH) = 27.00     NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 41.00
PIPE TRAVEL TIME(MIN.) = 0.55     Tc(MIN.) = 13.23
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.20 = 3369.96 FEET.

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*****
FLOW PROCESS FROM NODE 426.20 TO NODE 426.20 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 13.23
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.461
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.50    0.400    -
USER-DEFINED        -         0.30    0.50    0.400    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.50     SUBAREA RUNOFF(CFS) = 0.57
EFFECTIVE AREA(ACRES) = 33.40   AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 33.4     PEAK FLOW RATE(CFS) = 41.00
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 426.20 TO NODE 426.30 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 289.00 DOWNSTREAM(FEET) = 282.00
FLOW LENGTH(FEET) = 260.45 MANNING'S N = 0.013

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DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.60
ESTIMATED PIPE DIAMETER(INCH) = 27.00     NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 41.00
PIPE TRAVEL TIME(MIN.) = 0.32     Tc(MIN.) = 13.55
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.30 = 3630.41 FEET.

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*****
FLOW PROCESS FROM NODE 426.30 TO NODE 426.30 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 13.55
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.432
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.30    0.50    0.400    -
USER-DEFINED        -         0.80    0.50    0.400    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 1.10     SUBAREA RUNOFF(CFS) = 1.22
EFFECTIVE AREA(ACRES) = 34.50   AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 34.5     PEAK FLOW RATE(CFS) = 41.00
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 426.30 TO NODE 248.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 271.00
FLOW LENGTH(FEET) = 411.44 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.57
ESTIMATED PIPE DIAMETER(INCH) = 27.00     NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 41.00
PIPE TRAVEL TIME(MIN.) = 0.51     Tc(MIN.) = 14.06
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

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*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

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=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 14.06
RAINFALL INTENSITY(INCH/HR) = 1.39
AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 34.50
TOTAL STREAM AREA(ACRES) = 34.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 41.00

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*****
FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 233.60
ELEVATION DATA: UPSTREAM (FEET) = 306.50 DOWNSTREAM (FEET) = 301.80

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.882
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.476
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS   Tc
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL          -         0.20     0.50     0.100   56   5.88
COMMERCIAL          -         0.20     0.50     0.100   56   5.88
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF (CFS) = 0.87
TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 0.87

*****
FLOW PROCESS FROM NODE 426.00 TO NODE 427.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====
UPSTREAM ELEVATION (FEET) = 301.80 DOWNSTREAM ELEVATION (FEET) = 294.00
STREET LENGTH (FEET) = 478.70 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 51.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1.46
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.28
HALFSTREET FLOOD WIDTH (FEET) = 6.94
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.41
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.68
STREET FLOW TRAVEL TIME (MIN.) = 3.31 Tc (MIN.) = 9.19
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.896
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.50     0.100   -
USER-DEFINED        -         0.50     0.50     0.100   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.16
EFFECTIVE AREA (ACRES) = 1.10 AREA-AVERAGED Fm (INCH/HR) = 0.05

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AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 1.83

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.30 HALFSTREET FLOOD WIDTH (FEET) = 7.94
FLOW VELOCITY (FEET/SEC.) = 2.50 DEPTH*VELOCITY (FT*FT/SEC.) = 0.75
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 427.00 = 712.30 FEET.

*****
FLOW PROCESS FROM NODE 427.00 TO NODE 428.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====
UPSTREAM ELEVATION (FEET) = 294.00 DOWNSTREAM ELEVATION (FEET) = 286.00
STREET LENGTH (FEET) = 300.80 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 55.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.20
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.29
HALFSTREET FLOOD WIDTH (FEET) = 7.63
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.18
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.93
STREET FLOW TRAVEL TIME (MIN.) = 1.58 Tc (MIN.) = 10.77
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.685
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.50     0.100   -
USER-DEFINED        -         0.40     0.50     0.100   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.50 SUBAREA RUNOFF (CFS) = 0.74
EFFECTIVE AREA (ACRES) = 1.60 AREA-AVERAGED Fm (INCH/HR) = 0.05
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 1.6 PEAK FLOW RATE (CFS) = 2.35

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.30 HALFSTREET FLOOD WIDTH (FEET) = 7.95
FLOW VELOCITY (FEET/SEC.) = 3.21 DEPTH*VELOCITY (FT*FT/SEC.) = 0.96
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 428.00 = 1013.10 FEET.

*****
FLOW PROCESS FROM NODE 428.00 TO NODE 429.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====

```

UPSTREAM ELEVATION(FEET) = 286.00 DOWNSTREAM ELEVATION(FEET) = 276.00  
STREET LENGTH(FEET) = 242.40 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.63

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.29  
HALFSTREET FLOOD WIDTH(FEET) = 7.52  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.89  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.14  
STREET FLOW TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 11.81

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.591

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.55  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 2.77

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.74  
FLOW VELOCITY(FEET/SEC.) = 3.94 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.16  
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 429.00 = 1255.50 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 429.00 TO NODE 429.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.81

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.591

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.400	-
USER-DEFINED	-	1.50	0.50	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 2.50  
EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.25  
TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 5.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 429.00 TO NODE 248.00 IS CODE = 31  
-----

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 276.00	DOWNSTREAM(FEET) = 273.00
FLOW LENGTH(FEET) = 100.00	MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000	
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.8 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.58	
ESTIMATED PIPE DIAMETER(INCH) = 18.00	NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.28	
PIPE TRAVEL TIME(MIN.) = 0.19	Tc(MIN.) = 12.00
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 248.00 = 1355.50 FEET.	

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 12.00  
RAINFALL INTENSITY(INCH/HR) = 1.57  
AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.25  
EFFECTIVE STREAM AREA(ACRES) = 4.00  
TOTAL STREAM AREA(ACRES) = 4.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.28

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	39.28	12.21	1.554	0.50( 0.16)	0.31	29.7	400.00
1	41.00	14.06	1.386	0.50( 0.16)	0.31	34.5	300.00
2	5.28	12.00	1.573	0.50( 0.13)	0.25	4.0	425.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	44.41	12.00	1.573	0.50( 0.15)	0.30	33.2	425.00
2	44.49	12.21	1.554	0.50( 0.15)	0.30	33.7	400.00
3	45.60	14.06	1.386	0.50( 0.15)	0.31	38.5	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 45.60 Tc(MIN.) = 14.06  
EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31  
TOTAL AREA(ACRES) = 38.5  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	44.41	12.00	1.573	0.50( 0.15)	0.30	33.2	425.00
2	44.49	12.21	1.554	0.50( 0.15)	0.30	33.7	400.00
3	45.60	14.06	1.386	0.50( 0.15)	0.31	38.5	300.00

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	324.37	20.43	1.101	0.50( 0.19)	0.38	396.3	210.00
2	319.45	23.81	1.006	0.50( 0.19)	0.38	434.5	200.00
3	316.73	24.64	0.982	0.50( 0.19)	0.38	443.2	230.00
4	309.79	25.77	0.957	0.50( 0.19)	0.38	447.4	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	333.96	12.00	1.573	0.50( 0.19)	0.37	266.1	425.00
2	335.04	12.21	1.554	0.50( 0.19)	0.37	270.7	400.00
3	338.92	14.06	1.386	0.50( 0.19)	0.37	311.3	300.00
4	359.41	20.43	1.101	0.50( 0.19)	0.38	434.8	210.00
5	350.97	23.81	1.006	0.50( 0.19)	0.37	473.0	200.00
6	347.39	24.64	0.982	0.50( 0.19)	0.37	481.7	230.00
7	339.51	25.77	0.957	0.50( 0.18)	0.37	485.9	220.50

TOTAL AREA (ACRES) = 485.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 359.41 Tc(MIN.) = 20.428  
EFFECTIVE AREA(ACRES) = 434.81 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.38  
TOTAL AREA (ACRES) = 485.9  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 249.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 261.00  
FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.60  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 359.41  
PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 20.67

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 429.00 TO NODE 430.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 262.70

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.459  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.375

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL AREA GROUP (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	- 0.20	0.50	0.100	56	6.46
COMMERCIAL	- 0.40	0.50	0.100	56	6.46

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 1.26  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.26

\*\*\*\*\*

FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 262.70 DOWNSTREAM ELEVATION(FEET) = 258.98  
STREET LENGTH(FEET) = 345.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.75  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 8.64  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.12  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.66  
STREET FLOW TRAVEL TIME(MIN.) = 2.72 Tc(MIN.) = 9.18  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.898  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.50	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.00  
EFFECTIVE AREA(ACRES) = 1.20 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 2.00

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 9.23  
FLOW VELOCITY(FEET/SEC.) = 2.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.70  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.00 = 675.60 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.00 TO NODE 431.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 258.98 DOWNSTREAM(FEET) = 258.00  
FLOW LENGTH(FEET) = 91.03 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.52  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 2.00  
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 9.52  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.10 = 766.63 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 9.52  
RAINFALL INTENSITY(INCH/HR) = 1.84  
AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 1.20  
TOTAL STREAM AREA(ACRES) = 1.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 410.00 TO NODE 440.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 299.70  
ELEVATION DATA: UPSTREAM(FEET) = 312.69 DOWNSTREAM(FEET) = 310.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.40	0.50	0.100	56	8.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.196  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.071  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 0.73  
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 0.73

\*\*\*\*\*  
FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 306.50  
STREET LENGTH(FEET) = 299.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.03  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.26  
HALFSTREET FLOOD WIDTH(FEET) = 5.70  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.18  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.57  
STREET FLOW TRAVEL TIME(MIN.) = 2.29 Tc(MIN.) = 10.48  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.711  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.60  
EFFECTIVE AREA(ACRES) = 0.80 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 1.20

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 6.34  
FLOW VELOCITY(FEET/SEC.) = 2.23 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.61  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 441.00 = 598.70 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 61  
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 306.50  DOWNSTREAM ELEVATION(FEET) = 299.00
STREET LENGTH(FEET) = 341.60  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.59
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 6.64
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.79
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.77
STREET FLOW TRAVEL TIME(MIN.) = 2.04  Tc(MIN.) = 12.52
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.526
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	0.40	0.50	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.80  
EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 1.86

```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29  HALFSTREET FLOOD WIDTH(FEET) = 7.34
FLOW VELOCITY(FEET/SEC.) = 2.85  DEPTH*VELOCITY(FT*FT/SEC.) = 0.82
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 442.00 = 940.30 FEET.

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*****
FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 61

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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 299.00  DOWNSTREAM ELEVATION(FEET) = 288.50
STREET LENGTH(FEET) = 390.10  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

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Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.21
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.29
HALFSTREET FLOOD WIDTH(FEET) = 7.64
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.19
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.94
STREET FLOW TRAVEL TIME(MIN.) = 2.04  Tc(MIN.) = 14.56
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.341
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.70  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 2.32

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30  HALFSTREET FLOOD WIDTH(FEET) = 7.84
FLOW VELOCITY(FEET/SEC.) = 3.24  DEPTH*VELOCITY(FT*FT/SEC.) = 0.96
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 443.00 = 1330.40 FEET.

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*****
FLOW PROCESS FROM NODE 443.00 TO NODE 444.00 IS CODE = 61

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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 288.50  DOWNSTREAM ELEVATION(FEET) = 281.00
STREET LENGTH(FEET) = 272.60  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.54
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.30
HALFSTREET FLOOD WIDTH(FEET) = 8.24
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.29
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.00
STREET FLOW TRAVEL TIME(MIN.) = 1.38  Tc(MIN.) = 15.94
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.266
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.100	-



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.44  
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 2.63

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 8.34  
FLOW VELOCITY(FEET/SEC.) = 3.34 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.02  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 444.00 = 1603.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 444.00 TO NODE 445.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 281.00 DOWNSTREAM ELEVATION(FEET) = 268.10  
STREET LENGTH(FEET) = 462.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.98  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 8.93  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.41  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.08  
STREET FLOW TRAVEL TIME(MIN.) = 2.26 Tc(MIN.) = 18.20  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.181

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.71  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 3.15

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 9.23  
FLOW VELOCITY(FEET/SEC.) = 3.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.10  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 445.00 = 2065.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 445.00 TO NODE 446.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 268.10 DOWNSTREAM ELEVATION(FEET) = 257.00  
STREET LENGTH(FEET) = 532.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.62  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 10.53  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.18  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.09  
STREET FLOW TRAVEL TIME(MIN.) = 2.79 Tc(MIN.) = 20.99  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.085

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 0.100 -  
USER-DEFINED - 0.60 0.50 0.100 -  
USER-DEFINED - 0.30 0.50 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 0.93  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 3.82

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.85  
FLOW VELOCITY(FEET/SEC.) = 3.19 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.11  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 446.00 = 2598.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 446.00 TO NODE 431.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 257.00 DOWNSTREAM(FEET) = 256.50  
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.07  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 3.82  
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 21.40  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

```

*****
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 21.40
RAINFALL INTENSITY(INCH/HR) = 1.07
AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 4.10
TOTAL STREAM AREA(ACRES) = 4.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.82

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 2.00 9.52 1.839 0.50( 0.05) 0.10 1.2 429.00
2 3.82 21.40 1.073 0.50( 0.05) 0.10 4.1 410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 4.97 9.52 1.839 0.50( 0.05) 0.10 3.0 429.00
2 4.96 21.40 1.073 0.50( 0.05) 0.10 5.3 410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 4.97 Tc(MIN.) = 9.52
EFFECTIVE AREA(ACRES) = 3.02 AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 5.3
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

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*****
FLOW PROCESS FROM NODE 431.10 TO NODE 249.00 IS CODE = 31
-----

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM( FEET) = 258.00 DOWNSTREAM( FEET) = 257.00
FLOW LENGTH( FEET) = 230.42 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.7 INCHES
PIPE-FLOW VELOCITY( FEET/SEC.) = 4.08
ESTIMATED PIPE DIAMETER( INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW( CFS) = 4.97
PIPE TRAVEL TIME( MIN.) = 0.94 Tc( MIN.) = 10.46
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

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*****
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 11
-----
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

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*****
** MAIN STREAM CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 4.97 10.46 1.713 0.50( 0.05) 0.10 3.0 429.00
2 4.96 22.34 1.047 0.50( 0.05) 0.10 5.3 410.00
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 333.96 12.25 1.551 0.50( 0.19) 0.37 266.1 425.00
2 335.04 12.46 1.532 0.50( 0.19) 0.37 270.7 400.00
3 338.92 14.30 1.364 0.50( 0.19) 0.37 311.3 300.00
4 359.41 20.67 1.094 0.50( 0.19) 0.38 434.8 210.00
5 350.97 24.05 0.999 0.50( 0.19) 0.37 473.0 200.00
6 347.39 24.89 0.975 0.50( 0.19) 0.37 481.7 230.00
7 339.51 26.01 0.952 0.50( 0.18) 0.37 485.9 220.50
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 324.09 10.46 1.713 0.50( 0.18) 0.37 230.2 429.00
2 338.93 12.25 1.551 0.50( 0.18) 0.37 269.4 425.00
3 340.01 12.46 1.532 0.50( 0.18) 0.37 274.1 400.00
4 343.88 14.30 1.364 0.50( 0.19) 0.37 315.0 300.00
5 364.37 20.67 1.094 0.50( 0.19) 0.37 439.8 210.00
6 360.20 22.34 1.047 0.50( 0.19) 0.37 459.0 410.00
7 355.69 24.05 0.999 0.50( 0.18) 0.37 478.3 200.00
8 351.99 24.89 0.975 0.50( 0.18) 0.37 487.0 230.00
9 344.00 26.01 0.952 0.50( 0.18) 0.37 491.2 220.50
TOTAL AREA( ACRES) = 491.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE( CFS) = 364.37 Tc( MIN.) = 20.671
EFFECTIVE AREA( ACRES) = 439.79 AREA-AVERAGED Fm( INCH/HR) = 0.19
AREA-AVERAGED Fp( INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
TOTAL AREA( ACRES) = 491.2
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

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*****
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 12
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>>>>CLEAR MEMORY BANK # 1 <<<<
-----
END OF STUDY SUMMARY:
TOTAL AREA( ACRES) = 491.2 TC( MIN.) = 20.67
EFFECTIVE AREA( ACRES) = 439.79 AREA-AVERAGED Fm( INCH/HR) = 0.19
AREA-AVERAGED Fp( INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.373
PEAK FLOW RATE( CFS) = 364.37

```

```

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 324.09 10.46 1.713 0.50( 0.18) 0.37 230.2 429.00

```

2	338.93	12.25	1.551	0.50	( 0.18)	0.37	269.4	425.00
3	340.01	12.46	1.532	0.50	( 0.18)	0.37	274.1	400.00
4	343.88	14.30	1.364	0.50	( 0.19)	0.37	315.0	300.00
5	364.37	20.67	1.094	0.50	( 0.19)	0.37	439.8	210.00
6	360.20	22.34	1.047	0.50	( 0.19)	0.37	459.0	410.00
7	355.69	24.05	0.999	0.50	( 0.18)	0.37	478.3	200.00
8	351.99	24.89	0.975	0.50	( 0.18)	0.37	487.0	230.00
9	344.00	26.01	0.952	0.50	( 0.18)	0.37	491.2	220.50

=====  
=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506101F.DAT  
TIME/DATE OF STUDY: 12:42 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 2.230
- 2) 6.00; 2.010
- 3) 7.00; 1.850
- 4) 8.00; 1.710
- 5) 9.00; 1.600
- 6) 10.00; 1.510
- 7) 11.00; 1.430
- 8) 12.00; 1.360
- 9) 13.00; 1.300
- 10) 14.00; 1.250
- 11) 15.00; 1.200
- 12) 20.00; 1.020
- 13) 25.00; 0.900
- 14) 30.00; 0.810
- 15) 40.00; 0.690
- 16) 50.00; 0.610
- 17) 60.00; 0.550
- 18) 90.00; 0.440
- 19) 120.00; 0.370
- 20) 180.00; 0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10100.00 TO NODE 10101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 820.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.606

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.546

SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
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NATURAL FAIR COVER

"GRASS" - 0.10 0.50 1.000 98 9.61

NATURAL FAIR COVER

"OPEN BRUSH" - 0.30 0.50 1.000 98 9.61

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000

SUBAREA RUNOFF(CFS) = 0.38

TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 0.38

\*\*\*\*\*

FLOW PROCESS FROM NODE 10101.00 TO NODE 10102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 790.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 152.00 CHANNEL SLOPE = 0.1974

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00

CHANNEL FLOW THRU SUBAREA(CFS) = 0.38

FLOW VELOCITY(FEET/SEC.) = 3.35 FLOW DEPTH(FEET) = 0.19

TRAVEL TIME(MIN.) = 0.76  $T_c$ (MIN.) = 10.36

LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10102.00 = 479.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10102.00 TO NODE 10102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 10.36

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.481

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL	AREA	$F_p$	$A_p$	SCS
-------------------------------	------	-------	-------	-----

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.50 0.50 1.000 -  
 USER-DEFINED - 0.30 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.80 SUBAREA RUNOFF (CFS) = 0.71  
 EFFECTIVE AREA (ACRES) = 1.20 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.2 PEAK FLOW RATE (CFS) = 1.06

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10102.00 TO NODE 10103.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 762.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.1400  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.06  
 FLOW VELOCITY(FEET/SEC.) = 3.86 FLOW DEPTH(FEET) = 0.30  
 TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 11.23  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10103.00 = 679.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10103.00 TO NODE 10103.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 11.23  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.414  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.50 1.000 -  
 USER-DEFINED - 0.80 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 0.99  
 EFFECTIVE AREA (ACRES) = 2.40 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.4 PEAK FLOW RATE (CFS) = 1.97

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10103.00 TO NODE 10104.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 762.00 DOWNSTREAM(FEET) = 754.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 124.00 CHANNEL SLOPE = 0.0645  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.97  
 FLOW VELOCITY(FEET/SEC.) = 3.32 FLOW DEPTH(FEET) = 0.45  
 TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 11.85  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10104.00 = 803.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10104.00 TO NODE 10104.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 11.85  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.371  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.70 0.50 1.000 -  
 USER-DEFINED - 1.10 0.50 1.000 -  
 USER-DEFINED - 0.10 0.50 1.000 -  
 USER-DEFINED - 0.40 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 1.80  
 EFFECTIVE AREA (ACRES) = 4.70 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 4.7 PEAK FLOW RATE (CFS) = 3.68

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10104.00 TO NODE 10105.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 754.00 DOWNSTREAM(FEET) = 740.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00 CHANNEL SLOPE = 0.0255  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 3.68  
 FLOW VELOCITY(FEET/SEC.) = 2.75 FLOW DEPTH(FEET) = 0.67  
 TRAVEL TIME(MIN.) = 3.34 Tc(MIN.) = 15.19  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10105.00 = 1353.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10105.00 TO NODE 10105.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.19  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.193  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.40 0.50 1.000 -  
 USER-DEFINED - 0.60 0.50 1.000 -  
 USER-DEFINED - 6.00 0.50 1.000 -  
 USER-DEFINED - 0.60 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 10.60 SUBAREA RUNOFF (CFS) = 6.61  
 EFFECTIVE AREA (ACRES) = 15.30 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 15.3 PEAK FLOW RATE (CFS) = 9.54

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10106.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 740.00 DOWNSTREAM(FEET) = 623.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 929.00 CHANNEL SLOPE = 0.1259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 9.54
FLOW VELOCITY(FEET/SEC.) = 6.37 FLOW DEPTH(FEET) = 0.71
TRAVEL TIME(MIN.) = 2.43 Tc(MIN.) = 17.62
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10106.00 = 2282.00 FEET.
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10106.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.62
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.106
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.50 1.000 -
USER-DEFINED - 0.10 0.50 1.000 -
USER-DEFINED - 10.40 0.50 1.000 -
USER-DEFINED - 0.40 0.50 1.000 -
USER-DEFINED - 4.50 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 8.45
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 16.79
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 592.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 417.00 CHANNEL SLOPE = 0.0743
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 16.79
FLOW VELOCITY(FEET/SEC.) = 6.02 FLOW DEPTH(FEET) = 0.96
TRAVEL TIME(MIN.) = 1.15 Tc(MIN.) = 18.77
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10107.00 = 2699.00 FEET.
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10107.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.77

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* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.064
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.50 1.000 -
USER-DEFINED - 0.60 0.50 1.000 -
USER-DEFINED - 5.10 0.50 1.000 -
USER-DEFINED - 1.10 0.50 1.000 -
USER-DEFINED - 0.20 0.50 1.000 -
USER-DEFINED - 2.30 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 4.82
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 20.46
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 592.00 DOWNSTREAM(FEET) = 590.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0333
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.000
CHANNEL FLOW THRU SUBAREA(CFS) = 20.46
FLOW VELOCITY(FEET/SEC.) = 4.67 FLOW DEPTH(FEET) = 1.21
TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 18.99
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10108.00 = 2759.00 FEET.
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.99
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.057
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.50 1.000 -
USER-DEFINED - 1.10 0.50 1.000 -
USER-DEFINED - 7.00 0.50 1.000 -
USER-DEFINED - 0.40 0.50 1.000 -
USER-DEFINED - 7.50 0.50 1.000 -
USER-DEFINED - 1.80 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 9.06
EFFECTIVE AREA(ACRES) = 58.40 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.4 PEAK FLOW RATE(CFS) = 29.24
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.99
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.057
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.10
EFFECTIVE AREA(ACRES) = 58.60 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.6 PEAK FLOW RATE(CFS) = 29.34

\*\*\*\*\*
FLOW PROCESS FROM NODE 10108.00 TO NODE 10109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 526.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 973.00 CHANNEL SLOPE = 0.0658
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 29.34
FLOW VELOCITY(FEET/SEC.) = 6.61 FLOW DEPTH(FEET) = 1.22
TRAVEL TIME(MIN.) = 2.45 Tc(MIN.) = 21.44
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10109.00 = 3732.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10109.00 TO NODE 10109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.44
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.986
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 16.40 0.50 1.000 -
USER-DEFINED - 0.60 0.50 1.000 -
USER-DEFINED - 3.00 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 8.74
EFFECTIVE AREA(ACRES) = 78.60 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.6 PEAK FLOW RATE(CFS) = 34.33

\*\*\*\*\*
FLOW PROCESS FROM NODE 10109.00 TO NODE 10110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 526.00 DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1045.00 CHANNEL SLOPE = 0.0679

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 34.33
FLOW VELOCITY(FEET/SEC.) = 6.93 FLOW DEPTH(FEET) = 1.28
TRAVEL TIME(MIN.) = 2.51 Tc(MIN.) = 23.95
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10110.00 = 4777.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10110.00 TO NODE 10110.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.95
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.925
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.50 1.000 -
USER-DEFINED - 0.50 0.50 1.000 -
USER-DEFINED - 31.60 0.50 1.000 -
USER-DEFINED - 1.60 0.50 1.000 -
USER-DEFINED - 0.40 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.10 SUBAREA RUNOFF(CFS) = 13.43
EFFECTIVE AREA(ACRES) = 113.70 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.7 PEAK FLOW RATE(CFS) = 43.49

\*\*\*\*\*
FLOW PROCESS FROM NODE 10110.00 TO NODE 10111.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 675.00 CHANNEL SLOPE = 0.0667
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 43.49
FLOW VELOCITY(FEET/SEC.) = 7.33 FLOW DEPTH(FEET) = 1.41
TRAVEL TIME(MIN.) = 1.54 Tc(MIN.) = 25.48
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10111.00 = 5452.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10111.00 TO NODE 10111.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 25.48
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.891
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.40 0.50 1.000 -
USER-DEFINED - 6.00 0.50 1.000 -
USER-DEFINED - 24.80 0.50 1.000 -
USER-DEFINED - 0.90 0.50 1.000 -

USER-DEFINED - 4.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 43.20 SUBAREA RUNOFF (CFS) = 15.21  
EFFECTIVE AREA (ACRES) = 156.90 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 156.9 PEAK FLOW RATE (CFS) = 55.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10111.00 TO NODE 10112.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 410.00 DOWNSTREAM (FEET) = 405.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 143.00 CHANNEL SLOPE = 0.0350  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 55.23  
FLOW VELOCITY (FEET/SEC.) = 6.10 FLOW DEPTH (FEET) = 1.74  
TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 25.87  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10112.00 = 5595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 25.87

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.884

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	7.90	0.50	1.000	-
USER-DEFINED	-	25.90	0.50	1.000	-
USER-DEFINED	-	19.30	0.50	1.000	-
USER-DEFINED	-	2.10	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 56.20 SUBAREA RUNOFF (CFS) = 19.43

EFFECTIVE AREA (ACRES) = 213.10 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 213.1 PEAK FLOW RATE (CFS) = 73.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10113.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 363.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1642.00 CHANNEL SLOPE = 0.0256  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 73.66  
FLOW VELOCITY (FEET/SEC.) = 5.85 FLOW DEPTH (FEET) = 2.05

TRAVEL TIME (MIN.) = 4.68 Tc (MIN.) = 30.56  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10113.00 = 7237.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 30.56

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.803

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.50	1.000	-
USER-DEFINED	-	33.10	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 35.40 SUBAREA RUNOFF (CFS) = 9.66

EFFECTIVE AREA (ACRES) = 248.50 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 248.5 PEAK FLOW RATE (CFS) = 73.66

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10114.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 363.00 DOWNSTREAM (FEET) = 340.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 918.00 CHANNEL SLOPE = 0.0251  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 73.66  
FLOW VELOCITY (FEET/SEC.) = 5.80 FLOW DEPTH (FEET) = 2.06  
TRAVEL TIME (MIN.) = 2.64 Tc (MIN.) = 33.19  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10114.00 = 8155.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 33.19

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.772

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	10.10	0.50	1.000	-
USER-DEFINED	-	17.70	0.50	1.000	-
USER-DEFINED	-	52.90	0.50	1.000	-
USER-DEFINED	-	1.00	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000



SUBAREA AREA (ACRES) = 83.10 SUBAREA RUNOFF (CFS) = 20.30  
EFFECTIVE AREA (ACRES) = 331.60 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 331.6 PEAK FLOW RATE (CFS) = 81.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 33.19  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.772  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.50 SUBAREA RUNOFF (CFS) = 0.37  
EFFECTIVE AREA (ACRES) = 333.10 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 333.1 PEAK FLOW RATE (CFS) = 81.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10115.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 340.00 DOWNSTREAM (FEET) = 301.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1467.00 CHANNEL SLOPE = 0.0266  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 81.39  
FLOW VELOCITY (FEET/SEC.) = 6.06 FLOW DEPTH (FEET) = 2.12  
TRAVEL TIME (MIN.) = 4.04 Tc (MIN.) = 37.23  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10115.00 = 9622.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10115.00 TO NODE 10115.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 37.23  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.723  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.60 0.50 1.000 -  
USER-DEFINED - 24.30 0.50 1.000 -  
USER-DEFINED - 47.70 0.50 1.000 -  
USER-DEFINED - 9.80 0.50 1.000 -  
USER-DEFINED - 1.60 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 94.00 SUBAREA RUNOFF (CFS) = 18.87  
EFFECTIVE AREA (ACRES) = 427.10 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 427.1 PEAK FLOW RATE (CFS) = 85.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10115.00 TO NODE 10116.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 301.00 DOWNSTREAM (FEET) = 272.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1696.00 CHANNEL SLOPE = 0.0171  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 85.74  
FLOW VELOCITY (FEET/SEC.) = 5.22 FLOW DEPTH (FEET) = 2.34  
TRAVEL TIME (MIN.) = 5.41 Tc (MIN.) = 42.64  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10116.00 = 11318.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 42.64  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.669  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 1.000 -  
USER-DEFINED - 4.90 0.50 1.000 -  
USER-DEFINED - 4.10 0.50 1.000 -  
USER-DEFINED - 0.40 0.50 1.000 -  
USER-DEFINED - 32.00 0.50 1.000 -  
USER-DEFINED - 3.80 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 45.60 SUBAREA RUNOFF (CFS) = 6.92  
EFFECTIVE AREA (ACRES) = 472.70 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 472.7 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 42.64  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.669  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.50 1.000 -  
USER-DEFINED - 7.70 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 9.70 SUBAREA RUNOFF (CFS) = 1.47  
EFFECTIVE AREA (ACRES) = 482.40 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 482.4 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10116.00 TO NODE 10117.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 272.00 DOWNSTREAM (FEET) = 252.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 878.00 CHANNEL SLOPE = 0.0228  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 85.74  
FLOW VELOCITY (FEET/SEC.) = 5.81 FLOW DEPTH (FEET) = 2.22  
TRAVEL TIME (MIN.) = 2.52 Tc (MIN.) = 45.16  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10117.00 = 12196.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 45.16

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.649

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	0.850	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	8.20	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.993

SUBAREA AREA (ACRES) = 12.30 SUBAREA RUNOFF (CFS) = 1.68

EFFECTIVE AREA (ACRES) = 494.70 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 494.7 PEAK FLOW RATE (CFS) = 85.74

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 45.16

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.649

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	0.850	-
USER-DEFINED	-	14.60	0.50	1.000	-
USER-DEFINED	-	6.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	3.50	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.996

SUBAREA AREA (ACRES) = 25.00 SUBAREA RUNOFF (CFS) = 3.38

EFFECTIVE AREA (ACRES) = 519.70 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 519.7 PEAK FLOW RATE (CFS) = 85.74

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10117.00 TO NODE 10118.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 252.00 DOWNSTREAM (FEET) = 249.00  
FLOW LENGTH (FEET) = 280.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.56  
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 85.74  
PIPE TRAVEL TIME (MIN.) = 0.40 Tc (MIN.) = 45.56  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10118.00 = 12476.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10118.00 TO NODE 10119.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 249.00 DOWNSTREAM (FEET) = 240.00  
FLOW LENGTH (FEET) = 892.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.0 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.27  
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 85.74  
PIPE TRAVEL TIME (MIN.) = 1.32 Tc (MIN.) = 46.88  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10119.00 = 13368.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 46.88

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.635

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	0.100	-
USER-DEFINED	-	1.00	0.50	0.600	-
USER-DEFINED	-	0.80	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.706

SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 0.91

EFFECTIVE AREA (ACRES) = 523.30 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 523.3 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 46.88					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.635					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.80	0.50	1.000	-
USER-DEFINED	-	1.20	0.50	0.100	-
USER-DEFINED	-	9.60	0.50	0.600	-
USER-DEFINED	-	1.00	0.50	0.850	-
USER-DEFINED	-	0.80	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.627  
SUBAREA AREA (ACRES) = 13.60 SUBAREA RUNOFF (CFS) = 3.93  
EFFECTIVE AREA (ACRES) = 536.90 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 536.9 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 46.88					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.635					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.01  
EFFECTIVE AREA (ACRES) = 537.00 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 537.0 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10119.00 TO NODE 10120.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 240.00 DOWNSTREAM (FEET) = 239.00  
FLOW LENGTH (FEET) = 120.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.32  
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 85.74

PIPE TRAVEL TIME (MIN.) = 0.19 Tc (MIN.) = 47.08  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10120.00 = 13488.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 47.08					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.633					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	1.20	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	2.80	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.657  
SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 1.54  
EFFECTIVE AREA (ACRES) = 542.60 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 542.6 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 47.08					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.633					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	1.50	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	0.600	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	2.90	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.717  
SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 1.26  
EFFECTIVE AREA (ACRES) = 547.70 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 547.7 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 47.08					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.633					
SUBAREA LOSS RATE DATA (AMC II):					

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	1.00	0.50	1.000	-
USER-DEFINED	-	2.70	0.50	1.000	-
USER-DEFINED	-	11.20	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 15.80 SUBAREA RUNOFF (CFS) = 1.89  
EFFECTIVE AREA (ACRES) = 563.50 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 563.5 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10121.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----  
ELEVATION DATA: UPSTREAM(FEET) = 239.00 DOWNSTREAM(FEET) = 213.00  
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 30.03  
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 85.74  
PIPE TRAVEL TIME (MIN.) = 0.11 Tc (MIN.) = 47.18  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10121.00 = 13682.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10121.00 TO NODE 10122.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
-----  
ELEVATION DATA: UPSTREAM(FEET) = 213.00 DOWNSTREAM(FEET) = 176.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 995.00 CHANNEL SLOPE = 0.0372  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 85.74  
FLOW VELOCITY (FEET/SEC.) = 6.97 FLOW DEPTH (FEET) = 2.02  
TRAVEL TIME (MIN.) = 2.38 Tc (MIN.) = 49.56  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10122.00 = 14677.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc (MIN.) = 49.56  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.614  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 1.40 0.50 1.000 -

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	4.80	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 7.30 SUBAREA RUNOFF (CFS) = 0.74  
EFFECTIVE AREA (ACRES) = 570.80 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 570.8 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc (MIN.) = 49.56  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.614  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.80 0.50 1.000 -  
USER-DEFINED - 3.30 0.50 1.000 -  
USER-DEFINED - 1.40 0.50 1.000 -  
USER-DEFINED - 3.00 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 10.50 SUBAREA RUNOFF (CFS) = 1.07  
EFFECTIVE AREA (ACRES) = 581.30 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 581.3 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc (MIN.) = 49.56  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.614  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 3.30 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 0.60 0.50 1.000 -  
USER-DEFINED - 3.50 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 7.90 SUBAREA RUNOFF (CFS) = 0.81  
EFFECTIVE AREA (ACRES) = 589.20 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA (ACRES) = 589.2 PEAK FLOW RATE (CFS) = 85.74  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 49.56

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.614

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 0.18

EFFECTIVE AREA(ACRES) = 591.00 AREA-AVERAGED Fm(INCH/HR) = 0.49

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98

TOTAL AREA(ACRES) = 591.0 PEAK FLOW RATE(CFS) = 85.74

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====  
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 591.0 TC(MIN.) = 49.56

EFFECTIVE AREA(ACRES) = 591.00 AREA-AVERAGED Fm(INCH/HR)= 0.49

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.984

PEAK FLOW RATE(CFS) = 85.74

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
 RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
 (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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 Ver. 13.4 Release Date: 01/25/2007 License ID 1527

Analysis prepared by:

-----  
 FILE NAME: 0506102F.DAT  
 TIME/DATE OF STUDY: 14:01 01/08/2009  
 =====

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
 SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
 \*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.184
- 2) 10.00; 1.510
- 3) 15.00; 1.203
- 4) 20.00; 1.023
- 5) 25.00; 0.902
- 6) 30.00; 0.826
- 7) 40.00; 0.693
- 8) 50.00; 0.611
- 9) 60.00; 0.546
- 10) 90.00; 0.439
- 11) 120.00; 0.374
- 12) 180.00; 0.306
- 13) 360.00; 0.211
- 14) 1440.00; 0.088

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH	LIP	HIKE	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
 as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
 \*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10200.00 TO NODE 10201.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 293.00  
 ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 617.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.991  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.511

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	-	0.73	0.50	0.600	0	9.99

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
 SUBAREA RUNOFF(CFS) = 0.80  
 TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 0.80

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10201.00 TO NODE 10202.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 617.00 DOWNSTREAM ELEVATION(FEET) = 613.00  
 STREET LENGTH(FEET) = 323.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.22  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.28  
 HALFSTREET FLOOD WIDTH(FEET) = 6.07  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.18  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.61  
 STREET FLOW TRAVEL TIME(MIN.) = 2.47 Tc(MIN.) = 12.46  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.359

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.88	0.50	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 0.84  
EFFECTIVE AREA(ACRES) = 1.62 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 1.54

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.00  
FLOW VELOCITY(FEET/SEC.) = 2.26 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.68  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10202.00 = 616.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10202.00 TO NODE 10203.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 613.00 DOWNSTREAM ELEVATION(FEET) = 594.00  
STREET LENGTH(FEET) = 613.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.27  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.29  
HALFSTREET FLOOD WIDTH(FEET) = 6.73  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.53  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.03  
STREET FLOW TRAVEL TIME(MIN.) = 2.90 Tc(MIN.) = 15.35  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.190

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.82 0.50 0.614 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.614  
SUBAREA AREA(ACRES) = 1.82 SUBAREA RUNOFF(CFS) = 1.45  
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 2.74

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 7.50  
FLOW VELOCITY(FEET/SEC.) = 3.65 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.12  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10203.00 = 1229.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10203.00 TO NODE 10204.00 IS CODE = 63  
-----

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 594.00 DOWNSTREAM ELEVATION(FEET) = 578.00  
STREET LENGTH(FEET) = 433.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.18  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.71  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.05  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.27  
STREET FLOW TRAVEL TIME(MIN.) = 1.78 Tc(MIN.) = 17.14  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.126

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.21 0.50 0.655 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.655  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 0.87  
EFFECTIVE AREA(ACRES) = 4.64 AREA-AVERAGED Fm(INCH/HR) = 0.31  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 3.41

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 8.04  
FLOW VELOCITY(FEET/SEC.) = 4.08 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.30  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10204.00 = 1662.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 578.00 DOWNSTREAM(FEET) = 575.00  
FLOW LENGTH(FEET) = 147.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.62  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 3.41  
PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 17.51  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10205.00 = 1809.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.51
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.113
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.61     0.50    0.917   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917
SUBAREA AREA(ACRES) = 3.61      SUBAREA RUNOFF(CFS) = 2.12
EFFECTIVE AREA(ACRES) = 8.25   AREA-AVERAGED Fm(INCH/HR) = 0.37
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.75
TOTAL AREA(ACRES) = 8.3        PEAK FLOW RATE(CFS) = 5.48

*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 563.00
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.64
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.48
PIPE TRAVEL TIME(MIN.) = 1.23 Tc(MIN.) = 18.74
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10206.00 = 2374.00 FEET.

*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.74
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.068
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         4.75     0.50    0.669   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.669
SUBAREA AREA(ACRES) = 4.75      SUBAREA RUNOFF(CFS) = 3.13
EFFECTIVE AREA(ACRES) = 13.00   AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 13.0        PEAK FLOW RATE(CFS) = 8.28

*****
FLOW PROCESS FROM NODE 10206.00 TO NODE 10207.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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```

ELEVATION DATA: UPSTREAM(FEET) = 563.00 DOWNSTREAM(FEET) = 547.00
FLOW LENGTH(FEET) = 599.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.25
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.28
PIPE TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 19.82
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10207.00 = 2973.00 FEET.

*****
FLOW PROCESS FROM NODE 10206.10 TO NODE 10207.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.82
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.030
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         4.59     0.50    0.664   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.664
SUBAREA AREA(ACRES) = 4.59      SUBAREA RUNOFF(CFS) = 2.88
EFFECTIVE AREA(ACRES) = 17.58   AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 17.6        PEAK FLOW RATE(CFS) = 10.71

*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 516.00
FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.64
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.71
PIPE TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 20.61
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10208.00 = 3573.00 FEET.

*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.61
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.008
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.60     0.50    0.697   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.697
SUBAREA AREA(ACRES) = 3.60      SUBAREA RUNOFF(CFS) = 2.14

```



EFFECTIVE AREA(ACRES) = 21.18 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 21.2 PEAK FLOW RATE(CFS) = 12.51

\*\*\*\*\*

FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 516.00 DOWNSTREAM(FEET) = 480.00

FLOW LENGTH(FEET) = 604.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 13.86

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 12.51

PIPE TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 21.34

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10209.00 = 4177.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 21.34

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.991

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.21	0.50	0.645	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645

SUBAREA AREA(ACRES) = 8.21 SUBAREA RUNOFF(CFS) = 4.94

EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.34

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.69

TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 17.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 438.00

FLOW LENGTH(FEET) = 678.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.14

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 17.11

PIPE TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 22.08

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10210.00 = 4855.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.08

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.973

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.49	0.50	0.986	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986

SUBAREA AREA(ACRES) = 10.49 SUBAREA RUNOFF(CFS) = 4.53

EFFECTIVE AREA(ACRES) = 39.89 AREA-AVERAGED Fm(INCH/HR) = 0.38

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.77

TOTAL AREA(ACRES) = 39.9 PEAK FLOW RATE(CFS) = 21.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 280.00

FLOW LENGTH(FEET) = 2662.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.48

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 21.16

PIPE TRAVEL TIME(MIN.) = 2.87 Tc(MIN.) = 24.95

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10211.00 = 7517.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81

MAINLINE Tc(MIN.) = 24.95

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.903

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.00	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 3.63

EFFECTIVE AREA(ACRES) = 49.89 AREA-AVERAGED Fm(INCH/HR) = 0.41

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81

TOTAL AREA(ACRES) = 49.9 PEAK FLOW RATE(CFS) = 22.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 280.00 DOWNSTREAM(FEET) = 176.00

FLOW LENGTH(FEET) = 935.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 20.16

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 22.30

PIPE TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 25.72  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10212.00 = 8452.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 25.72  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.891  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	18.37	0.50	0.926	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.926  
SUBAREA AREA(ACRES) = 18.37 SUBAREA RUNOFF(CFS) = 7.07  
EFFECTIVE AREA(ACRES) = 68.26 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 68.3 PEAK FLOW RATE(CFS) = 28.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10212.00 TO NODE 10242.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 176.00 DOWNSTREAM(FEET) = 169.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00 CHANNEL SLOPE = 0.0211  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.872  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.97	0.50	0.970	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.17  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.32  
AVERAGE FLOW DEPTH(FEET) = 1.50 TRAVEL TIME(MIN.) = 1.28  
Tc(MIN.) = 27.00  
SUBAREA AREA(ACRES) = 1.97 SUBAREA RUNOFF(CFS) = 0.68  
EFFECTIVE AREA(ACRES) = 70.23 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 28.82  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.50 FLOW VELOCITY(FEET/SEC.) = 4.28  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 10  
-----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10220.00 TO NODE 10221.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 308.00 DOWNSTREAM(FEET) = 300.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.111  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.199  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	1.03	0.50	1.000	0	15.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.65  
TOTAL AREA(ACRES) = 1.03 PEAK FLOW RATE(CFS) = 0.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10221.10 TO NODE 10222.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 300.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.13  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.51  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.29  
STREET FLOW TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 16.22

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.159  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.64	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 0.97  
EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 2.7 PEAK FLOW RATE (CFS) = 1.58

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.20 HALFSTREET FLOOD WIDTH (FEET) = 2.00  
FLOW VELOCITY (FEET/SEC.) = 6.51 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.29  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10222.00 = 764.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10221.20 TO NODE 10222.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 16.22  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.159  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.12	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 3.12 SUBAREA RUNOFF (CFS) = 1.85  
EFFECTIVE AREA (ACRES) = 5.78 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 5.8 PEAK FLOW RATE (CFS) = 3.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.10 TO NODE 10223.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

=====

UPSTREAM ELEVATION (FEET) = 261.00 DOWNSTREAM ELEVATION (FEET) = 208.00  
STREET LENGTH (FEET) = 622.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.89  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.24  
HALFSTREET FLOOD WIDTH (FEET) = 4.11  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.44  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.31  
STREET FLOW TRAVEL TIME (MIN.) = 1.91 Tc (MIN.) = 18.13

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.090  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.75	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.75 SUBAREA RUNOFF (CFS) = 0.93  
EFFECTIVE AREA (ACRES) = 7.54 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 7.5 PEAK FLOW RATE (CFS) = 4.00

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.24 HALFSTREET FLOOD WIDTH (FEET) = 4.21  
FLOW VELOCITY (FEET/SEC.) = 5.46 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.32  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10223.00 = 1386.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.20 TO NODE 10223.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 18.13  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.090  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.91	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 7.91 SUBAREA RUNOFF (CFS) = 4.20  
EFFECTIVE AREA (ACRES) = 15.45 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 15.4 PEAK FLOW RATE (CFS) = 8.21

\*\*\*\*\*

FLOW PROCESS FROM NODE 10223.10 TO NODE 10224.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

=====

UPSTREAM ELEVATION (FEET) = 208.00 DOWNSTREAM ELEVATION (FEET) = 204.00  
STREET LENGTH (FEET) = 758.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.09  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.44  
HALFSTREET FLOOD WIDTH (FEET) = 14.26  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.04  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.91  
STREET FLOW TRAVEL TIME (MIN.) = 6.18 Tc (MIN.) = 24.31  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 0.919

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.70	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 1.77  
EFFECTIVE AREA(ACRES) = 20.15 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.1 PEAK FLOW RATE(CFS) = 8.21  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 13.65  
FLOW VELOCITY(FEET/SEC.) = 2.00 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.86  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10224.00 = 2144.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.20 TO NODE 10224.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 24.31  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.919  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.21	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 0.45  
EFFECTIVE AREA(ACRES) = 21.35 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 8.21  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 204.00 DOWNSTREAM(FEET) = 201.00  
FLOW LENGTH(FEET) = 422.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.42  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 8.21  
PIPE TRAVEL TIME(MIN.) = 1.30 Tc(MIN.) = 25.61  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10225.00 = 2566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 25.61  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.893

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.81	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.81 SUBAREA RUNOFF(CFS) = 1.70  
EFFECTIVE AREA(ACRES) = 26.17 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 26.2 PEAK FLOW RATE(CFS) = 9.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 201.00 DOWNSTREAM(FEET) = 197.00  
FLOW LENGTH(FEET) = 799.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.98  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 9.25  
PIPE TRAVEL TIME(MIN.) = 2.67 Tc(MIN.) = 28.28  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10238.00 = 3365.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 28.28  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.852  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.24	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.24 SUBAREA RUNOFF(CFS) = 1.34  
EFFECTIVE AREA(ACRES) = 30.41 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.4 PEAK FLOW RATE(CFS) = 9.63

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 28.28  
RAINFALL INTENSITY(INCH/HR) = 0.85  
AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 30.41  
TOTAL STREAM AREA(ACRES) = 30.41

PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 10230.00 TO NODE 10231.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 276.00

ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 390.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.944

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.057

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
AGRICULTURAL POOR COVER "FALLOW"	-	0.95	0.50	1.000	0	5.94

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.33  
TOTAL AREA(ACRES) = 0.95 PEAK FLOW RATE(CFS) = 1.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10231.10 TO NODE 10232.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 390.00 DOWNSTREAM(FEET) = 301.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 394.00 CHANNEL SLOPE = 0.2259

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.929

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.68	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.42  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.95  
AVERAGE FLOW DEPTH(FEET) = 0.34 TRAVEL TIME(MIN.) = 0.95  
Tc(MIN.) = 6.89  
SUBAREA AREA(ACRES) = 1.68 SUBAREA RUNOFF(CFS) = 2.17  
EFFECTIVE AREA(ACRES) = 2.63 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 3.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 FLOW VELOCITY(FEET/SEC.) = 7.57

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10232.00 = 670.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10231.20 TO NODE 10232.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 6.89

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.929

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.38	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.38 SUBAREA RUNOFF(CFS) = 8.20  
EFFECTIVE AREA(ACRES) = 9.01 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 9.0 PEAK FLOW RATE(CFS) = 11.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10232.00 TO NODE 10233.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 301.00 DOWNSTREAM ELEVATION(FEET) = 277.00

STREET LENGTH(FEET) = 341.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.61

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.65

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 9.64  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.10  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.14  
STREET FLOW TRAVEL TIME(MIN.) = 0.93 Tc(MIN.) = 7.82  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.804

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 4.11  
EFFECTIVE AREA(ACRES) = 12.52 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 12.5 PEAK FLOW RATE(CFS) = 14.68

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 10.00

FLOW VELOCITY(FEET/SEC.) = 6.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.21

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10233.00 = 1011.00 FEET.

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*****
FLOW PROCESS FROM NODE 10233.10 TO NODE 10234.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 277.00 DOWNSTREAM ELEVATION(FEET) = 226.00
STREET LENGTH(FEET) = 682.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.74
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 10.46
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.52
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.40
STREET FLOW TRAVEL TIME(MIN.) = 1.74 Tc(MIN.) = 9.56
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.569
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.27 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 4.27 SUBAREA RUNOFF(CFS) = 4.11
EFFECTIVE AREA(ACRES) = 16.78 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 16.14

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 10.30
FLOW VELOCITY(FEET/SEC.) = 6.45 DEPTH*VELOCITY(FT*FT/SEC.) = 2.35
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10234.00 = 1693.00 FEET.

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*****
FLOW PROCESS FROM NODE 10233.20 TO NODE 10234.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 9.56
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.569
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 15.60 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 15.00

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EFFECTIVE AREA(ACRES) = 32.38 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 31.14
*****
FLOW PROCESS FROM NODE 10234.10 TO NODE 10235.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 3 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 226.00 DOWNSTREAM ELEVATION(FEET) = 205.00
STREET LENGTH(FEET) = 759.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.04
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.50
HALFSTREET FLOOD WIDTH(FEET) = 17.29
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.19
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.62
STREET FLOW TRAVEL TIME(MIN.) = 2.44 Tc(MIN.) = 12.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.387
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.74 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 3.79
EFFECTIVE AREA(ACRES) = 37.13 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 31.14
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.50 HALFSTREET FLOOD WIDTH(FEET) = 16.87
FLOW VELOCITY(FEET/SEC.) = 5.13 DEPTH*VELOCITY(FT*FT/SEC.) = 2.54
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10235.00 = 2452.00 FEET.

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*****
FLOW PROCESS FROM NODE 10234.20 TO NODE 10235.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 12.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.387
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

```

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 8.02 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 8.02 SUBAREA RUNOFF (CFS) = 6.40  
 EFFECTIVE AREA (ACRES) = 45.15 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 45.1 PEAK FLOW RATE (CFS) = 36.04

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10234.30 TO NODE 10235.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 12.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.387  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.62 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.62 SUBAREA RUNOFF (CFS) = 2.09  
 EFFECTIVE AREA (ACRES) = 47.76 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 38.13

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10235.00 TO NODE 10236.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 205.00 DOWNSTREAM (FEET) = 201.00  
 FLOW LENGTH (FEET) = 489.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.2 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.56  
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 38.13  
 PIPE TRAVEL TIME (MIN.) = 0.95 Tc (MIN.) = 12.95  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10236.00 = 2941.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10235.10 TO NODE 10236.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 12.95  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.329  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.89 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.89 SUBAREA RUNOFF (CFS) = 2.16  
 EFFECTIVE AREA (ACRES) = 50.65 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 50.7 PEAK FLOW RATE (CFS) = 38.13  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10235.20 TO NODE 10236.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 12.95  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.329  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 4.84 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 4.84 SUBAREA RUNOFF (CFS) = 3.61  
 EFFECTIVE AREA (ACRES) = 55.49 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 41.38

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 201.00 DOWNSTREAM (FEET) = 199.00  
 FLOW LENGTH (FEET) = 278.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.16  
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 41.38  
 PIPE TRAVEL TIME (MIN.) = 0.57 Tc (MIN.) = 13.52  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10237.00 = 3219.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 13.52  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.294  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.62 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.62 SUBAREA RUNOFF (CFS) = 1.16  
 EFFECTIVE AREA (ACRES) = 57.11 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 57.1 PEAK FLOW RATE (CFS) = 41.38  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 31  
 -----

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 197.00
FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.66
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 41.38
PIPE TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 14.27
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

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*****
FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.27
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.248
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.38 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.38 SUBAREA RUNOFF(CFS) = 0.93
EFFECTIVE AREA(ACRES) = 58.49 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 41.38
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1
-----

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 14.27
RAINFALL INTENSITY(INCH/HR) = 1.25
AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 58.49
TOTAL STREAM AREA(ACRES) = 58.49
PEAK FLOW RATE(CFS) AT CONFLUENCE = 41.38

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** CONFLUENCE DATA **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.63	28.28	0.852	0.50( 0.50)	1.00	30.4	10220.00
2	41.38	14.27	1.248	0.50( 0.50)	1.00	58.5	10230.00

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RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

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** PEAK FLOW RATE TABLE **

```

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	51.01	14.27	1.248	0.50( 0.50)	1.00	73.8	10230.00
2	29.11	28.28	0.852	0.50( 0.50)	1.00	88.9	10220.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 51.01 Tc(MIN.) = 14.27
EFFECTIVE AREA(ACRES) = 73.83 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 88.9
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

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*****
FLOW PROCESS FROM NODE 10238.00 TO NODE 10239.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 197.00 DOWNSTREAM(FEET) = 193.00
FLOW LENGTH(FEET) = 753.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.78
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 51.01
PIPE TRAVEL TIME(MIN.) = 1.61 Tc(MIN.) = 15.88
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10239.00 = 4317.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 10238.10 TO NODE 10239.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.88
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.171
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.72 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.72 SUBAREA RUNOFF(CFS) = 1.64
EFFECTIVE AREA(ACRES) = 76.55 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 91.6 PEAK FLOW RATE(CFS) = 51.01
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10238.20 TO NODE 10239.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.88
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.171
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 34.37 0.50 0.991 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

```



SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991  
 SUBAREA AREA (ACRES) = 34.37 SUBAREA RUNOFF (CFS) = 20.90  
 EFFECTIVE AREA (ACRES) = 110.92 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 126.0 PEAK FLOW RATE (CFS) = 67.13

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 193.00 DOWNSTREAM(FEET) = 191.00  
 FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.10  
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 67.13  
 PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 16.43  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10240.00 = 4618.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.43  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.151  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.22	0.50	0.916	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.916  
 SUBAREA AREA(ACRES) = 2.22 SUBAREA RUNOFF(CFS) = 1.39  
 EFFECTIVE AREA(ACRES) = 113.15 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 128.2 PEAK FLOW RATE(CFS) = 67.13  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10240.00 TO NODE 10241.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 191.00 DOWNSTREAM(FEET) = 180.00  
 FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.44  
 ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 67.13  
 PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 16.54  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10241.00 = 4768.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10241.00 TO NODE 10242.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 169.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 267.00 CHANNEL SLOPE = 0.0412  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.129

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.16	0.50	0.958	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 67.76  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.50  
 AVERAGE FLOW DEPTH(FEET) = 1.63 TRAVEL TIME(MIN.) = 0.52  
 Tc(MIN.) = 17.07  
 SUBAREA AREA(ACRES) = 2.16 SUBAREA RUNOFF(CFS) = 1.26  
 EFFECTIVE AREA(ACRES) = 115.31 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 130.4 PEAK FLOW RATE(CFS) = 67.13  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.63 FLOW VELOCITY(FEET/SEC.) = 8.44  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

=====

**\*\* MAIN STREAM CONFLUENCE DATA \*\***

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	67.13	17.07	1.129	0.50( 0.50)	0.99	115.3	10230.00
2	36.90	31.50	0.806	0.50( 0.50)	1.00	130.4	10220.00

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

**\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\***

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	28.82	27.00	0.872	0.50( 0.42)	0.85	70.2	10200.00

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

**\*\* PEAK FLOW RATE TABLE \*\***

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	95.80	17.07	1.129	0.50( 0.48)	0.95	159.7	10230.00
2	75.15	27.00	0.872	0.50( 0.47)	0.94	195.9	10200.00
3	61.51	31.50	0.806	0.50( 0.47)	0.94	200.6	10220.00
TOTAL AREA(ACRES) =		200.6					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 95.80 Tc(MIN.) = 17.068  
 EFFECTIVE AREA(ACRES) = 159.70 AREA-AVERAGED Fm(INCH/HR) = 0.48

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95  
TOTAL AREA (ACRES) = 200.6  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 169.00 DOWNSTREAM(FEET) = 163.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 315.00 CHANNEL SLOPE = 0.0190  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.101

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.10	0.50	0.995	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.995

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 98.28

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.96

AVERAGE FLOW DEPTH (FEET) = 2.17 TRAVEL TIME (MIN.) = 0.75

Tc (MIN.) = 17.82

SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 4.95

EFFECTIVE AREA (ACRES) = 168.81 AREA-AVERAGED Fm (INCH/HR) = 0.48

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96

TOTAL AREA (ACRES) = 209.7 PEAK FLOW RATE (CFS) = 95.80

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.15 FLOW VELOCITY (FEET/SEC.) = 6.92

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10243.00 TO NODE 10256.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.82

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.101

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.01	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 7.01 SUBAREA RUNOFF (CFS) = 3.79

EFFECTIVE AREA (ACRES) = 175.81 AREA-AVERAGED Fm (INCH/HR) = 0.48

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96

TOTAL AREA (ACRES) = 216.7 PEAK FLOW RATE (CFS) = 98.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 17.82

RAINFALL INTENSITY (INCH/HR) = 1.10

AREA-AVERAGED Fm (INCH/HR) = 0.48

AREA-AVERAGED Fp (INCH/HR) = 0.50

AREA-AVERAGED Ap = 0.96

EFFECTIVE STREAM AREA (ACRES) = 175.81

TOTAL STREAM AREA (ACRES) = 216.71

PEAK FLOW RATE (CFS) AT CONFLUENCE = 98.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10250.00 TO NODE 10251.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 284.00

ELEVATION DATA: UPSTREAM (FEET) = 246.00 DOWNSTREAM (FEET) = 243.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 16.802

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.138

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "WOODLAND, GRASS"	-	1.04	0.50	1.000	0	16.80

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 0.60

TOTAL AREA (ACRES) = 1.04 PEAK FLOW RATE (CFS) = 0.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10251.00 TO NODE 10252.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 243.00 DOWNSTREAM ELEVATION (FEET) = 240.00

STREET LENGTH (FEET) = 301.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.96  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.20  
HALFSTREET FLOOD WIDTH(FEET) = 2.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.17  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.43  
STREET FLOW TRAVEL TIME(MIN.) = 2.31 Tc(MIN.) = 19.12  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.055  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.47	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 0.73  
EFFECTIVE AREA(ACRES) = 2.51 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 1.25

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.24 HALFSTREET FLOOD WIDTH(FEET) = 3.84  
FLOW VELOCITY(FEET/SEC.) = 1.86 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.44  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10252.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10252.00 TO NODE 10253.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 240.00 DOWNSTREAM ELEVATION(FEET) = 234.00  
STREET LENGTH(FEET) = 544.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.16  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.28  
HALFSTREET FLOOD WIDTH(FEET) = 5.84  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.03  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.56  
STREET FLOW TRAVEL TIME(MIN.) = 4.46 Tc(MIN.) = 23.57  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.936  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.60 SUBAREA RUNOFF(CFS) = 1.81  
EFFECTIVE AREA(ACRES) = 7.12 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 2.79

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 6.84  
FLOW VELOCITY(FEET/SEC.) = 2.12 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.63  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10253.00 = 1129.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 234.00 DOWNSTREAM(FEET) = 219.00  
FLOW LENGTH(FEET) = 362.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.05  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 2.79  
PIPE TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 24.32  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10254.00 = 1491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc(MIN.) = 24.32  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.918  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.55	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 3.22  
EFFECTIVE AREA(ACRES) = 15.66 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.7 PEAK FLOW RATE(CFS) = 5.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10254.00 TO NODE 10255.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 219.00 DOWNSTREAM(FEET) = 182.00  
FLOW LENGTH(FEET) = 716.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.77  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 5.89

PIPE TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 25.43  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10255.00 = 2207.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10255.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 182.00 DOWNSTREAM(FEET) = 163.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.0833  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 0.887

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	13.88	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.31

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.53

AVERAGE FLOW DEPTH(FEET) = 0.65 TRAVEL TIME(MIN.) = 0.58

Tc(MIN.) = 26.01

SUBAREA AREA(ACRES) = 13.88 SUBAREA RUNOFF(CFS) = 4.83

EFFECTIVE AREA(ACRES) = 29.54 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 29.5 PEAK FLOW RATE(CFS) = 10.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.70 FLOW VELOCITY(FEET/SEC.) = 6.89

LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10256.00 = 2435.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 26.01

RAINFALL INTENSITY(INCH/HR) = 0.89

AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50

AREA-AVERAGED Ap = 1.00

EFFECTIVE STREAM AREA(ACRES) = 29.54

TOTAL STREAM AREA(ACRES) = 29.54

PEAK FLOW RATE(CFS) AT CONFLUENCE = 10.27

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	98.47	17.82	1.101	0.50( 0.48)	0.96	175.8	10230.00
1	75.15	27.80	0.859	0.50( 0.47)	0.95	212.0	10200.00
1	62.59	32.34	0.795	0.50( 0.47)	0.95	216.7	10220.00
2	10.27	26.01	0.887	0.50( 0.50)	1.00	29.5	10250.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	108.74	17.82	1.101	0.50( 0.48)	0.96	196.1	10230.00
2	89.60	26.01	0.887	0.50( 0.48)	0.95	235.1	10250.00
3	84.70	27.80	0.859	0.50( 0.48)	0.95	241.6	10200.00
4	70.42	32.34	0.795	0.50( 0.48)	0.95	246.3	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 108.74 Tc(MIN.) = 17.82

EFFECTIVE AREA(ACRES) = 196.05 AREA-AVERAGED Fm(INCH/HR) = 0.48

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96

TOTAL AREA(ACRES) = 246.3

LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 246.3 TC(MIN.) = 17.82

EFFECTIVE AREA(ACRES) = 196.05 AREA-AVERAGED Fm(INCH/HR) = 0.48

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.962

PEAK FLOW RATE(CFS) = 108.74

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	108.74	17.82	1.101	0.50( 0.48)	0.96	196.1	10230.00
2	89.60	26.01	0.887	0.50( 0.48)	0.95	235.1	10250.00
3	84.70	27.80	0.859	0.50( 0.48)	0.95	241.6	10200.00
4	70.42	32.34	0.795	0.50( 0.48)	0.95	246.3	10220.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506103F.DAT  
TIME/DATE OF STUDY: 12:44 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 2.230
- 2) 6.00; 2.010
- 3) 7.00; 1.850
- 4) 8.00; 1.710
- 5) 9.00; 1.600
- 6) 10.00; 1.510
- 7) 11.00; 1.430
- 8) 12.00; 1.360
- 9) 13.00; 1.300
- 10) 14.00; 1.250
- 11) 15.00; 1.200
- 12) 20.00; 1.020
- 13) 25.00; 0.900
- 14) 30.00; 0.810
- 15) 40.00; 0.690
- 16) 50.00; 0.610
- 17) 60.00; 0.550
- 18) 90.00; 0.440
- 19) 120.00; 0.370
- 20) 180.00; 0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH	LIP	HIKE	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10300.00 TO NODE 10301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 627.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 5.147  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.198  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "5-7 DWELLINGS/ACRE"	-	1.20	0.50	0.500	95	5.15

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.500  
 SUBAREA RUNOFF(CFS) = 2.10  
 TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 2.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 10301.00 TO NODE 10302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 510.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.2609  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 2.10  
 FLOW VELOCITY(FEET/SEC.) = 5.79 FLOW DEPTH(FEET) = 0.35  
 TRAVEL TIME(MIN.) = 0.33  $T_c$ (MIN.) = 5.48  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10302.00 = 443.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10302.00 TO NODE 10302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 5.48  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.125  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.50	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 2.53  
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 4.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10302.00 TO NODE 10303.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 467.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.2575  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.56  
FLOW VELOCITY(FEET/SEC.) = 6.93 FLOW DEPTH(FEET) = 0.47  
TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 5.88  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10303.00 = 610.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10303.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.88  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 3.54  
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 7.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10304.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 467.00 DOWNSTREAM(FEET) = 446.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.88  
FLOW VELOCITY(FEET/SEC.) = 6.98 FLOW DEPTH(FEET) = 0.61  
TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 6.15  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10304.00 = 725.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10304.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.15  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.985  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.50 0.500 -  
USER-DEFINED - 0.40 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 3.66  
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 11.31

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10305.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 446.00 DOWNSTREAM(FEET) = 366.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 423.00 CHANNEL SLOPE = 0.1891  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 11.31  
FLOW VELOCITY(FEET/SEC.) = 7.71 FLOW DEPTH(FEET) = 0.70  
TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 7.07  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10305.00 = 1148.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10305.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 7.07  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.840  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.50 0.500 -  
USER-DEFINED - 1.30 0.50 1.000 -  
USER-DEFINED - 1.50 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.912  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 4.24  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.32  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.65  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 14.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10306.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 300.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 574.00 CHANNEL SLOPE = 0.1150  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 14.59  
 FLOW VELOCITY (FEET/SEC.) = 6.83 FLOW DEPTH (FEET) = 0.84  
 TRAVEL TIME (MIN.) = 1.40 Tc (MIN.) = 8.47  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10306.00 = 1722.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10306.00 TO NODE 10306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 8.47  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.658  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	2.80	0.50	1.000	-
USER-DEFINED	-	0.50	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.986  
 SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 3.77  
 EFFECTIVE AREA (ACRES) = 14.30 AREA-AVERAGED Fm (INCH/HR) = 0.37  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 14.3 PEAK FLOW RATE (CFS) = 16.62

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10306.00 TO NODE 10307.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 300.00 DOWNSTREAM (FEET) = 293.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0350  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 16.62  
 FLOW VELOCITY (FEET/SEC.) = 4.50 FLOW DEPTH (FEET) = 1.11  
 TRAVEL TIME (MIN.) = 0.74 Tc (MIN.) = 9.21  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10307.00 = 1922.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10307.00 TO NODE 10307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 9.21  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.581  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 0.68  
 EFFECTIVE AREA (ACRES) = 15.00 AREA-AVERAGED Fm (INCH/HR) = 0.37  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.75  
 TOTAL AREA (ACRES) = 15.0 PEAK FLOW RATE (CFS) = 16.62  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10307.00 TO NODE 10308.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 293.00 DOWNSTREAM (FEET) = 276.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0850  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 16.62  
 FLOW VELOCITY (FEET/SEC.) = 7.81 FLOW DEPTH (FEET) = 0.84  
 TRAVEL TIME (MIN.) = 0.43 Tc (MIN.) = 9.64  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10308.00 = 2122.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10308.00 TO NODE 10308.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 9.64  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.543  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.50	1.000	-
USER-DEFINED	-	8.50	0.50	0.500	-
USER-DEFINED	-	3.80	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.696  
 SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 15.05  
 EFFECTIVE AREA (ACRES) = 29.00 AREA-AVERAGED Fm (INCH/HR) = 0.36  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 29.0 PEAK FLOW RATE (CFS) = 30.83

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10308.00 TO NODE 10309.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 250.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 600.00 CHANNEL SLOPE = 0.0433  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 30.83  
 FLOW VELOCITY (FEET/SEC.) = 7.11 FLOW DEPTH (FEET) = 1.20  
 TRAVEL TIME (MIN.) = 1.41 Tc (MIN.) = 11.04  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10309.00 = 2722.00 FEET.



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FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.04

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.427

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.00	0.50	0.600	-
USER-DEFINED	-	1.80	0.50	0.850	-
USER-DEFINED	-	1.40	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	3.40	0.50	0.500	-
USER-DEFINED	-	2.10	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.662

SUBAREA AREA(ACRES) = 15.40 SUBAREA RUNOFF(CFS) = 15.19

EFFECTIVE AREA(ACRES) = 44.40 AREA-AVERAGED Fm(INCH/HR) = 0.35

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.70

TOTAL AREA(ACRES) = 44.4 PEAK FLOW RATE(CFS) = 43.00

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FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.04

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.427

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.50	0.850	-
USER-DEFINED	-	8.80	0.50	1.000	-
USER-DEFINED	-	3.50	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.967

SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 13.41

EFFECTIVE AREA(ACRES) = 60.20 AREA-AVERAGED Fm(INCH/HR) = 0.39

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.77

TOTAL AREA(ACRES) = 60.2 PEAK FLOW RATE(CFS) = 56.42

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 250.00 DOWNSTREAM(FEET) = 208.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 1021.00 CHANNEL SLOPE = 0.0411

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00

CHANNEL FLOW THRU SUBAREA(CFS) = 56.42

FLOW VELOCITY(FEET/SEC.) = 8.11 FLOW DEPTH(FEET) = 1.52

TRAVEL TIME(MIN.) = 2.10 Tc(MIN.) = 13.14

LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10310.00 = 3743.00 FEET.

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FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.14

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.293

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	4.00	0.50	0.600	-
USER-DEFINED	-	1.80	0.50	0.850	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.668

SUBAREA AREA(ACRES) = 6.60 SUBAREA RUNOFF(CFS) = 5.69

EFFECTIVE AREA(ACRES) = 66.80 AREA-AVERAGED Fm(INCH/HR) = 0.38

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76

TOTAL AREA(ACRES) = 66.8 PEAK FLOW RATE(CFS) = 56.42

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.14

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.293

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.500	-
USER-DEFINED	-	8.00	0.50	0.600	-
USER-DEFINED	-	7.10	0.50	0.850	-
USER-DEFINED	-	8.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA(ACRES) = 23.50 SUBAREA RUNOFF(CFS) = 18.73

EFFECTIVE AREA(ACRES) = 90.30 AREA-AVERAGED Fm(INCH/HR) = 0.39

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.77

TOTAL AREA(ACRES) = 90.3 PEAK FLOW RATE(CFS) = 73.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 10310.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 208.00 DOWNSTREAM(FEET) = 189.00

FLOW LENGTH(FEET) = 1595.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.9 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.59

ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 73.58

PIPE TRAVEL TIME(MIN.) = 2.29 Tc(MIN.) = 15.44

LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10335.00 = 5338.00 FEET.

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FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 15.44
RAINFALL INTENSITY(INCH/HR) = 1.18
AREA-AVERAGED Fm(INCH/HR) = 0.39
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.77
EFFECTIVE STREAM AREA(ACRES) = 90.30
TOTAL STREAM AREA(ACRES) = 90.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 73.58

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FLOW PROCESS FROM NODE 10320.00 TO NODE 10321.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 671.00 DOWNSTREAM(FEET) = 622.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.795
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.055

SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.00 0.50 0.500 95 5.79
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 1.62
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 1.62

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FLOW PROCESS FROM NODE 10321.00 TO NODE 10322.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 622.00 DOWNSTREAM(FEET) = 599.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 227.00 CHANNEL SLOPE = 0.1013
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.62
FLOW VELOCITY(FEET/SEC.) = 4.67 FLOW DEPTH(FEET) = 0.34
TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 6.60
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10322.00 = 557.00 FEET.

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FLOW PROCESS FROM NODE 10322.00 TO NODE 10322.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.60
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.913
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.50 0.500 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.10
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 3.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 10322.00 TO NODE 10323.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 599.00 DOWNSTREAM(FEET) = 539.00
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.80
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.59
PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 6.75
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10323.00 = 719.00 FEET.

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FLOW PROCESS FROM NODE 10323.00 TO NODE 10323.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.75
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.890
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.50 0.500 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 0.74
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 4.28

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FLOW PROCESS FROM NODE 10323.00 TO NODE 10324.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 539.00 DOWNSTREAM(FEET) = 530.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 97.00 CHANNEL SLOPE = 0.0928
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.28  
FLOW VELOCITY (FEET/SEC.) = 4.65 FLOW DEPTH (FEET) = 0.55  
TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 7.10  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10324.00 = 816.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10324.00 TO NODE 10324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 7.10  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.837  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.80 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 2.57  
EFFECTIVE AREA (ACRES) = 4.70 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 4.7 PEAK FLOW RATE (CFS) = 6.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10324.00 TO NODE 10325.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 530.00 DOWNSTREAM (FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 210.00 CHANNEL SLOPE = 0.1429  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 6.71  
FLOW VELOCITY (FEET/SEC.) = 6.10 FLOW DEPTH (FEET) = 0.61  
TRAVEL TIME (MIN.) = 0.57 Tc (MIN.) = 7.67  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10325.00 = 1026.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10325.00 TO NODE 10325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 7.67  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.756  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 1.70 SUBAREA RUNOFF (CFS) = 2.30  
EFFECTIVE AREA (ACRES) = 6.40 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 6.4 PEAK FLOW RATE (CFS) = 8.68

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FLOW PROCESS FROM NODE 10325.00 TO NODE 10326.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 500.00 DOWNSTREAM (FEET) = 460.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 345.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 8.68  
FLOW VELOCITY (FEET/SEC.) = 6.05 FLOW DEPTH (FEET) = 0.69  
TRAVEL TIME (MIN.) = 0.95 Tc (MIN.) = 8.62  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10326.00 = 1371.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10326.00 TO NODE 10326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.62  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.642  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.90 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 1.90 SUBAREA RUNOFF (CFS) = 2.38  
EFFECTIVE AREA (ACRES) = 8.30 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 8.3 PEAK FLOW RATE (CFS) = 10.40

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10326.00 TO NODE 10327.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 460.00 DOWNSTREAM (FEET) = 430.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 263.00 CHANNEL SLOPE = 0.1141  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 10.40  
FLOW VELOCITY (FEET/SEC.) = 6.28 FLOW DEPTH (FEET) = 0.74  
TRAVEL TIME (MIN.) = 0.70 Tc (MIN.) = 9.32  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10327.00 = 1634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.32  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.571  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.50 0.500 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 4.88  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 14.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10328.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 375.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 437.00 CHANNEL SLOPE = 0.1259  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 14.75  
FLOW VELOCITY(FEET/SEC.) = 8.86 FLOW DEPTH(FEET) = 0.74  
TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 10.14  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10328.00 = 2071.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10328.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 10.14  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.499  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.50 0.500 -  
USER-DEFINED - 1.20 0.50 0.850 -  
USER-DEFINED - 0.90 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.772  
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 3.20  
EFFECTIVE AREA(ACRES) = 15.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 15.6 PEAK FLOW RATE(CFS) = 17.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10329.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 375.00 DOWNSTREAM(FEET) = 372.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 224.00 CHANNEL SLOPE = 0.0134  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 17.14  
FLOW VELOCITY(FEET/SEC.) = 3.95 FLOW DEPTH(FEET) = 1.20  
TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 11.09  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10329.00 = 2295.00 FEET.

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FLOW PROCESS FROM NODE 10329.00 TO NODE 10329.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 11.09  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.424  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.20 0.50 0.500 -  
USER-DEFINED - 1.40 0.50 0.850 -  
USER-DEFINED - 0.60 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.571  
SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 11.48  
EFFECTIVE AREA(ACRES) = 26.80 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 26.8 PEAK FLOW RATE(CFS) = 27.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10329.00 TO NODE 10330.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 300.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 452.00 CHANNEL SLOPE = 0.1593  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 27.57  
FLOW VELOCITY(FEET/SEC.) = 11.22 FLOW DEPTH(FEET) = 0.91  
TRAVEL TIME(MIN.) = 0.67 Tc(MIN.) = 11.76  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10330.00 = 2747.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10330.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 11.76  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.377  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.50 0.850 -  
USER-DEFINED - 4.20 0.50 0.500 -  
USER-DEFINED - 2.50 0.50 0.850 -  
USER-DEFINED - 0.60 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.673  
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 7.30  
EFFECTIVE AREA(ACRES) = 34.60 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 34.6 PEAK FLOW RATE(CFS) = 33.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10331.00 IS CODE = 51  
-----

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 295.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 182.00 CHANNEL SLOPE = 0.0275
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 33.74
FLOW VELOCITY(FEET/SEC.) = 6.12 FLOW DEPTH(FEET) = 1.36
TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 12.25
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10331.00 = 2929.00 FEET.

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*****
FLOW PROCESS FROM NODE 10331.00 TO NODE 10331.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.25
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.345
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.70   0.50  0.850 -
USER-DEFINED        -        11.30   0.50  0.500 -
USER-DEFINED        -         0.20   0.50  0.600 -
USER-DEFINED        -         4.20   0.50  0.850 -
USER-DEFINED        -         1.60   0.50  1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.652
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 17.42
EFFECTIVE AREA(ACRES) = 53.60 AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 53.6 PEAK FLOW RATE(CFS) = 50.16

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*****
FLOW PROCESS FROM NODE 10331.00 TO NODE 10332.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 295.00 DOWNSTREAM(FEET) = 245.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.00 CHANNEL SLOPE = 0.0542
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 50.16
FLOW VELOCITY(FEET/SEC.) = 8.71 FLOW DEPTH(FEET) = 1.39
TRAVEL TIME(MIN.) = 1.76 Tc(MIN.) = 14.02
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10332.00 = 3851.00 FEET.

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*****
FLOW PROCESS FROM NODE 10332.00 TO NODE 10332.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.02
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.249
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS

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LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.50  0.850 -
USER-DEFINED        -         1.40   0.50  0.500 -
USER-DEFINED        -        15.40   0.50  0.850 -
USER-DEFINED        -         8.60   0.50  1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.881
SUBAREA AREA(ACRES) = 25.60 SUBAREA RUNOFF(CFS) = 18.62
EFFECTIVE AREA(ACRES) = 79.20 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 79.2 PEAK FLOW RATE(CFS) = 64.16

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*****
FLOW PROCESS FROM NODE 10332.00 TO NODE 10333.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 199.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 564.00 CHANNEL SLOPE = 0.0816
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 64.16
FLOW VELOCITY(FEET/SEC.) = 10.81 FLOW DEPTH(FEET) = 1.41
TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 14.89
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10333.00 = 4415.00 FEET.

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*****
FLOW PROCESS FROM NODE 10333.00 TO NODE 10333.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.89
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.206
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.50   0.50  0.500 -
USER-DEFINED        -         0.50   0.50  0.850 -
USER-DEFINED        -         0.60   0.50  0.500 -
USER-DEFINED        -         5.70   0.50  0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.761
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 6.16
EFFECTIVE AREA(ACRES) = 87.50 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 87.5 PEAK FLOW RATE(CFS) = 67.23

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*****
FLOW PROCESS FROM NODE 10333.00 TO NODE 10334.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 195.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 454.00 CHANNEL SLOPE = 0.0088
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 4.00

```

CHANNEL FLOW THRU SUBAREA(CFS) = 67.23  
FLOW VELOCITY(FEET/SEC.) = 4.75 FLOW DEPTH(FEET) = 2.17  
TRAVEL TIME(MIN.) = 1.59 Tc(MIN.) = 16.48  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10334.00 = 4869.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10334.00 TO NODE 10334.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 16.48  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.147  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.50 0.800 -  
USER-DEFINED - 2.60 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 2.43  
EFFECTIVE AREA(ACRES) = 91.20 AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.71  
TOTAL AREA(ACRES) = 91.2 PEAK FLOW RATE(CFS) = 67.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10334.00 TO NODE 10335.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 195.00 DOWNSTREAM(FEET) = 189.00  
FLOW LENGTH(FEET) = 1291.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.96  
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 67.23  
PIPE TRAVEL TIME(MIN.) = 2.70 Tc(MIN.) = 19.18  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 19.18  
RAINFALL INTENSITY(INCH/HR) = 1.05  
AREA-AVERAGED Fm(INCH/HR) = 0.35  
AREA-AVERAGED Fp(INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.71  
EFFECTIVE STREAM AREA(ACRES) = 91.20  
TOTAL STREAM AREA(ACRES) = 91.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 67.23

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	73.58	15.44	1.184	0.50( 0.39)	0.77	90.3	10300.00
2	67.23	19.18	1.049	0.50( 0.35)	0.71	91.2	10320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	138.18	15.44	1.184	0.50( 0.37)	0.75	163.7	10300.00
2	128.35	19.18	1.049	0.50( 0.37)	0.74	181.5	10320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 138.18 Tc(MIN.) = 15.44  
EFFECTIVE AREA(ACRES) = 163.69 AREA-AVERAGED Fm(INCH/HR) = 0.37  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.75  
TOTAL AREA(ACRES) = 181.5  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10335.00 TO NODE 10336.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 189.00 DOWNSTREAM(FEET) = 188.00  
FLOW LENGTH(FEET) = 103.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 37.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.54  
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 138.18  
PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 15.57  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10336.00 = 6263.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10336.00 TO NODE 10337.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.78  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 138.18  
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 15.74  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10337.00 = 6475.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10337.00 TO NODE 10338.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 161.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 872.00 CHANNEL SLOPE = 0.0218  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 138.18  
FLOW VELOCITY (FEET/SEC.) = 7.99 FLOW DEPTH (FEET) = 2.40  
TRAVEL TIME (MIN.) = 1.82 Tc (MIN.) = 17.56  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10338.00 = 7347.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 17.56  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.108  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 0.850 -  
USER-DEFINED - 0.80 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 1.30 0.50 1.000 -  
USER-DEFINED - 0.90 0.50 0.850 -  
USER-DEFINED - 0.20 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.943  
SUBAREA AREA (ACRES) = 4.20 SUBAREA RUNOFF (CFS) = 2.40  
EFFECTIVE AREA (ACRES) = 167.89 AREA-AVERAGED Fm (INCH/HR) = 0.38  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 185.7 PEAK FLOW RATE (CFS) = 138.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 17.56  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.108  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 1.000 -  
USER-DEFINED - 4.60 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 2.73  
EFFECTIVE AREA (ACRES) = 172.89 AREA-AVERAGED Fm (INCH/HR) = 0.38  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 190.7 PEAK FLOW RATE (CFS) = 138.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10339.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
-----

ELEVATION DATA: UPSTREAM (FEET) = 161.00 DOWNSTREAM (FEET) = 159.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 328.00 CHANNEL SLOPE = 0.0061  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 138.18  
FLOW VELOCITY (FEET/SEC.) = 4.95 FLOW DEPTH (FEET) = 3.05  
TRAVEL TIME (MIN.) = 1.10 Tc (MIN.) = 18.66  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10339.00 = 7675.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 18.66  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.068  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.50 0.850 -  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 0.40 0.50 0.500 -  
USER-DEFINED - 2.30 0.50 0.850 -  
USER-DEFINED - 0.40 0.50 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.767  
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 4.25  
EFFECTIVE AREA (ACRES) = 179.79 AREA-AVERAGED Fm (INCH/HR) = 0.38  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 138.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 18.66  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.068  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 0.500 -  
USER-DEFINED - 6.30 0.50 0.850 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 2.20 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.876  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 5.22  
EFFECTIVE AREA (ACRES) = 188.99 AREA-AVERAGED Fm (INCH/HR) = 0.38  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 206.8 PEAK FLOW RATE (CFS) = 138.18  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10390.00 IS CODE = 51

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-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 159.00 DOWNSTREAM(FEET) = 155.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 782.00 CHANNEL SLOPE = 0.0051
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 138.18
FLOW VELOCITY(FEET/SEC.) = 4.63 FLOW DEPTH(FEET) = 3.15
TRAVEL TIME(MIN.) = 2.81 Tc(MIN.) = 21.48
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 21.48
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.985
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -        0.30     0.50    0.800  -
USER-DEFINED       -        3.70     0.50    0.850  -
USER-DEFINED       -        0.10     0.50    1.000  -
USER-DEFINED       -        2.10     0.50    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.901
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 2.98
EFFECTIVE AREA(ACRES) = 195.19 AREA-AVERAGED Fm(INCH/HR) = 0.38
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 213.0 PEAK FLOW RATE(CFS) = 138.18
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
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*****
FLOW PROCESS FROM NODE 10340.00 TO NODE 10341.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

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```

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 585.00

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```

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.581
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.464
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap   SCS   Tc
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE"   -        0.10     0.50    0.800  95  10.58

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```

PUBLIC PARK - 0.50 0.50 0.850 95 10.90
AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW" - 0.40 0.50 1.000 95 21.09
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA RUNOFF(CFS) = 0.91
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 0.91

```

```

*****
FLOW PROCESS FROM NODE 10341.00 TO NODE 10342.00 IS CODE = 63
-----

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```

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====

```

```

UPSTREAM ELEVATION(FEET) = 585.00 DOWNSTREAM ELEVATION(FEET) = 570.00
STREET LENGTH(FEET) = 250.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.80
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.32
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.05
STREET FLOW TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 11.36
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.405
SUBAREA LOSS RATE DATA(AMC II):

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```

DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -        0.70     0.50    0.800  -
USER-DEFINED       -        1.40     0.50    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 1.77
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.46
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 2.63

```

```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.22 HALFSTREET FLOOD WIDTH(FEET) = 2.99
FLOW VELOCITY(FEET/SEC.) = 4.71 DEPTH*VELOCITY(FT*FT/SEC.) = 1.03
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10342.00 = 558.00 FEET.

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*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

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```

=====
UPSTREAM ELEVATION(FEET) = 570.00  DOWNSTREAM ELEVATION(FEET) = 560.00
STREET LENGTH(FEET) = 415.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.55
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 6.29
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.04
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.86
STREET FLOW TRAVEL TIME(MIN.) = 2.28  Tc(MIN.) = 13.64
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.268
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -  1.20  0.50  0.800  -
USER-DEFINED  -  1.20  0.50  0.850  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.825
SUBAREA AREA(ACRES) = 2.40  SUBAREA RUNOFF(CFS) = 1.85
EFFECTIVE AREA(ACRES) = 5.50  AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 5.5  PEAK FLOW RATE(CFS) = 4.09

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```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30  HALFSTREET FLOOD WIDTH(FEET) = 6.85
FLOW VELOCITY(FEET/SEC.) = 3.11  DEPTH*VELOCITY(FT*FT/SEC.) = 0.92
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10343.00 = 973.00 FEET.

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*****
FLOW PROCESS FROM NODE 10343.00 TO NODE 10344.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

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```

=====
UPSTREAM ELEVATION(FEET) = 560.00  DOWNSTREAM ELEVATION(FEET) = 550.00
STREET LENGTH(FEET) = 616.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.02
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.33
HALFSTREET FLOOD WIDTH(FEET) = 8.47
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.77
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.91
STREET FLOW TRAVEL TIME(MIN.) = 3.71  Tc(MIN.) = 17.35
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.115
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -  2.10  0.50  0.800  -
USER-DEFINED  -  0.80  0.50  0.850  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814
SUBAREA AREA(ACRES) = 2.90  SUBAREA RUNOFF(CFS) = 1.85
EFFECTIVE AREA(ACRES) = 8.40  AREA-AVERAGED Fm(INCH/HR) = 0.43
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.86
TOTAL AREA(ACRES) = 8.4  PEAK FLOW RATE(CFS) = 5.19

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.33  HALFSTREET FLOOD WIDTH(FEET) = 8.63
FLOW VELOCITY(FEET/SEC.) = 2.78  DEPTH*VELOCITY(FT*FT/SEC.) = 0.92
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10344.00 = 1589.00 FEET.

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*****
FLOW PROCESS FROM NODE 10344.00 TO NODE 10345.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

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```

=====
UPSTREAM ELEVATION(FEET) = 550.00  DOWNSTREAM ELEVATION(FEET) = 510.00
STREET LENGTH(FEET) = 474.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.08
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 5.94
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.61
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.55
STREET FLOW TRAVEL TIME(MIN.) = 1.41  Tc(MIN.) = 18.76
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.065
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN

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USER-DEFINED          -      2.80      0.50      0.800      -
USER-DEFINED          -      0.20      0.50      0.850      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803
SUBAREA AREA(ACRES) = 3.00      SUBAREA RUNOFF(CFS) = 1.79
EFFECTIVE AREA(ACRES) = 11.40      AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50      AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 11.4      PEAK FLOW RATE(CFS) = 6.59

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.28      HALFSTREET FLOOD WIDTH(FEET) = 6.24
FLOW VELOCITY(FEET/SEC.) = 5.70      DEPTH*VELOCITY(FT*FT/SEC.) = 1.61
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10345.00 = 2063.00 FEET.

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*****
FLOW PROCESS FROM NODE 10345.00 TO NODE 10346.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 510.00      DOWNSTREAM ELEVATION(FEET) = 484.00
STREET LENGTH(FEET) = 231.00      CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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```

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.54

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.29
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 6.09
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.51
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.82
STREET FLOW TRAVEL TIME(MIN.) = 0.59      Tc(MIN.) = 19.35
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.043
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN
USER-DEFINED      -      2.40      0.50      0.800      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 2.40      SUBAREA RUNOFF(CFS) = 1.39
EFFECTIVE AREA(ACRES) = 13.80      AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50      AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 13.8      PEAK FLOW RATE(CFS) = 7.76

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.28      HALFSTREET FLOOD WIDTH(FEET) = 6.29
FLOW VELOCITY(FEET/SEC.) = 6.63      DEPTH*VELOCITY(FT*FT/SEC.) = 1.88
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10346.00 = 2294.00 FEET.

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*****
FLOW PROCESS FROM NODE 10346.00 TO NODE 10347.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 484.00      DOWNSTREAM ELEVATION(FEET) = 378.00
STREET LENGTH(FEET) = 995.00      CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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```

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.55

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.83
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.30
HALFSTREET FLOOD WIDTH(FEET) = 6.90
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.63
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.96
STREET FLOW TRAVEL TIME(MIN.) = 2.50      Tc(MIN.) = 21.86
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.975
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN
USER-DEFINED      -      4.10      0.50      0.800      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 4.10      SUBAREA RUNOFF(CFS) = 2.12
EFFECTIVE AREA(ACRES) = 17.90      AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50      AREA-AVERAGED Ap = 0.83
TOTAL AREA(ACRES) = 17.9      PEAK FLOW RATE(CFS) = 9.05

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30      HALFSTREET FLOOD WIDTH(FEET) = 7.00
FLOW VELOCITY(FEET/SEC.) = 6.65      DEPTH*VELOCITY(FT*FT/SEC.) = 1.98
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10347.00 = 3289.00 FEET.

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*****
FLOW PROCESS FROM NODE 10347.00 TO NODE 10348.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<
=====
UPSTREAM ELEVATION(FEET) = 378.00      DOWNSTREAM ELEVATION(FEET) = 303.00
STREET LENGTH(FEET) = 751.00      CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

```

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.56

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.00  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 7.97  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.67  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.12  
STREET FLOW TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 23.73  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.930

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.20 0.50 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 3.91  
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 12.23

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.37  
FLOW VELOCITY(FEET/SEC.) = 6.87 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.24  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10348.00 = 4040.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10348.00 TO NODE 10349.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 303.00 DOWNSTREAM ELEVATION(FEET) = 252.00  
STREET LENGTH(FEET) = 607.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.50  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 9.54  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.59  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.30  
STREET FLOW TRAVEL TIME(MIN.) = 1.54 Tc(MIN.) = 25.27  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.895

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.30 0.50 0.800 -  
USER-DEFINED - 3.00 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.815  
SUBAREA AREA(ACRES) = 10.30 SUBAREA RUNOFF(CFS) = 4.52  
EFFECTIVE AREA(ACRES) = 36.40 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 36.4 PEAK FLOW RATE(CFS) = 15.93

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 9.95  
FLOW VELOCITY(FEET/SEC.) = 6.75 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.41  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10349.00 = 4647.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10349.00 TO NODE 10350.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 252.00 DOWNSTREAM ELEVATION(FEET) = 246.00  
STREET LENGTH(FEET) = 224.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.75  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.43  
HALFSTREET FLOOD WIDTH(FEET) = 13.76  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.50  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.95  
STREET FLOW TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 26.09  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.880

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 12.60 0.50 0.800 -  
USER-DEFINED - 0.50 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.802  
SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 5.65  
EFFECTIVE AREA(ACRES) = 49.50 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 49.5 PEAK FLOW RATE(CFS) = 21.09

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 HALFSTREET FLOOD WIDTH(FEET) = 14.47  
FLOW VELOCITY(FEET/SEC.) = 4.62 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.07  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10350.00 = 4871.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10350.00 TO NODE 10351.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 237.00  
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.86  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 21.09  
PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 26.97  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10351.00 = 5390.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10351.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 26.97  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.865  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 0.100 -  
USER-DEFINED - 5.60 0.50 0.800 -  
USER-DEFINED - 0.70 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.784  
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 2.76  
EFFECTIVE AREA(ACRES) = 56.00 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 56.0 PEAK FLOW RATE(CFS) = 23.15

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10352.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 237.00 DOWNSTREAM(FEET) = 230.00  
FLOW LENGTH(FEET) = 675.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.31  
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 23.15  
PIPE TRAVEL TIME(MIN.) = 1.35 Tc(MIN.) = 28.33  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10352.00 = 6065.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 28.33  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.840

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.00 0.50 0.100 -  
USER-DEFINED - 0.40 0.50 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.300  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 0.87  
EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.40  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 23.15  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 28.33  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.840  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.50 0.100 -  
USER-DEFINED - 9.40 0.50 0.800 -  
USER-DEFINED - 1.10 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.755  
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 4.70  
EFFECTIVE AREA(ACRES) = 68.70 AREA-AVERAGED Fm(INCH/HR) = 0.40  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.79  
TOTAL AREA(ACRES) = 68.7 PEAK FLOW RATE(CFS) = 27.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10353.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 230.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.69  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 27.49  
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 28.53  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10353.00 = 6366.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10353.00 TO NODE 10353.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 28.53  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.836

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	6.00	0.50	0.800	-
USER-DEFINED	-	1.30	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.799  
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 2.91  
EFFECTIVE AREA(ACRES) = 76.10 AREA-AVERAGED Fm(INCH/HR) = 0.40  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.79  
TOTAL AREA(ACRES) = 76.1 PEAK FLOW RATE(CFS) = 30.17

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10353.00 TO NODE 10354.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----  
ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 172.00  
FLOW LENGTH(FEET) = 458.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.79  
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 30.17  
PIPE TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 29.24  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10354.00 = 6824.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10354.00 TO NODE 10390.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
-----  
ELEVATION DATA: UPSTREAM(FEET) = 172.00 DOWNSTREAM(FEET) = 155.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00 CHANNEL SLOPE = 0.0411  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 30.17  
FLOW VELOCITY(FEET/SEC.) = 6.89 FLOW DEPTH(FEET) = 1.21  
TRAVEL TIME(MIN.) = 1.00 Tc(MIN.) = 30.24  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc(MIN.) = 30.24  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.807  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	0.90	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.520  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 0.98  
EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.39  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.78  
TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 30.17  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc(MIN.) = 30.24  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.807  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	2.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.964  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 1.11  
EFFECTIVE AREA(ACRES) = 81.90 AREA-AVERAGED Fm(INCH/HR) = 0.40  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.79  
TOTAL AREA(ACRES) = 81.9 PEAK FLOW RATE(CFS) = 30.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc(MIN.) = 30.24  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.807  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.50	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 0.69  
EFFECTIVE AREA(ACRES) = 84.40 AREA-AVERAGED Fm(INCH/HR) = 0.40  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 84.4 PEAK FLOW RATE(CFS) = 30.95

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
-----  
\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
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1 30.95 30.24 0.807 0.50( 0.40) 0.80 84.4 10340.00  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	138.18	21.48	0.985	0.50( 0.38)	0.77	195.2	10300.00
2	128.35	25.33	0.894	0.50( 0.38)	0.76	213.0	10320.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	169.13	21.48	0.985	0.50( 0.39)	0.78	255.1	10300.00
2	159.30	25.33	0.894	0.50( 0.39)	0.77	283.7	10320.00
3	137.55	30.24	0.807	0.50( 0.39)	0.77	297.4	10340.00

TOTAL AREA (ACRES) = 297.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 169.13 Tc(MIN.) = 21.479  
EFFECTIVE AREA(ACRES) = 255.15 AREA-AVERAGED Fm(INCH/HR) = 0.39  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.77  
TOTAL AREA(ACRES) = 297.4  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10360.00 TO NODE 10361.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 337.00 DOWNSTREAM(FEET) = 292.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.697

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.454

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.50	1.000	95	10.70
NATURAL FAIR COVER "GRASS"	-	0.50	0.50	1.000	95	10.70
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.10	0.50	1.000	95	10.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.77  
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 0.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10361.00 TO NODE 10362.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 292.00 DOWNSTREAM(FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 199.00 CHANNEL SLOPE = 0.0101  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.77  
FLOW VELOCITY(FEET/SEC.) = 1.61 FLOW DEPTH(FEET) = 0.40  
TRAVEL TIME(MIN.) = 2.06 Tc(MIN.) = 12.75  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10362.00 = 529.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10362.00 TO NODE 10362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 12.75

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.315

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986

SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 0.81

EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 1.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10362.00 TO NODE 10363.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 290.00 DOWNSTREAM(FEET) = 288.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.47  
FLOW VELOCITY(FEET/SEC.) = 2.15 FLOW DEPTH(FEET) = 0.48  
TRAVEL TIME(MIN.) = 1.14 Tc(MIN.) = 13.89  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10363.00 = 676.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10363.00 TO NODE 10363.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 13.89
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.255
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
  LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         1.40     0.50     1.000     -
USER-DEFINED        -         0.20     0.50     0.850     -
USER-DEFINED        -         0.80     0.50     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988
SUBAREA AREA(ACRES) = 2.40      SUBAREA RUNOFF(CFS) = 1.64
EFFECTIVE AREA(ACRES) = 4.40    AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 4.4      PEAK FLOW RATE(CFS) = 3.01

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*****
FLOW PROCESS FROM NODE 10363.00 TO NODE 10364.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 288.00 DOWNSTREAM(FEET) = 286.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.01
FLOW VELOCITY(FEET/SEC.) = 2.59 FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 14.84
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10364.00 = 823.00 FEET.

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*****
FLOW PROCESS FROM NODE 10364.00 TO NODE 10364.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 14.84
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.208
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
  LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.10     0.50     0.850     -
USER-DEFINED        -         1.40     0.50     1.000     -
USER-DEFINED        -         0.20     0.50     1.000     -
USER-DEFINED        -         0.10     0.50     0.850     -
USER-DEFINED        -         0.10     0.50     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984
SUBAREA AREA(ACRES) = 1.90      SUBAREA RUNOFF(CFS) = 1.22
EFFECTIVE AREA(ACRES) = 6.30    AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 6.3      PEAK FLOW RATE(CFS) = 4.05

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*****
FLOW PROCESS FROM NODE 10364.00 TO NODE 10365.00 IS CODE = 51
-----

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 286.00 DOWNSTREAM(FEET) = 284.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.05
FLOW VELOCITY(FEET/SEC.) = 2.29 FLOW DEPTH(FEET) = 0.77
TRAVEL TIME(MIN.) = 1.81 Tc(MIN.) = 16.64
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10365.00 = 1071.00 FEET.

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*****
FLOW PROCESS FROM NODE 10365.00 TO NODE 10365.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 16.64
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.141
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
  LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.90     0.50     1.000     -
USER-DEFINED        -         1.80     0.50     1.000     -
USER-DEFINED        -         0.30     0.50     0.850     -
USER-DEFINED        -         0.50     0.50     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987
SUBAREA AREA(ACRES) = 3.50      SUBAREA RUNOFF(CFS) = 2.04
EFFECTIVE AREA(ACRES) = 9.80    AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 9.8      PEAK FLOW RATE(CFS) = 5.70

```

```

*****
FLOW PROCESS FROM NODE 10365.00 TO NODE 10366.00 IS CODE = 51
-----

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 282.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.70
FLOW VELOCITY(FEET/SEC.) = 2.49 FLOW DEPTH(FEET) = 0.87
TRAVEL TIME(MIN.) = 1.66 Tc(MIN.) = 18.31
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10366.00 = 1319.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10366.00 TO NODE 10366.00 IS CODE = 81
-----

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 18.31
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.081
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp      Ap      SCS
  LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.10     0.50     0.850     -

```

USER-DEFINED - 3.20 0.50 1.000 -  
USER-DEFINED - 2.30 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 0.850 -  
USER-DEFINED - 2.70 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995  
SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 4.46  
EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 9.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10366.00 TO NODE 10367.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 279.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 292.00 CHANNEL SLOPE = 0.0103  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.64  
FLOW VELOCITY(FEET/SEC.) = 3.09 FLOW DEPTH(FEET) = 1.02  
TRAVEL TIME(MIN.) = 1.57 Tc(MIN.) = 19.88  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10367.00 = 1611.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10367.00 TO NODE 10367.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 19.88  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.024  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 0.850 -  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 1.10 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 0.850 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972  
SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 0.77  
EFFECTIVE AREA (ACRES) = 19.90 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 19.9 PEAK FLOW RATE (CFS) = 9.64  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10367.00 TO NODE 10368.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 279.00 DOWNSTREAM(FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 378.00 CHANNEL SLOPE = 0.0079  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.64  
FLOW VELOCITY(FEET/SEC.) = 2.80 FLOW DEPTH(FEET) = 1.07  
TRAVEL TIME(MIN.) = 2.25 Tc(MIN.) = 22.13  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10368.00 = 1989.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10368.00 TO NODE 10368.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 22.13  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.969  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 0.850 -  
USER-DEFINED - 0.90 0.50 1.000 -  
USER-DEFINED - 0.90 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.973  
SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 0.95  
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 9.64  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10368.00 TO NODE 10369.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 247.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 229.00 CHANNEL SLOPE = 0.1266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.64  
FLOW VELOCITY(FEET/SEC.) = 7.94 FLOW DEPTH(FEET) = 0.64  
TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 22.61  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10369.00 = 2218.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10369.00 TO NODE 10369.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 22.61  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.957  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.50 0.850 -  
USER-DEFINED - 9.70 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 1.40 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996



SUBAREA AREA (ACRES) = 11.60 SUBAREA RUNOFF (CFS) = 4.79  
EFFECTIVE AREA (ACRES) = 33.70 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 33.7 PEAK FLOW RATE (CFS) = 14.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10369.00 TO NODE 10370.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 247.00 DOWNSTREAM (FEET) = 226.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 179.00 CHANNEL SLOPE = 0.1173  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 14.01  
FLOW VELOCITY (FEET/SEC.) = 8.46 FLOW DEPTH (FEET) = 0.74  
TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 22.96  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10370.00 = 2397.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10370.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 22.96  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.949  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 0.850 -  
USER-DEFINED - 3.60 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 5.60 0.50 1.000 -  
USER-DEFINED - 1.50 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
SUBAREA AREA (ACRES) = 11.10 SUBAREA RUNOFF (CFS) = 4.50  
EFFECTIVE AREA (ACRES) = 44.80 AREA-AVERAGED Fm (INCH/HR) = 0.50  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 44.8 PEAK FLOW RATE (CFS) = 18.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10371.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 226.00 DOWNSTREAM (FEET) = 188.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 434.00 CHANNEL SLOPE = 0.0876  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 18.25  
FLOW VELOCITY (FEET/SEC.) = 8.09 FLOW DEPTH (FEET) = 0.87  
TRAVEL TIME (MIN.) = 0.89 Tc (MIN.) = 23.86  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10371.00 = 2831.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10371.00 TO NODE 10371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 23.86  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.927  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 0.100 -  
USER-DEFINED - 1.20 0.50 0.850 -  
USER-DEFINED - 1.60 0.50 1.000 -  
USER-DEFINED - 0.40 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 0.100 -  
USER-DEFINED - 7.20 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958  
SUBAREA AREA (ACRES) = 10.70 SUBAREA RUNOFF (CFS) = 4.32  
EFFECTIVE AREA (ACRES) = 55.50 AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 21.70

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10371.00 TO NODE 10389.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 188.00 DOWNSTREAM (FEET) = 157.00  
FLOW LENGTH (FEET) = 1918.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.64  
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 21.70  
PIPE TRAVEL TIME (MIN.) = 3.32 Tc (MIN.) = 27.17  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 27.17  
RAINFALL INTENSITY (INCH/HR) = 0.86  
AREA-AVERAGED Fm (INCH/HR) = 0.49  
AREA-AVERAGED Fp (INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.99  
EFFECTIVE STREAM AREA (ACRES) = 55.50  
TOTAL STREAM AREA (ACRES) = 55.50  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 21.70

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10380.00 TO NODE 10381.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 241.00
ELEVATION DATA: UPSTREAM (FEET) = 275.00 DOWNSTREAM (FEET) = 273.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.110
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.835
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL - 0.20 0.50 0.100 95 7.11
PUBLIC PARK - 1.10 0.50 0.850 95 11.30
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.735
SUBAREA RUNOFF (CFS) = 1.72
TOTAL AREA (ACRES) = 1.30 PEAK FLOW RATE (CFS) = 1.72

\*\*\*\*\*
FLOW PROCESS FROM NODE 10381.00 TO NODE 10382.00 IS CODE = 63
-----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<
>>>> (STREET TABLE SECTION # 5 USED) <<<<<

UPSTREAM ELEVATION (FEET) = 273.00 DOWNSTREAM ELEVATION (FEET) = 271.00
STREET LENGTH (FEET) = 238.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.65
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.30
HALFSTREET FLOOD WIDTH (FEET) = 7.22
AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.87
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.56
STREET FLOW TRAVEL TIME (MIN.) = 2.13 Tc (MIN.) = 9.24
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.579
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.50 0.100 -
USER-DEFINED - 1.40 0.50 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.718
SUBAREA AREA (ACRES) = 1.70 SUBAREA RUNOFF (CFS) = 1.87
EFFECTIVE AREA (ACRES) = 3.00 AREA-AVERAGED Fm (INCH/HR) = 0.36
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73
TOTAL AREA (ACRES) = 3.0 PEAK FLOW RATE (CFS) = 3.28

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.32 HALFSTREET FLOOD WIDTH (FEET) = 8.09
FLOW VELOCITY (FEET/SEC.) = 1.94 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.62
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10382.00 = 479.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10382.00 TO NODE 10383.00 IS CODE = 63
-----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<
>>>> (STREET TABLE SECTION # 5 USED) <<<<<

UPSTREAM ELEVATION (FEET) = 271.00 DOWNSTREAM ELEVATION (FEET) = 268.00
STREET LENGTH (FEET) = 357.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.81
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.35
HALFSTREET FLOOD WIDTH (FEET) = 9.72
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.12
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.75
STREET FLOW TRAVEL TIME (MIN.) = 2.80 Tc (MIN.) = 12.04
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.358

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.50 0.50 0.100 -
USER-DEFINED - 0.20 0.50 0.500 -
USER-DEFINED - 1.30 0.50 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.452
SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 3.06
EFFECTIVE AREA (ACRES) = 6.00 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59
TOTAL AREA (ACRES) = 6.0 PEAK FLOW RATE (CFS) = 5.74

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 10.59
FLOW VELOCITY (FEET/SEC.) = 2.19 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.81
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10383.00 = 836.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10383.00 TO NODE 10384.00 IS CODE = 63
-----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<
>>>> (STREET TABLE SECTION # 5 USED) <<<<<

UPSTREAM ELEVATION (FEET) = 268.00 DOWNSTREAM ELEVATION (FEET) = 264.00
STREET LENGTH (FEET) = 473.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.51  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.40  
HALFSTREET FLOOD WIDTH(FEET) = 11.91  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.33  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.93  
STREET FLOW TRAVEL TIME(MIN.) = 3.38 Tc(MIN.) = 15.42  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.185

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.50 0.500 -  
USER-DEFINED - 0.10 0.50 0.850 -  
USER-DEFINED - 0.10 0.50 0.100 -  
USER-DEFINED - 3.00 0.50 0.500 -  
USER-DEFINED - 0.60 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.548  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 3.53  
EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.57  
TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 8.33

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 12.46  
FLOW VELOCITY(FEET/SEC.) = 2.39 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.97  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10384.00 = 1309.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10384.00 TO NODE 10385.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 264.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
STREET LENGTH(FEET) = 463.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.46  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.45  
HALFSTREET FLOOD WIDTH(FEET) = 14.49  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.28  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.02  
STREET FLOW TRAVEL TIME(MIN.) = 3.38 Tc(MIN.) = 18.80  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.063

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 0.600 -  
USER-DEFINED - 0.30 0.50 0.600 -  
USER-DEFINED - 0.60 0.50 0.850 -  
USER-DEFINED - 0.30 0.50 0.500 -  
USER-DEFINED - 4.00 0.50 0.600 -  
USER-DEFINED - 0.80 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.650  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 4.25  
EFFECTIVE AREA(ACRES) = 16.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 16.7 PEAK FLOW RATE(CFS) = 11.46

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 15.04  
FLOW VELOCITY(FEET/SEC.) = 2.34 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.07  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10385.00 = 1772.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10385.00 TO NODE 10385.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc(MIN.) = 18.80  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.063  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 0.500 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.15  
EFFECTIVE AREA(ACRES) = 16.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 16.9 PEAK FLOW RATE(CFS) = 11.61

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10385.00 TO NODE 10386.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 261.00 DOWNSTREAM(FEET) = 200.00  
FLOW LENGTH(FEET) = 712.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.56  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 11.61  
PIPE TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 19.56  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10386.00 = 2484.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 19.56  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.50 0.100 -  
USER-DEFINED - 0.20 0.50 0.850 -  
USER-DEFINED - 0.30 0.50 0.100 -  
USER-DEFINED - 0.30 0.50 0.850 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.561  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 0.95  
EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 12.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 19.56  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.50 0.100 -  
USER-DEFINED - 0.10 0.50 0.600 -  
USER-DEFINED - 1.70 0.50 0.850 -  
USER-DEFINED - 0.20 0.50 0.100 -  
USER-DEFINED - 0.30 0.50 0.850 -  
USER-DEFINED - 0.30 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.544  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 2.82  
EFFECTIVE AREA(ACRES) = 22.40 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 22.4 PEAK FLOW RATE(CFS) = 14.96

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.56  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.50 0.100 -  
USER-DEFINED - 0.20 0.50 0.500 -  
USER-DEFINED - 0.10 0.50 0.600 -  
USER-DEFINED - 0.30 0.50 0.850 -  
USER-DEFINED - 0.70 0.50 0.100 -  
USER-DEFINED - 0.10 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 2.91  
EFFECTIVE AREA(ACRES) = 25.90 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.54  
TOTAL AREA(ACRES) = 25.9 PEAK FLOW RATE(CFS) = 17.87

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 19.56  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 1.70 0.50 0.100 -  
USER-DEFINED - 0.10 0.50 0.850 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.228  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 1.66  
EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.52  
TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 19.53

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 19.56  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 0.100 -  
USER-DEFINED - 0.50 0.50 0.850 -  
USER-DEFINED - 2.10 0.50 0.100 -  
USER-DEFINED - 0.20 0.50 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.225  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 2.49  
EFFECTIVE AREA(ACRES) = 30.90 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.49

TOTAL AREA (ACRES) = 30.9 PEAK FLOW RATE (CFS) = 22.02

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 19.56

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.036

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.50	0.100	-
USER-DEFINED	-	1.50	0.50	0.600	-
USER-DEFINED	-	1.70	0.50	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.204

SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 6.05

EFFECTIVE AREA (ACRES) = 38.10 AREA-AVERAGED Fm (INCH/HR) = 0.22

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43

TOTAL AREA (ACRES) = 38.1 PEAK FLOW RATE (CFS) = 28.07

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10387.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 200.00 DOWNSTREAM (FEET) = 163.00

FLOW LENGTH (FEET) = 1145.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.2 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 13.39

ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 28.07

PIPE TRAVEL TIME (MIN.) = 1.42 Tc (MIN.) = 20.98

LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10387.00 = 3629.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 20.98

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.996

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.100	-
USER-DEFINED	-	23.80	0.50	0.850	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	0.80	0.50	1.000	-
USER-DEFINED	-	0.60	0.50	0.100	-
USER-DEFINED	-	6.90	0.50	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.830

SUBAREA AREA (ACRES) = 32.90 SUBAREA RUNOFF (CFS) = 17.21

EFFECTIVE AREA (ACRES) = 71.00 AREA-AVERAGED Fm (INCH/HR) = 0.31

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.62

TOTAL AREA (ACRES) = 71.0 PEAK FLOW RATE (CFS) = 43.93

\*\*\*\*\*

FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 20.98

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.996

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	0.850	-
USER-DEFINED	-	1.20	0.50	0.100	-
USER-DEFINED	-	1.70	0.50	0.850	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.641

SUBAREA AREA (ACRES) = 3.80 SUBAREA RUNOFF (CFS) = 2.31

EFFECTIVE AREA (ACRES) = 74.80 AREA-AVERAGED Fm (INCH/HR) = 0.31

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.62

TOTAL AREA (ACRES) = 74.8 PEAK FLOW RATE (CFS) = 46.24

\*\*\*\*\*

FLOW PROCESS FROM NODE 10387.00 TO NODE 10388.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 163.00 DOWNSTREAM (FEET) = 158.00

FLOW LENGTH (FEET) = 150.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.3 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 15.18

ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 46.24

PIPE TRAVEL TIME (MIN.) = 0.16 Tc (MIN.) = 21.15

LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10388.00 = 3779.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 21.15

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.992

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.80	0.50	0.100	-
USER-DEFINED	-	0.40	0.50	0.400	-
USER-DEFINED	-	0.60	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223

SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 4.84  
EFFECTIVE AREA (ACRES) = 80.90 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 80.9 PEAK FLOW RATE (CFS) = 50.81

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 21.15  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.992  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 0.100 -  
USER-DEFINED - 10.70 0.50 0.400 -  
USER-DEFINED - 2.30 0.50 0.850 -  
USER-DEFINED - 0.50 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 0.70 0.50 0.400 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.502  
SUBAREA AREA (ACRES) = 14.60 SUBAREA RUNOFF (CFS) = 9.74  
EFFECTIVE AREA (ACRES) = 95.50 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.58  
TOTAL AREA (ACRES) = 95.5 PEAK FLOW RATE (CFS) = 60.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 21.15  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.992  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 0.36  
EFFECTIVE AREA (ACRES) = 96.20 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.58  
TOTAL AREA (ACRES) = 96.2 PEAK FLOW RATE (CFS) = 60.91

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10389.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 158.00 DOWNSTREAM (FEET) = 157.00  
FLOW LENGTH (FEET) = 51.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.7 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.32  
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 60.91

PIPE TRAVEL TIME (MIN.) = 0.06 Tc (MIN.) = 21.21  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10389.00 = 3830.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION (MIN.) = 21.21  
RAINFALL INTENSITY (INCH/HR) = 0.99  
AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.50  
AREA-AVERAGED Ap = 0.58  
EFFECTIVE STREAM AREA (ACRES) = 96.20  
TOTAL STREAM AREA (ACRES) = 96.20  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 60.91

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	21.70	27.17	0.861	0.50 (0.49)	0.99	55.5	10360.00
2	60.91	21.21	0.991	0.50 (0.29)	0.58	96.2	10380.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	82.61	21.21	0.991	0.50 (0.35)	0.70	139.5	10380.00
2	71.33	27.17	0.861	0.50 (0.36)	0.73	151.7	10360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 82.61 Tc (MIN.) = 21.21  
EFFECTIVE AREA (ACRES) = 139.52 AREA-AVERAGED Fm (INCH/HR) = 0.35  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.70  
TOTAL AREA (ACRES) = 151.7  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10390.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 157.00 DOWNSTREAM (FEET) = 155.00  
FLOW LENGTH (FEET) = 312.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.41  
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 82.61  
PIPE TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 21.77  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.77

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.978

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	3.10	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	5.70	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997

SUBAREA AREA (ACRES) = 9.50 SUBAREA RUNOFF (CFS) = 4.10

EFFECTIVE AREA (ACRES) = 149.02 AREA-AVERAGED Fm (INCH/HR) = 0.36

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.72

TOTAL AREA (ACRES) = 161.2 PEAK FLOW RATE (CFS) = 82.62

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.77

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.978

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 0.95  
EFFECTIVE AREA (ACRES) = 151.22 AREA-AVERAGED Fm (INCH/HR) = 0.36  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73  
TOTAL AREA (ACRES) = 163.4 PEAK FLOW RATE (CFS) = 83.57

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	83.57	21.77	0.978	0.50 ( 0.36)	0.73	151.2	10380.00
2	71.33	27.75	0.850	0.50 ( 0.37)	0.75	163.4	10360.00

LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	169.13	21.48	0.985	0.50 ( 0.39)	0.78	255.1	10300.00
2	159.30	25.33	0.894	0.50 ( 0.39)	0.77	283.7	10320.00

3 137.55 30.24 0.807 0.50 ( 0.39) 0.77 297.4 10340.00  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	252.52	21.48	0.985	0.50 ( 0.38)	0.76	404.4	10300.00
2	251.96	21.77	0.978	0.50 ( 0.38)	0.76	408.5	10380.00
3	235.57	25.33	0.894	0.50 ( 0.38)	0.76	442.2	10320.00
4	219.91	27.75	0.850	0.50 ( 0.38)	0.76	453.9	10360.00
5	202.40	30.24	0.807	0.50 ( 0.38)	0.76	460.8	10340.00
TOTAL AREA (ACRES) = 460.8							

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 252.52 Tc (MIN.) = 21.479

EFFECTIVE AREA (ACRES) = 404.38 AREA-AVERAGED Fm (INCH/HR) = 0.38

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76

TOTAL AREA (ACRES) = 460.8

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 460.8 TC (MIN.) = 21.48

EFFECTIVE AREA (ACRES) = 404.38 AREA-AVERAGED Fm (INCH/HR) = 0.38

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.757

PEAK FLOW RATE (CFS) = 252.52

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	252.52	21.48	0.985	0.50 ( 0.38)	0.76	404.4	10300.00
2	251.96	21.77	0.978	0.50 ( 0.38)	0.76	408.5	10380.00
3	235.57	25.33	0.894	0.50 ( 0.38)	0.76	442.2	10320.00
4	219.91	27.75	0.850	0.50 ( 0.38)	0.76	453.9	10360.00
5	202.40	30.24	0.807	0.50 ( 0.38)	0.76	460.8	10340.00

END OF RATIONAL METHOD ANALYSIS





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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506104F.DAT  
TIME/DATE OF STUDY: 12:47 04/15/2013  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 2.230
- 2) 6.00; 2.010
- 3) 7.00; 1.850
- 4) 8.00; 1.710
- 5) 9.00; 1.600
- 6) 10.00; 1.510
- 7) 11.00; 1.430
- 8) 12.00; 1.360
- 9) 13.00; 1.300
- 10) 14.00; 1.250
- 11) 15.00; 1.200
- 12) 20.00; 1.020
- 13) 25.00; 0.900
- 14) 30.00; 0.810
- 15) 40.00; 0.690
- 16) 50.00; 0.610
- 17) 60.00; 0.550
- 18) 90.00; 0.440
- 19) 120.00; 0.370
- 20) 180.00; 0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10400.00 TO NODE 10401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00  
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.434  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.941  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
PUBLIC PARK	-	0.50	0.50	0.850	95	6.43

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.850  
 SUBAREA RUNOFF(CFS) = 0.68  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.68

\*\*\*\*\*

FLOW PROCESS FROM NODE 10401.00 TO NODE 10402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.3419  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 0.68  
 FLOW VELOCITY(FEET/SEC.) = 4.77 FLOW DEPTH(FEET) = 0.22  
 TRAVEL TIME(MIN.) = 0.41  $T_c$ (MIN.) = 6.84  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10402.00 = 424.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 6.84  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.875  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.850	-
USER-DEFINED	-	0.30	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.940  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 0.63  
EFFECTIVE AREA(ACRES) = 1.00 AREA-AVERAGED Fm(INCH/HR) = 0.45  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 1.28

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10403.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.2439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.28  
FLOW VELOCITY(FEET/SEC.) = 4.93 FLOW DEPTH(FEET) = 0.29  
TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 7.26  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10403.00 = 547.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10403.00 TO NODE 10403.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.26  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.814

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.850	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.10  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.45  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.91  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 2.33

\*\*\*\*\*

FLOW PROCESS FROM NODE 10403.00 TO NODE 10404.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 420.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 266.00 CHANNEL SLOPE = 0.1880  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.33  
FLOW VELOCITY(FEET/SEC.) = 5.20 FLOW DEPTH(FEET) = 0.39  
TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 8.11  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10404.00 = 813.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10404.00 TO NODE 10404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.11  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.698

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.50	0.850	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.863  
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 2.62  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.44  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 4.75

\*\*\*\*\*

FLOW PROCESS FROM NODE 10404.00 TO NODE 10405.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 370.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 289.00 CHANNEL SLOPE = 0.1730  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.75  
FLOW VELOCITY(FEET/SEC.) = 5.99 FLOW DEPTH(FEET) = 0.51  
TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 8.91  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10405.00 = 1102.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10405.00 TO NODE 10405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.91  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.609

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 4.26  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.43  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 8.68

\*\*\*\*\*

FLOW PROCESS FROM NODE 10405.00 TO NODE 10406.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 367.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 23.00 CHANNEL SLOPE = 0.1304

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 8.68  
FLOW VELOCITY (FEET/SEC.) = 6.33 FLOW DEPTH (FEET) = 0.68  
TRAVEL TIME (MIN.) = 0.06 Tc (MIN.) = 8.98  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10406.00 = 1125.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.98  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.603  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 2.23  
EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.43  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 10.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 367.00 DOWNSTREAM (FEET) = 344.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 214.00 CHANNEL SLOPE = 0.1075  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 10.85  
FLOW VELOCITY (FEET/SEC.) = 6.17 FLOW DEPTH (FEET) = 0.77  
TRAVEL TIME (MIN.) = 0.58 Tc (MIN.) = 9.55  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10407.00 = 1339.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.55  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.550  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 2.03  
EFFECTIVE AREA (ACRES) = 12.30 AREA-AVERAGED Fm (INCH/HR) = 0.43  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 12.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 344.00 DOWNSTREAM (FEET) = 327.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 919.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 12.39  
FLOW VELOCITY (FEET/SEC.) = 4.11 FLOW DEPTH (FEET) = 1.00  
TRAVEL TIME (MIN.) = 3.72 Tc (MIN.) = 13.28  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10408.00 = 2258.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10408.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 13.28  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.286  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 0.800 -  
USER-DEFINED - 7.90 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.849  
SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 6.20  
EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.43  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 15.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 327.00 DOWNSTREAM (FEET) = 314.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 807.00 CHANNEL SLOPE = 0.0161  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 15.67  
FLOW VELOCITY (FEET/SEC.) = 4.13 FLOW DEPTH (FEET) = 1.12  
TRAVEL TIME (MIN.) = 3.26 Tc (MIN.) = 16.53  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10409.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10409.00 TO NODE 10409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 16.53  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.145  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

```

LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        6.90     0.50      0.800      -
USER-DEFINED  -        5.70     0.50      0.850      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.823
SUBAREA AREA (ACRES) = 12.60  SUBAREA RUNOFF (CFS) = 8.32
EFFECTIVE AREA (ACRES) = 32.90  AREA-AVERAGED Fm (INCH/HR) = 0.42
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.84
TOTAL AREA (ACRES) = 32.9  PEAK FLOW RATE (CFS) = 21.40

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*****
FLOW PROCESS FROM NODE 10409.00 TO NODE 10410.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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```

ELEVATION DATA: UPSTREAM(FEET) = 314.00  DOWNSTREAM(FEET) = 266.00
FLOW LENGTH(FEET) = 213.00  MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 26.10
ESTIMATED PIPE DIAMETER (INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 21.40
PIPE TRAVEL TIME (MIN.) = 0.14  Tc (MIN.) = 16.67
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10410.00 = 3278.00 FEET.

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*****
FLOW PROCESS FROM NODE 10410.00 TO NODE 10411.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

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```

ELEVATION DATA: UPSTREAM(FEET) = 266.00  DOWNSTREAM(FEET) = 170.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 1470.00  CHANNEL SLOPE = 0.0653
CHANNEL BASE (FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 21.40
FLOW VELOCITY (FEET/SEC.) = 7.55  FLOW DEPTH (FEET) = 0.97
TRAVEL TIME (MIN.) = 3.24  Tc (MIN.) = 19.91
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10411.00 = 4748.00 FEET.

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*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10411.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 19.91
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.023
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -  0.60  0.50  0.100  -
USER-DEFINED  -  0.10  0.50  0.850  -
USER-DEFINED  -  0.40  0.50  0.100  -
USER-DEFINED  -  6.60  0.50  0.800  -
USER-DEFINED  -  0.80  0.50  0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.723

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SUBAREA AREA (ACRES) = 8.50  SUBAREA RUNOFF (CFS) = 5.06
EFFECTIVE AREA (ACRES) = 41.40  AREA-AVERAGED Fm (INCH/HR) = 0.41
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.82
TOTAL AREA (ACRES) = 41.4  PEAK FLOW RATE (CFS) = 22.86

```

```

*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10412.00 IS CODE = 31
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```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

```

```

ELEVATION DATA: UPSTREAM(FEET) = 170.00  DOWNSTREAM(FEET) = 161.00
FLOW LENGTH (FEET) = 1129.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 7.43
ESTIMATED PIPE DIAMETER (INCH) = 27.00  NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 22.86
PIPE TRAVEL TIME (MIN.) = 2.53  Tc (MIN.) = 22.44
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10412.00 = 5877.00 FEET.

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*****
FLOW PROCESS FROM NODE 10412.00 TO NODE 10413.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

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```

ELEVATION DATA: UPSTREAM(FEET) = 161.00  DOWNSTREAM(FEET) = 141.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 360.00  CHANNEL SLOPE = 0.0556
CHANNEL BASE (FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 22.86
FLOW VELOCITY (FEET/SEC.) = 7.22  FLOW DEPTH (FEET) = 1.03
TRAVEL TIME (MIN.) = 0.83  Tc (MIN.) = 23.27
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10413.00 = 6237.00 FEET.

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*****
FLOW PROCESS FROM NODE 10413.00 TO NODE 10413.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 23.27
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.941
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -  1.20  0.50  0.100  -
USER-DEFINED  -  0.40  0.50  0.850  -
USER-DEFINED  -  0.30  0.50  0.100  -
USER-DEFINED  -  0.10  0.50  0.850  -
USER-DEFINED  -  0.90  0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.509
SUBAREA AREA (ACRES) = 2.90  SUBAREA RUNOFF (CFS) = 1.79
EFFECTIVE AREA (ACRES) = 44.30  AREA-AVERAGED Fm (INCH/HR) = 0.40
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.80
TOTAL AREA (ACRES) = 44.3  PEAK FLOW RATE (CFS) = 22.86
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
=====

```

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 44.3 TC (MIN.) = 23.27  
EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.40  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.50 AREA-AVERAGED  $A_p$  = 0.798  
PEAK FLOW RATE (CFS) = 22.86

=====  
=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

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FILE NAME: 0506105M.DAT  
TIME/DATE OF STUDY: 12:50 04/15/2013  
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--\*TIME-OF-CONCENTRATION MODEL\*--  
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\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10500.00 TO NODE 10501.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 326.00  
ELEVATION DATA: UPSTREAM (FEET) = 1123.00 DOWNSTREAM (FEET) = 1085.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.984

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.431

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.20	0.50	1.000	95	10.98
NATURAL FAIR COVER "GRASS"	-	0.30	0.50	1.000	95	10.98

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 0.42

TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 0.42

\*\*\*\*\*

FLOW PROCESS FROM NODE 10501.00 TO NODE 10502.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 1085.00 DOWNSTREAM (FEET) = 1050.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 181.00 CHANNEL SLOPE = 0.1934

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00

CHANNEL FLOW THRU SUBAREA (CFS) = 0.42

FLOW VELOCITY (FEET/SEC.) = 3.45 FLOW DEPTH (FEET) = 0.20

TRAVEL TIME (MIN.) = 0.87 Tc (MIN.) = 11.86

LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10502.00 = 507.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10502.00 TO NODE 10502.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 11.86

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.370

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "GRASS"	-	0.20	0.50	1.000	95
NATURAL FAIR COVER "GRASS"	-	0.30	0.50	1.000	95

```

LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.10     0.50      1.000     -
USER-DEFINED  -        0.80     0.50      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 0.70
EFFECTIVE AREA (ACRES) = 1.40  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.4    PEAK FLOW RATE (CFS) = 1.10

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*****
FLOW PROCESS FROM NODE 10502.00 TO NODE 10503.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1025.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 193.00  CHANNEL SLOPE = 0.1295
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.10
FLOW VELOCITY(FEET/SEC.) = 3.80  FLOW DEPTH(FEET) = 0.31
TRAVEL TIME(MIN.) = 0.85  Tc(MIN.) = 12.71
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10503.00 = 700.00 FEET.

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10503.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.71
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.318
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.50   0.50  1.000  -
USER-DEFINED      -        1.80   0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 1.69
EFFECTIVE AREA (ACRES) = 3.70  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 3.7    PEAK FLOW RATE (CFS) = 2.72

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```

*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10504.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 1025.00  DOWNSTREAM(FEET) = 1020.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00  CHANNEL SLOPE = 0.0151
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.72
FLOW VELOCITY(FEET/SEC.) = 2.60  FLOW DEPTH(FEET) = 0.59
TRAVEL TIME(MIN.) = 2.13  Tc(MIN.) = 14.83
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10504.00 = 1032.00 FEET.

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10504.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN.) = 14.83
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.208
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.10   0.50  1.000  -
USER-DEFINED      -        0.80   0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 0.57
EFFECTIVE AREA (ACRES) = 4.60  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.6    PEAK FLOW RATE (CFS) = 2.93

```

```

*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10505.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 1020.00  DOWNSTREAM(FEET) = 975.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 397.00  CHANNEL SLOPE = 0.1134
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.93
FLOW VELOCITY(FEET/SEC.) = 5.63  FLOW DEPTH(FEET) = 0.42
TRAVEL TIME(MIN.) = 1.18  Tc(MIN.) = 16.01
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10505.00 = 1429.00 FEET.

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10505.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 16.01
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.164
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.20   0.50  1.000  -
USER-DEFINED      -        1.20   0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.40  SUBAREA RUNOFF (CFS) = 0.84
EFFECTIVE AREA (ACRES) = 6.00  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.0    PEAK FLOW RATE (CFS) = 3.58

```

```

*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10506.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

```

```

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 905.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 334.00 CHANNEL SLOPE = 0.2096
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.58
FLOW VELOCITY(FEET/SEC.) = 7.48 FLOW DEPTH(FEET) = 0.40
TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 16.75
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10506.00 = 1763.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10506.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN.) = 16.75
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.137
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        6.10   0.50   1.000  -
USER-DEFINED        -        3.70   0.50   1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 5.62
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 9.06

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10507.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 790.00 CHANNEL SLOPE = 0.0380
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 9.06
FLOW VELOCITY(FEET/SEC.) = 4.02 FLOW DEPTH(FEET) = 0.87
TRAVEL TIME(MIN.) = 3.28 Tc(MIN.) = 20.03
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10507.00 = 2553.00 FEET.

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10507.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 20.03
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.019
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        2.70   0.50   1.000  -
USER-DEFINED        -        6.30   0.50   1.000  -
USER-DEFINED        -        0.30   0.50   1.000  -

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```

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 4.35
EFFECTIVE AREA(ACRES) = 25.10 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 11.73

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10508.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 755.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 11.73
FLOW VELOCITY(FEET/SEC.) = 6.28 FLOW DEPTH(FEET) = 0.79
TRAVEL TIME(MIN.) = 2.97 Tc(MIN.) = 23.00
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10508.00 = 3673.00 FEET.

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10508.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 23.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.948
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.80   0.50   1.000  -
USER-DEFINED        -       11.10   0.50   1.000  -
USER-DEFINED        -        3.10   0.50   1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 6.05
EFFECTIVE AREA(ACRES) = 40.10 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 16.16

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FLOW PROCESS FROM NODE 10508.00 TO NODE 10509.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 755.00 DOWNSTREAM(FEET) = 533.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1578.00 CHANNEL SLOPE = 0.1407
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 16.16
FLOW VELOCITY(FEET/SEC.) = 7.56 FLOW DEPTH(FEET) = 0.84
TRAVEL TIME(MIN.) = 3.48 Tc(MIN.) = 26.48
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10509.00 = 5251.00 FEET.

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FLOW PROCESS FROM NODE 10509.00 TO NODE 10509.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 26.48

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.873

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.80	0.50	1.000	-
USER-DEFINED	-	11.40	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-
USER-DEFINED	-	8.30	0.50	1.000	-
USER-DEFINED	-	38.10	0.50	1.000	-
USER-DEFINED	-	8.70	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 77.40 SUBAREA RUNOFF (CFS) = 26.00

EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 39.47

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FLOW PROCESS FROM NODE 10509.00 TO NODE 10510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 415.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1236.00 CHANNEL SLOPE = 0.0955  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 39.47  
 FLOW VELOCITY (FEET/SEC.) = 8.17 FLOW DEPTH (FEET) = 1.27  
 TRAVEL TIME (MIN.) = 2.52 Tc (MIN.) = 29.00  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10510.00 = 6487.00 FEET.

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FLOW PROCESS FROM NODE 10510.00 TO NODE 10510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 29.00

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.828

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	30.10	0.50	1.000	-
USER-DEFINED	-	15.30	0.50	1.000	-
USER-DEFINED	-	2.00	0.50	1.000	-
USER-DEFINED	-	11.30	0.50	1.000	-
USER-DEFINED	-	5.10	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 64.90 SUBAREA RUNOFF (CFS) = 19.15

EFFECTIVE AREA (ACRES) = 182.40 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 182.4 PEAK FLOW RATE (CFS) = 53.81

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FLOW PROCESS FROM NODE 10510.00 TO NODE 10511.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1161.00 CHANNEL SLOPE = 0.0973  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 53.81  
 FLOW VELOCITY (FEET/SEC.) = 8.87 FLOW DEPTH (FEET) = 1.42  
 TRAVEL TIME (MIN.) = 2.18 Tc (MIN.) = 31.18  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10511.00 = 7648.00 FEET.

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FLOW PROCESS FROM NODE 10511.00 TO NODE 10511.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 31.18

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.796

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.50	0.50	1.000	-
USER-DEFINED	-	10.80	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-
USER-DEFINED	-	22.10	0.50	1.000	-
USER-DEFINED	-	4.30	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 54.80 SUBAREA RUNOFF (CFS) = 14.58

EFFECTIVE AREA (ACRES) = 237.20 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 237.2 PEAK FLOW RATE (CFS) = 63.11

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FLOW PROCESS FROM NODE 10511.00 TO NODE 10512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 302.00 DOWNSTREAM (FEET) = 190.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1644.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 63.11  
 FLOW VELOCITY (FEET/SEC.) = 8.09 FLOW DEPTH (FEET) = 1.61  
 TRAVEL TIME (MIN.) = 3.39 Tc (MIN.) = 34.57  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10512.00 = 9292.00 FEET.

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FLOW PROCESS FROM NODE 10512.00 TO NODE 10512.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 34.57
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.755
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50   0.50   1.000  -
USER-DEFINED        -         0.20   0.50   1.000  -
USER-DEFINED        -         1.70   0.50   1.000  -
USER-DEFINED        -         0.10   0.50   1.000  -
USER-DEFINED        -        14.20   0.50   1.000  -
USER-DEFINED        -         2.80   0.50   1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 19.50   SUBAREA RUNOFF(CFS) = 4.48
EFFECTIVE AREA(ACRES) = 256.70   AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 256.7   PEAK FLOW RATE(CFS) = 63.11
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10512.00 TO NODE 10513.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 190.00 DOWNSTREAM(FEET) = 183.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 86.00 CHANNEL SLOPE = 0.0814
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00
CHANNEL FLOW THRU SUBAREA(CFS) = 63.11
FLOW VELOCITY(FEET/SEC.) = 8.65 FLOW DEPTH(FEET) = 1.56
TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 34.73
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10513.00 = 9378.00 FEET.

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*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 34.73
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.50   0.100  -
USER-DEFINED        -         1.30   0.50   1.000  -
USER-DEFINED        -        29.90   0.50   1.000  -
USER-DEFINED        -        11.90   0.50   1.000  -
USER-DEFINED        -         1.70   0.50   1.000  -
USER-DEFINED        -         0.60   0.50   0.100  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 45.50   SUBAREA RUNOFF(CFS) = 10.64
EFFECTIVE AREA(ACRES) = 302.20   AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 302.2   PEAK FLOW RATE(CFS) = 69.10

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*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 34.73
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.753
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         9.30   0.50   1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30   SUBAREA RUNOFF(CFS) = 2.12
EFFECTIVE AREA(ACRES) = 311.50   AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 311.5   PEAK FLOW RATE(CFS) = 71.21

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FLOW PROCESS FROM NODE 10513.00 TO NODE 10514.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 171.00
FLOW LENGTH(FEET) = 1209.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.66
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 71.21
PIPE TRAVEL TIME(MIN.) = 1.89 Tc(MIN.) = 36.62
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10514.00 = 10587.00 FEET.

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*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10514.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 36.62
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.731
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.50   0.100  -
USER-DEFINED        -         0.40   0.50   1.000  -
USER-DEFINED        -         1.70   0.50   0.100  -
USER-DEFINED        -        31.30   0.50   1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 33.60   SUBAREA RUNOFF(CFS) = 7.73
EFFECTIVE AREA(ACRES) = 345.10   AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 345.1   PEAK FLOW RATE(CFS) = 72.59

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*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10515.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

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>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 171.00 DOWNSTREAM(FEET) = 165.00
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.01
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 72.59
PIPE TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 37.48
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10515.00 = 11152.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10515.00 TO NODE 10515.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 37.48
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.720
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.50 0.850 -
USER-DEFINED - 1.30 0.50 0.100 -
USER-DEFINED - 0.90 0.50 0.850 -
USER-DEFINED - 15.30 0.50 0.100 -
USER-DEFINED - 1.10 0.50 0.850 -
USER-DEFINED - 0.10 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.202
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 10.70
EFFECTIVE AREA(ACRES) = 364.30 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 364.3 PEAK FLOW RATE(CFS) = 80.10

\*\*\*\*\*
FLOW PROCESS FROM NODE 10515.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00
FLOW LENGTH(FEET) = 709.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.05
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 80.10
PIPE TRAVEL TIME(MIN.) = 1.07 Tc(MIN.) = 38.55
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 38.55
RAINFALL INTENSITY(INCH/HR) = 0.71

AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.95
EFFECTIVE STREAM AREA(ACRES) = 364.30
TOTAL STREAM AREA(ACRES) = 364.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 80.10

\*\*\*\*\*
FLOW PROCESS FROM NODE 10520.00 TO NODE 10521.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 289.00
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 180.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.311
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.806
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL - 0.30 0.50 0.100 95 7.31
PUBLIC PARK - 1.20 0.50 0.850 95 11.62
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.700
SUBAREA RUNOFF(CFS) = 1.97
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 1.97

\*\*\*\*\*
FLOW PROCESS FROM NODE 10521.00 TO NODE 10522.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<

UPSTREAM ELEVATION(FEET) = 180.00 DOWNSTREAM ELEVATION(FEET) = 176.00
STREET LENGTH(FEET) = 408.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.32
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.31
HALFSTREET FLOOD WIDTH(FEET) = 7.78
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.09
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.66
STREET FLOW TRAVEL TIME(MIN.) = 3.25 Tc(MIN.) = 10.56
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.465
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	0.850	-
USER-DEFINED	-	0.60	0.50	0.100	-
USER-DEFINED	-	0.80	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.520  
SUBAREA AREA (ACRES) = 2.50 SUBAREA RUNOFF (CFS) = 2.71  
EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 4.22

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.33 HALFSTREET FLOOD WIDTH (FEET) = 8.78  
FLOW VELOCITY (FEET/SEC.) = 2.19 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.73  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10522.00 = 697.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10522.00 TO NODE 10523.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION (FEET) = 176.00 DOWNSTREAM ELEVATION (FEET) = 173.00  
STREET LENGTH (FEET) = 333.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.25  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.39  
HALFSTREET FLOOD WIDTH (FEET) = 11.52  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.39  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.93  
STREET FLOW TRAVEL TIME (MIN.) = 2.32 Tc (MIN.) = 12.89  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.307

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.100	-
USER-DEFINED	-	4.70	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.600	-
USER-DEFINED	-	0.10	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.109  
SUBAREA AREA (ACRES) = 5.40 SUBAREA RUNOFF (CFS) = 6.09  
EFFECTIVE AREA (ACRES) = 9.40 AREA-AVERAGED Fm (INCH/HR) = 0.16  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31

TOTAL AREA (ACRES) = 9.4 PEAK FLOW RATE (CFS) = 9.73

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 13.16  
FLOW VELOCITY (FEET/SEC.) = 2.53 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.07  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10523.00 = 1030.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10523.00 TO NODE 10523.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 12.89  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.307

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	1.90	0.50	0.850	-
USER-DEFINED	-	0.80	0.50	0.100	-
USER-DEFINED	-	4.80	0.50	0.850	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	4.90	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785  
SUBAREA AREA (ACRES) = 12.70 SUBAREA RUNOFF (CFS) = 10.45  
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.58  
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 20.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10523.00 TO NODE 10524.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM (FEET) = 173.00 DOWNSTREAM (FEET) = 165.00  
FLOW LENGTH (FEET) = 736.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 8.06  
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 20.18  
PIPE TRAVEL TIME (MIN.) = 1.52 Tc (MIN.) = 14.41  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10524.00 = 1766.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10524.00 TO NODE 10524.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc (MIN.) = 14.41  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.230

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	0.100	-

USER-DEFINED - 0.40 0.50 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.308  
 SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 1.74  
 EFFECTIVE AREA (ACRES) = 23.90 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.56  
 TOTAL AREA (ACRES) = 23.9 PEAK FLOW RATE (CFS) = 20.39

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10524.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 165.00 DOWNSTREAM (FEET) = 158.00  
 FLOW LENGTH (FEET) = 623.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.19  
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 20.39  
 PIPE TRAVEL TIME (MIN.) = 1.27 Tc (MIN.) = 15.68  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10525.00 = 2389.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 15.68  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.176  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.90	0.50	0.850	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	6.80	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.853  
 SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 6.13  
 EFFECTIVE AREA (ACRES) = 33.00 AREA-AVERAGED Fm (INCH/HR) = 0.32  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.64  
 TOTAL AREA (ACRES) = 33.0 PEAK FLOW RATE (CFS) = 25.36

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 15.68  
 RAINFALL INTENSITY (INCH/HR) = 1.18  
 AREA-AVERAGED Fm (INCH/HR) = 0.32  
 AREA-AVERAGED Fp (INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.64

EFFECTIVE STREAM AREA (ACRES) = 33.00  
 TOTAL STREAM AREA (ACRES) = 33.00  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 25.36

\*\* CONFLUENCE DATA \*\*

STREAM	Q	Tc	Intensity	Fp (Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	80.10	38.55	0.707	0.50 (0.48)	0.95	364.3	10500.00
2	25.36	15.68	1.176	0.50 (0.32)	0.64	33.0	10520.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM	Q	Tc	Intensity	Fp (Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	105.46	15.68	1.176	0.50 (0.45)	0.90	181.1	10520.00
2	91.55	38.55	0.707	0.50 (0.46)	0.93	397.3	10500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 105.46 Tc (MIN.) = 15.68  
 EFFECTIVE AREA (ACRES) = 181.15 AREA-AVERAGED Fm (INCH/HR) = 0.45  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.90  
 TOTAL AREA (ACRES) = 397.3  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10525.00 TO NODE 10526.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 158.00 DOWNSTREAM (FEET) = 148.00  
 FLOW LENGTH (FEET) = 30.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.0 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 44.28  
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 105.46  
 PIPE TRAVEL TIME (MIN.) = 0.01 Tc (MIN.) = 15.69  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10526.00 = 11891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10526.00 TO NODE 10527.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 148.00 DOWNSTREAM (FEET) = 135.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 296.00 CHANNEL SLOPE = 0.0439  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 105.46  
 FLOW VELOCITY (FEET/SEC.) = 9.69 FLOW DEPTH (FEET) = 1.90  
 TRAVEL TIME (MIN.) = 0.51 Tc (MIN.) = 16.20  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10527.00 = 12187.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 16.20  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.157  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 0.80 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 0.83  
EFFECTIVE AREA(ACRES) = 182.55 AREA-AVERAGED Fm(INCH/HR) = 0.45  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 398.7 PEAK FLOW RATE(CFS) = 116.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 16.20  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.157  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 0.100 -  
USER-DEFINED - 1.10 0.50 1.000 -  
USER-DEFINED - 0.40 0.50 1.000 -  
USER-DEFINED - 1.10 0.50 1.000 -  
USER-DEFINED - 2.20 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 2.94  
EFFECTIVE AREA(ACRES) = 187.45 AREA-AVERAGED Fm(INCH/HR) = 0.45  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 403.6 PEAK FLOW RATE(CFS) = 119.37

=====  
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 403.6 TC(MIN.) = 16.20  
EFFECTIVE AREA(ACRES) = 187.45 AREA-AVERAGED Fm(INCH/HR) = 0.45  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.898  
PEAK FLOW RATE(CFS) = 119.37

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	119.37	16.20	1.157	0.50(0.45)	0.90	187.4	10520.00
2	91.55	39.09	0.701	0.50(0.46)	0.93	403.6	10500.00

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506106F.DAT  
TIME/DATE OF STUDY: 12:52 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 2.230
- 2) 6.00; 2.010
- 3) 7.00; 1.850
- 4) 8.00; 1.710
- 5) 9.00; 1.600
- 6) 10.00; 1.510
- 7) 11.00; 1.430
- 8) 12.00; 1.360
- 9) 13.00; 1.300
- 10) 14.00; 1.250
- 11) 15.00; 1.200
- 12) 20.00; 1.020
- 13) 25.00; 0.900
- 14) 30.00; 0.810
- 15) 40.00; 0.690
- 16) 50.00; 0.610
- 17) 60.00; 0.550
- 18) 90.00; 0.440
- 19) 120.00; 0.370
- 20) 180.00; 0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10600.00 TO NODE 10601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 311.00  
ELEVATION DATA: UPSTREAM(FEET) = 166.00 DOWNSTREAM(FEET) = 164.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.602  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.462  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	-	0.50	0.50	0.500	95	10.60
PUBLIC PARK	-	0.60	0.50	0.850	95	13.16

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 0.691  
 SUBAREA RUNOFF(CFS) = 1.11  
 TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 1.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 10601.00 TO NODE 10602.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 164.00 DOWNSTREAM ELEVATION(FEET) = 162.00  
STREET LENGTH(FEET) = 220.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.11  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.28  
HALFSTREET FLOOD WIDTH(FEET) = 6.16  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.86

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.52  
 STREET FLOW TRAVEL TIME (MIN.) = 1.97 Tc (MIN.) = 12.57  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.326  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.500	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	1.80	0.50	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.517  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 2.02  
 EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 2.99

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.31 HALFSTREET FLOOD WIDTH (FEET) = 7.53  
 FLOW VELOCITY (FEET/SEC.) = 1.97 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.61  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10602.00 = 531.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10602.00 TO NODE 10603.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 162.00 DOWNSTREAM ELEVATION (FEET) = 159.00  
 STREET LENGTH (FEET) = 328.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.63  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.35  
 HALFSTREET FLOOD WIDTH (FEET) = 9.34  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.18  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.75  
 STREET FLOW TRAVEL TIME (MIN.) = 2.51 Tc (MIN.) = 15.09  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.197

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.50	0.500	-
USER-DEFINED	-	0.30	0.50	0.850	-
USER-DEFINED	-	2.40	0.50	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527  
 SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 3.28

EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 5.89

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 10.51  
 FLOW VELOCITY (FEET/SEC.) = 2.28 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.84  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10603.00 = 859.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10603.00 TO NODE 10604.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 159.00 DOWNSTREAM ELEVATION (FEET) = 155.00  
 STREET LENGTH (FEET) = 465.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.68  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.41  
 HALFSTREET FLOOD WIDTH (FEET) = 12.62  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.44  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.00  
 STREET FLOW TRAVEL TIME (MIN.) = 3.18 Tc (MIN.) = 18.27  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.082

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.50	0.500	-
USER-DEFINED	-	0.40	0.50	0.850	-
USER-DEFINED	-	3.00	0.50	0.500	-
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	0.10	0.50	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.513  
 SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 5.58  
 EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 10.74

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.43 HALFSTREET FLOOD WIDTH (FEET) = 13.79  
 FLOW VELOCITY (FEET/SEC.) = 2.57 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.11  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10604.00 = 1324.00 FEET.



```

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10604.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 18.27
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.082
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.50    0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.10    SUBAREA RUNOFF(CFS) = 0.06
EFFECTIVE AREA(ACRES) = 14.70  AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 14.7    PEAK FLOW RATE(CFS) = 10.80

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10605.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 155.00  DOWNSTREAM(FEET) = 140.00
FLOW LENGTH(FEET) = 214.00  MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.18
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.80
PIPE TRAVEL TIME(MIN.) = 0.25  Tc(MIN.) = 18.52
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10605.00 = 1538.00 FEET.

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10605.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 18.52
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.073
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20    0.50    0.100  -
USER-DEFINED        -         1.70    0.50    0.100  -
USER-DEFINED        -        10.20    0.50    0.800  -
USER-DEFINED        -         2.90    0.50    0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.682
SUBAREA AREA(ACRES) = 16.00  SUBAREA RUNOFF(CFS) = 10.54
EFFECTIVE AREA(ACRES) = 30.70  AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 30.7    PEAK FLOW RATE(CFS) = 21.22

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10606.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 140.00  DOWNSTREAM(FEET) = 133.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00  CHANNEL SLOPE = 0.0400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 21.22
FLOW VELOCITY(FEET/SEC.) = 6.26  FLOW DEPTH(FEET) = 1.06
TRAVEL TIME(MIN.) = 0.47  Tc(MIN.) = 18.98
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10606.00 = 1713.00 FEET.

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 18.98
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.057
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.50    0.500  -
USER-DEFINED        -         0.30    0.50    0.850  -
USER-DEFINED        -         0.10    0.50    1.000  -
USER-DEFINED        -         1.10    0.50    1.000  -
USER-DEFINED        -         0.10    0.50    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 1.80  SUBAREA RUNOFF(CFS) = 0.97
EFFECTIVE AREA(ACRES) = 32.50  AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 32.5    PEAK FLOW RATE(CFS) = 21.72

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 18.98
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.057
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.50    0.850  -
USER-DEFINED        -         1.20    0.50    1.000  -
USER-DEFINED        -         0.10    0.50    1.000  -
USER-DEFINED        -         1.80    0.50    1.000  -
USER-DEFINED        -         0.10    0.50    0.850  -
USER-DEFINED        -         0.20    0.50    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980
SUBAREA AREA(ACRES) = 3.80  SUBAREA RUNOFF(CFS) = 1.94
EFFECTIVE AREA(ACRES) = 36.30  AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.66
TOTAL AREA(ACRES) = 36.3    PEAK FLOW RATE(CFS) = 23.66

*****

```

FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.98

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.057

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.30

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.34

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.67

TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 23.96

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 36.9 TC(MIN.) = 18.98

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR)= 0.34

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.670

PEAK FLOW RATE(CFS) = 23.96

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 2 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 5-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P201XX05.DAT  
TIME/DATE OF STUDY: 10:20 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.000; 2.230  
2) 6.000; 2.010  
3) 7.000; 1.850  
4) 8.000; 1.710  
5) 9.000; 1.600  
6) 10.000; 1.510  
7) 11.000; 1.430  
8) 12.000; 1.360  
9) 13.000; 1.300  
10) 14.000; 1.250  
11) 15.000; 1.200  
12) 20.000; 1.020  
13) 25.000; 0.900  
14) 30.000; 0.810  
15) 40.000; 0.690  
16) 50.000; 0.610  
17) 60.000; 0.550  
18) 90.000; 0.440  
19) 120.000; 0.370  
20) 180.000; 0.300  
\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20100.00 TO NODE 20101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 830.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.230  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.579  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.50	1.000	95	9.23
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.50	1.000	95	9.23

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.58  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20101.00 TO NODE 20102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 276.00 CHANNEL SLOPE = 0.2899  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.58  
FLOW VELOCITY(FEET/SEC.) = 4.37 FLOW DEPTH(FEET) = 0.21  
TRAVEL TIME(MIN.) = 1.05  $T_c$ (MIN.) = 10.28  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20102.00 = 595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20102.00 TO NODE 20102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN) = 10.28
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.487
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         0.80    0.50    1.000   -
USER-DEFINED       -         0.20    0.50    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.00    SUBAREA RUNOFF(CFS) = 0.89
EFFECTIVE AREA(ACRES) = 1.60    AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6        PEAK FLOW RATE(CFS) = 1.42

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*****
FLOW PROCESS FROM NODE 20102.00 TO NODE 20103.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.1863
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.42
FLOW VELOCITY(FEET/SEC.) = 4.53 FLOW DEPTH(FEET) = 0.32
TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 10.87
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20103.00 = 756.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20103.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.87
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.440
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         0.50    0.50    1.000   -
USER-DEFINED       -         0.10    0.50    1.000   -
USER-DEFINED       -         0.30    0.50    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90    SUBAREA RUNOFF(CFS) = 0.76
EFFECTIVE AREA(ACRES) = 2.50    AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.5        PEAK FLOW RATE(CFS) = 2.11

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20104.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

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=====
ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 690.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 64.00 CHANNEL SLOPE = 0.4688

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CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.11
FLOW VELOCITY(FEET/SEC.) = 7.07 FLOW DEPTH(FEET) = 0.32
TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 11.02
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20104.00 = 820.00 FEET.

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.02
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.428
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         0.40    0.50    1.000   -
USER-DEFINED       -         3.30    0.50    1.000   -
USER-DEFINED       -         0.10    0.50    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 3.17
EFFECTIVE AREA(ACRES) = 6.30    AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.3        PEAK FLOW RATE(CFS) = 5.26

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 690.00 DOWNSTREAM(FEET) = 670.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 159.00 CHANNEL SLOPE = 0.1258
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.26
FLOW VELOCITY(FEET/SEC.) = 5.45 FLOW DEPTH(FEET) = 0.57
TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 11.51
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20105.00 = 979.00 FEET.

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*****
FLOW PROCESS FROM NODE 20105.00 TO NODE 20105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 11.51
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.394
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         0.20    0.50    1.000   -
USER-DEFINED       -         1.50    0.50    1.000   -
USER-DEFINED       -         2.20    0.50    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90    SUBAREA RUNOFF(CFS) = 3.14

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EFFECTIVE AREA(ACRES) = 10.20 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 10.2 PEAK FLOW RATE(CFS) = 8.21

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FLOW PROCESS FROM NODE 20105.00 TO NODE 20106.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 670.00 DOWNSTREAM(FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 192.00 CHANNEL SLOPE = 0.1042  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 8.21  
FLOW VELOCITY(FEET/SEC.) = 5.72 FLOW DEPTH(FEET) = 0.69  
TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 12.07  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20106.00 = 1171.00 FEET.

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FLOW PROCESS FROM NODE 20106.00 TO NODE 20106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 12.07  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.356  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.50 1.000 -  
USER-DEFINED - 2.10 0.50 1.000 -  
USER-DEFINED - 0.90 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 2.93  
EFFECTIVE AREA(ACRES) = 14.00 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 10.78

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 650.00 DOWNSTREAM(FEET) = 640.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 156.00 CHANNEL SLOPE = 0.0641  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.78  
FLOW VELOCITY(FEET/SEC.) = 5.07 FLOW DEPTH(FEET) = 0.84  
TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 12.58  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20107.00 = 1327.00 FEET.

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FLOW PROCESS FROM NODE 20107.00 TO NODE 20107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN) = 12.58  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.325

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 1.20 0.50 1.000 -  
USER-DEFINED - 2.30 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 2.97  
EFFECTIVE AREA(ACRES) = 18.00 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 18.0 PEAK FLOW RATE(CFS) = 13.36

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FLOW PROCESS FROM NODE 20107.00 TO NODE 20108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 640.00 DOWNSTREAM(FEET) = 609.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 512.00 CHANNEL SLOPE = 0.0605  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 13.36  
FLOW VELOCITY(FEET/SEC.) = 5.26 FLOW DEPTH(FEET) = 0.92  
TRAVEL TIME(MIN.) = 1.62 Tc(MIN.) = 14.21  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20108.00 = 1839.00 FEET.

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 14.21  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.240  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 0.200 -  
USER-DEFINED - 1.50 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 0.80 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 1.83  
EFFECTIVE AREA(ACRES) = 20.70 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.7 PEAK FLOW RATE(CFS) = 13.81

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 600.00
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.90
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.81
PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 14.46
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20109.00 = 2033.00 FEET.

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FLOW PROCESS FROM NODE 20109.00 TO NODE 20109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 14.46
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.227
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.70     0.50     0.200   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.71
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 14.29

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FLOW PROCESS FROM NODE 20109.00 TO NODE 20110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 594.00
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.82
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 14.29
PIPE TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 15.14
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20110.00 = 2393.00 FEET.

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FLOW PROCESS FROM NODE 20110.00 TO NODE 20110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 15.14
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.195
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.30     0.50     0.100   -
USER-DEFINED         -        3.50     0.50     0.200   -
USER-DEFINED         -        2.70     0.50     1.000   -
USER-DEFINED         -        0.20     0.50     1.000   -
USER-DEFINED         -        1.20     0.50     1.000   -

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```

USER-DEFINED         -        0.30     0.50     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 6.51
EFFECTIVE AREA(ACRES) = 29.60 AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 29.6 PEAK FLOW RATE(CFS) = 20.18

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FLOW PROCESS FROM NODE 20110.00 TO NODE 20111.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 594.00 DOWNSTREAM(FEET) = 590.00
FLOW LENGTH(FEET) = 246.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.53
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.18
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 15.57
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20111.00 = 2639.00 FEET.

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*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 15.57
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.180
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap    SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN

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USER-DEFINED         -        0.70     0.50     0.100   -
USER-DEFINED         -        2.10     0.50     0.200   -
USER-DEFINED         -        2.10     0.50     1.000   -
USER-DEFINED         -        0.60     0.50     1.000   -
USER-DEFINED         -        4.70     0.50     1.000   -
USER-DEFINED         -        0.90     0.50     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.792
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 7.83
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.43
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 27.60

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FLOW PROCESS FROM NODE 20111.00 TO NODE 20112.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 580.00
FLOW LENGTH(FEET) = 628.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.22
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 27.60

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PIPE TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 16.59  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20112.00 = 3267.00 FEET.

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FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.59

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.143

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.50	0.100	-
USER-DEFINED	-	0.90	0.50	0.200	-
USER-DEFINED	-	4.40	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	7.50	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.797

SUBAREA AREA(ACRES) = 15.20 SUBAREA RUNOFF(CFS) = 10.18

EFFECTIVE AREA(ACRES) = 55.90 AREA-AVERAGED Fm(INCH/HR) = 0.42

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 55.9 PEAK FLOW RATE(CFS) = 36.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.59

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.143

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	0.850	-
USER-DEFINED	-	0.80	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 1.44

EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.42

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 37.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20113.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 580.00 DOWNSTREAM(FEET) = 570.00

FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.65

ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 37.87  
PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 17.33  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20113.00 = 3786.00 FEET.

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FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.33

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.116

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.50	0.100	-
USER-DEFINED	-	4.30	0.50	0.850	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	1.80	0.50	1.000	-
USER-DEFINED	-	4.60	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.877

SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 7.68

EFFECTIVE AREA(ACRES) = 70.90 AREA-AVERAGED Fm(INCH/HR) = 0.42

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 44.14

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.33

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.116

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	0.100	-
USER-DEFINED	-	0.90	0.50	0.850	-
USER-DEFINED	-	1.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.787

SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 2.34

EFFECTIVE AREA(ACRES) = 74.50 AREA-AVERAGED Fm(INCH/HR) = 0.42

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 74.5 PEAK FLOW RATE(CFS) = 46.48

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FLOW PROCESS FROM NODE 20113.00 TO NODE 20114.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00

FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 9.05

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 46.48  
PIPE TRAVEL TIME(MIN.) = 1.12 Tc(MIN.) = 18.45  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20114.00 = 4393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 18.45  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.076  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.50 0.100 -  
USER-DEFINED - 4.00 0.50 0.850 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 1.40 0.50 1.000 -  
USER-DEFINED - 0.50 0.50 0.100 -  
USER-DEFINED - 0.90 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.747  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 4.99  
EFFECTIVE AREA(ACRES) = 82.40 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 82.4 PEAK FLOW RATE(CFS) = 48.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 18.45  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.076  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.50 1.000 -  
USER-DEFINED - 8.20 0.50 1.000 -  
USER-DEFINED - 3.20 0.50 1.000 -  
USER-DEFINED - 0.70 0.50 0.100 -  
USER-DEFINED - 3.70 0.50 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.932  
SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 9.60  
EFFECTIVE AREA(ACRES) = 99.90 AREA-AVERAGED Fm(INCH/HR) = 0.43  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 99.9 PEAK FLOW RATE(CFS) = 58.37

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20115.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 560.00  
FLOW LENGTH(FEET) = 461.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.53  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 58.37  
PIPE TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 19.18  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20115.00 = 4854.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 19.18  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.049  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.60 0.50 0.850 -  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 1.40 0.50 0.100 -  
USER-DEFINED - 6.20 0.50 0.850 -  
USER-DEFINED - 2.20 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798  
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 7.49  
EFFECTIVE AREA(ACRES) = 112.70 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 112.7 PEAK FLOW RATE(CFS) = 63.50

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 19.18  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.049  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.35  
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 63.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20116.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 560.00 DOWNSTREAM(FEET) = 528.00  
FLOW LENGTH(FEET) = 219.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 28.86



ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 63.84  
 PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 19.31  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20116.00 = 5073.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20116.00 TO NODE 20117.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 489.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 174.00 CHANNEL SLOPE = 0.2241  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 63.84  
 FLOW VELOCITY(FEET/SEC.) = 15.75 FLOW DEPTH(FEET) = 1.16  
 TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 19.49  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20117.00 = 5247.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 19.49  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.038  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.50	0.850	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.910  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 1.31  
 EFFECTIVE AREA(ACRES) = 115.90 AREA-AVERAGED Fm(INCH/HR) = 0.42  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 115.9 PEAK FLOW RATE(CFS) = 64.01

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 19.49  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.038  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.50	0.200	-
USER-DEFINED	-	3.30	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	6.50	0.50	1.000	-

USER-DEFINED - 0.20 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.855  
 SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 7.03  
 EFFECTIVE AREA(ACRES) = 128.70 AREA-AVERAGED Fm(INCH/HR) = 0.42  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 128.7 PEAK FLOW RATE(CFS) = 71.05

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 19.49  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.038  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	2.80	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 2.52  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 133.8 PEAK FLOW RATE(CFS) = 73.57

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 133.8 TC(MIN.) = 19.49  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.43  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.854  
 PEAK FLOW RATE(CFS) = 73.57

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 5-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P501XX05.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.000; 2.230  
2) 6.000; 2.010  
3) 7.000; 1.850  
4) 8.000; 1.710  
5) 9.000; 1.600  
6) 10.000; 1.510  
7) 11.000; 1.430  
8) 12.000; 1.360  
9) 13.000; 1.300  
10) 14.000; 1.250  
11) 15.000; 1.200  
12) 20.000; 1.020  
13) 25.000; 0.900  
14) 30.000; 0.810  
15) 40.000; 0.690  
16) 50.000; 0.610  
17) 60.000; 0.550  
18) 90.000; 0.440  
19) 120.000; 0.370  
20) 180.000; 0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50100.00 TO NODE 50101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 424.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.479  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.657  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "8-10 DWELLINGS/ACRE"	-	0.10	0.50	0.400	95	8.48
RESIDENTIAL "8-10 DWELLINGS/ACRE"	-	0.90	0.50	0.400	95	8.48

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 0.400  
SUBAREA RUNOFF(CFS) = 1.31  
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 1.31

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50101.00 TO NODE 50102.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 424.00 DOWNSTREAM ELEVATION(FEET) = 420.00  
STREET LENGTH(FEET) = 115.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.92
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.21
HALFSTREET FLOOD WIDTH(FEET) = 2.66
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.70
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.78
STREET FLOW TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 9.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.600
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.30   0.50   0.100  -
USER-DEFINED        -         0.10   0.50   0.400  -
USER-DEFINED        -         0.40   0.50   0.100  -
USER-DEFINED        -         0.10   0.50   0.500  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.178
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.22
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.29
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 2.48

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.24 HALFSTREET FLOOD WIDTH(FEET) = 4.09
FLOW VELOCITY(FEET/SEC.) = 3.48 DEPTH*VELOCITY(FT*FT/SEC.) = 0.84
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50102.00 = 445.00 FEET.

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*****
FLOW PROCESS FROM NODE 50102.00 TO NODE 50103.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 420.00 DOWNSTREAM ELEVATION(FEET) = 418.00
STREET LENGTH(FEET) = 84.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.21
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 5.91
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.98
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.82
STREET FLOW TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 9.47
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.558
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.90   0.50   0.500  -
USER-DEFINED        -         0.50   0.50   0.500  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.60
EFFECTIVE AREA(ACRES) = 4.50 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 4.5 PEAK FLOW RATE(CFS) = 5.35

```

```

LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.50   0.100  -
USER-DEFINED        -         0.10   0.50   0.100  -
USER-DEFINED        -         0.90   0.50   0.500  -
USER-DEFINED        -         0.10   0.50   0.500  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.433
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 1.45
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 3.86

```

```

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 6.59
FLOW VELOCITY(FEET/SEC.) = 3.09 DEPTH*VELOCITY(FT*FT/SEC.) = 0.90
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50103.00 = 529.00 FEET.

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*****
FLOW PROCESS FROM NODE 50103.00 TO NODE 50104.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 418.00 DOWNSTREAM ELEVATION(FEET) = 416.00
STREET LENGTH(FEET) = 84.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.66
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.31
HALFSTREET FLOOD WIDTH(FEET) = 7.34
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.20
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.98
STREET FLOW TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 9.90
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.519
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.90   0.50   0.500  -
USER-DEFINED        -         0.50   0.50   0.500  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.60
EFFECTIVE AREA(ACRES) = 4.50 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 4.5 PEAK FLOW RATE(CFS) = 5.35

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END OF SUBAREA STREET FLOW HYDRAULICS:

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DEPTH (FEET) = 0.32 HALFSTREET FLOOD WIDTH (FEET) = 7.91  
FLOW VELOCITY (FEET/SEC.) = 3.28 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.04  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50104.00 = 613.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50104.00 TO NODE 50105.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 416.00 DOWNSTREAM ELEVATION (FEET) = 400.00  
STREET LENGTH (FEET) = 513.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.03

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.33  
HALFSTREET FLOOD WIDTH (FEET) = 8.53  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.83  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.26  
STREET FLOW TRAVEL TIME (MIN.) = 2.23 Tc (MIN.) = 12.14  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.352

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	0.500	-
USER-DEFINED	-	0.40	0.50	0.600	-
USER-DEFINED	-	2.40	0.50	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.512  
SUBAREA AREA (ACRES) = 3.40 SUBAREA RUNOFF (CFS) = 3.35  
EFFECTIVE AREA (ACRES) = 7.90 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.45  
TOTAL AREA (ACRES) = 7.9 PEAK FLOW RATE (CFS) = 8.03

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.34 HALFSTREET FLOOD WIDTH (FEET) = 9.09  
FLOW VELOCITY (FEET/SEC.) = 3.95 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.34  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50105.00 = 1126.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 12.14

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.352

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	2.50	0.50	0.600	-
USER-DEFINED	-	1.00	0.50	0.500	-
USER-DEFINED	-	3.00	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 6.30  
EFFECTIVE AREA (ACRES) = 14.50 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.51  
TOTAL AREA (ACRES) = 14.5 PEAK FLOW RATE (CFS) = 14.32

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50106.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 400.00 DOWNSTREAM ELEVATION (FEET) = 390.00  
STREET LENGTH (FEET) = 562.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.54

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.46  
HALFSTREET FLOOD WIDTH (FEET) = 14.88  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.86  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.76  
STREET FLOW TRAVEL TIME (MIN.) = 2.43 Tc (MIN.) = 14.57  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.222

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	3.70	0.50	0.600	-
USER-DEFINED	-	1.10	0.50	0.500	-
USER-DEFINED	-	5.20	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.588  
SUBAREA AREA (ACRES) = 10.10 SUBAREA RUNOFF (CFS) = 8.43  
EFFECTIVE AREA (ACRES) = 24.60 AREA-AVERAGED Fm (INCH/HR) = 0.27  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.54  
TOTAL AREA (ACRES) = 24.6 PEAK FLOW RATE (CFS) = 21.06

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.47 HALFSTREET FLOOD WIDTH (FEET) = 15.74  
FLOW VELOCITY (FEET/SEC.) = 3.95 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.87

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50106.00 = 1688.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50106.00 TO NODE 50107.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 390.00 DOWNSTREAM ELEVATION(FEET) = 381.00
STREET LENGTH(FEET) = 252.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.81

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.44
HALFSTREET FLOOD WIDTH(FEET) = 14.34
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.30
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.36

STREET FLOW TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 15.36

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.187

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.50 0.600 -
USER-DEFINED - 6.80 0.50 0.600 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600

SUBAREA AREA(ACRES) = 6.90 SUBAREA RUNOFF(CFS) = 5.51

EFFECTIVE AREA(ACRES) = 31.50 AREA-AVERAGED Fm(INCH/HR) = 0.28

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.55

TOTAL AREA(ACRES) = 31.5 PEAK FLOW RATE(CFS) = 25.80

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.45 HALFSTREET FLOOD WIDTH(FEET) = 14.80

FLOW VELOCITY(FEET/SEC.) = 5.42 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.46

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50107.00 = 1940.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50107.00 TO NODE 50108.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 381.00 DOWNSTREAM(FEET) = 345.00
FLOW LENGTH(FEET) = 109.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 31.56

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 25.80

PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 15.42

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50108.00 = 2049.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50108.00 TO NODE 50109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 315.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 220.00 CHANNEL SLOPE = 0.1364
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 25.80
FLOW VELOCITY(FEET/SEC.) = 8.40 FLOW DEPTH(FEET) = 1.01
TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 15.85
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50109.00 = 2269.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 15.85

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.169

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.50 0.600 -
USER-DEFINED - 0.10 0.50 1.000 -
USER-DEFINED - 0.20 0.50 0.600 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.667

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.45

EFFECTIVE AREA(ACRES) = 32.10 AREA-AVERAGED Fm(INCH/HR) = 0.28

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.56

TOTAL AREA(ACRES) = 32.1 PEAK FLOW RATE(CFS) = 25.80

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 15.85

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.169

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.50 0.100 -
USER-DEFINED - 2.30 0.50 0.600 -
USER-DEFINED - 0.70 0.50 1.000 -
USER-DEFINED - 8.30 0.50 1.000 -
USER-DEFINED - 6.90 0.50 1.000 -
USER-DEFINED - 13.20 0.50 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965  
SUBAREA AREA (ACRES) = 31.60 SUBAREA RUNOFF (CFS) = 19.52  
EFFECTIVE AREA (ACRES) = 63.70 AREA-AVERAGED Fm (INCH/HR) = 0.38  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 63.7 PEAK FLOW RATE (CFS) = 45.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 15.85  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.169  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.50	0.600	-
USER-DEFINED	-	4.30	0.50	1.000	-
USER-DEFINED	-	4.10	0.50	1.000	-
USER-DEFINED	-	37.30	0.50	1.000	-
USER-DEFINED	-	37.20	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990  
SUBAREA AREA (ACRES) = 84.90 SUBAREA RUNOFF (CFS) = 51.51  
EFFECTIVE AREA (ACRES) = 148.60 AREA-AVERAGED Fm (INCH/HR) = 0.45  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.89  
TOTAL AREA (ACRES) = 148.6 PEAK FLOW RATE (CFS) = 96.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 15.85  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.169  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.600	-
USER-DEFINED	-	1.20	0.50	1.000	-
USER-DEFINED	-	4.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.985  
SUBAREA AREA (ACRES) = 5.50 SUBAREA RUNOFF (CFS) = 3.35  
EFFECTIVE AREA (ACRES) = 154.10 AREA-AVERAGED Fm (INCH/HR) = 0.45  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.89  
TOTAL AREA (ACRES) = 154.1 PEAK FLOW RATE (CFS) = 100.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50119.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 315.00 DOWNSTREAM (FEET) = 284.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 893.00 CHANNEL SLOPE = 0.0347  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 100.13  
FLOW VELOCITY (FEET/SEC.) = 7.08 FLOW DEPTH (FEET) = 2.17  
TRAVEL TIME (MIN.) = 2.10 Tc (MIN.) = 17.96  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50119.00 = 3162.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 17.96  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.094  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.600	-
USER-DEFINED	-	0.20	0.50	0.850	-
USER-DEFINED	-	5.30	0.50	1.000	-
USER-DEFINED	-	2.70	0.50	1.000	-
USER-DEFINED	-	2.50	0.50	1.000	-
USER-DEFINED	-	2.80	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.904  
SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 8.08  
EFFECTIVE AREA (ACRES) = 168.10 AREA-AVERAGED Fm (INCH/HR) = 0.45  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.90  
TOTAL AREA (ACRES) = 168.1 PEAK FLOW RATE (CFS) = 100.13  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 17.96  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.094  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.80	0.50	1.000	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	1.50	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	0.850	-
USER-DEFINED	-	2.30	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980  
SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 4.56  
EFFECTIVE AREA (ACRES) = 176.50 AREA-AVERAGED Fm (INCH/HR) = 0.45  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.90  
TOTAL AREA (ACRES) = 176.5 PEAK FLOW RATE (CFS) = 102.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 17.96  
 RAINFALL INTENSITY(INCH/HR) = 1.09  
 AREA-AVERAGED Fm(INCH/HR) = 0.45  
 AREA-AVERAGED Fp(INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.90  
 EFFECTIVE STREAM AREA(ACRES) = 176.50  
 TOTAL STREAM AREA(ACRES) = 176.50  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 102.27

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50110.00 TO NODE 50111.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 420.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.342  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.802

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	-	1.20	0.50	0.500	95	7.34
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	-	0.20	0.50	0.600	95	7.78
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	-	0.10	0.50	0.500	95	7.34

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.513  
 SUBAREA RUNOFF(CFS) = 2.09  
 TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 2.09

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50111.00 TO NODE 50112.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 420.00 DOWNSTREAM ELEVATION(FEET) = 415.00  
 STREET LENGTH(FEET) = 122.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.99

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.25  
 HALFSTREET FLOOD WIDTH(FEET) = 4.53  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.79  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.94  
 STREET FLOW TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 7.88  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.727

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.600	-
USER-DEFINED	-	0.30	0.50	0.500	-
USER-DEFINED	-	0.50	0.50	0.600	-
USER-DEFINED	-	0.10	0.50	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.571  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.82  
 EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.54  
 TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 3.80

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 5.47  
 FLOW VELOCITY(FEET/SEC.) = 3.89 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.04  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50112.00 = 452.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50112.00 TO NODE 50113.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 415.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 122.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.79

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.29  
 HALFSTREET FLOOD WIDTH(FEET) = 6.41  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.99  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.14  
 STREET FLOW TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 8.39  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.667

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.600	-



USER-DEFINED - 0.10 0.50 0.500 -  
 USER-DEFINED - 1.00 0.50 0.600 -  
 USER-DEFINED - 0.20 0.50 0.500 -  
 USER-DEFINED - 0.10 0.50 0.600 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.581  
 SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 1.98  
 EFFECTIVE AREA(ACRES) = 4.50 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.56  
 TOTAL AREA(ACRES) = 4.5 PEAK FLOW RATE(CFS) = 5.63

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.03  
 FLOW VELOCITY(FEET/SEC.) = 4.11 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.23  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50113.00 = 574.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50113.00 TO NODE 50113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 8.39  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.667  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.500	-
USER-DEFINED	-	1.90	0.50	0.600	-
USER-DEFINED	-	0.20	0.50	0.500	-
USER-DEFINED	-	0.20	0.50	0.600	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.575  
 SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 3.48  
 EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.56  
 TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 9.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50113.00 TO NODE 50114.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<

UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 400.00  
 STREET LENGTH(FEET) = 238.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.83

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.35  
 HALFSTREET FLOOD WIDTH(FEET) = 9.78  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.72  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.67  
 STREET FLOW TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 9.23  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.580  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.50	0.600	-
USER-DEFINED	-	1.90	0.50	0.600	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 3.45  
 EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.57  
 TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 11.98

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 10.27  
 FLOW VELOCITY(FEET/SEC.) = 4.81 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.75  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50114.00 = 812.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50114.00 TO NODE 50115.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<

UPSTREAM ELEVATION(FEET) = 400.00 DOWNSTREAM ELEVATION(FEET) = 390.00  
 STREET LENGTH(FEET) = 241.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.02

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.39  
 HALFSTREET FLOOD WIDTH(FEET) = 11.37  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.07  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.95  
 STREET FLOW TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 10.02  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.508

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.50	0.600	-
USER-DEFINED	-	1.50	0.50	0.600	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.607  
SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 6.07  
EFFECTIVE AREA(ACRES) = 15.90 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 15.9 PEAK FLOW RATE(CFS) = 17.39

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 12.15  
FLOW VELOCITY(FEET/SEC.) = 5.22 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.10  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50115.00 = 1053.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50115.00 TO NODE 50116.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 390.00 DOWNSTREAM ELEVATION(FEET) = 380.00  
STREET LENGTH(FEET) = 268.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.60  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.42  
HALFSTREET FLOOD WIDTH(FEET) = 13.09  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.15  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.16  
STREET FLOW TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 10.89  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.439

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.50 0.600 -  
USER-DEFINED - 3.50 0.50 0.600 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 4.41  
EFFECTIVE AREA(ACRES) = 20.20 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 20.2 PEAK FLOW RATE(CFS) = 20.81

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 13.40  
FLOW VELOCITY(FEET/SEC.) = 5.24 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.23  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50116.00 = 1321.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50116.00 TO NODE 50117.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 380.00 DOWNSTREAM ELEVATION(FEET) = 355.00  
STREET LENGTH(FEET) = 507.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.49  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.44  
HALFSTREET FLOOD WIDTH(FEET) = 14.18  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.25  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.76  
STREET FLOW TRAVEL TIME(MIN.) = 1.35 Tc(MIN.) = 12.24  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.346

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 6.80 0.50 0.600 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 6.10 0.50 0.600 -  
USER-DEFINED - 1.20 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.644  
SUBAREA AREA(ACRES) = 14.50 SUBAREA RUNOFF(CFS) = 13.36  
EFFECTIVE AREA(ACRES) = 34.70 AREA-AVERAGED Fm(INCH/HR) = 0.31  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 34.7 PEAK FLOW RATE(CFS) = 32.47

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 15.20  
FLOW VELOCITY(FEET/SEC.) = 6.50 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.00  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50117.00 = 1828.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50117.00 TO NODE 50118.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 355.00 DOWNSTREAM(FEET) = 315.00  
FLOW LENGTH(FEET) = 171.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.27

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 32.47  
 PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 12.34  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50118.00 = 1999.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50118.00 TO NODE 50119.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 180.00 CHANNEL SLOPE = 0.1722  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 32.47  
 FLOW VELOCITY(FEET/SEC.) = 9.71 FLOW DEPTH(FEET) = 1.06  
 TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 12.65  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50119.00 = 2179.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 12.65  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.321  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.600	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	2.30	0.50	0.600	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.688  
 SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 2.81  
 EFFECTIVE AREA(ACRES) = 37.90 AREA-AVERAGED Fm(INCH/HR) = 0.31  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.62  
 TOTAL AREA(ACRES) = 37.9 PEAK FLOW RATE(CFS) = 34.52

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 12.65  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.321  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.44

EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.31  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.62  
 TOTAL AREA(ACRES) = 38.5 PEAK FLOW RATE(CFS) = 34.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 12.65  
 RAINFALL INTENSITY(INCH/HR) = 1.32  
 AREA-AVERAGED Fm(INCH/HR) = 0.31  
 AREA-AVERAGED Fp(INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.62  
 EFFECTIVE STREAM AREA(ACRES) = 38.50  
 TOTAL STREAM AREA(ACRES) = 38.50  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 34.96

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	102.27	17.96	1.094	0.50( 0.45)	0.90	176.5	50100.00
2	34.96	12.65	1.321	0.50( 0.31)	0.62	38.5	50110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	132.46	12.65	1.321	0.50( 0.42)	0.83	162.8	50110.00
2	129.35	17.96	1.094	0.50( 0.43)	0.85	215.0	50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 132.46 Tc(MIN.) = 12.65  
 EFFECTIVE AREA(ACRES) = 162.81 AREA-AVERAGED Fm(INCH/HR) = 0.42  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA(ACRES) = 215.0  
 LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50119.00 = 3162.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50119.00 TO NODE 50120.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 240.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00 CHANNEL SLOPE = 0.0437  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 132.46  
 FLOW VELOCITY(FEET/SEC.) = 8.24 FLOW DEPTH(FEET) = 2.31  
 TRAVEL TIME(MIN.) = 2.04 Tc(MIN.) = 14.68  
 LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50120.00 = 4170.00 FEET.

```

*****
FLOW PROCESS FROM NODE 50120.00 TO NODE 50120.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.68
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.216
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.50     1.000    -
USER-DEFINED        -         0.10     0.50     0.100    -
USER-DEFINED        -         0.30     0.50     1.000    -
USER-DEFINED        -         0.10     0.50     1.000    -
USER-DEFINED        -         0.70     0.50     0.100    -
USER-DEFINED        -         0.70     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.640
SUBAREA AREA(ACRES) = 2.00      SUBAREA RUNOFF(CFS) = 1.61
EFFECTIVE AREA(ACRES) = 164.81  AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.83
TOTAL AREA(ACRES) = 217.0      PEAK FLOW RATE(CFS) = 132.46
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

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*****
FLOW PROCESS FROM NODE 50120.00 TO NODE 50120.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.68
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.216
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50     0.50     1.000    -
USER-DEFINED        -         1.70     0.50     1.000    -
USER-DEFINED        -         0.40     0.50     0.100    -
USER-DEFINED        -         0.10     0.50     0.850    -
USER-DEFINED        -         0.50     0.50     1.000    -
USER-DEFINED        -         2.10     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.929
SUBAREA AREA(ACRES) = 5.30      SUBAREA RUNOFF(CFS) = 3.58
EFFECTIVE AREA(ACRES) = 170.11  AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.83
TOTAL AREA(ACRES) = 222.3      PEAK FLOW RATE(CFS) = 132.46
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

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*****
FLOW PROCESS FROM NODE 50120.00 TO NODE 50120.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.68
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.216
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN

```

```

USER-DEFINED        -         0.90     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90      SUBAREA RUNOFF(CFS) = 0.58
EFFECTIVE AREA(ACRES) = 171.01  AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 223.2      PEAK FLOW RATE(CFS) = 132.46
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 223.2  TC(MIN.) = 14.68
EFFECTIVE AREA(ACRES) = 171.01  AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.836
PEAK FLOW RATE(CFS) = 132.46

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1          132.46 14.68  1.216  0.50( 0.42) 0.84 171.0 50110.00
2          129.35 20.00  1.020  0.50( 0.43) 0.85 223.2 50100.00
=====
END OF RATIONAL METHOD ANALYSIS

```



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2013 Advanced Engineering Software (aes)  
Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

Michael Baker International  
5 Hutton Centre Drive, Suite 500  
Santa Ana, CA 92707

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PA3 & PA4 ROMP \*  
\* REGIONAL WATERSHED S29 - FREE DRAINING - ULTIMATE CONDITION \*  
\* 5-YR RM EV JULY 2018 ROKAMOTO \*  
\*\*\*\*\*

FILE NAME: P503XX05.DAT  
TIME/DATE OF STUDY: 17:46 03/27/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.00; 2.230  
2) 6.00; 2.010  
3) 7.00; 1.850  
4) 8.00; 1.710  
5) 9.00; 1.600  
6) 10.00; 1.510  
7) 11.00; 1.430  
8) 12.00; 1.360  
9) 13.00; 1.300  
10) 14.00; 1.250  
11) 15.00; 1.200  
12) 20.00; 1.020  
13) 25.00; 0.900  
14) 30.00; 0.810  
15) 40.00; 0.690  
16) 50.00; 0.610  
17) 60.00; 0.550  
18) 90.00; 0.440  
19) 120.00; 0.370  
20) 180.00; 0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0312 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0312 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0312 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0312 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0312 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50300.00 TO NODE 50301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 660.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.792  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.529  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.70	0.50	1.000	0	9.79
NATURAL FAIR COVER "GRASS"	-	0.40	0.50	1.000	0	9.79
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.20	0.50	1.000	0	9.79
NATURAL FAIR COVER "GRASS"	-	0.10	0.50	1.000	0	9.79

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.30  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 1.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50301.00 TO NODE 50302.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 660.00 DOWNSTREAM ELEVATION(FEET) = 650.00  
STREET LENGTH(FEET) = 259.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.07  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.22  
HALFSTREET FLOOD WIDTH(FEET) = 2.84  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.82  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.82  
STREET FLOW TRAVEL TIME(MIN.) = 1.13 Tc(MIN.) = 10.92  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.436

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 1.000 -  
USER-DEFINED - 0.50 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 0.700 -  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.967  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 1.54  
EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 2.72

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.24 HALFSTREET FLOOD WIDTH(FEET) = 4.28  
FLOW VELOCITY(FEET/SEC.) = 3.65 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.89  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50302.00 = 589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50302.00 TO NODE 50303.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 650.00 DOWNSTREAM ELEVATION(FEET) = 630.00  
STREET LENGTH(FEET) = 298.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.35  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.24  
HALFSTREET FLOOD WIDTH(FEET) = 3.97

AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.83  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.15  
STREET FLOW TRAVEL TIME(MIN.) = 1.03 Tc(MIN.) = 11.95  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.364  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 1.30 0.50 0.700 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.721  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.26  
EFFECTIVE AREA(ACRES) = 4.60 AREA-AVERAGED Fm(INCH/HR) = 0.45  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 3.78

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.25 HALFSTREET FLOOD WIDTH(FEET) = 4.47  
FLOW VELOCITY(FEET/SEC.) = 4.85 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.20  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50303.00 = 887.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50303.00 TO NODE 50304.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 630.00 DOWNSTREAM ELEVATION(FEET) = 590.00  
STREET LENGTH(FEET) = 724.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.62

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.97  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.29  
HALFSTREET FLOOD WIDTH(FEET) = 6.66  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.72  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.38  
STREET FLOW TRAVEL TIME(MIN.) = 2.56 Tc(MIN.) = 14.50  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.225

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.40 0.50 0.700 -  
USER-DEFINED - 0.70 0.50 1.000 -  
USER-DEFINED - 0.70 0.50 0.700 -  
USER-DEFINED - 0.50 0.50 1.000 -  
USER-DEFINED - 1.00 0.50 1.000 -  
USER-DEFINED - 0.80 0.50 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.848  
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 4.40  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.44  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 7.60

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 7.66  
FLOW VELOCITY(FEET/SEC.) = 4.90 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.53  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50304.00 = 1611.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50304.00 TO NODE 50304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 14.50  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.225

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.07

EFFECTIVE AREA(ACRES) = 10.80 AREA-AVERAGED Fm(INCH/HR) = 0.44

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.87

TOTAL AREA(ACRES) = 10.8 PEAK FLOW RATE(CFS) = 7.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50304.00 TO NODE 50305.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 590.00 DOWNSTREAM ELEVATION(FEET) = 550.00  
STREET LENGTH(FEET) = 788.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.63

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.46

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.35

HALFSTREET FLOOD WIDTH(FEET) = 9.59

AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.16

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.81

STREET FLOW TRAVEL TIME(MIN.) = 2.54 Tc(MIN.) = 17.05

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.126

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.60	0.50	0.600	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	1.30	0.50	0.600	-
USER-DEFINED	-	2.20	0.50	1.000	-
USER-DEFINED	-	4.00	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835

SUBAREA AREA(ACRES) = 11.90 SUBAREA RUNOFF(CFS) = 7.59

EFFECTIVE AREA(ACRES) = 22.70 AREA-AVERAGED Fm(INCH/HR) = 0.43

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 22.7 PEAK FLOW RATE(CFS) = 14.29

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.66

FLOW VELOCITY(FEET/SEC.) = 5.39 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.00

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50305.00 = 2399.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 17.05  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.126

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.700	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.35

EFFECTIVE AREA(ACRES) = 23.30 AREA-AVERAGED Fm(INCH/HR) = 0.43

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.86

TOTAL AREA(ACRES) = 23.3 PEAK FLOW RATE(CFS) = 14.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 17.05  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.126

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.50	0.600	-
USER-DEFINED	-	1.20	0.50	0.700	-
USER-DEFINED	-	2.50	0.50	0.600	-
USER-DEFINED	-	7.60	0.50	0.700	-
USER-DEFINED	-	0.50	0.50	0.600	-
USER-DEFINED	-	1.30	0.50	0.700	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50



SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.666  
 SUBAREA AREA (ACRES) = 15.20 SUBAREA RUNOFF (CFS) = 10.85  
 EFFECTIVE AREA (ACRES) = 38.50 AREA-AVERAGED Fm (INCH/HR) = 0.39  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.78  
 TOTAL AREA (ACRES) = 38.5 PEAK FLOW RATE (CFS) = 25.49

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50305.00 TO NODE 50306.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 510.00  
 FLOW LENGTH (FEET) = 813.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.8 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.27  
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 25.49  
 PIPE TRAVEL TIME (MIN.) = 0.89 Tc (MIN.) = 17.94  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50306.00 = 3212.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.94  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.094  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.100	-
USER-DEFINED	-	2.80	0.50	0.600	-
USER-DEFINED	-	2.00	0.50	0.100	-
USER-DEFINED	-	10.00	0.50	0.600	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.536  
 SUBAREA AREA (ACRES) = 15.90 SUBAREA RUNOFF (CFS) = 11.82  
 EFFECTIVE AREA (ACRES) = 54.40 AREA-AVERAGED Fm (INCH/HR) = 0.35  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.71  
 TOTAL AREA (ACRES) = 54.4 PEAK FLOW RATE (CFS) = 36.20

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.94  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.094  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 0.96

EFFECTIVE AREA (ACRES) = 56.20 AREA-AVERAGED Fm (INCH/HR) = 0.36  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 56.2 PEAK FLOW RATE (CFS) = 37.17

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50306.00 TO NODE 50307.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 510.00 DOWNSTREAM (FEET) = 470.00  
 FLOW LENGTH (FEET) = 919.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.94  
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 37.17  
 PIPE TRAVEL TIME (MIN.) = 0.96 Tc (MIN.) = 18.90  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50307.00 = 4131.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 18.90  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.060  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.50	0.600	-
USER-DEFINED	-	2.20	0.50	0.100	-
USER-DEFINED	-	1.50	0.50	0.400	-
USER-DEFINED	-	10.50	0.50	0.600	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.533  
 SUBAREA AREA (ACRES) = 17.90 SUBAREA RUNOFF (CFS) = 12.78  
 EFFECTIVE AREA (ACRES) = 74.10 AREA-AVERAGED Fm (INCH/HR) = 0.34  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.67  
 TOTAL AREA (ACRES) = 74.1 PEAK FLOW RATE (CFS) = 48.19

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 18.90  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.060  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.60	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 1.51  
 EFFECTIVE AREA (ACRES) = 77.10 AREA-AVERAGED Fm (INCH/HR) = 0.34

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.69  
TOTAL AREA (ACRES) = 77.1 PEAK FLOW RATE (CFS) = 49.70

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50307.00 TO NODE 50308.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 425.00  
FLOW LENGTH (FEET) = 1006.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.3 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 17.36  
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 49.70  
PIPE TRAVEL TIME (MIN.) = 0.97 Tc (MIN.) = 19.86  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50308.00 = 5137.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 19.86  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.025  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.50	0.100	-
USER-DEFINED	-	2.10	0.50	0.600	-
USER-DEFINED	-	0.20	0.50	0.850	-
USER-DEFINED	-	0.80	0.50	0.100	-
USER-DEFINED	-	2.50	0.50	0.400	-
USER-DEFINED	-	6.30	0.50	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.495  
SUBAREA AREA (ACRES) = 12.90 SUBAREA RUNOFF (CFS) = 9.02  
EFFECTIVE AREA (ACRES) = 90.00 AREA-AVERAGED Fm (INCH/HR) = 0.33  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.66  
TOTAL AREA (ACRES) = 90.0 PEAK FLOW RATE (CFS) = 56.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 19.86  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.025  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.850	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.893  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 0.36  
EFFECTIVE AREA (ACRES) = 90.70 AREA-AVERAGED Fm (INCH/HR) = 0.33  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.66

TOTAL AREA (ACRES) = 90.7 PEAK FLOW RATE (CFS) = 56.68

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 19.86  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.025  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	0.400	-
USER-DEFINED	-	0.90	0.50	0.850	-
USER-DEFINED	-	5.20	0.50	0.100	-
USER-DEFINED	-	11.00	0.50	0.400	-
USER-DEFINED	-	8.80	0.50	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.419  
SUBAREA AREA (ACRES) = 26.80 SUBAREA RUNOFF (CFS) = 19.66  
EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.61  
TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 76.34

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 19.86  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.025  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.60	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	2.80	0.50	0.400	-
USER-DEFINED	-	0.20	0.50	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.749  
SUBAREA AREA (ACRES) = 13.70 SUBAREA RUNOFF (CFS) = 8.02  
EFFECTIVE AREA (ACRES) = 131.20 AREA-AVERAGED Fm (INCH/HR) = 0.31  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.62  
TOTAL AREA (ACRES) = 131.2 PEAK FLOW RATE (CFS) = 84.36

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50309.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 425.00 DOWNSTREAM (FEET) = 410.00  
FLOW LENGTH (FEET) = 296.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.6 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 20.33  
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 84.36

PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 20.11  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 5433.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 15.1

>>>>DEFINE MEMORY BANK # 2<<<<<

PEAK FLOWRATE TABLE FILE NAME: P502XX05.DNA

MEMORY BANK # 2 DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	339.24	15.07	0.50 ( 0.38)	0.76	446.2	50240.00
2	333.59	19.15	0.50 ( 0.38)	0.76	538.9	50280.00
3	313.42	22.58	0.50 ( 0.38)	0.77	592.7	50220.00
4	264.97	28.87	0.50 ( 0.38)	0.76	642.4	50260.00
5	252.02	30.31	0.50 ( 0.38)	0.76	645.2	50200.00
TOTAL AREA(ACRES) =						645.2

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 14.0

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<<

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	339.24	15.07	0.50 ( 0.38)	0.76	446.2	50240.00
2	333.59	19.15	0.50 ( 0.38)	0.76	538.9	50280.00
3	313.42	22.58	0.50 ( 0.38)	0.77	592.7	50220.00
4	264.97	28.87	0.50 ( 0.38)	0.76	642.4	50260.00
5	252.02	30.31	0.50 ( 0.38)	0.76	645.2	50200.00
TOTAL AREA(ACRES) =						645.2

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2<<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	339.24	15.07	1.198	0.50 ( 0.38)	0.76	446.2	50240.00
2	333.59	19.15	1.051	0.50 ( 0.38)	0.76	538.9	50280.00

3	313.42	22.58	0.958	0.50 ( 0.38)	0.77	592.7	50220.00
4	264.97	28.87	0.830	0.50 ( 0.38)	0.76	642.4	50260.00
5	252.02	30.31	0.806	0.50 ( 0.38)	0.76	645.2	50200.00

LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50309.00 = 11241.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	84.36	20.11	1.017	0.50 ( 0.31)	0.62	131.2	50300.00

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 5433.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	418.56	15.07	1.198	0.50 ( 0.37)	0.74	544.5	50240.00
2	417.71	19.15	1.051	0.50 ( 0.37)	0.74	663.8	50280.00
3	412.32	20.11	1.017	0.50 ( 0.37)	0.74	685.1	50300.00
4	390.68	22.58	0.958	0.50 ( 0.37)	0.74	723.9	50220.00
5	327.00	28.87	0.830	0.50 ( 0.37)	0.74	773.6	50260.00
6	311.18	30.31	0.806	0.50 ( 0.37)	0.74	776.4	50200.00
TOTAL AREA(ACRES) =						776.4	

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 418.56 Tc(MIN.) = 15.066  
EFFECTIVE AREA(ACRES) = 544.47 AREA-AVERAGED Fm(INCH/HR) = 0.37  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.74  
TOTAL AREA(ACRES) = 776.4  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50309.00 = 11241.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1<<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50310.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 407.00  
FLOW LENGTH(FEET) = 898.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 90.0 INCH PIPE IS 73.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.86  
ESTIMATED PIPE DIAMETER(INCH) = 90.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 418.56  
PIPE TRAVEL TIME(MIN.) = 1.38 Tc(MIN.) = 16.44  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50310.00 = 12139.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.44  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.148  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.20 0.50 0.100 -  
 USER-DEFINED - 4.60 0.50 0.400 -  
 USER-DEFINED - 2.60 0.50 0.850 -  
 USER-DEFINED - 1.00 0.50 0.100 -  
 USER-DEFINED - 9.60 0.50 0.400 -  
 USER-DEFINED - 0.50 0.50 0.500 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.446  
 SUBAREA AREA (ACRES) = 18.50 SUBAREA RUNOFF (CFS) = 15.40  
 EFFECTIVE AREA (ACRES) = 562.97 AREA-AVERAGED Fm (INCH/HR) = 0.36  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 794.9 PEAK FLOW RATE (CFS) = 418.56  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 16.44  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.148  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.50 0.600 -  
 USER-DEFINED - 10.70 0.50 0.850 -  
 USER-DEFINED - 3.20 0.50 0.400 -  
 USER-DEFINED - 0.50 0.50 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.749  
 SUBAREA AREA (ACRES) = 14.50 SUBAREA RUNOFF (CFS) = 10.09  
 EFFECTIVE AREA (ACRES) = 577.47 AREA-AVERAGED Fm (INCH/HR) = 0.36  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 809.4 PEAK FLOW RATE (CFS) = 418.56  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50310.00 TO NODE 50345.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 407.00 DOWNSTREAM (FEET) = 403.00  
 FLOW LENGTH (FEET) = 1487.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 96.0 INCH PIPE IS 73.4 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.14  
 ESTIMATED PIPE DIAMETER (INCH) = 96.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 418.56  
 PIPE TRAVEL TIME (MIN.) = 2.44 Tc (MIN.) = 18.89  
 LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50345.00 = 13626.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50320.00 TO NODE 50321.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 322.00  
 ELEVATION DATA: UPSTREAM (FEET) = 1110.00 DOWNSTREAM (FEET) = 1035.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.517  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.553

SUBAREA Tc AND LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 NATURAL FAIR COVER  
 "GRASS" - 0.60 0.50 1.000 0 9.52  
 NATURAL FAIR COVER  
 "WOODLAND, GRASS" - 0.30 0.50 1.000 0 9.52  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 0.85  
 TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 0.85

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50321.00 TO NODE 50322.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1035.00 DOWNSTREAM (FEET) = 960.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 225.00 CHANNEL SLOPE = 0.3333  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 0.85  
 FLOW VELOCITY (FEET/SEC.) = 4.96 FLOW DEPTH (FEET) = 0.24  
 TRAVEL TIME (MIN.) = 0.76 Tc (MIN.) = 10.27  
 LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50322.00 = 547.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50322.00 TO NODE 50322.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 10.27  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.488  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.50 1.000 -  
 USER-DEFINED - 1.00 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 0.98  
 EFFECTIVE AREA (ACRES) = 2.00 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 1.78

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*****
FLOW PROCESS FROM NODE 50322.00 TO NODE 50323.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 955.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 33.00 CHANNEL SLOPE = 0.1515
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.78
FLOW VELOCITY(FEET/SEC.) = 4.49 FLOW DEPTH(FEET) = 0.36
TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 10.40
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50323.00 = 580.00 FEET.

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*****
FLOW PROCESS FROM NODE 50323.00 TO NODE 50323.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.40
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.478
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         1.70   0.50  1.000  -
USER-DEFINED       -         1.50   0.50  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 2.82
EFFECTIVE AREA(ACRES) = 5.20 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 5.2 PEAK FLOW RATE(CFS) = 4.58

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*****
FLOW PROCESS FROM NODE 50323.00 TO NODE 50324.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 955.00 DOWNSTREAM(FEET) = 915.00
FLOW LENGTH(FEET) = 254.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.94
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.58
PIPE TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 10.68
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50324.00 = 834.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50324.00 TO NODE 50324.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.68
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.456

```

```

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         2.00   0.50  0.800  -
USER-DEFINED       -         0.20   0.50  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.818
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 2.07
EFFECTIVE AREA(ACRES) = 7.40 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 7.4 PEAK FLOW RATE(CFS) = 6.54

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*****
FLOW PROCESS FROM NODE 50324.00 TO NODE 50324.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.68
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.456
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         2.80   0.50  0.800  -
USER-DEFINED       -         0.10   0.50  1.000  -
USER-DEFINED       -         2.00   0.50  0.800  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.804
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 4.65
EFFECTIVE AREA(ACRES) = 12.30 AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.89
TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 11.19

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```

*****
FLOW PROCESS FROM NODE 50324.00 TO NODE 50325.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 880.00
FLOW LENGTH(FEET) = 548.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.83
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 11.19
PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 11.34
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50325.00 = 1382.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 50325.00 TO NODE 50325.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 11.34
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.406
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN

```

USER-DEFINED - 3.90 0.50 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 3.53  
EFFECTIVE AREA (ACRES) = 16.20 AREA-AVERAGED Fm (INCH/HR) = 0.43  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.87  
TOTAL AREA (ACRES) = 16.2 PEAK FLOW RATE (CFS) = 14.17

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50325.00 TO NODE 50326.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 880.00 DOWNSTREAM (FEET) = 850.00  
FLOW LENGTH (FEET) = 441.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.5 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 15.03  
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 14.17  
PIPE TRAVEL TIME (MIN.) = 0.49 Tc (MIN.) = 11.83  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50326.00 = 1823.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50326.00 TO NODE 50326.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 11.83  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.372  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.30 0.50 0.800 -  
USER-DEFINED - 1.20 0.50 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 4.50 SUBAREA RUNOFF (CFS) = 3.94  
EFFECTIVE AREA (ACRES) = 20.70 AREA-AVERAGED Fm (INCH/HR) = 0.43  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
TOTAL AREA (ACRES) = 20.7 PEAK FLOW RATE (CFS) = 17.61

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50326.00 TO NODE 50327.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 850.00 DOWNSTREAM (FEET) = 810.00  
FLOW LENGTH (FEET) = 616.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.0 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 15.51  
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 17.61  
PIPE TRAVEL TIME (MIN.) = 0.66 Tc (MIN.) = 12.49  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50327.00 = 2439.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50327.00 TO NODE 50327.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 12.49  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.331  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.50 0.800 -  
USER-DEFINED - 5.00 0.50 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 6.03  
EFFECTIVE AREA (ACRES) = 27.90 AREA-AVERAGED Fm (INCH/HR) = 0.42  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84  
TOTAL AREA (ACRES) = 27.9 PEAK FLOW RATE (CFS) = 22.87

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50327.00 TO NODE 50328.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 810.00 DOWNSTREAM (FEET) = 760.00  
FLOW LENGTH (FEET) = 724.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.0 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 16.70  
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 22.87  
PIPE TRAVEL TIME (MIN.) = 0.72 Tc (MIN.) = 13.21  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50328.00 = 3163.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50328.00 TO NODE 50328.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 13.21  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.289  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.90 0.50 0.800 -  
USER-DEFINED - 6.30 0.50 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 7.36  
EFFECTIVE AREA (ACRES) = 37.10 AREA-AVERAGED Fm (INCH/HR) = 0.41  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.83  
TOTAL AREA (ACRES) = 37.1 PEAK FLOW RATE (CFS) = 29.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50328.00 TO NODE 50328.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.21  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.289  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.90 0.50 0.800 -  
 USER-DEFINED - 3.10 0.50 0.800 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA(ACRES) = 6.00 SUBAREA RUNOFF(CFS) = 4.80  
 EFFECTIVE AREA(ACRES) = 43.10 AREA-AVERAGED Fm(INCH/HR) = 0.41  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA(ACRES) = 43.1 PEAK FLOW RATE(CFS) = 34.00

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50328.00 TO NODE 50329.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 760.00 DOWNSTREAM(FEET) = 700.00  
 FLOW LENGTH(FEET) = 769.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.43  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 34.00  
 PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 13.87  
 LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50329.00 = 3932.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50329.00 TO NODE 50329.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.87  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.256  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 7.10 0.50 0.800 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 5.47  
 EFFECTIVE AREA(ACRES) = 50.20 AREA-AVERAGED Fm(INCH/HR) = 0.41  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA(ACRES) = 50.2 PEAK FLOW RATE(CFS) = 38.19

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50329.00 TO NODE 50340.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 660.00  
 FLOW LENGTH(FEET) = 478.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.39  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 38.19  
 PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 14.26  
 LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50340.00 = 4410.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.26  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.237  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 8.70 0.50 0.800 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA(ACRES) = 8.70 SUBAREA RUNOFF(CFS) = 6.55  
 EFFECTIVE AREA(ACRES) = 58.90 AREA-AVERAGED Fm(INCH/HR) = 0.41  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA(ACRES) = 58.9 PEAK FLOW RATE(CFS) = 43.86

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 14.26  
 RAINFALL INTENSITY(INCH/HR) = 1.24  
 AREA-AVERAGED Fm(INCH/HR) = 0.41  
 AREA-AVERAGED Fp(INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.82  
 EFFECTIVE STREAM AREA(ACRES) = 58.90  
 TOTAL STREAM AREA(ACRES) = 58.90  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 43.86

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50330.00 TO NODE 50331.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 294.00  
 ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 965.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.457  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.786  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "1 DWELLING/ACRE"	-	1.60	0.50	0.800	0	7.46
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800						
SUBAREA RUNOFF(CFS) = 2.00						

TOTAL AREA (ACRES) = 1.60 PEAK FLOW RATE (CFS) = 2.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 50331.00 TO NODE 50332.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 965.00 DOWNSTREAM ELEVATION (FEET) = 960.00
STREET LENGTH (FEET) = 285.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.38
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.29
HALFSTREET FLOOD WIDTH (FEET) = 6.72
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.63
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.77
STREET FLOW TRAVEL TIME (MIN.) = 1.80 Tc (MIN.) = 9.26

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.576

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.60 0.50 0.800 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA (ACRES) = 2.60 SUBAREA RUNOFF (CFS) = 2.75
EFFECTIVE AREA (ACRES) = 4.20 AREA-AVERAGED Fm (INCH/HR) = 0.40
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.80
TOTAL AREA (ACRES) = 4.2 PEAK FLOW RATE (CFS) = 4.45

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.31 HALFSTREET FLOOD WIDTH (FEET) = 7.78
FLOW VELOCITY (FEET/SEC.) = 2.80 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.88
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50332.00 = 579.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50332.00 TO NODE 50333.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 960.00 DOWNSTREAM ELEVATION (FEET) = 940.00
STREET LENGTH (FEET) = 364.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.62

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.36
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.30
HALFSTREET FLOOD WIDTH (FEET) = 6.97
AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.71
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.40
STREET FLOW TRAVEL TIME (MIN.) = 1.29 Tc (MIN.) = 10.55
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.466

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.90 0.50 0.800 -
USER-DEFINED - 0.10 0.50 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.805
SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 3.83
EFFECTIVE AREA (ACRES) = 8.20 AREA-AVERAGED Fm (INCH/HR) = 0.40
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.80
TOTAL AREA (ACRES) = 8.2 PEAK FLOW RATE (CFS) = 7.86

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.31 HALFSTREET FLOOD WIDTH (FEET) = 7.78
FLOW VELOCITY (FEET/SEC.) = 4.94 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.55
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50333.00 = 943.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50333.00 TO NODE 50334.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 940.00 DOWNSTREAM ELEVATION (FEET) = 920.00
STREET LENGTH (FEET) = 405.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.64

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.64
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.35
HALFSTREET FLOOD WIDTH (FEET) = 9.34
AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.01



PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.73  
 STREET FLOW TRAVEL TIME (MIN.) = 1.35 Tc (MIN.) = 11.90  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.367  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.50	0.50	0.800	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.831  
 SUBAREA AREA (ACRES) = 6.50 SUBAREA RUNOFF (CFS) = 5.57  
 EFFECTIVE AREA (ACRES) = 14.70 AREA-AVERAGED Fm (INCH/HR) = 0.41  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 14.7 PEAK FLOW RATE (CFS) = 12.69

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.36 HALFSTREET FLOOD WIDTH (FEET) = 10.12  
 FLOW VELOCITY (FEET/SEC.) = 5.23 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.89  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50334.00 = 1348.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50334.00 TO NODE 50335.00 IS CODE = 63  
 -----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>> (STREET TABLE SECTION # 5 USED)<<<<<  
 -----

UPSTREAM ELEVATION (FEET) = 920.00 DOWNSTREAM ELEVATION (FEET) = 905.00  
 STREET LENGTH (FEET) = 270.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.62

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 21.68  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.41  
 HALFSTREET FLOOD WIDTH (FEET) = 12.54  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.15  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.52  
 STREET FLOW TRAVEL TIME (MIN.) = 0.73 Tc (MIN.) = 12.63  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.322

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	12.90	0.50	0.800	-
USER-DEFINED	-	4.00	0.50	1.000	-
USER-DEFINED	-	5.40	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.886

SUBAREA AREA (ACRES) = 22.70 SUBAREA RUNOFF (CFS) = 17.96  
 EFFECTIVE AREA (ACRES) = 37.40 AREA-AVERAGED Fm (INCH/HR) = 0.43  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA (ACRES) = 37.4 PEAK FLOW RATE (CFS) = 30.06

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.45 HALFSTREET FLOOD WIDTH (FEET) = 14.41  
 FLOW VELOCITY (FEET/SEC.) = 6.63 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.96  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50335.00 = 1618.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50335.00 TO NODE 50336.00 IS CODE = 31  
 -----

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----

ELEVATION DATA: UPSTREAM (FEET) = 905.00 DOWNSTREAM (FEET) = 870.00  
 FLOW LENGTH (FEET) = 898.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 14.9 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.63  
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 30.06  
 PIPE TRAVEL TIME (MIN.) = 1.02 Tc (MIN.) = 13.65  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50336.00 = 2516.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50336.00 TO NODE 50336.00 IS CODE = 81  
 -----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----

MAINLINE Tc (MIN.) = 13.65  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.267  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.40	0.50	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA (ACRES) = 6.40 SUBAREA RUNOFF (CFS) = 5.00  
 EFFECTIVE AREA (ACRES) = 43.80 AREA-AVERAGED Fm (INCH/HR) = 0.43  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA (ACRES) = 43.8 PEAK FLOW RATE (CFS) = 33.21

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50336.00 TO NODE 50337.00 IS CODE = 31  
 -----

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----

ELEVATION DATA: UPSTREAM (FEET) = 870.00 DOWNSTREAM (FEET) = 820.00  
 FLOW LENGTH (FEET) = 799.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 17.65  
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 33.21  
 PIPE TRAVEL TIME (MIN.) = 0.75 Tc (MIN.) = 14.41  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50337.00 = 3315.00 FEET.

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*****
FLOW PROCESS FROM NODE 50337.00 TO NODE 50337.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 14.41
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.230
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.00     0.50     0.800   -
USER-DEFINED        -         7.20     0.50     0.800   -
USER-DEFINED        -         1.50     0.50     1.000   -
USER-DEFINED        -         0.70     0.50     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.839
SUBAREA AREA(ACRES) = 11.40   SUBAREA RUNOFF(CFS) = 8.31
EFFECTIVE AREA(ACRES) = 55.20   AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 55.2     PEAK FLOW RATE(CFS) = 40.03
*****
FLOW PROCESS FROM NODE 50337.00 TO NODE 50338.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 820.00   DOWNSTREAM(FEET) = 750.00
FLOW LENGTH(FEET) = 1063.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.12
ESTIMATED PIPE DIAMETER(INCH) = 24.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 40.03
PIPE TRAVEL TIME(MIN.) = 0.93   Tc(MIN.) = 15.33
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50338.00 = 4378.00 FEET.
*****
FLOW PROCESS FROM NODE 50338.00 TO NODE 50338.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 15.33
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.188
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         4.70     0.50     0.800   -
USER-DEFINED        -         4.20     0.50     0.800   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 8.90   SUBAREA RUNOFF(CFS) = 6.31
EFFECTIVE AREA(ACRES) = 64.10   AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 64.1     PEAK FLOW RATE(CFS) = 44.27
*****
FLOW PROCESS FROM NODE 50338.00 TO NODE 50339.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 750.00   DOWNSTREAM(FEET) = 685.00
FLOW LENGTH(FEET) = 1107.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.58
ESTIMATED PIPE DIAMETER(INCH) = 24.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 44.27
PIPE TRAVEL TIME(MIN.) = 0.99   Tc(MIN.) = 16.33
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50339.00 = 5485.00 FEET.
*****
FLOW PROCESS FROM NODE 50339.00 TO NODE 50339.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 16.33
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.152
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         6.10     0.50     0.800   -
USER-DEFINED        -         1.20     0.50     0.800   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 7.30   SUBAREA RUNOFF(CFS) = 4.94
EFFECTIVE AREA(ACRES) = 71.40   AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 71.4     PEAK FLOW RATE(CFS) = 47.15
*****
FLOW PROCESS FROM NODE 50339.00 TO NODE 50340.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 685.00   DOWNSTREAM(FEET) = 660.00
FLOW LENGTH(FEET) = 592.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.79
ESTIMATED PIPE DIAMETER(INCH) = 27.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 47.15
PIPE TRAVEL TIME(MIN.) = 0.59   Tc(MIN.) = 16.91
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50340.00 = 6077.00 FEET.
*****
FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 16.91
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.131
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         5.00     0.50     0.800   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

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SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 3.29  
 EFFECTIVE AREA (ACRES) = 76.40 AREA-AVERAGED Fm (INCH/HR) = 0.42  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA (ACRES) = 76.4 PEAK FLOW RATE (CFS) = 49.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
 -----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 16.91  
 RAINFALL INTENSITY (INCH/HR) = 1.13  
 AREA-AVERAGED Fm (INCH/HR) = 0.42  
 AREA-AVERAGED Fp (INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.83  
 EFFECTIVE STREAM AREA (ACRES) = 76.40  
 TOTAL STREAM AREA (ACRES) = 76.40  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 49.08

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	43.86	14.26	1.237	0.50 (0.41)	0.82	58.9	50320.00
2	49.08	16.91	1.131	0.50 (0.42)	0.83	76.4	50330.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	91.38	14.26	1.237	0.50 (0.41)	0.83	123.3	50320.00
2	87.34	16.91	1.131	0.50 (0.41)	0.83	135.3	50330.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 91.38 Tc (MIN.) = 14.26  
 EFFECTIVE AREA (ACRES) = 123.33 AREA-AVERAGED Fm (INCH/HR) = 0.41  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA (ACRES) = 135.3  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50340.00 = 6077.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50340.00 TO NODE 50341.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 -----

ELEVATION DATA: UPSTREAM (FEET) = 660.00 DOWNSTREAM (FEET) = 575.00  
 FLOW LENGTH (FEET) = 1133.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.4 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 24.41  
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 91.38  
 PIPE TRAVEL TIME (MIN.) = 0.77 Tc (MIN.) = 15.04

LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50341.00 = 7210.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50341.00 TO NODE 50341.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----

MAINLINE Tc (MIN.) = 15.04  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.199  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.30	0.50	0.600	-
USER-DEFINED	-	3.10	0.50	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.684  
 SUBAREA AREA (ACRES) = 7.40 SUBAREA RUNOFF (CFS) = 5.71  
 EFFECTIVE AREA (ACRES) = 130.73 AREA-AVERAGED Fm (INCH/HR) = 0.41  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 142.7 PEAK FLOW RATE (CFS) = 92.85

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50341.00 TO NODE 50342.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 -----

ELEVATION DATA: UPSTREAM (FEET) = 575.00 DOWNSTREAM (FEET) = 540.00  
 FLOW LENGTH (FEET) = 495.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.2 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 23.84  
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 92.85  
 PIPE TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 15.38  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50342.00 = 7705.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50342.00 TO NODE 50342.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----

MAINLINE Tc (MIN.) = 15.38  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.186  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.50	0.600	-
USER-DEFINED	-	0.20	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 1.67  
 EFFECTIVE AREA (ACRES) = 132.83 AREA-AVERAGED Fm (INCH/HR) = 0.41  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 144.8 PEAK FLOW RATE (CFS) = 93.06

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50342.00 TO NODE 50342.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 15.38  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.186  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.10	0.50	0.600	-
USER-DEFINED	-	17.00	0.50	0.800	-
USER-DEFINED	-	0.90	0.50	0.600	-
USER-DEFINED	-	0.90	0.50	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.738  
 SUBAREA AREA(ACRES) = 25.90 SUBAREA RUNOFF(CFS) = 19.04  
 EFFECTIVE AREA(ACRES) = 158.73 AREA-AVERAGED Fm(INCH/HR) = 0.40  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 170.7 PEAK FLOW RATE(CFS) = 112.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 50342.00 TO NODE 50343.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 470.00  
 FLOW LENGTH(FEET) = 894.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.25  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 112.10  
 PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 15.95  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50343.00 = 8599.00 FEET.

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FLOW PROCESS FROM NODE 50343.00 TO NODE 50343.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN.) = 15.95  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.166  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.60	0.50	0.600	-
USER-DEFINED	-	0.10	0.50	0.800	-
USER-DEFINED	-	0.20	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.603  
 SUBAREA AREA(ACRES) = 6.90 SUBAREA RUNOFF(CFS) = 5.37  
 EFFECTIVE AREA(ACRES) = 165.63 AREA-AVERAGED Fm(INCH/HR) = 0.40  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 177.6 PEAK FLOW RATE(CFS) = 114.55

\*\*\*\*\*

FLOW PROCESS FROM NODE 50343.00 TO NODE 50343.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 15.95  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.166  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	0.500	-
USER-DEFINED	-	1.80	0.50	0.600	-
USER-DEFINED	-	17.90	0.50	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.777  
 SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 13.98  
 EFFECTIVE AREA(ACRES) = 185.63 AREA-AVERAGED Fm(INCH/HR) = 0.40  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 197.6 PEAK FLOW RATE(CFS) = 128.53

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FLOW PROCESS FROM NODE 50343.00 TO NODE 50344.00 IS CODE = 31

-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 416.00  
 FLOW LENGTH(FEET) = 780.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 25.33  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 128.53  
 PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 16.46  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50344.00 = 9379.00 FEET.

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FLOW PROCESS FROM NODE 50344.00 TO NODE 50344.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 16.46  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.147  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.60	0.50	0.500	-
USER-DEFINED	-	0.20	0.50	0.600	-
USER-DEFINED	-	1.90	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.400	-
USER-DEFINED	-	14.70	0.50	0.500	-
USER-DEFINED	-	33.20	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA(ACRES) = 53.70 SUBAREA RUNOFF(CFS) = 42.21  
 EFFECTIVE AREA(ACRES) = 239.33 AREA-AVERAGED Fm(INCH/HR) = 0.37  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.74  
 TOTAL AREA(ACRES) = 251.3 PEAK FLOW RATE(CFS) = 167.65

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FLOW PROCESS FROM NODE 50344.00 TO NODE 50344.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 16.46  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.147  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 4.60 0.50 0.800 -  
 USER-DEFINED - 0.40 0.50 0.500 -  
 USER-DEFINED - 0.10 0.50 0.600 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.773  
 SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 3.49  
 EFFECTIVE AREA(ACRES) = 244.43 AREA-AVERAGED Fm(INCH/HR) = 0.37  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.74  
 TOTAL AREA(ACRES) = 256.4 PEAK FLOW RATE(CFS) = 171.15

\*\*\*\*\*

FLOW PROCESS FROM NODE 50344.00 TO NODE 50345.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 416.00 DOWNSTREAM(FEET) = 403.00  
 FLOW LENGTH(FEET) = 526.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 18.58  
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 171.15  
 PIPE TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 16.93  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50345.00 = 9905.00 FEET.

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FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	171.15	16.93	1.130	0.50( 0.37)	0.74	244.4	50320.00
2	156.72	19.62	1.034	0.50( 0.37)	0.74	256.4	50330.00

LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50345.00 = 9905.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	418.56	18.89	1.060	0.50( 0.36)	0.73	577.5	50240.00
2	417.71	22.97	0.949	0.50( 0.37)	0.73	696.8	50280.00
3	412.32	23.97	0.925	0.50( 0.37)	0.73	718.1	50300.00
4	390.68	26.46	0.874	0.50( 0.37)	0.73	756.9	50220.00
5	327.00	32.92	0.775	0.50( 0.37)	0.73	806.6	50260.00
6	311.18	34.45	0.757	0.50( 0.37)	0.73	809.4	50200.00

LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50345.00 = 13626.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	584.35	16.93	1.130	0.50( 0.37)	0.73	762.2	50320.00

2	579.24	18.89	1.060	0.50( 0.37)	0.73	830.6	50240.00
3	575.13	19.62	1.034	0.50( 0.37)	0.73	855.4	50330.00
4	554.36	22.97	0.949	0.50( 0.37)	0.73	953.2	50280.00
5	543.27	23.97	0.925	0.50( 0.37)	0.73	974.5	50300.00
6	509.57	26.46	0.874	0.50( 0.37)	0.73	1013.3	50220.00
7	422.48	32.92	0.775	0.50( 0.37)	0.74	1063.0	50260.00
8	402.34	34.45	0.757	0.50( 0.37)	0.74	1065.8	50200.00

TOTAL AREA(ACRES) = 1065.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 584.35 Tc(MIN.) = 16.935  
 EFFECTIVE AREA(ACRES) = 762.22 AREA-AVERAGED Fm(INCH/HR) = 0.37  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 1065.8  
 LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50345.00 = 13626.00 FEET.

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FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

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FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.93  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.130  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.50 0.100 -  
 USER-DEFINED - 1.40 0.50 0.500 -  
 USER-DEFINED - 0.10 0.50 0.850 -  
 USER-DEFINED - 6.30 0.50 0.100 -  
 USER-DEFINED - 8.70 0.50 0.400 -  
 USER-DEFINED - 10.80 0.50 0.500 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.376  
 SUBAREA AREA(ACRES) = 27.40 SUBAREA RUNOFF(CFS) = 23.24  
 EFFECTIVE AREA(ACRES) = 789.62 AREA-AVERAGED Fm(INCH/HR) = 0.36  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA(ACRES) = 1093.2 PEAK FLOW RATE(CFS) = 584.35  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.93  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.130  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.10 0.50 0.600 -  
 USER-DEFINED - 1.60 0.50 0.850 -

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USER-DEFINED      -      1.80    0.50    0.100    -
USER-DEFINED      -      6.20    0.50    0.400    -
USER-DEFINED      -      2.80    0.50    0.500    -
USER-DEFINED      -      0.20    0.50    0.850    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456
SUBAREA AREA(ACRES) = 13.70    SUBAREA RUNOFF(CFS) = 11.12
EFFECTIVE AREA(ACRES) = 803.32    AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 1106.9    PEAK FLOW RATE(CFS) = 584.35
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 50345.00 TO NODE 50346.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 403.00    DOWNSTREAM(FEET) = 350.00
FLOW LENGTH(FEET) = 1031.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 33.42
ESTIMATED PIPE DIAMETER(INCH) = 63.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 584.35
PIPE TRAVEL TIME(MIN.) = 0.51    Tc(MIN.) = 17.45
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50346.00 = 14657.00 FEET.

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FLOW PROCESS FROM NODE 50346.00 TO NODE 50346.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 17.45
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.112
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED      -      0.40    0.50    0.100    -
USER-DEFINED      -      1.10    0.50    0.500    -
USER-DEFINED      -      0.20    0.50    0.600    -
USER-DEFINED      -      1.40    0.50    0.100    -
USER-DEFINED      -      0.50    0.50    0.500    -
USER-DEFINED      -      2.40    0.50    0.600    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.423
SUBAREA AREA(ACRES) = 6.00    SUBAREA RUNOFF(CFS) = 4.86
EFFECTIVE AREA(ACRES) = 809.32    AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 1112.9    PEAK FLOW RATE(CFS) = 584.35
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 50346.00 TO NODE 50347.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 350.00    DOWNSTREAM(FEET) = 313.00

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FLOW LENGTH(FEET) = 240.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 50.35
ESTIMATED PIPE DIAMETER(INCH) = 51.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 584.35
PIPE TRAVEL TIME(MIN.) = 0.08    Tc(MIN.) = 17.53
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50347.00 = 14897.00 FEET.

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FLOW PROCESS FROM NODE 50347.00 TO NODE 50347.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 17.53
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.109
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED      -      1.00    0.50    0.500    -
USER-DEFINED      -      0.10    0.50    1.000    -
USER-DEFINED      -      0.30    0.50    1.000    -
USER-DEFINED      -      0.80    0.50    0.500    -
USER-DEFINED      -      1.90    0.50    0.800    -
USER-DEFINED      -      1.00    0.50    1.000    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.749
SUBAREA AREA(ACRES) = 5.10    SUBAREA RUNOFF(CFS) = 3.37
EFFECTIVE AREA(ACRES) = 814.42    AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 1118.0    PEAK FLOW RATE(CFS) = 584.35
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 50347.00 TO NODE 50347.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 17.53
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.109
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED      -      1.40    0.50    0.500    -
USER-DEFINED      -      1.00    0.50    0.500    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 2.40    SUBAREA RUNOFF(CFS) = 1.86
EFFECTIVE AREA(ACRES) = 816.82    AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.50    AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 1120.4    PEAK FLOW RATE(CFS) = 584.35
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 50347.00 TO NODE 50348.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 313.00 DOWNSTREAM(FEET) = 233.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1690.00 CHANNEL SLOPE = 0.0473  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 7.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 584.35  
 FLOW VELOCITY(FEET/SEC.) = 12.35 FLOW DEPTH(FEET) = 3.97  
 TRAVEL TIME(MIN.) = 2.28 Tc(MIN.) = 19.81  
 LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50348.00 = 16587.00 FEET.

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FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.81

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.027

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	0.500	-
USER-DEFINED	-	0.10	0.50	0.600	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-
USER-DEFINED	-	5.50	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949

SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 3.63

EFFECTIVE AREA(ACRES) = 824.12 AREA-AVERAGED Fm(INCH/HR) = 0.36

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.71

TOTAL AREA(ACRES) = 1127.7 PEAK FLOW RATE(CFS) = 584.35

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.81

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.027

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	0.100	-
USER-DEFINED	-	0.40	0.50	0.600	-
USER-DEFINED	-	42.40	0.50	0.800	-
USER-DEFINED	-	3.00	0.50	1.000	-
USER-DEFINED	-	4.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.827

SUBAREA AREA(ACRES) = 54.60 SUBAREA RUNOFF(CFS) = 30.13

EFFECTIVE AREA(ACRES) = 878.72 AREA-AVERAGED Fm(INCH/HR) = 0.36

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.72

TOTAL AREA(ACRES) = 1182.3 PEAK FLOW RATE(CFS) = 584.35

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.81

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.027

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.90	0.50	1.000	-
USER-DEFINED	-	3.70	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	4.10	0.50	0.800	-
USER-DEFINED	-	2.30	0.50	1.000	-
USER-DEFINED	-	0.80	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.948

SUBAREA AREA(ACRES) = 21.10 SUBAREA RUNOFF(CFS) = 10.49

EFFECTIVE AREA(ACRES) = 899.82 AREA-AVERAGED Fm(INCH/HR) = 0.36

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73

TOTAL AREA(ACRES) = 1203.4 PEAK FLOW RATE(CFS) = 584.35

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.81

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.027

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.09

EFFECTIVE AREA(ACRES) = 900.02 AREA-AVERAGED Fm(INCH/HR) = 0.36

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73

TOTAL AREA(ACRES) = 1203.6 PEAK FLOW RATE(CFS) = 584.35

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.81

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.027

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	1.40	0.50	1.000	-
USER-DEFINED	-	1.70	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.90	0.50	0.850	-
USER-DEFINED	-	4.50	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.944  
SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 4.44  
EFFECTIVE AREA(ACRES) = 908.92 AREA-AVERAGED Fm(INCH/HR) = 0.36  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1212.5 PEAK FLOW RATE(CFS) = 584.35  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 19.81  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.027  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.33  
EFFECTIVE AREA(ACRES) = 909.62 AREA-AVERAGED Fm(INCH/HR) = 0.36  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1213.2 PEAK FLOW RATE(CFS) = 584.35  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 19.81  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.027  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.50 0.100 -  
USER-DEFINED - 0.10 0.50 0.500 -  
USER-DEFINED - 3.50 0.50 0.600 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 0.100 -  
USER-DEFINED - 0.20 0.50 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.556  
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 3.03  
EFFECTIVE AREA(ACRES) = 914.12 AREA-AVERAGED Fm(INCH/HR) = 0.36  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1217.7 PEAK FLOW RATE(CFS) = 584.35  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 19.81  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.027

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.80 0.50 0.600 -  
USER-DEFINED - 1.50 0.50 1.000 -  
USER-DEFINED - 2.50 0.50 1.000 -  
USER-DEFINED - 0.60 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 0.100 -  
USER-DEFINED - 0.10 0.50 0.600 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.732  
SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 8.09  
EFFECTIVE AREA(ACRES) = 927.72 AREA-AVERAGED Fm(INCH/HR) = 0.36  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1231.3 PEAK FLOW RATE(CFS) = 584.35  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 19.81  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.027  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.40 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 0.81  
EFFECTIVE AREA(ACRES) = 929.42 AREA-AVERAGED Fm(INCH/HR) = 0.36  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1233.0 PEAK FLOW RATE(CFS) = 584.35  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50349.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 233.00 DOWNSTREAM(FEET) = 214.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1010.00 CHANNEL SLOPE = 0.0188  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 8.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 584.35  
FLOW VELOCITY(FEET/SEC.) = 10.84 FLOW DEPTH(FEET) = 4.24  
TRAVEL TIME(MIN.) = 1.55 Tc(MIN.) = 21.36  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50349.00 = 17597.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 21.36



\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.987  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.40 0.50 0.100 -  
 USER-DEFINED - 0.30 0.50 1.000 -  
 USER-DEFINED - 0.40 0.50 1.000 -  
 USER-DEFINED - 1.40 0.50 1.000 -  
 USER-DEFINED - 2.30 0.50 1.000 -  
 USER-DEFINED - 1.10 0.50 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.817  
 SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 3.59  
 EFFECTIVE AREA (ACRES) = 936.32 AREA-AVERAGED Fm (INCH/HR) = 0.36  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 1239.9 PEAK FLOW RATE (CFS) = 584.35  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 21.36  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.987  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.20 0.50 1.000 -  
 USER-DEFINED - 1.60 0.50 1.000 -  
 USER-DEFINED - 5.10 0.50 0.850 -  
 USER-DEFINED - 0.70 0.50 1.000 -  
 USER-DEFINED - 0.60 0.50 1.000 -  
 USER-DEFINED - 7.20 0.50 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.958  
 SUBAREA AREA (ACRES) = 18.40 SUBAREA RUNOFF (CFS) = 8.41  
 EFFECTIVE AREA (ACRES) = 954.72 AREA-AVERAGED Fm (INCH/HR) = 0.37  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 1258.3 PEAK FLOW RATE (CFS) = 584.35  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 21.36  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.987  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.20 0.50 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.09  
 EFFECTIVE AREA (ACRES) = 954.92 AREA-AVERAGED Fm (INCH/HR) = 0.37  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73

TOTAL AREA (ACRES) = 1258.5 PEAK FLOW RATE (CFS) = 584.35  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 21.36  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.987  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.70 0.50 0.100 -  
 USER-DEFINED - 3.50 0.50 1.000 -  
 USER-DEFINED - 0.80 0.50 1.000 -  
 USER-DEFINED - 3.00 0.50 1.000 -  
 USER-DEFINED - 11.70 0.50 1.000 -  
 USER-DEFINED - 12.40 0.50 0.850 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.874  
 SUBAREA AREA (ACRES) = 34.10 SUBAREA RUNOFF (CFS) = 16.88  
 EFFECTIVE AREA (ACRES) = 989.02 AREA-AVERAGED Fm (INCH/HR) = 0.37  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.74  
 TOTAL AREA (ACRES) = 1292.6 PEAK FLOW RATE (CFS) = 584.35  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 21.36  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.987  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.00 0.50 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 6.00 SUBAREA RUNOFF (CFS) = 2.63  
 EFFECTIVE AREA (ACRES) = 995.02 AREA-AVERAGED Fm (INCH/HR) = 0.37  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.74  
 TOTAL AREA (ACRES) = 1298.6 PEAK FLOW RATE (CFS) = 584.35  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:  
 TOTAL AREA (ACRES) = 1298.6 TC (MIN.) = 21.36  
 EFFECTIVE AREA (ACRES) = 995.02 AREA-AVERAGED Fm (INCH/HR) = 0.37  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.74  
 PEAK FLOW RATE (CFS) = 584.35

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	584.35	21.36	0.987	0.50 (0.37)	0.74	995.0	50320.00
2	579.24	23.33	0.940	0.50 (0.37)	0.74	1063.4	50240.00
3	575.13	24.07	0.922	0.50 (0.37)	0.74	1088.2	50330.00

4	554.36	27.47	0.856	0.50	( 0.37)	0.74	1186.0	50280.00
5	543.27	28.48	0.837	0.50	( 0.37)	0.74	1207.3	50300.00
6	509.57	31.04	0.797	0.50	( 0.37)	0.74	1246.1	50220.00
7	422.48	37.74	0.717	0.50	( 0.37)	0.74	1295.8	50260.00
8	402.34	39.31	0.698	0.50	( 0.37)	0.74	1298.6	50200.00

=====  
=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2013 Advanced Engineering Software (aes)  
Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

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92707

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PA3 & PA4 ROMP \*  
\* REGIONAL WATERSHED S29 - FREE DRAINING - ULTIMATE CONDITION \*  
\* 25-YR RM EV JULY 2018 ROKAMOTO \*  
\*\*\*\*\*

FILE NAME: P504XX05.DAT  
TIME/DATE OF STUDY: 09:07 07/24/2018

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.00;	2.230
2)	6.00;	2.010
3)	7.00;	1.850
4)	8.00;	1.710
5)	9.00;	1.600
6)	10.00;	1.510
7)	11.00;	1.430
8)	12.00;	1.360
9)	13.00;	1.300
10)	14.00;	1.250
11)	15.00;	1.200
12)	20.00;	1.020
13)	25.00;	0.900
14)	30.00;	0.810
15)	40.00;	0.690
16)	50.00;	0.610
17)	60.00;	0.550
18)	90.00;	0.440
19)	120.00;	0.370
20)	180.00;	0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

$T_c = K * [(LENGTH^{**} 3.00) / (ELEVATION CHANGE)]^{**} 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.963  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.856  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "1 DWELLING/ACRE"	-	0.50	0.50	0.800	0	6.96

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.800  
SUBAREA RUNOFF(CFS) = 0.66  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.66  
FLOW VELOCITY(FEET/SEC.) = 4.27 FLOW DEPTH(FEET) = 0.23  
TRAVEL TIME(MIN.) = 1.02  $T_c$ (MIN.) = 7.98  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN.) = 7.98

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.712  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.50 0.800 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.47  
 EFFECTIVE AREA (ACRES) = 0.90 AREA-AVERAGED Fm (INCH/HR) = 0.40  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 1.06

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 239.00 CHANNEL SLOPE = 0.4184  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1.06  
 FLOW VELOCITY (FEET/SEC.) = 5.81 FLOW DEPTH (FEET) = 0.25  
 TRAVEL TIME (MIN.) = 0.69 Tc (MIN.) = 8.67  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50403.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====  
 MAINLINE Tc (MIN.) = 8.67  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.636  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.50 0.800 -  
 USER-DEFINED - 0.10 0.50 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.44  
 EFFECTIVE AREA (ACRES) = 1.30 AREA-AVERAGED Fm (INCH/HR) = 0.41  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 1.3 PEAK FLOW RATE (CFS) = 1.44

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00 CHANNEL SLOPE = 0.7042  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1.44  
 FLOW VELOCITY (FEET/SEC.) = 7.73 FLOW DEPTH (FEET) = 0.25

TRAVEL TIME (MIN.) = 0.15 Tc (MIN.) = 8.82  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50404.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====  
 MAINLINE Tc (MIN.) = 8.82  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.619  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.90 0.50 0.800 -  
 USER-DEFINED - 0.10 0.50 1.000 -  
 USER-DEFINED - 0.30 0.50 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.862  
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 1.39  
 EFFECTIVE AREA (ACRES) = 2.60 AREA-AVERAGED Fm (INCH/HR) = 0.42  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA (ACRES) = 2.6 PEAK FLOW RATE (CFS) = 2.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 145.00 CHANNEL SLOPE = 0.3448  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 2.81  
 FLOW VELOCITY (FEET/SEC.) = 6.87 FLOW DEPTH (FEET) = 0.37  
 TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 9.18  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50405.00 TO NODE 50405.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====  
 MAINLINE Tc (MIN.) = 9.18  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.584  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.20 0.50 0.800 -  
 USER-DEFINED - 0.10 0.50 1.000 -  
 USER-DEFINED - 0.80 0.50 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.964  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 1.09  
 EFFECTIVE AREA (ACRES) = 3.70 AREA-AVERAGED Fm (INCH/HR) = 0.44  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.88  
 TOTAL AREA (ACRES) = 3.7 PEAK FLOW RATE (CFS) = 3.82

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*****
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.82
FLOW VELOCITY(FEET/SEC.) = 7.13 FLOW DEPTH(FEET) = 0.42
TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 9.54
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50406.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.54
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.551
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.50  1.000  -
USER-DEFINED        -         0.20   0.50  1.000  -
USER-DEFINED        -         0.80   0.50  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 1.13
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.45
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.91
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 4.84

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.2193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.84
FLOW VELOCITY(FEET/SEC.) = 6.64 FLOW DEPTH(FEET) = 0.49
TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 10.12
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50407.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.12
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.501
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.70   0.50  0.800  -
USER-DEFINED        -         1.00   0.50  1.000  -
USER-DEFINED        -         1.60   0.50  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.883
SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 6.01
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.45
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.89
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 10.62

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 325.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 490.00 CHANNEL SLOPE = 0.1531
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.62
FLOW VELOCITY(FEET/SEC.) = 6.98 FLOW DEPTH(FEET) = 0.71
TRAVEL TIME(MIN.) = 1.17 Tc(MIN.) = 11.29
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 11.29
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.410
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.50  1.000  -
USER-DEFINED        -         0.10   0.50  1.000  -
USER-DEFINED        -         0.60   0.50  1.000  -
USER-DEFINED        -         1.40   0.50  1.000  -
USER-DEFINED        -         0.50   0.50  1.000  -
USER-DEFINED        -         1.20   0.50  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90 SUBAREA RUNOFF(CFS) = 3.19
EFFECTIVE AREA(ACRES) = 15.10 AREA-AVERAGED Fm(INCH/HR) = 0.46
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 15.1 PEAK FLOW RATE(CFS) = 12.90

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 11.29
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.410
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 0.74  
EFFECTIVE AREA(ACRES) = 16.00 AREA-AVERAGED Fm(INCH/HR) = 0.46  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.92  
TOTAL AREA(ACRES) = 16.0 PEAK FLOW RATE(CFS) = 13.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 13.64  
FLOW VELOCITY(FEET/SEC.) = 5.55 FLOW DEPTH(FEET) = 0.91  
TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 11.51  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 11.51  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.395  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	4.30	0.50	0.800	-
USER-DEFINED	-	1.60	0.50	1.000	-
USER-DEFINED	-	3.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.910  
SUBAREA AREA(ACRES) = 9.60 SUBAREA RUNOFF(CFS) = 8.11  
EFFECTIVE AREA(ACRES) = 25.60 AREA-AVERAGED Fm(INCH/HR) = 0.46  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.92  
TOTAL AREA(ACRES) = 25.6 PEAK FLOW RATE(CFS) = 21.53

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 11.51  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.395  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.30	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 5.90 SUBAREA RUNOFF(CFS) = 4.75  
EFFECTIVE AREA(ACRES) = 31.50 AREA-AVERAGED Fm(INCH/HR) = 0.47  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.93  
TOTAL AREA(ACRES) = 31.5 PEAK FLOW RATE(CFS) = 26.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 26.28  
FLOW VELOCITY(FEET/SEC.) = 6.84 FLOW DEPTH(FEET) = 1.13  
TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 11.76  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 11.76  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.377  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	2.50	0.50	1.000	-
USER-DEFINED	-	1.20	0.50	1.000	-
USER-DEFINED	-	1.80	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 5.05  
EFFECTIVE AREA(ACRES) = 37.90 AREA-AVERAGED Fm(INCH/HR) = 0.47  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 37.9 PEAK FLOW RATE(CFS) = 30.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 11.76  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.377  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA (ACRES) =		0.60	SUBAREA RUNOFF (CFS) =		0.47
EFFECTIVE AREA (ACRES) =		38.50	AREA-AVERAGED Fm (INCH/HR) =		0.47
AREA-AVERAGED Fp (INCH/HR) =		0.50	AREA-AVERAGED Ap =		0.95
TOTAL AREA (ACRES) =		38.5	PEAK FLOW RATE (CFS) =		31.31

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	312.00	DOWNSTREAM (FEET) =	282.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	566.00	CHANNEL SLOPE =	0.0530
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	3.00
CHANNEL FLOW THRU SUBAREA (CFS) =	31.31		
FLOW VELOCITY (FEET/SEC.) =	6.18	FLOW DEPTH (FEET) =	1.30
TRAVEL TIME (MIN.) =	1.53	Tc (MIN.) =	13.28
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 13.28					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.286					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	1.60	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	1.50	0.50	0.100	-
USER-DEFINED	-	0.40	0.50	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658					
SUBAREA AREA (ACRES) =		5.00	SUBAREA RUNOFF (CFS) =		4.31
EFFECTIVE AREA (ACRES) =		43.50	AREA-AVERAGED Fm (INCH/HR) =		0.46
AREA-AVERAGED Fp (INCH/HR) =		0.50	AREA-AVERAGED Ap =		0.91
TOTAL AREA (ACRES) =		43.5	PEAK FLOW RATE (CFS) =		32.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 13.28					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.286					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.50	1.000	-
USER-DEFINED	-	5.80	0.50	1.000	-
USER-DEFINED	-	0.50	0.50	1.000	-
USER-DEFINED	-	3.40	0.50	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA (ACRES) =		10.50	SUBAREA RUNOFF (CFS) =		7.42
EFFECTIVE AREA (ACRES) =		54.00	AREA-AVERAGED Fm (INCH/HR) =		0.47
AREA-AVERAGED Fp (INCH/HR) =		0.50	AREA-AVERAGED Ap =		0.93
TOTAL AREA (ACRES) =		54.0	PEAK FLOW RATE (CFS) =		39.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	282.00	DOWNSTREAM (FEET) =	216.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	954.00	CHANNEL SLOPE =	0.0692
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH (FEET) =	3.00
CHANNEL FLOW THRU SUBAREA (CFS) =	39.88		
FLOW VELOCITY (FEET/SEC.) =	8.99	FLOW DEPTH (FEET) =	1.22
TRAVEL TIME (MIN.) =	1.77	Tc (MIN.) =	15.05
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 15.05					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.198					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	1.00	0.50	1.000	-
USER-DEFINED	-	1.10	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	0.100	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875					
SUBAREA AREA (ACRES) =		3.60	SUBAREA RUNOFF (CFS) =		2.46
EFFECTIVE AREA (ACRES) =		57.60	AREA-AVERAGED Fm (INCH/HR) =		0.46
AREA-AVERAGED Fp (INCH/HR) =		0.50	AREA-AVERAGED Ap =		0.93
TOTAL AREA (ACRES) =		57.6	PEAK FLOW RATE (CFS) =		39.88
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE					

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 15.05					
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.198					
SUBAREA LOSS RATE DATA (AMC II):					

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	1.30	0.50	1.000	-
USER-DEFINED	-	9.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 SUBAREA AREA (ACRES) = 10.60      SUBAREA RUNOFF (CFS) = 6.67  
 EFFECTIVE AREA (ACRES) = 68.20      AREA-AVERAGED Fm (INCH/HR) = 0.47  
 AREA-AVERAGED Fp (INCH/HR) = 0.50      AREA-AVERAGED Ap = 0.94  
 TOTAL AREA (ACRES) = 68.2      PEAK FLOW RATE (CFS) = 44.75

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.05  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.198  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.50	0.850	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	1.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.934  
 SUBAREA AREA (ACRES) = 2.50      SUBAREA RUNOFF (CFS) = 1.64  
 EFFECTIVE AREA (ACRES) = 70.70      AREA-AVERAGED Fm (INCH/HR) = 0.47  
 AREA-AVERAGED Fp (INCH/HR) = 0.50      AREA-AVERAGED Ap = 0.94  
 TOTAL AREA (ACRES) = 70.7      PEAK FLOW RATE (CFS) = 46.39

END OF STUDY SUMMARY:  
 TOTAL AREA (ACRES) = 70.7      TC (MIN.) = 15.05  
 EFFECTIVE AREA (ACRES) = 70.70      AREA-AVERAGED Fm (INCH/HR) = 0.47  
 AREA-AVERAGED Fp (INCH/HR) = 0.50      AREA-AVERAGED Ap = 0.938  
 PEAK FLOW RATE (CFS) = 46.39

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2006 Advanced Engineering Software (aes)  
Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 5 \*  
\* HYDROLOGIC ANALYSIS - 5-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P505XX05.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	2.230
2)	6.000;	2.010
3)	7.000;	1.850
4)	8.000;	1.710
5)	9.000;	1.600
6)	10.000;	1.510
7)	11.000;	1.430
8)	12.000;	1.360
9)	13.000;	1.300
10)	14.000;	1.250
11)	15.000;	1.200
12)	20.000;	1.020
13)	25.000;	0.900
14)	30.000;	0.810
15)	40.000;	0.690
16)	50.000;	0.610
17)	60.000;	0.550
18)	90.000;	0.440
19)	120.000;	0.370
20)	180.000;	0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50500.00 TO NODE 50501.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 254.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 779.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.543

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.923

SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
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RESIDENTIAL

"1 DWELLING/ACRE"	-	2.00	0.50	0.800	95	6.54
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SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.800

SUBAREA RUNOFF(CFS) = 2.74

TOTAL AREA(ACRES) = 2.00 PEAK FLOW RATE(CFS) = 2.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50501.00 TO NODE 50502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 779.00 DOWNSTREAM(FEET) = 765.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 382.00 CHANNEL SLOPE = 0.0366  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.74  
FLOW VELOCITY(FEET/SEC.) = 2.92 FLOW DEPTH(FEET) = 0.56  
TRAVEL TIME(MIN.) = 2.18  $T_c$ (MIN.) = 8.73  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50502.00 = 636.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50502.00 TO NODE 50502.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 8.73

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.630  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.60 0.50 0.800 -  
 USER-DEFINED - 0.30 0.50 1.000 -  
 USER-DEFINED - 0.10 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.840  
 SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 2.18  
 EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.41  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 4.39

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50502.00 TO NODE 50503.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 765.00 DOWNSTREAM (FEET) = 750.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 355.00 CHANNEL SLOPE = 0.0423  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 4.39  
 FLOW VELOCITY (FEET/SEC.) = 3.45 FLOW DEPTH (FEET) = 0.65  
 TRAVEL TIME (MIN.) = 1.71 Tc (MIN.) = 10.44  
 LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50503.00 = 991.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50503.00 TO NODE 50503.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 10.44  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.475  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.70 0.50 0.800 -  
 USER-DEFINED - 1.30 0.50 1.000 -  
 USER-DEFINED - 0.10 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.890  
 SUBAREA AREA (ACRES) = 3.10 SUBAREA RUNOFF (CFS) = 2.87  
 EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.43  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 6.70

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50503.00 TO NODE 50504.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 750.00 DOWNSTREAM (FEET) = 712.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 261.00 CHANNEL SLOPE = 0.1456  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 6.70  
 FLOW VELOCITY (FEET/SEC.) = 6.21 FLOW DEPTH (FEET) = 0.60  
 TRAVEL TIME (MIN.) = 0.70 Tc (MIN.) = 11.14  
 LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50504.00 = 1252.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50504.00 TO NODE 50504.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 11.14  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.420  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.90 0.50 1.000 -  
 USER-DEFINED - 0.40 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 5.22  
 EFFECTIVE AREA (ACRES) = 13.40 AREA-AVERAGED Fm (INCH/HR) = 0.46  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.92  
 TOTAL AREA (ACRES) = 13.4 PEAK FLOW RATE (CFS) = 11.57

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50504.00 TO NODE 50505.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 464.00 CHANNEL SLOPE = 0.2414  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 11.57  
 FLOW VELOCITY (FEET/SEC.) = 8.48 FLOW DEPTH (FEET) = 0.67  
 TRAVEL TIME (MIN.) = 0.91 Tc (MIN.) = 12.05  
 LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50505.00 = 1716.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50505.00 TO NODE 50505.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 12.05  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.357  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.50 0.50 1.000 -  
 USER-DEFINED - 0.70 0.50 1.000 -  
 USER-DEFINED - 0.40 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.60 SUBAREA RUNOFF (CFS) = 2.00  
 EFFECTIVE AREA (ACRES) = 16.00 AREA-AVERAGED Fm (INCH/HR) = 0.47  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.93

TOTAL AREA (ACRES) = 16.0 PEAK FLOW RATE (CFS) = 12.81

\*\*\*\*\*

FLOW PROCESS FROM NODE 50505.00 TO NODE 50506.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 535.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 310.00 CHANNEL SLOPE = 0.2097  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 12.81  
FLOW VELOCITY (FEET/SEC.) = 8.24 FLOW DEPTH (FEET) = 0.72  
TRAVEL TIME (MIN.) = 0.63 Tc (MIN.) = 12.68  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50506.00 = 2026.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50506.00 TO NODE 50506.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 12.68  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.319  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.80 0.50 0.800 -  
USER-DEFINED - 0.90 0.50 1.000 -  
USER-DEFINED - 0.70 0.50 1.000 -  
USER-DEFINED - 2.70 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.941  
SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 4.66  
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.47  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.94  
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 16.93

\*\*\*\*\*

FLOW PROCESS FROM NODE 50506.00 TO NODE 50507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 405.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.2658  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 16.93  
FLOW VELOCITY (FEET/SEC.) = 9.77 FLOW DEPTH (FEET) = 0.76  
TRAVEL TIME (MIN.) = 0.83 Tc (MIN.) = 13.52  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50507.00 = 2515.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50507.00 TO NODE 50507.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 13.52  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.274  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.50 0.800 -  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 1.30 0.50 1.000 -  
USER-DEFINED - 2.80 0.50 1.000 -  
USER-DEFINED - 5.20 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.988  
SUBAREA AREA (ACRES) = 10.00 SUBAREA RUNOFF (CFS) = 7.02  
EFFECTIVE AREA (ACRES) = 32.10 AREA-AVERAGED Fm (INCH/HR) = 0.48  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95  
TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 23.05

\*\*\*\*\*

FLOW PROCESS FROM NODE 50507.00 TO NODE 50508.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 285.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 706.00 CHANNEL SLOPE = 0.1700  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 23.05  
FLOW VELOCITY (FEET/SEC.) = 8.93 FLOW DEPTH (FEET) = 0.93  
TRAVEL TIME (MIN.) = 1.32 Tc (MIN.) = 14.83  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50508.00 = 3221.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50508.00 TO NODE 50508.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 14.83  
\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.208  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.50 0.100 -  
USER-DEFINED - 0.90 0.50 1.000 -  
USER-DEFINED - 0.20 0.50 1.000 -  
USER-DEFINED - 5.10 0.50 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.945  
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 4.37  
EFFECTIVE AREA (ACRES) = 38.70 AREA-AVERAGED Fm (INCH/HR) = 0.48  
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95  
TOTAL AREA (ACRES) = 38.7 PEAK FLOW RATE (CFS) = 25.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 50508.00 TO NODE 50509.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 238.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1169.00 CHANNEL SLOPE = 0.0402
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 25.52
FLOW VELOCITY(FEET/SEC.) = 6.55 FLOW DEPTH(FEET) = 1.14
TRAVEL TIME(MIN.) = 2.97 Tc(MIN.) = 17.81
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50509.00 = 4390.00 FEET.

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*****
FLOW PROCESS FROM NODE 50509.00 TO NODE 50509.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 17.81
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.099
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED           -         0.10     0.50     1.000    -
USER-DEFINED           -         1.30     0.50     1.000    -
USER-DEFINED           -         6.90     0.50     1.000    -
USER-DEFINED           -         1.10     0.50     0.100    -
USER-DEFINED           -         0.80     0.50     1.000    -
USER-DEFINED           -         2.10     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.920
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 7.07
EFFECTIVE AREA(ACRES) = 51.00 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 51.0 PEAK FLOW RATE(CFS) = 28.78

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*****
FLOW PROCESS FROM NODE 50509.00 TO NODE 50509.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 17.81
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.099
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED           -         9.40     0.50     1.000    -
USER-DEFINED           -         0.70     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.10 SUBAREA RUNOFF(CFS) = 5.44
EFFECTIVE AREA(ACRES) = 61.10 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 61.1 PEAK FLOW RATE(CFS) = 34.22

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*****
FLOW PROCESS FROM NODE 50509.00 TO NODE 50510.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

ELEVATION DATA: UPSTREAM(FEET) = 238.00 DOWNSTREAM(FEET) = 209.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1026.00 CHANNEL SLOPE = 0.0283
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 34.22
FLOW VELOCITY(FEET/SEC.) = 6.21 FLOW DEPTH(FEET) = 1.36
TRAVEL TIME(MIN.) = 2.75 Tc(MIN.) = 20.56
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50510.00 = 5416.00 FEET.

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 20.56
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.007
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED           -         0.10     0.50     1.000    -
USER-DEFINED           -         1.40     0.50     1.000    -
USER-DEFINED           -         4.40     0.50     1.000    -
USER-DEFINED           -         0.20     0.50     1.000    -
USER-DEFINED           -         1.50     0.50     1.000    -
USER-DEFINED           -        10.00     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 17.60 SUBAREA RUNOFF(CFS) = 8.02
EFFECTIVE AREA(ACRES) = 78.70 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 78.7 PEAK FLOW RATE(CFS) = 37.16

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 20.56
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.007
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED           -         1.70     0.50     0.100    -
USER-DEFINED           -        13.10     0.50     1.000    -
USER-DEFINED           -         1.60     0.50     1.000    -
USER-DEFINED           -        12.70     0.50     1.000    -
USER-DEFINED           -         0.60     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.948
SUBAREA AREA(ACRES) = 29.70 SUBAREA RUNOFF(CFS) = 14.22
EFFECTIVE AREA(ACRES) = 108.40 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 108.4 PEAK FLOW RATE(CFS) = 51.39

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 20.56
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.007
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.90     0.50     1.000    -
USER-DEFINED        -         1.70     0.50     1.000    -
USER-DEFINED        -         0.40     0.50     0.850    -
USER-DEFINED        -         3.40     0.50     1.000    -
USER-DEFINED        -         2.10     0.50     1.000    -
USER-DEFINED        -         1.10     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.994
SUBAREA AREA(ACRES) = 10.60      SUBAREA RUNOFF(CFS) = 4.86
EFFECTIVE AREA(ACRES) = 119.00   AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 119.0      PEAK FLOW RATE(CFS) = 56.24

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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=====
MAINLINE Tc(MIN) = 20.56
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.007
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50     0.50     0.100    -
USER-DEFINED        -         0.30     0.50     1.000    -
USER-DEFINED        -         4.80     0.50     1.000    -
USER-DEFINED        -         2.60     0.50     1.000    -
USER-DEFINED        -         0.90     0.50     1.000    -
USER-DEFINED        -         7.50     0.50     0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA AREA(ACRES) = 16.60      SUBAREA RUNOFF(CFS) = 8.27
EFFECTIVE AREA(ACRES) = 135.60   AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 135.6      PEAK FLOW RATE(CFS) = 64.52

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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=====
MAINLINE Tc(MIN) = 20.56
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.007
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         8.00     0.50     1.000    -
USER-DEFINED        -         2.80     0.50     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.80      SUBAREA RUNOFF(CFS) = 4.92
EFFECTIVE AREA(ACRES) = 146.40   AREA-AVERAGED Fm(INCH/HR) = 0.48

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=====
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 146.4      PEAK FLOW RATE(CFS) = 69.44
=====

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END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 146.4 TC(MIN.) = 20.56
EFFECTIVE AREA(ACRES) = 146.40 AREA-AVERAGED Fm(INCH/HR)= 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.959
PEAK FLOW RATE(CFS) = 69.44
=====

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END OF RATIONAL METHOD ANALYSIS

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\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 6 \*  
\* HYDROLOGIC ANALYSIS - 5-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P506XX05.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	2.230
2)	6.000;	2.010
3)	7.000;	1.850
4)	8.000;	1.710
5)	9.000;	1.600
6)	10.000;	1.510
7)	11.000;	1.430
8)	12.000;	1.360
9)	13.000;	1.300
10)	14.000;	1.250
11)	15.000;	1.200
12)	20.000;	1.020
13)	25.000;	0.900
14)	30.000;	0.810
15)	40.000;	0.690
16)	50.000;	0.610
17)	60.000;	0.550
18)	90.000;	0.440
19)	120.000;	0.370
20)	180.000;	0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50600.00 TO NODE 50601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00  
ELEVATION DATA: UPSTREAM(FEET) = 780.00 DOWNSTREAM(FEET) = 730.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.166  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.497  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	1.40	0.50	1.000	95	10.17

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.26  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 1.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50601.00 TO NODE 50602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.1541  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.26  
FLOW VELOCITY(FEET/SEC.) = 4.15 FLOW DEPTH(FEET) = 0.32  
TRAVEL TIME(MIN.) = 1.43  $T_c$ (MIN.) = 11.60  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50602.00 = 671.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50602.00 TO NODE 50602.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN) = 11.60

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.388  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.30 0.50 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 1.04  
 EFFECTIVE AREA (ACRES) = 2.70 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.7 PEAK FLOW RATE (CFS) = 2.16

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50602.00 TO NODE 50603.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 258.00 CHANNEL SLOPE = 0.2907  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 2.16  
 FLOW VELOCITY (FEET/SEC.) = 6.00 FLOW DEPTH (FEET) = 0.35  
 TRAVEL TIME (MIN.) = 0.72 Tc (MIN.) = 12.32  
 LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50603.00 = 929.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50603.00 TO NODE 50603.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.32  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.341  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.30 0.50 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 0.98  
 EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 3.03

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50603.00 TO NODE 50604.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 585.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 116.00 CHANNEL SLOPE = 0.1293  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 3.03  
 FLOW VELOCITY (FEET/SEC.) = 4.88 FLOW DEPTH (FEET) = 0.45  
 TRAVEL TIME (MIN.) = 0.40 Tc (MIN.) = 12.71

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50604.00 = 1045.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50604.00 TO NODE 50604.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.71  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.317  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.60 0.50 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 1.18  
 EFFECTIVE AREA (ACRES) = 5.60 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.6 PEAK FLOW RATE (CFS) = 4.12

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50604.00 TO NODE 50605.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 585.00 DOWNSTREAM (FEET) = 584.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 16.00 CHANNEL SLOPE = 0.0625  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 4.12  
 FLOW VELOCITY (FEET/SEC.) = 3.94 FLOW DEPTH (FEET) = 0.59  
 TRAVEL TIME (MIN.) = 0.07 Tc (MIN.) = 12.78  
 LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50605.00 = 1061.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50605.00 TO NODE 50605.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.78  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.313  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.00 0.50 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 3.66  
 EFFECTIVE AREA (ACRES) = 10.60 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 10.6 PEAK FLOW RATE (CFS) = 7.76

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50605.00 TO NODE 50606.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<



ELEVATION DATA: UPSTREAM(FEET) = 584.00 DOWNSTREAM(FEET) = 579.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 122.00 CHANNEL SLOPE = 0.0410  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.76  
FLOW VELOCITY(FEET/SEC.) = 3.98 FLOW DEPTH(FEET) = 0.81  
TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 13.29  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50606.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50606.00 TO NODE 50606.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 13.29  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.285  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 5.20 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 3.67  
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 11.17

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50606.00 TO NODE 50607.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 579.00 DOWNSTREAM(FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 637.00 CHANNEL SLOPE = 0.0801  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 11.17  
FLOW VELOCITY(FEET/SEC.) = 5.55 FLOW DEPTH(FEET) = 0.82  
TRAVEL TIME(MIN.) = 1.91 Tc(MIN.) = 15.21  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50607.00 = 1820.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50607.00 TO NODE 50607.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 15.21  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.193  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.30 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 4.55  
EFFECTIVE AREA(ACRES) = 23.10 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 23.1 PEAK FLOW RATE(CFS) = 14.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50607.00 TO NODE 50608.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 422.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 529.00 CHANNEL SLOPE = 0.2004  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 14.39  
FLOW VELOCITY(FEET/SEC.) = 8.35 FLOW DEPTH(FEET) = 0.76  
TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 16.26  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50608.00 = 2349.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50608.00 TO NODE 50608.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 16.26  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.155  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.30 0.50 1.000 -  
USER-DEFINED - 0.70 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 1.77  
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 15.37

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50608.00 TO NODE 50609.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 422.00 DOWNSTREAM(FEET) = 297.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 708.00 CHANNEL SLOPE = 0.1766  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 15.37  
FLOW VELOCITY(FEET/SEC.) = 8.08 FLOW DEPTH(FEET) = 0.80  
TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 17.72  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50609.00 = 3057.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50609.00 TO NODE 50609.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 17.72

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.102  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.60	0.50	0.100	-
USER-DEFINED	-	7.90	0.50	1.000	-
USER-DEFINED	-	2.50	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.880  
 SUBAREA AREA (ACRES) = 12.00 SUBAREA RUNOFF (CFS) = 7.15  
 EFFECTIVE AREA (ACRES) = 38.10 AREA-AVERAGED Fm (INCH/HR) = 0.48  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 38.1 PEAK FLOW RATE (CFS) = 21.28

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50609.00 TO NODE 50610.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 297.00 DOWNSTREAM (FEET) = 207.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1321.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 21.28  
 FLOW VELOCITY (FEET/SEC.) = 7.63 FLOW DEPTH (FEET) = 0.96  
 TRAVEL TIME (MIN.) = 2.88 Tc (MIN.) = 20.61  
 LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50610.00 = 4378.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN) = 20.61  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.005  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	4.40	0.50	1.000	-
USER-DEFINED	-	3.60	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.974  
 SUBAREA AREA (ACRES) = 10.20 SUBAREA RUNOFF (CFS) = 4.76  
 EFFECTIVE AREA (ACRES) = 48.30 AREA-AVERAGED Fm (INCH/HR) = 0.48  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 48.3 PEAK FLOW RATE (CFS) = 22.73

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN) = 20.61

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.005  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.05  
 EFFECTIVE AREA (ACRES) = 48.40 AREA-AVERAGED Fm (INCH/HR) = 0.48  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 22.78

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN) = 20.61  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.005  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 0.50  
 EFFECTIVE AREA (ACRES) = 49.50 AREA-AVERAGED Fm (INCH/HR) = 0.48  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 49.5 PEAK FLOW RATE (CFS) = 23.28

END OF STUDY SUMMARY:  
 TOTAL AREA (ACRES) = 49.5 TC (MIN.) = 20.61  
 EFFECTIVE AREA (ACRES) = 49.50 AREA-AVERAGED Fm (INCH/HR) = 0.48  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.965  
 PEAK FLOW RATE (CFS) = 23.28  
 =====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 7 \*  
\* HYDROLOGIC ANALYSIS - 5-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P507XX05.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	2.230
2)	6.000;	2.010
3)	7.000;	1.850
4)	8.000;	1.710
5)	9.000;	1.600
6)	10.000;	1.510
7)	11.000;	1.430
8)	12.000;	1.360
9)	13.000;	1.300
10)	14.000;	1.250
11)	15.000;	1.200
12)	20.000;	1.020
13)	25.000;	0.900
14)	30.000;	0.810
15)	40.000;	0.690
16)	50.000;	0.610
17)	60.000;	0.550
18)	90.000;	0.440
19)	120.000;	0.370
20)	180.000;	0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50700.00 TO NODE 50701.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 925.00 DOWNSTREAM(FEET) = 815.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.946  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.606  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"OPEN BRUSH"	-	0.20	0.50	1.000	95	8.95
NATURAL FAIR COVER						
"GRASS"	-	0.20	0.50	1.000	95	8.95
NATURAL FAIR COVER						
"OPEN BRUSH"	-	0.20	0.50	1.000	95	8.95

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.60  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50701.00 TO NODE 50702.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 815.00 DOWNSTREAM(FEET) = 800.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 169.00 CHANNEL SLOPE = 0.0888  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.60  
FLOW VELOCITY(FEET/SEC.) = 2.73 FLOW DEPTH(FEET) = 0.27  
TRAVEL TIME(MIN.) = 1.03  $T_c$ (MIN.) = 9.98  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50702.00 = 499.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50702.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.98  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.512  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.50 1.000 -  
USER-DEFINED - 0.30 0.50 1.000 -  
USER-DEFINED - 0.10 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 0.91  
EFFECTIVE AREA(ACRES) = 1.60 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 1.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50703.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====  
ELEVATION DATA: UPSTREAM(FEET) = 800.00 DOWNSTREAM(FEET) = 785.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 128.00 CHANNEL SLOPE = 0.1172  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.46  
FLOW VELOCITY(FEET/SEC.) = 3.88 FLOW DEPTH(FEET) = 0.35  
TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 10.53  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50703.00 = 627.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50703.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.53  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.468  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.50 1.000 -  
USER-DEFINED - 0.40 0.50 1.000 -  
USER-DEFINED - 0.70 0.50 1.000 -  
USER-DEFINED - 0.40 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 1.39  
EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 2.79

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50704.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 775.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.79  
FLOW VELOCITY(FEET/SEC.) = 3.52 FLOW DEPTH(FEET) = 0.51  
TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 11.33  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50704.00 = 797.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50704.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 11.33  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.407  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.50 1.000 -  
USER-DEFINED - 0.60 0.50 1.000 -  
USER-DEFINED - 1.80 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 2.53  
EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 5.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50705.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====  
ELEVATION DATA: UPSTREAM(FEET) = 775.00 DOWNSTREAM(FEET) = 772.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 162.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 5.14  
FLOW VELOCITY(FEET/SEC.) = 2.65 FLOW DEPTH(FEET) = 0.80  
TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 12.35  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50705.00 = 959.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50705.00 TO NODE 50705.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 12.35  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.339  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.30 0.50 1.000 -  
USER-DEFINED - 0.40 0.50 1.000 -

USER-DEFINED - 2.50 0.50 1.000 -  
 USER-DEFINED - 0.10 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 3.25  
 EFFECTIVE AREA(ACRES) = 10.60 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 10.6 PEAK FLOW RATE(CFS) = 8.00

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FLOW PROCESS FROM NODE 50705.00 TO NODE 50706.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 772.00 DOWNSTREAM(FEET) = 745.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.0756  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.00  
 FLOW VELOCITY(FEET/SEC.) = 5.04 FLOW DEPTH(FEET) = 0.73  
 TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 13.53  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50706.00 = 1316.00 FEET.

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FLOW PROCESS FROM NODE 50706.00 TO NODE 50706.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 13.53  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.273  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.50	1.000	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	1.80	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 2.44  
 EFFECTIVE AREA(ACRES) = 14.10 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 14.1 PEAK FLOW RATE(CFS) = 9.81

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FLOW PROCESS FROM NODE 50706.00 TO NODE 50707.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 733.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 444.00 CHANNEL SLOPE = 0.0270  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 9.81  
 FLOW VELOCITY(FEET/SEC.) = 3.62 FLOW DEPTH(FEET) = 0.95  
 TRAVEL TIME(MIN.) = 2.05 Tc(MIN.) = 15.58

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50707.00 = 1760.00 FEET.

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FLOW PROCESS FROM NODE 50707.00 TO NODE 50707.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 15.58  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.179  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.40	0.50	1.000	-
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 5.50 SUBAREA RUNOFF(CFS) = 3.36  
 EFFECTIVE AREA(ACRES) = 19.60 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 19.6 PEAK FLOW RATE(CFS) = 11.98

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FLOW PROCESS FROM NODE 50707.00 TO NODE 50708.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 733.00 DOWNSTREAM(FEET) = 675.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 467.00 CHANNEL SLOPE = 0.1242  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 11.98  
 FLOW VELOCITY(FEET/SEC.) = 6.67 FLOW DEPTH(FEET) = 0.77  
 TRAVEL TIME(MIN.) = 1.17 Tc(MIN.) = 16.74  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50708.00 = 2227.00 FEET.

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FLOW PROCESS FROM NODE 50708.00 TO NODE 50708.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 16.74  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.137  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.50	1.000	-
USER-DEFINED	-	1.00	0.50	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 2.41  
 EFFECTIVE AREA(ACRES) = 23.80 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 23.8 PEAK FLOW RATE(CFS) = 13.64

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FLOW PROCESS FROM NODE 50708.00 TO NODE 50709.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 619.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 516.00 CHANNEL SLOPE = 0.1085
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 13.64
FLOW VELOCITY(FEET/SEC.) = 6.62 FLOW DEPTH(FEET) = 0.83
TRAVEL TIME(MIN.) = 1.30 Tc(MIN.) = 18.04
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50709.00 = 2743.00 FEET.

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FLOW PROCESS FROM NODE 50709.00 TO NODE 50709.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 18.04
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.090
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 17.70 0.50 1.000 -
USER-DEFINED - 2.00 0.50 1.000 -
USER-DEFINED - 0.30 0.50 1.000 -
USER-DEFINED - 0.20 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.20 SUBAREA RUNOFF(CFS) = 10.73
EFFECTIVE AREA(ACRES) = 44.00 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 44.0 PEAK FLOW RATE(CFS) = 23.37

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FLOW PROCESS FROM NODE 50709.00 TO NODE 50710.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 619.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 650.00 CHANNEL SLOPE = 0.0292
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 23.37
FLOW VELOCITY(FEET/SEC.) = 5.69 FLOW DEPTH(FEET) = 1.17
TRAVEL TIME(MIN.) = 1.90 Tc(MIN.) = 19.95
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50710.00 = 3393.00 FEET.

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FLOW PROCESS FROM NODE 50710.00 TO NODE 50710.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 19.95
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.022
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.60 0.50 1.000 -
USER-DEFINED - 0.90 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 3.52
EFFECTIVE AREA(ACRES) = 51.50 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 51.5 PEAK FLOW RATE(CFS) = 24.18

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FLOW PROCESS FROM NODE 50710.00 TO NODE 50711.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 528.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 794.00 CHANNEL SLOPE = 0.0907
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 24.18
FLOW VELOCITY(FEET/SEC.) = 8.81 FLOW DEPTH(FEET) = 0.96
TRAVEL TIME(MIN.) = 1.50 Tc(MIN.) = 21.45
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50711.00 = 4187.00 FEET.

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FLOW PROCESS FROM NODE 50711.00 TO NODE 50711.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 21.45
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.985
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 33.10 0.50 1.000 -
USER-DEFINED - 0.30 0.50 1.000 -
USER-DEFINED - 1.50 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 34.90 SUBAREA RUNOFF(CFS) = 15.23
EFFECTIVE AREA(ACRES) = 86.40 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 86.4 PEAK FLOW RATE(CFS) = 37.72

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FLOW PROCESS FROM NODE 50711.00 TO NODE 50712.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 423.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1215.00 CHANNEL SLOPE = 0.0864
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 37.72
FLOW VELOCITY(FEET/SEC.) = 9.68 FLOW DEPTH(FEET) = 1.14
TRAVEL TIME(MIN.) = 2.09 Tc(MIN.) = 23.54

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LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50712.00 = 5402.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50712.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 23.54

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.935

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	0.900	-
USER-DEFINED	-	18.20	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.998

SUBAREA AREA(ACRES) = 18.60 SUBAREA RUNOFF(CFS) = 7.29

EFFECTIVE AREA(ACRES) = 105.00 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 105.0 PEAK FLOW RATE(CFS) = 41.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50713.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 319.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 768.00 CHANNEL SLOPE = 0.1354

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00

CHANNEL FLOW THRU SUBAREA(CFS) = 41.10

FLOW VELOCITY(FEET/SEC.) = 11.74 FLOW DEPTH(FEET) = 1.08

TRAVEL TIME(MIN.) = 1.09 Tc(MIN.) = 24.63

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50713.00 = 6170.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50713.00 TO NODE 50713.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 24.63

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.909

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	4.60	0.50	1.000	-
USER-DEFINED	-	0.50	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.966

SUBAREA AREA(ACRES) = 5.30 SUBAREA RUNOFF(CFS) = 2.03

EFFECTIVE AREA(ACRES) = 110.30 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 110.3 PEAK FLOW RATE(CFS) = 41.10

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50713.00 TO NODE 50714.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 319.00 DOWNSTREAM(FEET) = 182.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 1513.00 CHANNEL SLOPE = 0.0905

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00

CHANNEL FLOW THRU SUBAREA(CFS) = 41.10

FLOW VELOCITY(FEET/SEC.) = 10.01 FLOW DEPTH(FEET) = 1.17

TRAVEL TIME(MIN.) = 2.52 Tc(MIN.) = 27.15

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50714.00 = 7683.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 27.15

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.861

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	1.60	0.50	1.000	-
USER-DEFINED	-	5.20	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	7.70	0.50	1.000	-
USER-DEFINED	-	2.60	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867

SUBAREA AREA(ACRES) = 17.60 SUBAREA RUNOFF(CFS) = 6.77

EFFECTIVE AREA(ACRES) = 127.90 AREA-AVERAGED Fm(INCH/HR) = 0.49

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98

TOTAL AREA(ACRES) = 127.9 PEAK FLOW RATE(CFS) = 42.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 27.15

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.861

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	0.900	-
USER-DEFINED	-	52.70	0.50	1.000	-
USER-DEFINED	-	7.00	0.50	1.000	-
USER-DEFINED	-	0.80	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999

SUBAREA AREA(ACRES) = 61.30 SUBAREA RUNOFF(CFS) = 19.95

EFFECTIVE AREA(ACRES) = 189.20 AREA-AVERAGED Fm(INCH/HR) = 0.49

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99



TOTAL AREA (ACRES) = 189.2 PEAK FLOW RATE (CFS) = 62.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 27.15

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.861

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.80	0.50	1.000	-
USER-DEFINED	-	6.20	0.50	1.000	-
USER-DEFINED	-	3.40	0.50	1.000	-
USER-DEFINED	-	2.00	0.50	1.000	-
USER-DEFINED	-	3.50	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 16.30 SUBAREA RUNOFF (CFS) = 5.30

EFFECTIVE AREA (ACRES) = 205.50 AREA-AVERAGED Fm (INCH/HR) = 0.49

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 205.5 PEAK FLOW RATE (CFS) = 67.95

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FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 27.15

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.861

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	7.60	0.50	1.000	-
USER-DEFINED	-	10.40	0.50	1.000	-
USER-DEFINED	-	7.80	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997

SUBAREA AREA (ACRES) = 25.90 SUBAREA RUNOFF (CFS) = 8.46

EFFECTIVE AREA (ACRES) = 231.40 AREA-AVERAGED Fm (INCH/HR) = 0.49

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 231.4 PEAK FLOW RATE (CFS) = 76.41

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 231.4 TC (MIN.) = 27.15

EFFECTIVE AREA (ACRES) = 231.40 AREA-AVERAGED Fm (INCH/HR) = 0.49

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.988

PEAK FLOW RATE (CFS) = 76.41

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2006 Advanced Engineering Software (aes)  
Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 8 \*  
\* HYDROLOGIC ANALYSIS - 5-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P508XX05.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.000; 2.230
- 2) 6.000; 2.010
- 3) 7.000; 1.850
- 4) 8.000; 1.710
- 5) 9.000; 1.600
- 6) 10.000; 1.510
- 7) 11.000; 1.430
- 8) 12.000; 1.360
- 9) 13.000; 1.300
- 10) 14.000; 1.250
- 11) 15.000; 1.200
- 12) 20.000; 1.020
- 13) 25.000; 0.900
- 14) 30.000; 0.810
- 15) 40.000; 0.690
- 16) 50.000; 0.610
- 17) 60.000; 0.550
- 18) 90.000; 0.440
- 19) 120.000; 0.370
- 20) 180.000; 0.300

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50800.00 TO NODE 50801.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00  
ELEVATION DATA: UPSTREAM(FEET) = 795.00 DOWNSTREAM(FEET) = 745.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.302  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.486  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.60	0.50	1.000	95	10.30

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.50  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.53  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.53

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50801.00 TO NODE 50802.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 725.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 245.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.53  
FLOW VELOCITY(FEET/SEC.) = 2.58 FLOW DEPTH(FEET) = 0.26  
TRAVEL TIME(MIN.) = 1.58  $T_c$ (MIN.) = 11.88  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50802.00 = 566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50802.00 TO NODE 50802.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.88

\* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.368  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.20 0.50 1.000 -  
 USER-DEFINED - 0.10 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 2.58  
 EFFECTIVE AREA (ACRES) = 3.90 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.9 PEAK FLOW RATE (CFS) = 3.05

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50802.00 TO NODE 50803.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 725.00 DOWNSTREAM (FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 325.00 CHANNEL SLOPE = 0.0769  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 3.05  
 FLOW VELOCITY (FEET/SEC.) = 3.96 FLOW DEPTH (FEET) = 0.51  
 TRAVEL TIME (MIN.) = 1.37 Tc (MIN.) = 13.25  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50803.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50803.00 TO NODE 50803.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 13.25  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.287  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.50 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.50 SUBAREA RUNOFF (CFS) = 1.06  
 EFFECTIVE AREA (ACRES) = 5.40 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.4 PEAK FLOW RATE (CFS) = 3.83

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50803.00 TO NODE 50804.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 652.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 594.00 CHANNEL SLOPE = 0.0808  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 3.83  
 FLOW VELOCITY (FEET/SEC.) = 4.30 FLOW DEPTH (FEET) = 0.54

TRAVEL TIME (MIN.) = 2.30 Tc (MIN.) = 15.55  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50804.00 = 1485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50804.00 TO NODE 50804.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 15.55  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.180  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.10 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 3.73  
 EFFECTIVE AREA (ACRES) = 11.50 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 11.5 PEAK FLOW RATE (CFS) = 7.04

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50804.00 TO NODE 50805.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 652.00 DOWNSTREAM (FEET) = 542.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 499.00 CHANNEL SLOPE = 0.2204  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 7.04  
 FLOW VELOCITY (FEET/SEC.) = 7.28 FLOW DEPTH (FEET) = 0.57  
 TRAVEL TIME (MIN.) = 1.14 Tc (MIN.) = 16.70  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50805.00 = 1984.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50805.00 TO NODE 50805.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 16.70  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.139  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.70 0.50 1.000 -  
 USER-DEFINED - 1.10 0.50 1.000 -  
 USER-DEFINED - 0.40 0.50 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 5.20 SUBAREA RUNOFF (CFS) = 2.99  
 EFFECTIVE AREA (ACRES) = 16.70 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 16.7 PEAK FLOW RATE (CFS) = 9.60

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50805.00 TO NODE 50806.00 IS CODE = 51

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-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 542.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 650.00 CHANNEL SLOPE = 0.1415
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 9.60
FLOW VELOCITY(FEET/SEC.) = 6.69 FLOW DEPTH(FEET) = 0.69
TRAVEL TIME(MIN.) = 1.62 Tc(MIN.) = 18.32
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50806.00 = 2634.00 FEET.

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*****
FLOW PROCESS FROM NODE 50806.00 TO NODE 50806.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 18.32
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.081
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.20 0.50 1.000 -
USER-DEFINED - 1.50 0.50 1.000 -
USER-DEFINED - 0.50 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 2.72
EFFECTIVE AREA(ACRES) = 21.90 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 21.9 PEAK FLOW RATE(CFS) = 11.44

```

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*****
FLOW PROCESS FROM NODE 50806.00 TO NODE 50807.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 639.00 CHANNEL SLOPE = 0.0782
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 11.44
FLOW VELOCITY(FEET/SEC.) = 5.58 FLOW DEPTH(FEET) = 0.83
TRAVEL TIME(MIN.) = 1.91 Tc(MIN.) = 20.22
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50807.00 = 3273.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50807.00 TO NODE 50807.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 20.22
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.015
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

```

```

USER-DEFINED - 15.50 0.50 1.000 -
USER-DEFINED - 0.10 0.50 1.000 -
USER-DEFINED - 0.30 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 7.36
EFFECTIVE AREA(ACRES) = 37.80 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 17.50

```

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*****
FLOW PROCESS FROM NODE 50807.00 TO NODE 50808.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 350.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 448.00 CHANNEL SLOPE = 0.1116
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 17.50
FLOW VELOCITY(FEET/SEC.) = 7.12 FLOW DEPTH(FEET) = 0.91
TRAVEL TIME(MIN.) = 1.05 Tc(MIN.) = 21.27
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50808.00 = 3721.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50808.00 TO NODE 50808.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 21.27
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.989
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.90 0.50 1.000 -
USER-DEFINED - 0.60 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 3.30
EFFECTIVE AREA(ACRES) = 45.30 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 45.3 PEAK FLOW RATE(CFS) = 19.95

```

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*****
FLOW PROCESS FROM NODE 50808.00 TO NODE 50809.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 283.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 438.00 CHANNEL SLOPE = 0.1530
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 19.95
FLOW VELOCITY(FEET/SEC.) = 8.26 FLOW DEPTH(FEET) = 0.90
TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 22.16
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50809.00 = 4159.00 FEET.

```

```
*****
FLOW PROCESS FROM NODE 50809.00 TO NODE 50809.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 22.16
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.968
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.20     0.50     0.100     -
USER-DEFINED        -         5.70     0.50     1.000     -
USER-DEFINED        -         1.30     0.50     1.000     -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.975
SUBAREA AREA(ACRES) = 7.20     SUBAREA RUNOFF(CFS) = 3.11
EFFECTIVE AREA(ACRES) = 52.50   AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 52.5     PEAK FLOW RATE(CFS) = 22.20
```

```
*****
FLOW PROCESS FROM NODE 50809.00 TO NODE 50810.00 IS CODE = 51
-----
```

```
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 283.00 DOWNSTREAM(FEET) = 243.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.00 CHANNEL SLOPE = 0.0602
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 22.20
FLOW VELOCITY(FEET/SEC.) = 7.36 FLOW DEPTH(FEET) = 1.00
TRAVEL TIME(MIN.) = 1.50 Tc(MIN.) = 23.66
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50810.00 = 4824.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 50810.00 TO NODE 50810.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 23.66
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.932
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         1.20     0.50     0.100     -
USER-DEFINED        -        41.90     0.50     1.000     -
USER-DEFINED        -         4.90     0.50     1.000     -
USER-DEFINED        -         4.40     0.50     1.000     -
USER-DEFINED        -         9.90     0.50     1.000     -
USER-DEFINED        -         1.20     0.50     1.000     -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.983
SUBAREA AREA(ACRES) = 63.50     SUBAREA RUNOFF(CFS) = 25.17
EFFECTIVE AREA(ACRES) = 116.00   AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 116.0     PEAK FLOW RATE(CFS) = 45.66
```

```
*****
FLOW PROCESS FROM NODE 50810.00 TO NODE 50811.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 243.00 DOWNSTREAM(FEET) = 173.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1122.00 CHANNEL SLOPE = 0.0624
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 45.66
FLOW VELOCITY(FEET/SEC.) = 7.21 FLOW DEPTH(FEET) = 1.45
TRAVEL TIME(MIN.) = 2.59 Tc(MIN.) = 26.25
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50811.00 = 5946.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 26.25
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.877
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         4.00     0.50     1.000     -
USER-DEFINED        -         0.40     0.50     1.000     -
USER-DEFINED        -         2.70     0.50     1.000     -
USER-DEFINED        -         0.30     0.50     0.100     -
USER-DEFINED        -         3.00     0.50     1.000     -
USER-DEFINED        -         1.10     0.50     1.000     -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.977
SUBAREA AREA(ACRES) = 11.50     SUBAREA RUNOFF(CFS) = 4.03
EFFECTIVE AREA(ACRES) = 127.50   AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 127.5     PEAK FLOW RATE(CFS) = 45.66
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

```
*****
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 26.25
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.877
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.20     0.50     1.000     -
USER-DEFINED        -         1.90     0.50     1.000     -
USER-DEFINED        -         0.20     0.50     1.000     -
USER-DEFINED        -         0.80     0.50     1.000     -
USER-DEFINED        -         0.20     0.50     1.000     -
USER-DEFINED        -         0.10     0.50     1.000     -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
```

SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 1.15  
EFFECTIVE AREA(ACRES) = 130.90 AREA-AVERAGED Fm(INCH/HR) = 0.49  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 130.9 PEAK FLOW RATE(CFS) = 45.66  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN) = 26.25

\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.877

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.14

EFFECTIVE AREA(ACRES) = 131.30 AREA-AVERAGED Fm(INCH/HR) = 0.49

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 131.3 PEAK FLOW RATE(CFS) = 45.66

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 131.3 TC(MIN.) = 26.25

EFFECTIVE AREA(ACRES) = 131.30 AREA-AVERAGED Fm(INCH/HR) = 0.49

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.988

PEAK FLOW RATE(CFS) = 45.66  
=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S31 \*  
\* Rational Method Hydrology Analysis - 5-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S31.DAT  
TIME/DATE OF STUDY: 16:20 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.184
- 2) 10.00; 1.510
- 3) 15.00; 1.203
- 4) 20.00; 1.023
- 5) 25.00; 0.902
- 6) 30.00; 0.826
- 7) 40.00; 0.693
- 8) 50.00; 0.611
- 9) 60.00; 0.546
- 10) 90.00; 0.439
- 11) 120.00; 0.374
- 12) 180.00; 0.306
- 13) 360.00; 0.211
- 14) 1440.00; 0.088

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL IN- / OUT- / PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	MANNING LIP (FT)	HIKE FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13100.00 TO NODE 13101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.58  
ELEVATION DATA: UPSTREAM(FEET) = 1069.66 DOWNSTREAM(FEET) = 969.92

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.312  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.738  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.94	0.50	1.000	0	8.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.05  
TOTAL AREA(ACRES) = 0.94 PEAK FLOW RATE(CFS) = 1.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13101.00 TO NODE 13102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 969.92 DOWNSTREAM(FEET) = 807.20  
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.89 CHANNEL SLOPE = 0.2444  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.477  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.67	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.44  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.99  
AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 2.22  
Tc(MIN.) = 10.54  
SUBAREA AREA(ACRES) = 7.67 SUBAREA RUNOFF(CFS) = 6.74  
EFFECTIVE AREA(ACRES) = 8.61 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 7.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.67 FLOW VELOCITY(FEET/SEC.) = 5.68  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13102.00 = 948.47 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13102.00 TO NODE 13103.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 807.20 DOWNSTREAM(FEET) = 769.94
CHANNEL LENGTH THRU SUBAREA(FEET) = 691.01 CHANNEL SLOPE = 0.0539
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.292
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 20.65 0.50 0.999 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.98
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.83
AVERAGE FLOW DEPTH(FEET) = 1.14 TRAVEL TIME(MIN.) = 3.01
Tc(MIN.) = 13.54
SUBAREA AREA(ACRES) = 20.65 SUBAREA RUNOFF(CFS) = 14.73
EFFECTIVE AREA(ACRES) = 29.26 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 29.3 PEAK FLOW RATE(CFS) = 20.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.29 FLOW VELOCITY(FEET/SEC.) = 4.15
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13103.00 = 1639.48 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 769.94 DOWNSTREAM(FEET) = 693.88
FLOW LENGTH(FEET) = 1563.10 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 9.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.19
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.87
PIPE TRAVEL TIME(MIN.) = 1.84 Tc(MIN.) = 15.38
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13104.00 = 3202.58 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.38
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.189
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 28.00 0.50 0.750 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750

SUBAREA AREA(ACRES) = 28.00 SUBAREA RUNOFF(CFS) = 20.51
EFFECTIVE AREA(ACRES) = 57.26 AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 57.3 PEAK FLOW RATE(CFS) = 38.66

\*\*\*\*\*
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 693.88 DOWNSTREAM(FEET) = 645.69
FLOW LENGTH(FEET) = 1068.98 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 13.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.42
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 38.66
PIPE TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 16.46
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13105.00 = 4271.56 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.46
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.150
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 35.28 0.50 0.867 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867
SUBAREA AREA(ACRES) = 35.28 SUBAREA RUNOFF(CFS) = 22.75
EFFECTIVE AREA(ACRES) = 92.54 AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 59.39

\*\*\*\*\*
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 645.69 DOWNSTREAM(FEET) = 608.48
FLOW LENGTH(FEET) = 1127.55 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 18.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.39
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 59.39
PIPE TRAVEL TIME(MIN.) = 1.15 Tc(MIN.) = 17.61
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 81



>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

=====
MAINLINE Tc(MIN.) = 17.61
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.109
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      37.68   0.50    0.889  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.889
SUBAREA AREA(ACRES) = 37.68   SUBAREA RUNOFF(CFS) = 22.52
EFFECTIVE AREA(ACRES) = 130.22  AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 130.2     PEAK FLOW RATE(CFS) = 78.49

```

```

*****
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 10
-----

```

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

```

*****
FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 15.1
-----

```

>>>>DEFINE MEMORY BANK # 2 <<<<

```

=====
PEAK FLOWRATE TABLE FILE NAME: S30.DNA
MEMORY BANK # 2 DEFINED AS FOLLOWS:
STREAM   Q      Tc      Fp(Fm)   Ap    Ae    HEADWATER
NUMBER  (CFS) (MIN.) (INCH/HR) (ACRES) NODE
1      497.31  41.52  0.50( 0.40) 0.81  1990.5  13000.00
2      455.52  44.80  0.50( 0.40) 0.81  2016.1  13010.00
TOTAL AREA(ACRES) = 2016.1

```

```

*****
FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 14.0
-----

```

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<

```

=====
MAIN-STREAM MEMORY DEFINED AS FOLLOWS:
STREAM   Q      Tc      Fp(Fm)   Ap    Ae    HEADWATER
NUMBER  (CFS) (MIN.) (INCH/HR) (ACRES) NODE
1      497.31  41.52  0.50( 0.40) 0.81  1990.5  13000.00
2      455.52  44.80  0.50( 0.40) 0.81  2016.1  13010.00
TOTAL AREA(ACRES) = 2016.1

```

```

*****
FLOW PROCESS FROM NODE 13026.00 TO NODE 13106.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 662.66  DOWNSTREAM(FEET) = 608.48
CHANNEL LENGTH THRU SUBAREA(FEET) = 3098.88  CHANNEL SLOPE = 0.0175
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.639

```

SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      75.28   0.50    0.755  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.755
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 506.16
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.15
AVERAGE FLOW DEPTH(FEET) = 4.08  TRAVEL TIME(MIN.) = 5.09
Tc(MIN.) = 46.61
SUBAREA AREA(ACRES) = 75.28   SUBAREA RUNOFF(CFS) = 17.71
EFFECTIVE AREA(ACRES) = 2065.80  AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 2091.4     PEAK FLOW RATE(CFS) = 497.31
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.05  FLOW VELOCITY(FEET/SEC.) = 10.11
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

```

```

*****
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 11
-----

```

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

```

** MAIN STREAM CONFLUENCE DATA **
STREAM   Q      Tc      Intensity  Fp(Fm)   Ap    Ae    HEADWATER
NUMBER  (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1      497.31  46.61   0.639  0.50( 0.40) 0.80  2065.8  13000.00
2      455.52  50.00   0.611  0.50( 0.40) 0.80  2091.4  13010.00
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

```

```

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM   Q      Tc      Intensity  Fp(Fm)   Ap    Ae    HEADWATER
NUMBER  (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1      78.49   17.61   1.109  0.50( 0.44) 0.88  130.2  13100.00
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

```

```

** PEAK FLOW RATE TABLE **
STREAM   Q      Tc      Intensity  Fp(Fm)   Ap    Ae    HEADWATER
NUMBER  (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1      575.80  17.61   1.109  0.50( 0.41) 0.81  910.7  13100.00
2      520.73  46.61   0.639  0.50( 0.40) 0.81  2196.0  13000.00
3      475.69  50.00   0.611  0.50( 0.40) 0.81  2221.6  13010.00
TOTAL AREA(ACRES) = 2221.6

```

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 575.80  Tc(MIN.) = 17.610
EFFECTIVE AREA(ACRES) = 910.69  AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 2221.6
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

```

```

*****
FLOW PROCESS FROM NODE 13106.00 TO NODE 13107.00 IS CODE = 51
-----

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 608.48 DOWNSTREAM(FEET) = 584.29
CHANNEL LENGTH THRU SUBAREA(FEET) = 1650.20 CHANNEL SLOPE = 0.0147
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.015
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 190.45 0.50 0.755 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 630.40
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.05
AVERAGE FLOW DEPTH(FEET) = 4.57 TRAVEL TIME(MIN.) = 2.74
Tc(MIN.) = 20.35
SUBAREA AREA(ACRES) = 190.45 SUBAREA RUNOFF(CFS) = 109.19
EFFECTIVE AREA(ACRES) = 1101.14 AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 2412.1 PEAK FLOW RATE(CFS) = 606.99
END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.51 FLOW VELOCITY(FEET/SEC.) = 9.96
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13107.00 = 20924.84 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13107.00 TO NODE 13108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 584.29 DOWNSTREAM(FEET) = 563.78
CHANNEL LENGTH THRU SUBAREA(FEET) = 1061.67 CHANNEL SLOPE = 0.0193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.977
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 314.12 0.50 0.939 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.939
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 678.75
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.34
AVERAGE FLOW DEPTH(FEET) = 4.47 TRAVEL TIME(MIN.) = 1.56
Tc(MIN.) = 21.91
SUBAREA AREA(ACRES) = 314.12 SUBAREA RUNOFF(CFS) = 143.44
EFFECTIVE AREA(ACRES) = 1415.26 AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.83
TOTAL AREA(ACRES) = 2726.2 PEAK FLOW RATE(CFS) = 713.15
END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.55 FLOW VELOCITY(FEET/SEC.) = 11.48
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13108.00 = 21986.51 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13108.00 TO NODE 13109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 563.78 DOWNSTREAM(FEET) = 541.61
CHANNEL LENGTH THRU SUBAREA(FEET) = 1657.28 CHANNEL SLOPE = 0.0134
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.912
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 203.63 0.50 0.785 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 760.72
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.17
AVERAGE FLOW DEPTH(FEET) = 4.99 TRAVEL TIME(MIN.) = 2.72
Tc(MIN.) = 24.62
SUBAREA AREA(ACRES) = 203.63 SUBAREA RUNOFF(CFS) = 95.10
EFFECTIVE AREA(ACRES) = 1618.89 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.83
TOTAL AREA(ACRES) = 2929.8 PEAK FLOW RATE(CFS) = 724.86
END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.90 FLOW VELOCITY(FEET/SEC.) = 10.05
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13109.00 = 23643.79 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13109.00 TO NODE 13110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 541.61 DOWNSTREAM(FEET) = 509.94
CHANNEL LENGTH THRU SUBAREA(FEET) = 2016.96 CHANNEL SLOPE = 0.0157
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.861
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 283.06 0.50 0.791 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.791
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 784.15
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.88
AVERAGE FLOW DEPTH(FEET) = 4.90 TRAVEL TIME(MIN.) = 3.09
Tc(MIN.) = 27.71
SUBAREA AREA(ACRES) = 283.06 SUBAREA RUNOFF(CFS) = 118.55
EFFECTIVE AREA(ACRES) = 1901.95 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82
TOTAL AREA(ACRES) = 3212.9 PEAK FLOW RATE(CFS) = 769.71
END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.86 FLOW VELOCITY(FEET/SEC.) = 10.84
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13110.00 = 25660.75 FEET.

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FLOW PROCESS FROM NODE 13110.00 TO NODE 13111.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 509.94 DOWNSTREAM(FEET) = 461.07
CHANNEL LENGTH THRU SUBAREA(FEET) = 3058.95 CHANNEL SLOPE = 0.0160
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.795
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 248.05 0.50 0.783 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 814.77
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.06
AVERAGE FLOW DEPTH(FEET) = 4.95 TRAVEL TIME(MIN.) = 4.61
Tc(MIN.) = 32.32
SUBAREA AREA(ACRES) = 248.05 SUBAREA RUNOFF(CFS) = 90.08
EFFECTIVE AREA(ACRES) = 2150.00 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82
TOTAL AREA(ACRES) = 3460.9 PEAK FLOW RATE(CFS) = 769.71
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.85 FLOW VELOCITY(FEET/SEC.) = 10.91
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13111.00 = 28719.70 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13111.00 TO NODE 13112.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 461.07 DOWNSTREAM(FEET) = 452.77
CHANNEL LENGTH THRU SUBAREA(FEET) = 1781.78 CHANNEL SLOPE = 0.0047
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.738
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 179.91 0.50 0.694 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.694
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 801.38
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.94
AVERAGE FLOW DEPTH(FEET) = 6.21 TRAVEL TIME(MIN.) = 4.28
Tc(MIN.) = 36.60
SUBAREA AREA(ACRES) = 179.91 SUBAREA RUNOFF(CFS) = 63.32
EFFECTIVE AREA(ACRES) = 2329.91 AREA-AVERAGED Fm(INCH/HR) = 0.40
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 3640.9 PEAK FLOW RATE(CFS) = 769.71
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 6.11 FLOW VELOCITY(FEET/SEC.) = 6.88
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13112.00 = 30501.48 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13112.00 TO NODE 13222.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 452.77 DOWNSTREAM(FEET) = 427.51
CHANNEL LENGTH THRU SUBAREA(FEET) = 1625.01 CHANNEL SLOPE = 0.0155
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.705
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 155.96 0.50 0.836 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.836
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 789.85
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.86
AVERAGE FLOW DEPTH(FEET) = 4.92 TRAVEL TIME(MIN.) = 2.49
Tc(MIN.) = 39.09
SUBAREA AREA(ACRES) = 155.96 SUBAREA RUNOFF(CFS) = 40.27
EFFECTIVE AREA(ACRES) = 2485.87 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 3796.8 PEAK FLOW RATE(CFS) = 769.71
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.87 FLOW VELOCITY(FEET/SEC.) = 10.81
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13222.00 = 32126.49 FEET.

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 3796.8 TC(MIN.) = 39.09
EFFECTIVE AREA(ACRES) = 2485.87 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.810
PEAK FLOW RATE(CFS) = 769.71

\*\* PEAK FLOW RATE TABLE \*\*
Table with 7 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap (ACRES), Ae (ACRES), HEADWATER NODE. Contains 3 rows of data.

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S32 \*  
\* Rational Method Hydrology Analysis - 5-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S32.DAT  
TIME/DATE OF STUDY: 16:20 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.184
- 2) 10.00; 1.510
- 3) 15.00; 1.203
- 4) 20.00; 1.023
- 5) 25.00; 0.902
- 6) 30.00; 0.826
- 7) 40.00; 0.693
- 8) 50.00; 0.611
- 9) 60.00; 0.546
- 10) 90.00; 0.439
- 11) 120.00; 0.374
- 12) 180.00; 0.306
- 13) 360.00; 0.211
- 14) 1440.00; 0.088

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP HEIGHT (FT)	HIKE FACTOR (FT)	MANNING (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13200.00 TO NODE 13201.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 298.57  
ELEVATION DATA: UPSTREAM(FEET) = 1069.04 DOWNSTREAM(FEET) = 1005.76

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.590  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.67	0.50	1.000	0	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.66  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 0.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13201.00 TO NODE 13202.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.76 DOWNSTREAM(FEET) = 896.98  
CHANNEL LENGTH THRU SUBAREA(FEET) = 747.55 CHANNEL SLOPE = 0.1455  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.348  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.42	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.52  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.85  
AVERAGE FLOW DEPTH(FEET) = 0.55 TRAVEL TIME(MIN.) = 3.23  
Tc(MIN.) = 12.64  
SUBAREA AREA(ACRES) = 7.42 SUBAREA RUNOFF(CFS) = 5.66  
EFFECTIVE AREA(ACRES) = 8.09 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.1 PEAK FLOW RATE(CFS) = 6.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.68 FLOW VELOCITY(FEET/SEC.) = 4.42  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13202.00 = 1046.12 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 896.98 DOWNSTREAM(FEET) = 840.27
FLOW LENGTH(FEET) = 1789.59 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 5.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.53
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 6.17
PIPE TRAVEL TIME(MIN.) = 3.50 Tc(MIN.) = 16.14
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13203.00 = 2835.71 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 16.14
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.162
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 38.89 0.50 0.731 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.731
SUBAREA AREA(ACRES) = 38.89 SUBAREA RUNOFF(CFS) = 27.86
EFFECTIVE AREA(ACRES) = 46.98 AREA-AVERAGED Fm(INCH/HR) = 0.39
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.78
TOTAL AREA(ACRES) = 47.0 PEAK FLOW RATE(CFS) = 32.68

\*\*\*\*\*
FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 840.27 DOWNSTREAM(FEET) = 782.97
FLOW LENGTH(FEET) = 992.54 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 11.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.14
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 32.68
PIPE TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 17.10
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13204.00 = 3828.25 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 17.10
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.127
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 163.73 0.50 0.858 -

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 83.09 0.50 0.645 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645
SUBAREA AREA(ACRES) = 83.09 SUBAREA RUNOFF(CFS) = 60.15
EFFECTIVE AREA(ACRES) = 130.07 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 130.1 PEAK FLOW RATE(CFS) = 91.37

\*\*\*\*\*
FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 782.97 DOWNSTREAM(FEET) = 692.52
FLOW LENGTH(FEET) = 2046.57 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000
DEPTH OF FLOW IN 36.0 INCH PIPE IS 21.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.28
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 91.37
PIPE TRAVEL TIME(MIN.) = 1.68 Tc(MIN.) = 18.79
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13205.00 = 5874.82 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 18.79
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.067
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 88.51 0.50 0.679 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.679
SUBAREA AREA(ACRES) = 88.51 SUBAREA RUNOFF(CFS) = 57.91
EFFECTIVE AREA(ACRES) = 218.58 AREA-AVERAGED Fm(INCH/HR) = 0.34
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 218.6 PEAK FLOW RATE(CFS) = 142.21

\*\*\*\*\*
FLOW PROCESS FROM NODE 13205.00 TO NODE 13206.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 692.52 DOWNSTREAM(FEET) = 605.24
CHANNEL LENGTH THRU SUBAREA(FEET) = 2704.69 CHANNEL SLOPE = 0.0323
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.915
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 163.73 0.50 0.858 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.858  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 178.25  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.94  
 AVERAGE FLOW DEPTH(FEET) = 2.74 TRAVEL TIME(MIN.) = 5.68  
 Tc(MIN.) = 24.47  
 SUBAREA AREA(ACRES) = 163.73 SUBAREA RUNOFF(CFS) = 71.64  
 EFFECTIVE AREA(ACRES) = 382.31 AREA-AVERAGED Fm(INCH/HR) = 0.38  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA(ACRES) = 382.3 PEAK FLOW RATE(CFS) = 184.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.77 FLOW VELOCITY(FEET/SEC.) = 8.02  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13206.00 = 8579.51 FEET.

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 FLOW PROCESS FROM NODE 13206.00 TO NODE 13207.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 605.24 DOWNSTREAM(FEET) = 555.41  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2479.15 CHANNEL SLOPE = 0.0201  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.820

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 143.41 0.50 0.888 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.888  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 208.40  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.92  
 AVERAGE FLOW DEPTH(FEET) = 3.17 TRAVEL TIME(MIN.) = 5.97  
 Tc(MIN.) = 30.44  
 SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 48.53  
 EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.40  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 199.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.12 FLOW VELOCITY(FEET/SEC.) = 6.83  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13207.00 = 11058.66 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 555.41 DOWNSTREAM(FEET) = 505.65  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1734.55 CHANNEL SLOPE = 0.0287  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.772

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 123.56 0.50 0.858 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.858  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 218.95  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.01  
 AVERAGE FLOW DEPTH(FEET) = 3.02 TRAVEL TIME(MIN.) = 3.61  
 Tc(MIN.) = 34.05  
 SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 38.14  
 EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.40  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 215.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.00 FLOW VELOCITY(FEET/SEC.) = 7.97  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 34.05  
 RAINFALL INTENSITY(INCH/HR) = 0.77  
 AREA-AVERAGED Fm(INCH/HR) = 0.40  
 AREA-AVERAGED Fp(INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.81  
 EFFECTIVE STREAM AREA(ACRES) = 649.28  
 TOTAL STREAM AREA(ACRES) = 649.28  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 215.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13210.00 TO NODE 13211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.51  
 ELEVATION DATA: UPSTREAM(FEET) = 949.80 DOWNSTREAM(FEET) = 828.64

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.525  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.709  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 NATURAL FAIR COVER  
 "OPEN BRUSH" - 1.96 0.50 1.000 0 8.53  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 2.13  
 TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 2.13

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13211.00 TO NODE 13212.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 828.64 DOWNSTREAM(FEET) = 767.94
CHANNEL LENGTH THRU SUBAREA(FEET) = 652.49 CHANNEL SLOPE = 0.0930
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.430
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 11.95 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.18
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.90
AVERAGE FLOW DEPTH(FEET) = 0.78 TRAVEL TIME(MIN.) = 2.79
Tc(MIN.) = 11.31
SUBAREA AREA(ACRES) = 11.95 SUBAREA RUNOFF(CFS) = 10.00
EFFECTIVE AREA(ACRES) = 13.91 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 11.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.94 FLOW VELOCITY(FEET/SEC.) = 4.38
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13212.00 = 967.00 FEET.

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FLOW PROCESS FROM NODE 13212.00 TO NODE 13213.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 767.94 DOWNSTREAM(FEET) = 706.43
CHANNEL LENGTH THRU SUBAREA(FEET) = 967.91 CHANNEL SLOPE = 0.0635
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.204
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 27.07 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.29
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.39
AVERAGE FLOW DEPTH(FEET) = 1.24 TRAVEL TIME(MIN.) = 3.67
Tc(MIN.) = 14.98
SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 17.13
EFFECTIVE AREA(ACRES) = 40.98 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 41.0 PEAK FLOW RATE(CFS) = 25.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.36 FLOW VELOCITY(FEET/SEC.) = 4.67
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13213.00 = 1934.91 FEET.

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FLOW PROCESS FROM NODE 13213.00 TO NODE 13214.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 706.43 DOWNSTREAM(FEET) = 659.31
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.11 CHANNEL SLOPE = 0.0497
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.076
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 18.09 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.63
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.45
AVERAGE FLOW DEPTH(FEET) = 1.52 TRAVEL TIME(MIN.) = 3.55
Tc(MIN.) = 18.54
SUBAREA AREA(ACRES) = 18.09 SUBAREA RUNOFF(CFS) = 9.37
EFFECTIVE AREA(ACRES) = 59.07 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 30.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.52 FLOW VELOCITY(FEET/SEC.) = 4.44
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13214.00 = 2883.02 FEET.

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FLOW PROCESS FROM NODE 13214.00 TO NODE 13215.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 659.31 DOWNSTREAM(FEET) = 628.91
CHANNEL LENGTH THRU SUBAREA(FEET) = 970.24 CHANNEL SLOPE = 0.0313
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.964
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 71.42 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.54
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.12
AVERAGE FLOW DEPTH(FEET) = 1.92 TRAVEL TIME(MIN.) = 3.93
Tc(MIN.) = 22.46
SUBAREA AREA(ACRES) = 71.42 SUBAREA RUNOFF(CFS) = 29.79
EFFECTIVE AREA(ACRES) = 130.49 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 130.5 PEAK FLOW RATE(CFS) = 54.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.06 FLOW VELOCITY(FEET/SEC.) = 4.29
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13215.00 = 3853.26 FEET.

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FLOW PROCESS FROM NODE 13215.00 TO NODE 13216.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 628.91 DOWNSTREAM(FEET) = 598.39
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.63 CHANNEL SLOPE = 0.0331
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.889
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 36.33 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 60.79
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.52
AVERAGE FLOW DEPTH(FEET) = 2.12 TRAVEL TIME(MIN.) = 3.40
Tc(MIN.) = 25.87
SUBAREA AREA(ACRES) = 36.33 SUBAREA RUNOFF(CFS) = 12.72
EFFECTIVE AREA(ACRES) = 166.82 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 166.8 PEAK FLOW RATE(CFS) = 58.40

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.09 FLOW VELOCITY(FEET/SEC.) = 4.47
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13216.00 = 4775.89 FEET.

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FLOW PROCESS FROM NODE 13216.00 TO NODE 13217.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 598.39 DOWNSTREAM(FEET) = 568.48
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.40 CHANNEL SLOPE = 0.0470
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.858
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 42.51 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 65.25
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.26
AVERAGE FLOW DEPTH(FEET) = 2.03 TRAVEL TIME(MIN.) = 2.02
Tc(MIN.) = 27.89
SUBAREA AREA(ACRES) = 42.51 SUBAREA RUNOFF(CFS) = 13.70
EFFECTIVE AREA(ACRES) = 209.33 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 209.3 PEAK FLOW RATE(CFS) = 67.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.06 FLOW VELOCITY(FEET/SEC.) = 5.28
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13217.00 = 5412.29 FEET.

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FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 568.48 DOWNSTREAM(FEET) = 505.65
CHANNEL LENGTH THRU SUBAREA(FEET) = 1896.50 CHANNEL SLOPE = 0.0331
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.766
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 73.24 0.50 0.951 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.951
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 77.07
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.80
AVERAGE FLOW DEPTH(FEET) = 2.31 TRAVEL TIME(MIN.) = 6.59
Tc(MIN.) = 34.48
SUBAREA AREA(ACRES) = 73.24 SUBAREA RUNOFF(CFS) = 19.16
EFFECTIVE AREA(ACRES) = 282.57 AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 282.6 PEAK FLOW RATE(CFS) = 69.32

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.22 FLOW VELOCITY(FEET/SEC.) = 4.68
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13220.00 = 7308.79 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 34.48
RAINFALL INTENSITY(INCH/HR) = 0.77
AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.99
EFFECTIVE STREAM AREA(ACRES) = 282.57
TOTAL STREAM AREA(ACRES) = 282.57
PEAK FLOW RATE(CFS) AT CONFLUENCE = 69.32

\*\* CONFLUENCE DATA \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 215.29 34.05 0.772 0.50( 0.40) 0.81 649.3 13200.00
2 69.32 34.48 0.766 0.50( 0.49) 0.99 282.6 13210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	284.60	34.05	0.772	0.50 ( 0.43)	0.86	928.3	13200.00
2	281.25	34.48	0.766	0.50 ( 0.43)	0.86	931.8	13210.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 284.60 Tc(MIN.) = 34.05  
EFFECTIVE AREA(ACRES) = 928.31 AREA-AVERAGED Fm(INCH/HR) = 0.43  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.86  
TOTAL AREA(ACRES) = 931.8  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

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FLOW PROCESS FROM NODE 13220.00 TO NODE 13221.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 505.65 DOWNSTREAM(FEET) = 478.94  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1949.14 CHANNEL SLOPE = 0.0137  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.719

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	108.50	0.50	0.637	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.637  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 304.15  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.17  
AVERAGE FLOW DEPTH(FEET) = 3.52 TRAVEL TIME(MIN.) = 3.97  
Tc(MIN.) = 38.02  
SUBAREA AREA(ACRES) = 108.50 SUBAREA RUNOFF(CFS) = 39.12  
EFFECTIVE AREA(ACRES) = 1036.81 AREA-AVERAGED Fm(INCH/HR) = 0.42  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 1040.3 PEAK FLOW RATE(CFS) = 284.60  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.44 FLOW VELOCITY(FEET/SEC.) = 8.04  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13221.00 = 14742.35 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13221.00 TO NODE 13222.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 478.94 DOWNSTREAM(FEET) = 427.51  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2078.70 CHANNEL SLOPE = 0.0247  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.681

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	87.26	0.50	0.699	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.699  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 297.62  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.12  
AVERAGE FLOW DEPTH(FEET) = 3.13 TRAVEL TIME(MIN.) = 3.42  
Tc(MIN.) = 41.45  
SUBAREA AREA(ACRES) = 87.26 SUBAREA RUNOFF(CFS) = 26.04  
EFFECTIVE AREA(ACRES) = 1124.07 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.83  
TOTAL AREA(ACRES) = 1127.6 PEAK FLOW RATE(CFS) = 284.60  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.08 FLOW VELOCITY(FEET/SEC.) = 10.02  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13222.00 = 16821.05 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1127.6 TC(MIN.) = 41.45  
EFFECTIVE AREA(ACRES) = 1124.07 AREA-AVERAGED Fm(INCH/HR) = 0.41  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.827  
PEAK FLOW RATE(CFS) = 284.60

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	284.60	41.45	0.681	0.50 ( 0.41)	0.83	1124.1	13200.00
2	281.25	41.90	0.677	0.50 ( 0.41)	0.83	1127.6	13210.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S35 \*  
\* Rational Method Hydrology Analysis - 5-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S35.DAT  
TIME/DATE OF STUDY: 16:21 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.184
- 2) 10.00; 1.510
- 3) 15.00; 1.203
- 4) 20.00; 1.023
- 5) 25.00; 0.902
- 6) 30.00; 0.826
- 7) 40.00; 0.693
- 8) 50.00; 0.611
- 9) 60.00; 0.546
- 10) 90.00; 0.439
- 11) 120.00; 0.374
- 12) 180.00; 0.306
- 13) 360.00; 0.211
- 14) 1440.00; 0.088

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.00 TO NODE 13500.50 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 548.43  
ELEVATION DATA: UPSTREAM(FEET) = 1183.47 DOWNSTREAM(FEET) = 1065.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.390  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	5.11	0.50	1.000	0	11.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 4.09  
TOTAL AREA(ACRES) = 5.11 PEAK FLOW RATE(CFS) = 4.09

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.50 TO NODE 13501.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1033.15  
CHANNEL LENGTH THRU SUBAREA(FEET) = 431.71 CHANNEL SLOPE = 0.0738  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.265  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.87	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.16  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.56  
AVERAGE FLOW DEPTH(FEET) = 0.82 TRAVEL TIME(MIN.) = 2.02  
Tc(MIN.) = 13.98  
SUBAREA AREA(ACRES) = 8.87 SUBAREA RUNOFF(CFS) = 6.11  
EFFECTIVE AREA(ACRES) = 13.98 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 9.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.91 FLOW VELOCITY(FEET/SEC.) = 3.85  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13501.00 = 980.14 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13501.00 TO NODE 13502.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1033.15 DOWNSTREAM(FEET) = 990.26  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.63 CHANNEL SLOPE = 0.0452  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.077  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 16.82 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.03  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.51  
AVERAGE FLOW DEPTH(FEET) = 1.15 TRAVEL TIME(MIN.) = 4.51  
Tc(MIN.) = 18.49  
SUBAREA AREA(ACRES) = 16.82 SUBAREA RUNOFF(CFS) = 8.74  
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 16.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.21 FLOW VELOCITY(FEET/SEC.) = 3.64  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13502.00 = 1928.77 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13502.00 TO NODE 13503.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.26 DOWNSTREAM(FEET) = 956.06  
CHANNEL LENGTH THRU SUBAREA(FEET) = 940.98 CHANNEL SLOPE = 0.0363  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.959  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 46.02 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 25.55  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.76  
AVERAGE FLOW DEPTH(FEET) = 1.51 TRAVEL TIME(MIN.) = 4.18  
Tc(MIN.) = 22.66  
SUBAREA AREA(ACRES) = 46.02 SUBAREA RUNOFF(CFS) = 18.99  
EFFECTIVE AREA(ACRES) = 76.82 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 76.8 PEAK FLOW RATE(CFS) = 31.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.63 FLOW VELOCITY(FEET/SEC.) = 3.98  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13503.00 = 2869.75 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13503.00 TO NODE 13504.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 956.06 DOWNSTREAM(FEET) = 889.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2131.31 CHANNEL SLOPE = 0.0312  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.805  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 58.46 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 39.78  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.98  
AVERAGE FLOW DEPTH(FEET) = 1.83 TRAVEL TIME(MIN.) = 8.93  
Tc(MIN.) = 31.60  
SUBAREA AREA(ACRES) = 58.46 SUBAREA RUNOFF(CFS) = 16.02  
EFFECTIVE AREA(ACRES) = 135.28 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 135.3 PEAK FLOW RATE(CFS) = 37.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.78 FLOW VELOCITY(FEET/SEC.) = 3.90  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13504.00 = 5001.06 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13504.00 TO NODE 13505.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 889.48 DOWNSTREAM(FEET) = 848.10  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1661.97 CHANNEL SLOPE = 0.0249  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.705  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 49.30 0.50 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.66  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.69  
AVERAGE FLOW DEPTH(FEET) = 1.94 TRAVEL TIME(MIN.) = 7.51  
Tc(MIN.) = 39.11  
SUBAREA AREA(ACRES) = 49.30 SUBAREA RUNOFF(CFS) = 9.08  
EFFECTIVE AREA(ACRES) = 184.58 AREA-AVERAGED Fm(INCH/HR) = 0.50  
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 184.6 PEAK FLOW RATE(CFS) = 37.08

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.86 FLOW VELOCITY(FEET/SEC.) = 3.58  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.00 = 6663.03 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13505.00 TO NODE 13505.50 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 848.10 DOWNSTREAM(FEET) = 811.10  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1234.61 CHANNEL SLOPE = 0.0300  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.658

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.35	0.50	0.811	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.811

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.54

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.95

AVERAGE FLOW DEPTH(FEET) = 1.87 TRAVEL TIME(MIN.) = 5.21

Tc(MIN.) = 44.32

SUBAREA AREA(ACRES) = 39.35 SUBAREA RUNOFF(CFS) = 8.93

EFFECTIVE AREA(ACRES) = 223.93 AREA-AVERAGED Fm(INCH/HR) = 0.48

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.97

TOTAL AREA(ACRES) = 223.9 PEAK FLOW RATE(CFS) = 37.08

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.79 FLOW VELOCITY(FEET/SEC.) = 3.86

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.50 = 7897.64 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13505.50 TO NODE 13506.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 811.10 DOWNSTREAM(FEET) = 781.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1415.98 CHANNEL SLOPE = 0.0213  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.604

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	54.33	0.50	0.738	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.738

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.82

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.51

AVERAGE FLOW DEPTH(FEET) = 2.02 TRAVEL TIME(MIN.) = 6.73

Tc(MIN.) = 51.05

SUBAREA AREA(ACRES) = 54.33 SUBAREA RUNOFF(CFS) = 11.51

EFFECTIVE AREA(ACRES) = 278.26 AREA-AVERAGED Fm(INCH/HR) = 0.46

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.92  
TOTAL AREA(ACRES) = 278.3 PEAK FLOW RATE(CFS) = 37.08  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.91 FLOW VELOCITY(FEET/SEC.) = 3.38

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.00 = 9313.62 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13506.00 TO NODE 13506.50 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 781.00 DOWNSTREAM(FEET) = 743.17  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1542.62 CHANNEL SLOPE = 0.0245  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	61.33	0.50	0.783	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.69

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.68

AVERAGE FLOW DEPTH(FEET) = 1.94 TRAVEL TIME(MIN.) = 6.98

Tc(MIN.) = 58.03

SUBAREA AREA(ACRES) = 61.33 SUBAREA RUNOFF(CFS) = 9.23

EFFECTIVE AREA(ACRES) = 339.59 AREA-AVERAGED Fm(INCH/HR) = 0.45

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.90

TOTAL AREA(ACRES) = 339.6 PEAK FLOW RATE(CFS) = 37.08

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.86 FLOW VELOCITY(FEET/SEC.) = 3.58

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.50 = 10856.24 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13506.50 TO NODE 13520.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 743.17 DOWNSTREAM(FEET) = 717.04  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1370.93 CHANNEL SLOPE = 0.0191  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.528

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.86	0.50	0.848	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.848

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.95

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.29

AVERAGE FLOW DEPTH (FEET) = 1.99 TRAVEL TIME (MIN.) = 6.95  
 Tc (MIN.) = 64.97  
 SUBAREA AREA (ACRES) = 39.86 SUBAREA RUNOFF (CFS) = 3.74  
 EFFECTIVE AREA (ACRES) = 379.45 AREA-AVERAGED Fm (INCH/HR) = 0.45  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.89  
 TOTAL AREA (ACRES) = 379.5 PEAK FLOW RATE (CFS) = 37.08  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.95 FLOW VELOCITY (FEET/SEC.) = 3.25  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13520.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 -----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 64.97  
 RAINFALL INTENSITY (INCH/HR) = 0.53  
 AREA-AVERAGED Fm (INCH/HR) = 0.45  
 AREA-AVERAGED Fp (INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 0.89  
 EFFECTIVE STREAM AREA (ACRES) = 379.45  
 TOTAL STREAM AREA (ACRES) = 379.45  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 37.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13510.00 TO NODE 13511.00 IS CODE = 21

-----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 -----

INITIAL SUBAREA FLOW-LENGTH (FEET) = 903.68  
 ELEVATION DATA: UPSTREAM (FEET) = 1216.90 DOWNSTREAM (FEET) = 1022.78  
  
 $Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.615  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.226  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"GRASS"	-	6.66	0.50	1.000	0	14.62

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 4.35  
 TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 4.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13511.00 TO NODE 13512.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----

ELEVATION DATA: UPSTREAM (FEET) = 1022.78 DOWNSTREAM (FEET) = 954.27  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1027.63 CHANNEL SLOPE = 0.0667

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.054  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.76  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.80  
 AVERAGE FLOW DEPTH (FEET) = 0.97 TRAVEL TIME (MIN.) = 4.51  
 Tc (MIN.) = 19.12

SUBAREA AREA (ACRES) = 25.40 SUBAREA RUNOFF (CFS) = 12.67  
 EFFECTIVE AREA (ACRES) = 32.06 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 15.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.13 FLOW VELOCITY (FEET/SEC.) = 4.20  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13512.00 = 1931.31 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13512.00 TO NODE 13513.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----

ELEVATION DATA: UPSTREAM (FEET) = 954.27 DOWNSTREAM (FEET) = 872.45  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1926.42 CHANNEL SLOPE = 0.0425  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH (FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 0.876  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	90.23	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.46  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.22  
 AVERAGE FLOW DEPTH (FEET) = 1.58 TRAVEL TIME (MIN.) = 7.61  
 Tc (MIN.) = 26.73  
 SUBAREA AREA (ACRES) = 90.23 SUBAREA RUNOFF (CFS) = 30.51  
 EFFECTIVE AREA (ACRES) = 122.29 AREA-AVERAGED Fm (INCH/HR) = 0.50  
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 122.3 PEAK FLOW RATE (CFS) = 41.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.75 FLOW VELOCITY (FEET/SEC.) = 4.50  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13513.00 = 3857.73 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13513.00 TO NODE 13514.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----

ELEVATION DATA: UPSTREAM(FEET) = 872.45 DOWNSTREAM(FEET) = 813.12  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1895.66 CHANNEL SLOPE = 0.0313  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.774

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	135.65	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 58.18  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.39  
 AVERAGE FLOW DEPTH(FEET) = 2.10 TRAVEL TIME(MIN.) = 7.20  
 Tc(MIN.) = 33.94  
 SUBAREA AREA(ACRES) = 135.65 SUBAREA RUNOFF(CFS) = 33.38  
 EFFECTIVE AREA(ACRES) = 257.94 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 257.9 PEAK FLOW RATE(CFS) = 63.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.18 FLOW VELOCITY(FEET/SEC.) = 4.46  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13514.00 = 5753.39 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13514.00 TO NODE 13515.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 813.12 DOWNSTREAM(FEET) = 773.74  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.15 CHANNEL SLOPE = 0.0204  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.676

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	109.30	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 72.17  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.95  
 AVERAGE FLOW DEPTH(FEET) = 2.47 TRAVEL TIME(MIN.) = 8.13  
 Tc(MIN.) = 42.07  
 SUBAREA AREA(ACRES) = 109.30 SUBAREA RUNOFF(CFS) = 17.30  
 EFFECTIVE AREA(ACRES) = 367.24 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 367.2 PEAK FLOW RATE(CFS) = 63.48  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.35 FLOW VELOCITY(FEET/SEC.) = 3.82  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13515.00 = 7679.54 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 773.74 DOWNSTREAM(FEET) = 717.04  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2279.49 CHANNEL SLOPE = 0.0249  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.060 MAXIMUM DEPTH(FEET) = 20.00  
 \* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.605

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	231.44	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 74.56  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.27  
 AVERAGE FLOW DEPTH(FEET) = 2.41 TRAVEL TIME(MIN.) = 8.91  
 Tc(MIN.) = 50.98  
 SUBAREA AREA(ACRES) = 231.44 SUBAREA RUNOFF(CFS) = 21.81  
 EFFECTIVE AREA(ACRES) = 598.68 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 598.7 PEAK FLOW RATE(CFS) = 63.48  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.27 FLOW VELOCITY(FEET/SEC.) = 4.10  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13520.00 = 9959.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 50.98  
 RAINFALL INTENSITY(INCH/HR) = 0.60  
 AREA-AVERAGED Fm(INCH/HR) = 0.50  
 AREA-AVERAGED Fp(INCH/HR) = 0.50  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 598.68  
 TOTAL STREAM AREA(ACRES) = 598.68  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 63.48

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	37.08	64.97	0.528	0.50( 0.45)	0.89	379.5	13500.00
2	63.48	50.98	0.605	0.50( 0.50)	1.00	598.7	13510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	100.55	50.98	0.605	0.50( 0.48)	0.96	896.4	13510.00



2 54.12 64.97 0.528 0.50( 0.48) 0.96 978.1 13500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 100.55 Tc(MIN.) = 50.98
EFFECTIVE AREA(ACRES) = 896.38 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 978.1
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13520.00 TO NODE 13520.50 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 717.04 DOWNSTREAM(FEET) = 700.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 2019.22 CHANNEL SLOPE = 0.0084
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.553

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 193.31 0.50 0.965 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 106.71
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.22
AVERAGE FLOW DEPTH(FEET) = 2.90 TRAVEL TIME(MIN.) = 7.97
Tc(MIN.) = 58.95
SUBAREA AREA(ACRES) = 193.31 SUBAREA RUNOFF(CFS) = 12.21
EFFECTIVE AREA(ACRES) = 1089.69 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 1171.4 PEAK FLOW RATE(CFS) = 100.55
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.84 FLOW VELOCITY(FEET/SEC.) = 4.15
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.50 = 14246.39 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13520.50 TO NODE 13521.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 661.95
CHANNEL LENGTH THRU SUBAREA(FEET) = 1622.36 CHANNEL SLOPE = 0.0235
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.534

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 129.79 0.50 0.897 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 105.55

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.18
AVERAGE FLOW DEPTH(FEET) = 2.39 TRAVEL TIME(MIN.) = 4.37
Tc(MIN.) = 63.32
SUBAREA AREA(ACRES) = 129.79 SUBAREA RUNOFF(CFS) = 9.99
EFFECTIVE AREA(ACRES) = 1219.48 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 1301.2 PEAK FLOW RATE(CFS) = 100.55
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.35 FLOW VELOCITY(FEET/SEC.) = 6.09
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13521.00 = 15868.75 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13521.00 TO NODE 13522.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 661.95 DOWNSTREAM(FEET) = 632.19
CHANNEL LENGTH THRU SUBAREA(FEET) = 2746.01 CHANNEL SLOPE = 0.0108
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.499

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 278.60 0.50 0.905 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 106.50
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.64
AVERAGE FLOW DEPTH(FEET) = 2.77 TRAVEL TIME(MIN.) = 9.87
Tc(MIN.) = 73.18
SUBAREA AREA(ACRES) = 278.60 SUBAREA RUNOFF(CFS) = 11.89
EFFECTIVE AREA(ACRES) = 1498.08 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95
\* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
\* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 1579.8 PEAK FLOW RATE(CFS) = 100.55
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.71 FLOW VELOCITY(FEET/SEC.) = 4.58
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13522.00 = 18614.76 FEET.

\*\*\*\*\*

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1579.8 TC(MIN.) = 73.18
EFFECTIVE AREA(ACRES) = 1498.08 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.947
PEAK FLOW RATE(CFS) = 100.55

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 100.55 73.18 0.499 0.50( 0.47) 0.95 1498.1 13510.00

2 54.12 90.88 0.437 0.50( 0.47) 0.94 1579.8 13500.00

=====  
=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 18.0 Release Date: 07/01/2011 License ID 1264

Analysis prepared by:

RBF Consulting

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 10-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P10EVAA.DAT  
TIME/DATE OF STUDY: 16:37 11/13/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.720
- 2) 10.00; 2.487
- 3) 15.00; 1.851
- 4) 20.00; 1.582
- 5) 25.00; 1.382
- 6) 30.00; 1.244
- 7) 40.00; 1.061
- 8) 50.00; 0.944
- 9) 60.00; 0.855
- 10) 90.00; 0.707
- 11) 120.00; 0.622
- 12) 180.00; 0.520
- 13) 360.00; 0.381
- 14) 1200.00; 0.166

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE/ WAY		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 571.00

Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.305  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.151  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56	7.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 2.23  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 2.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.151  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.170  
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 9.21  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 11.43

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.151  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 2.60 0.30 0.200 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 7.23  
EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.06  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19  
TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 18.67

\*\*\*\*\*

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 571.00 DOWNSTREAM ELEVATION(FEET) = 530.50  
STREET LENGTH(FEET) = 1215.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.46

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.43  
HALFSTREET FLOOD WIDTH(FEET) = 15.20  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.98  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.16  
STREET FLOW TRAVEL TIME(MIN.) = 4.07 Tc(MIN.) = 11.37

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.312

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.20	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	2.40	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.135  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 7.57  
EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 21.17

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 14.80  
FLOW VELOCITY(FEET/SEC.) = 4.92 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.10  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1542.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 11.37  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.312  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.119  
SUBAREA AREA(ACRES) = 22.60 SUBAREA RUNOFF(CFS) = 46.31  
EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.04  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.13  
TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 67.48

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 11.37  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.312  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.198  
SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 12.77  
EFFECTIVE AREA(ACRES) = 39.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
TOTAL AREA(ACRES) = 39.3 PEAK FLOW RATE(CFS) = 80.25

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.50 DOWNSTREAM(FEET) = 522.00  
FLOW LENGTH(FEET) = 837.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.19  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 80.25  
PIPE TRAVEL TIME(MIN.) = 1.25 Tc(MIN.) = 12.62  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2379.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 12.62  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.154  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 15.30 0.30 0.100 56  
 PUBLIC PARK B 0.70 0.30 0.850 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.133  
 SUBAREA AREA(ACRES) = 16.00 SUBAREA RUNOFF(CFS) = 30.44  
 EFFECTIVE AREA(ACRES) = 55.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA(ACRES) = 55.3 PEAK FLOW RATE(CFS) = 105.09

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 522.00 DOWNSTREAM(FEET) = 473.00  
 FLOW LENGTH(FEET) = 568.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.41  
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 105.09  
 PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 12.98  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2947.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.98  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.108  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	2.10	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
COMMERCIAL	B	0.50	0.30	0.100	56
PUBLIC PARK	B	13.00	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.820  
 SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 26.65  
 EFFECTIVE AREA(ACRES) = 71.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 71.2 PEAK FLOW RATE(CFS) = 129.47

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 127.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 435.00  
 FLOW LENGTH(FEET) = 588.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 25.31

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 129.47  
 PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 13.36  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 100.00 TO NODE 121.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 574.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.872  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56	8.44

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 1.52  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.52

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 574.00 DOWNSTREAM ELEVATION(FEET) = 557.00  
 STREET LENGTH(FEET) = 221.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.62  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.37  
 HALFSTREET FLOOD WIDTH(FEET) = 11.68  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.59  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.45

STREET FLOW TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 9.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.735  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 7.90 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.10 0.30 0.400 56  
 APARTMENTS B 2.20 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.257  
 SUBAREA AREA(ACRES) = 14.30 SUBAREA RUNOFF(CFS) = 34.20  
 EFFECTIVE AREA(ACRES) = 14.90 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.26  
 TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 35.64

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 15.51  
 FLOW VELOCITY(FEET/SEC.) = 7.61 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.35  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 551.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 557.00 DOWNSTREAM ELEVATION(FEET) = 527.00  
 STREET LENGTH(FEET) = 317.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 46.03  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.46  
 HALFSTREET FLOOD WIDTH(FEET) = 16.52  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.74  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.00  
 STREET FLOW TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 9.60  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.586  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.50 0.30 0.400 56  
 APARTMENTS B 0.70 0.30 0.200 56

COMMERCIAL B 0.40 0.30 0.100 56  
 CONDOMINIUMS B 3.50 0.30 0.350 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.352  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 20.76  
 EFFECTIVE AREA(ACRES) = 24.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 24.2 PEAK FLOW RATE(CFS) = 54.40

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 17.70  
 FLOW VELOCITY(FEET/SEC.) = 9.10 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.35  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 123.00 = 868.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 527.00 DOWNSTREAM ELEVATION(FEET) = 496.00  
 STREET LENGTH(FEET) = 315.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 66.47

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.50  
 HALFSTREET FLOOD WIDTH(FEET) = 19.02  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.70  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.87  
 STREET FLOW TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 10.14  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.469

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 2.90 0.30 0.400 56  
 CONDOMINIUMS B 1.40 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.00 0.30 0.400 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 CONDOMINIUMS B 2.70 0.30 0.350 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387  
 SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 24.14  
 EFFECTIVE AREA(ACRES) = 35.60 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32

TOTAL AREA (ACRES) = 35.6 PEAK FLOW RATE (CFS) = 76.00

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.52 HALFSTREET FLOOD WIDTH (FEET) = 20.04
FLOW VELOCITY (FEET/SEC.) = 10.05 DEPTH\*VELOCITY (FT\*FT/SEC.) = 5.23
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 124.00 = 1183.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 10.14

RAINFALL INTENSITY (INCH/HR) = 2.47

AREA-AVERAGED Fm (INCH/HR) = 0.10

AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.32

EFFECTIVE STREAM AREA (ACRES) = 35.60

TOTAL STREAM AREA (ACRES) = 35.60

PEAK FLOW RATE (CFS) AT CONFLUENCE = 76.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 317.00

ELEVATION DATA: UPSTREAM (FEET) = 699.00 DOWNSTREAM (FEET) = 610.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.111

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.706

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER
"OPEN BRUSH" B 1.50 0.30 1.000 66 9.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 3.25

TOTAL AREA (ACRES) = 1.50 PEAK FLOW RATE (CFS) = 3.25

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FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 610.00 DOWNSTREAM (FEET) = 575.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 206.00 CHANNEL SLOPE = 0.1699

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.573

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 2.80 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.12

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.33

AVERAGE FLOW DEPTH (FEET) = 0.57 TRAVEL TIME (MIN.) = 0.54

Tc (MIN.) = 9.65

SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 5.73

EFFECTIVE AREA (ACRES) = 4.30 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 4.3 PEAK FLOW RATE (CFS) = 8.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.65 FLOW VELOCITY (FEET/SEC.) = 7.03

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 523.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 575.00 DOWNSTREAM (FEET) = 548.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.1350

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.470

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 3.30 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.02

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.93

AVERAGE FLOW DEPTH (FEET) = 0.76 TRAVEL TIME (MIN.) = 0.48

Tc (MIN.) = 10.13

SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 6.44

EFFECTIVE AREA (ACRES) = 7.60 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 7.6 PEAK FLOW RATE (CFS) = 14.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.82 FLOW VELOCITY (FEET/SEC.) = 7.34

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 723.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 548.00 DOWNSTREAM (FEET) = 524.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 318.00 CHANNEL SLOPE = 0.0755

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.359  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	2.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 16.97  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.06  
 AVERAGE FLOW DEPTH (FEET) = 0.97 TRAVEL TIME (MIN.) = 0.87  
 Tc (MIN.) = 11.01  
 SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 4.26  
 EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 18.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.99 FLOW VELOCITY (FEET/SEC.) = 6.18  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 1041.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 524.00 DOWNSTREAM (FEET) = 515.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 94.00 CHANNEL SLOPE = 0.0957  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.331  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	3.70	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 21.72  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.07  
 AVERAGE FLOW DEPTH (FEET) = 1.01 TRAVEL TIME (MIN.) = 0.22  
 Tc (MIN.) = 11.23  
 SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 6.76  
 EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 24.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.07 FLOW VELOCITY (FEET/SEC.) = 7.30  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 1135.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 507.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 207.00 CHANNEL SLOPE = 0.0386  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.251  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	8.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 32.14  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.53  
 AVERAGE FLOW DEPTH (FEET) = 1.39 TRAVEL TIME (MIN.) = 0.62  
 Tc (MIN.) = 11.85  
 SUBAREA AREA (ACRES) = 8.30 SUBAREA RUNOFF (CFS) = 14.58  
 EFFECTIVE AREA (ACRES) = 21.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 21.9 PEAK FLOW RATE (CFS) = 38.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.49 FLOW VELOCITY (FEET/SEC.) = 5.77  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 1342.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
 ELEVATION DATA: UPSTREAM (FEET) = 507.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 338.00 CHANNEL SLOPE = 0.0207  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.105  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	0.60	0.30	1.000	66
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
NATURAL FAIR COVER "OPEN BRUSH"	B	13.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 49.94  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.90  
 AVERAGE FLOW DEPTH (FEET) = 1.84 TRAVEL TIME (MIN.) = 1.15  
 Tc (MIN.) = 13.00  
 SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 22.95  
 EFFECTIVE AREA (ACRES) = 36.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 36.0 PEAK FLOW RATE (CFS) = 58.53

END OF SUBAREA CHANNEL FLOW HYDRAULICS:



DEPTH(FEET) = 1.96 FLOW VELOCITY(FEET/SEC.) = 5.09  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 1680.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 137.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 496.00  
FLOW LENGTH(FEET) = 726.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.23  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 58.53  
PIPE TRAVEL TIME(MIN.) = 1.47 Tc(MIN.) = 14.47  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.47  
RAINFALL INTENSITY(INCH/HR) = 1.92  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 36.00  
TOTAL STREAM AREA(ACRES) = 36.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 58.53

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	76.00	10.14	2.469	0.30( 0.10)	0.32	35.6	100.00
2	58.53	14.47	1.918	0.30( 0.30)	1.00	36.0	130.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	130.97	10.14	2.469	0.30( 0.18)	0.60	60.8	100.00
2	116.88	14.47	1.918	0.30( 0.20)	0.66	71.6	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 130.97 Tc(MIN.) = 10.14  
EFFECTIVE AREA(ACRES) = 60.82 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 71.6  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 444.00  
FLOW LENGTH(FEET) = 888.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.34  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 130.97  
PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 10.75  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 125.00 = 3294.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.75  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.392  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCs SOIL AREA Fp Ap SCs  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 7.50 0.30 0.400 56  
NATURAL FAIR COVER  
"OPEN BRUSH" B 0.10 0.30 1.000 66  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.407  
SUBAREA AREA(ACRES) = 8.60 SUBAREA RUNOFF(CFS) = 17.57  
EFFECTIVE AREA(ACRES) = 69.42 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 138.61

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 444.00 DOWNSTREAM(FEET) = 438.00  
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.20  
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 138.61  
PIPE TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 11.65  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.65

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.277  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	4.30	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.70	0.30	0.400	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.20	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 7.10 SUBAREA RUNOFF (CFS) = 14.12  
 EFFECTIVE AREA (ACRES) = 76.52 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54  
 TOTAL AREA (ACRES) = 87.3 PEAK FLOW RATE (CFS) = 145.56

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.65  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.277  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.40  
 EFFECTIVE AREA (ACRES) = 76.72 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54  
 TOTAL AREA (ACRES) = 87.5 PEAK FLOW RATE (CFS) = 145.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 11.65  
 RAINFALL INTENSITY (INCH/HR) = 2.28  
 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.54  
 EFFECTIVE STREAM AREA (ACRES) = 76.72  
 TOTAL STREAM AREA (ACRES) = 87.50  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 145.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====  
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 557.00 DOWNSTREAM (FEET) = 546.00  
 Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.105  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.447  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.50	0.30	0.100	56	6.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 1.54  
 TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 1.54

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION (FEET) = 546.00 DOWNSTREAM ELEVATION (FEET) = 488.00  
 STREET LENGTH (FEET) = 671.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00  
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.46  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.30  
 HALfstREET FLOOD WIDTH (FEET) = 7.72  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.82  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.75  
 STREET FLOW TRAVEL TIME (MIN.) = 1.92 Tc (MIN.) = 8.03  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.974  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.50	0.30	0.200	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	3.90	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293  
 SUBAREA AREA (ACRES) = 5.30 SUBAREA RUNOFF (CFS) = 13.77  
 EFFECTIVE AREA (ACRES) = 5.80 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA (ACRES) = 5.8 PEAK FLOW RATE (CFS) = 15.09

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.35  
 FLOW VELOCITY(FEET/SEC.) = 6.56 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.28  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1001.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 8.03  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.974  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	14.60	0.30	0.200	56
COMMERCIAL	B	1.10	0.30	0.100	56
CONDOMINIUMS	B	4.30	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.227  
 SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 52.31  
 EFFECTIVE AREA(ACRES) = 25.80 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 25.8 PEAK FLOW RATE(CFS) = 67.40

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

-----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 488.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
 STREET LENGTH(FEET) = 371.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 84.34  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.56  
 HALFSTREET FLOOD WIDTH(FEET) = 22.07  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.28  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 5.17  
 STREET FLOW TRAVEL TIME(MIN.) = 0.67 Tc(MIN.) = 8.69  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.810

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.50	0.30	0.200	56

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 10.00 0.30 0.200 56  
 APARTMENTS B 1.70 0.30 0.200 56  
 COMMERCIAL B 0.50 0.30 0.100 56  
 CONDOMINIUMS B 1.00 0.30 0.350 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.207  
 SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 33.88  
 EFFECTIVE AREA(ACRES) = 39.50 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA(ACRES) = 39.5 PEAK FLOW RATE(CFS) = 97.46

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 23.32  
 FLOW VELOCITY(FEET/SEC.) = 9.65 DEPTH\*VELOCITY(FT\*FT/SEC.) = 5.59  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1372.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 113.00 TO NODE 126.00 IS CODE = 31

-----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 438.00  
 FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.12  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 97.46  
 PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 9.11  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 1872.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 9.11  
 RAINFALL INTENSITY(INCH/HR) = 2.71  
 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.23  
 EFFECTIVE STREAM AREA(ACRES) = 39.50  
 TOTAL STREAM AREA(ACRES) = 39.50  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 97.46

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	145.96	11.65	2.277	0.30( 0.16)	0.54	76.7	100.00
1	127.17	16.05	1.795	0.30( 0.18)	0.60	87.5	130.00
2	97.46	9.11	2.708	0.30( 0.07)	0.23	39.5	110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	234.76	9.11	2.708	0.30 ( 0.13)	0.42	99.5	110.00
2	227.52	11.65	2.277	0.30 ( 0.13)	0.44	116.2	100.00
3	190.92	16.05	1.795	0.30 ( 0.15)	0.48	127.0	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 234.76 Tc(MIN.) = 9.11  
EFFECTIVE AREA(ACRES) = 99.46 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 127.0  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 435.00  
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 60.0 INCH PIPE IS 46.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.41  
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 234.76  
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 9.45  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.45

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.623

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56
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RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	5.10	0.30	0.400	56
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COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56

RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56
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RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.366

SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 17.64

EFFECTIVE AREA(ACRES) = 107.26 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41

TOTAL AREA(ACRES) = 134.8 PEAK FLOW RATE(CFS) = 241.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.45

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.623

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	3.10	0.30	0.400	56
--------------------------------------	---	------	------	-------	----

COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	1.50	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519

SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 10.88

EFFECTIVE AREA(ACRES) = 112.16 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 139.7 PEAK FLOW RATE(CFS) = 252.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	252.10	9.45	2.623	0.30 ( 0.13)	0.42	112.2	110.00
2	243.98	12.00	2.233	0.30 ( 0.13)	0.44	128.9	100.00
3	205.18	16.40	1.775	0.30 ( 0.14)	0.48	139.7	130.00

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	129.47	13.36	2.059	0.30 ( 0.09)	0.29	71.2	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	369.81	9.45	2.623	0.30 ( 0.11)	0.38	162.5	110.00
2	370.44	12.00	2.233	0.30 ( 0.12)	0.39	192.8	100.00
3	361.39	13.36	2.059	0.30 ( 0.12)	0.39	203.5	100.00
4	316.02	16.40	1.775	0.30 ( 0.12)	0.42	210.9	130.00

TOTAL AREA(ACRES) = 210.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 370.44 Tc(MIN.) = 11.995

EFFECTIVE AREA(ACRES) = 192.83 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39

TOTAL AREA(ACRES) = 210.9

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.10 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 500.20 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 42.35
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 370.44
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 12.19
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.10 = 4750.20 FEET.

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FLOW PROCESS FROM NODE 127.10 TO NODE 127.20 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 353.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 595.30 CHANNEL SLOPE = 0.0218
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.031
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         3.50   0.30  0.100  56
COMMERCIAL          B         0.10   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 373.68
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.11
AVERAGE FLOW DEPTH(FEET) = 1.01 TRAVEL TIME(MIN.) = 1.39
Tc(MIN.) = 13.59
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 6.48
EFFECTIVE AREA(ACRES) = 196.43 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 214.5 PEAK FLOW RATE(CFS) = 370.44
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.00 FLOW VELOCITY(FEET/SEC.) = 7.11
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.20 = 5345.50 FEET.

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FLOW PROCESS FROM NODE 127.20 TO NODE 127.30 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 340.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 476.00 CHANNEL SLOPE = 0.0273
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.899
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS

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LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         3.10   0.30  0.100  56
COMMERCIAL          B         0.10   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 373.13
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.64
AVERAGE FLOW DEPTH(FEET) = 0.94 TRAVEL TIME(MIN.) = 1.04
Tc(MIN.) = 14.63
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 5.38
EFFECTIVE AREA(ACRES) = 199.63 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 217.7 PEAK FLOW RATE(CFS) = 370.44
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.94 FLOW VELOCITY(FEET/SEC.) = 7.63
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.30 = 5821.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.30 TO NODE 13569.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 338.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 506.00 CHANNEL SLOPE = 0.0040
CHANNEL BASE(FEET) = 150.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.710
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         2.80   0.30  0.100  56
COMMERCIAL          B         0.60   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 373.01
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.82
AVERAGE FLOW DEPTH(FEET) = 0.87 TRAVEL TIME(MIN.) = 2.99
Tc(MIN.) = 17.62
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 5.14
EFFECTIVE AREA(ACRES) = 203.03 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 221.1 PEAK FLOW RATE(CFS) = 370.44
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.87 FLOW VELOCITY(FEET/SEC.) = 2.82
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 13569.00 = 6327.50 FEET.

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FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 12
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>>>>CLEAR MEMORY BANK # 1 <<<<
=====
END OF STUDY SUMMARY:

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TOTAL AREA (ACRES) = 221.1 TC (MIN.) = 17.62  
 EFFECTIVE AREA (ACRES) = 203.03 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.374  
 PEAK FLOW RATE (CFS) = 370.44

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	369.81	15.08	1.847	0.30 ( 0.11)	0.36	172.7	110.00
2	370.44	17.62	1.710	0.30 ( 0.11)	0.37	203.0	100.00
3	361.39	19.04	1.634	0.30 ( 0.11)	0.38	213.7	100.00
4	316.02	22.37	1.487	0.30 ( 0.12)	0.40	221.1	130.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2012 Advanced Engineering Software (aes)  
Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 10-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P10EVBB.DAT  
TIME/DATE OF STUDY: 16:37 12/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.757
- 2) 10.00; 2.507
- 3) 15.00; 1.859
- 4) 20.00; 1.590
- 5) 25.00; 1.388
- 6) 30.00; 1.248
- 7) 40.00; 1.066
- 8) 50.00; 0.948
- 9) 60.00; 0.860
- 10) 90.00; 0.712
- 11) 120.00; 0.627
- 12) 180.00; 0.525
- 13) 360.00; 0.386
- 14) 1200.00; 0.169

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00  
ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 543.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.596  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.108  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.80	0.30	0.100	56	7.60

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 2.22  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 2.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 543.00 DOWNSTREAM ELEVATION(FEET) = 523.00  
STREET LENGTH(FEET) = 502.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.24  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.28  
HALFSTREET FLOOD WIDTH(FEET) = 5.96  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.90  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.08  
STREET FLOW TRAVEL TIME(MIN.) = 2.15 Tc(MIN.) = 9.74  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.571

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.20	0.30	0.200	56
COMMERCIAL	B	1.30	0.30	0.100	56

NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.261  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.04  
 EFFECTIVE AREA(ACRES) = 2.60 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 5.87

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.24  
 FLOW VELOCITY(FEET/SEC.) = 4.11 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.25  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 810.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.74  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.571  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 1.40 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 3.20  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 9.07

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 523.00 DOWNSTREAM ELEVATION(FEET) = 468.00  
 STREET LENGTH(FEET) = 987.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.91  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.36  
 HALFSTREET FLOOD WIDTH(FEET) = 9.94  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.48  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.96  
 STREET FLOW TRAVEL TIME(MIN.) = 3.00 Tc(MIN.) = 12.74  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.152  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56  
 COMMERCIAL B 2.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.426  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 7.65  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 15.21

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.70  
 FLOW VELOCITY(FEET/SEC.) = 5.70 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.12  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 1797.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 468.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.67  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.38  
 HALFSTREET FLOOD WIDTH(FEET) = 12.15  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.84  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.22  
 STREET FLOW TRAVEL TIME(MIN.) = 2.79 Tc(MIN.) = 15.53  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.831  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.10 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 COMMERCIAL B 1.90 0.30 0.100 56



SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 4.91  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 17.75

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.15  
 FLOW VELOCITY(FEET/SEC.) = 5.87 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.23  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2774.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
 MAINLINE Tc(MIN.) = 15.53  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.831  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.30 0.30 1.000 66  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 1.79  
 EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
 TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 19.54

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 204.00 TO NODE 218.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

-----  
 UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 343.00  
 STREET LENGTH(FEET) = 1228.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.26  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.41  
 HALFSTREET FLOOD WIDTH(FEET) = 13.63  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.01  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.44  
 STREET FLOW TRAVEL TIME(MIN.) = 3.41 Tc(MIN.) = 18.94  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.647

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 COMMERCIAL B 0.50 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.40 0.30 1.000 66  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.70 0.30 0.500 56  
 COMMERCIAL B 1.50 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.80 0.30 1.000 66  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 5.44  
 EFFECTIVE AREA(ACRES) = 16.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 16.6 PEAK FLOW RATE(CFS) = 22.91

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 13.79  
 FLOW VELOCITY(FEET/SEC.) = 6.05 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.48  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
 MAINLINE Tc(MIN.) = 18.94  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.647  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 1.20 0.30 0.500 56  
 COMMERCIAL B 0.10 0.30 0.100 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
 COMMERCIAL B 0.10 0.30 0.100 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450  
 SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 2.18  
 EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 25.09

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

-----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 18.94  
 RAINFALL INTENSITY(INCH/HR) = 1.65  
 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.39  
 EFFECTIVE STREAM AREA (ACRES) = 18.20  
 TOTAL STREAM AREA (ACRES) = 18.20  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 25.09

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 268.00  
 ELEVATION DATA: UPSTREAM (FEET) = 514.00 DOWNSTREAM (FEET) = 511.50

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.724  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.076

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	B	2.30	0.30	0.500	56	9.27
APARTMENTS	B	0.40	0.30	0.200	56	7.72

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456

SUBAREA RUNOFF (CFS) = 7.14

TOTAL AREA (ACRES) = 2.70 PEAK FLOW RATE (CFS) = 7.14

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION (FEET) = 511.50 DOWNSTREAM ELEVATION (FEET) = 503.00  
 STREET LENGTH (FEET) = 503.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 14.77  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.43  
 HALFSTREET FLOOD WIDTH (FEET) = 14.73  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.47  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.48  
 STREET FLOW TRAVEL TIME (MIN.) = 2.42 Tc (MIN.) = 10.14  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.489

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.20	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.475  
 SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 15.20  
 EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.14  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47  
 TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 20.92

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.47 HALFSTREET FLOOD WIDTH (FEET) = 16.99  
 FLOW VELOCITY (FEET/SEC.) = 3.77 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.76  
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 771.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.14

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.489

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

RESIDENTIAL

"11+ DWELLINGS/ACRE"

RESIDENTIAL

"5-7 DWELLINGS/ACRE"

CONDOMINIUMS

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.281

SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 2.81

EFFECTIVE AREA (ACRES) = 11.20 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45

TOTAL AREA (ACRES) = 11.2 PEAK FLOW RATE (CFS) = 23.73

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION (FEET) = 503.00 DOWNSTREAM ELEVATION (FEET) = 476.00  
 STREET LENGTH (FEET) = 423.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.93  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.41  
HALFSTREET FLOOD WIDTH(FEET) = 13.87  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.52  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.68  
STREET FLOW TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 11.22  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.348

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 1.00 0.30 0.500 56  
COMMERCIAL B 0.10 0.30 0.100 56  
CONDOMINIUMS B 0.10 0.30 0.350 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.454  
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 2.39  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 24.71

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 13.79  
FLOW VELOCITY(FEET/SEC.) = 6.53 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.67  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 11.22  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.348  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.50 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
COMMERCIAL B 0.30 0.30 0.100 56  
CONDOMINIUMS B 3.30 0.30 0.350 56  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.332  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 9.92  
EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 34.63

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 11.22  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.348  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 3.40 0.30 0.100 56  
CONDOMINIUMS B 8.10 0.30 0.350 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.276  
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 23.45  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 58.07

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 476.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
STREET LENGTH(FEET) = 789.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 58.07  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.60  
HALFSTREET FLOOD WIDTH(FEET) = 24.65  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.17  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.11  
STREET FLOW TRAVEL TIME(MIN.) = 2.54 Tc(MIN.) = 13.77  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.019  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 58.07  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.60 HALFSTREET FLOOD WIDTH(FEET) = 24.65  
FLOW VELOCITY(FEET/SEC.) = 5.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.11  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1983.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.77  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.019  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	8.00	0.30	0.500	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	6.40	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 24.22  
 EFFECTIVE AREA(ACRES) = 43.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
 TOTAL AREA(ACRES) = 43.2 PEAK FLOW RATE(CFS) = 73.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 460.00 DOWNSTREAM ELEVATION(FEET) = 419.00  
STREET LENGTH(FEET) = 529.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 76.88  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.54  
 HALFSTREET FLOOD WIDTH(FEET) = 21.13  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.19  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.96  
 STREET FLOW TRAVEL TIME(MIN.) = 0.96 Tc(MIN.) = 14.73  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.894  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	1.20	0.30	0.500	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	2.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 6.28  
 EFFECTIVE AREA(ACRES) = 47.20 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 47.2 PEAK FLOW RATE(CFS) = 75.19

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 20.98  
FLOW VELOCITY(FEET/SEC.) = 9.12 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.90  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 2512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.73  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.894  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	0.70	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 8.79  
 EFFECTIVE AREA(ACRES) = 52.80 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
 TOTAL AREA(ACRES) = 52.8 PEAK FLOW RATE(CFS) = 83.98

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.73  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.894  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	0.90	0.30	0.500	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	2.50	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 11.77  
 EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 95.76

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 419.00 DOWNSTREAM ELEVATION(FEET) = 405.00  
STREET LENGTH(FEET) = 174.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 95.76  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.57  
HALFSTREET FLOOD WIDTH(FEET) = 22.85  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.86  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 5.63  
STREET FLOW TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 15.02  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.858  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 95.76  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.57 HALFSTREET FLOOD WIDTH(FEET) = 22.85  
FLOW VELOCITY(FEET/SEC.) = 9.86 DEPTH\*VELOCITY(FT\*FT/SEC.) = 5.63  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 2686.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 372.00  
FLOW LENGTH(FEET) = 395.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.73  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 95.76  
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 15.28  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 3081.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.28  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.844  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500					
SUBAREA AREA(ACRES) = 2.20		SUBAREA RUNOFF(CFS) = 3.35			
EFFECTIVE AREA(ACRES) = 62.50		AREA-AVERAGED Fm(INCH/HR) = 0.13			
AREA-AVERAGED Fp(INCH/HR) = 0.30		AREA-AVERAGED Ap = 0.44			
TOTAL AREA(ACRES) = 62.5		PEAK FLOW RATE(CFS) = 96.38			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.28  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.844  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	3.50	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.90	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500					
SUBAREA AREA(ACRES) = 10.60		SUBAREA RUNOFF(CFS) = 16.16			
EFFECTIVE AREA(ACRES) = 73.10		AREA-AVERAGED Fm(INCH/HR) = 0.13			
AREA-AVERAGED Fp(INCH/HR) = 0.30		AREA-AVERAGED Ap = 0.44			
TOTAL AREA(ACRES) = 73.1		PEAK FLOW RATE(CFS) = 112.54			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 343.00  
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.80  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 112.54  
PIPE TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 15.74  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 3688.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.74

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.819  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.443  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.06  
 EFFECTIVE AREA (ACRES) = 73.80 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 73.8 PEAK FLOW RATE (CFS) = 112.54  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
 -----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 15.74  
 RAINFALL INTENSITY (INCH/HR) = 1.82  
 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.44  
 EFFECTIVE STREAM AREA (ACRES) = 73.80  
 TOTAL STREAM AREA (ACRES) = 73.80  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 112.54

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	25.09	18.94	1.647	0.30 ( 0.12)	0.39	18.2	200.00
2	112.54	15.74	1.819	0.30 ( 0.13)	0.44	73.8	210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	135.74	15.74	1.819	0.30 ( 0.13)	0.43	88.9	210.00
2	126.15	18.94	1.647	0.30 ( 0.13)	0.43	92.0	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 135.74 Tc (MIN.) = 15.74  
 EFFECTIVE AREA (ACRES) = 88.93 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA (ACRES) = 92.0  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 343.00 DOWNSTREAM (FEET) = 326.50  
 FLOW LENGTH (FEET) = 734.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.6 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 16.92  
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 135.74  
 PIPE TRAVEL TIME (MIN.) = 0.72 Tc (MIN.) = 16.46  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 219.00 = 4736.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 16.46  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.780  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56  
 COMMERCIAL  
 B 0.60 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.70 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.90 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 4.22  
 EFFECTIVE AREA (ACRES) = 91.83 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 94.9 PEAK FLOW RATE (CFS) = 136.26

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 16.46  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.780  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL  
 B 0.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 0.90  
 EFFECTIVE AREA (ACRES) = 92.43 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44

TOTAL AREA (ACRES) = 95.5 PEAK FLOW RATE (CFS) = 137.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 326.50 DOWNSTREAM (FEET) = 325.00
FLOW LENGTH (FEET) = 161.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 37.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 12.31
ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 137.16
PIPE TRAVEL TIME (MIN.) = 0.22 Tc (MIN.) = 16.68
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 220.00 = 4897.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 16.68
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.769
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 4.90 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 3.60 0.30 0.400 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 18.40 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 4.30 0.30 0.400 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 6.90 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462
SUBAREA AREA (ACRES) = 38.60 SUBAREA RUNOFF (CFS) = 56.63
EFFECTIVE AREA (ACRES) = 131.03 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44
TOTAL AREA (ACRES) = 134.1 PEAK FLOW RATE (CFS) = 192.81

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 245.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 325.00 DOWNSTREAM (FEET) = 315.00
FLOW LENGTH (FEET) = 1019.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 42.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.64
ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 192.81

PIPE TRAVEL TIME (MIN.) = 1.25 Tc (MIN.) = 17.93
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.93
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.702
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56
COMMERCIAL B 0.40 0.30 0.100 56
NATURAL FAIR COVER
"OPEN BRUSH" B 0.30 0.30 1.000 66
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56
COMMERCIAL B 0.40 0.30 0.100 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379
SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 4.14
EFFECTIVE AREA (ACRES) = 133.93 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44
TOTAL AREA (ACRES) = 137.0 PEAK FLOW RATE (CFS) = 192.81
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.93
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.702
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.90 0.30 0.100 56
NATURAL FAIR COVER
"OPEN BRUSH" B 0.20 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.264
SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 1.61
EFFECTIVE AREA (ACRES) = 135.03 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44
TOTAL AREA (ACRES) = 138.1 PEAK FLOW RATE (CFS) = 192.81
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.93

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.702  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.40	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.434  
 SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 4.53  
 EFFECTIVE AREA (ACRES) = 138.23 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 141.3 PEAK FLOW RATE (CFS) = 195.18

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 220.50 TO NODE 221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 251.00  
 ELEVATION DATA: UPSTREAM (FEET) = 551.00 DOWNSTREAM (FEET) = 547.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.785  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.561  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"1 DWELLING/ACRE"	B	3.10	0.30	0.800	56	9.79
RESIDENTIAL						
"1 DWELLING/ACRE"	B	3.10	0.30	0.800	56	9.79

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA RUNOFF (CFS) = 12.95  
 TOTAL AREA (ACRES) = 6.20 PEAK FLOW RATE (CFS) = 12.95

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 547.00 DOWNSTREAM (FEET) = 542.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 386.00 CHANNEL SLOPE = 0.0130

CHANNEL BASE (FEET) = 10.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 5.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.370  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.163  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.86  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.06  
 AVERAGE FLOW DEPTH (FEET) = 0.33 TRAVEL TIME (MIN.) = 1.27  
 Tc (MIN.) = 11.06  
 SUBAREA AREA (ACRES) = 4.70 SUBAREA RUNOFF (CFS) = 9.82  
 EFFECTIVE AREA (ACRES) = 10.90 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA (ACRES) = 10.9 PEAK FLOW RATE (CFS) = 21.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.37 FLOW VELOCITY (FEET/SEC.) = 5.48  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 222.00 = 637.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 542.00 DOWNSTREAM ELEVATION (FEET) = 531.00  
 STREET LENGTH (FEET) = 1146.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 35.20  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.58  
 HALFSTREET FLOOD WIDTH (FEET) = 23.48  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.44  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.00  
 STREET FLOW TRAVEL TIME (MIN.) = 5.55 Tc (MIN.) = 16.61

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.772  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	11.50	0.30	0.200	56



APARTMENTS B 2.90 0.30 0.200 56  
 COMMERCIAL B 0.70 0.30 0.100 56  
 PUBLIC PARK B 2.60 0.30 0.850 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.292  
 SUBAREA AREA (ACRES) = 17.70 SUBAREA RUNOFF (CFS) = 26.84  
 EFFECTIVE AREA (ACRES) = 28.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 28.6 PEAK FLOW RATE (CFS) = 42.68

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.61 HALFSTREET FLOOD WIDTH (FEET) = 25.27  
 FLOW VELOCITY (FEET/SEC.) = 3.62 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.22  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 223.00 = 1783.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION (FEET) = 531.00 DOWNSTREAM ELEVATION (FEET) = 520.00  
 STREET LENGTH (FEET) = 702.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 51.23  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.60  
 HALFSTREET FLOOD WIDTH (FEET) = 24.65  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.56  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.75  
 STREET FLOW TRAVEL TIME (MIN.) = 2.57 Tc (MIN.) = 19.18  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.634  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.40	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
CONDOMINIUMS	B	0.70	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.175  
 SUBAREA AREA (ACRES) = 12.00 SUBAREA RUNOFF (CFS) = 17.08  
 EFFECTIVE AREA (ACRES) = 40.60 AREA-AVERAGED Fm (INCH/HR) = 0.10  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32  
 TOTAL AREA (ACRES) = 40.6 PEAK FLOW RATE (CFS) = 56.21

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.62 HALFSTREET FLOOD WIDTH (FEET) = 25.59  
 FLOW VELOCITY (FEET/SEC.) = 4.65 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.88  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 224.00 = 2485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 520.00 DOWNSTREAM (FEET) = 463.00  
 FLOW LENGTH (FEET) = 1760.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.86  
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 56.21  
 PIPE TRAVEL TIME (MIN.) = 1.85 Tc (MIN.) = 21.02  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 225.00 = 4245.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 21.02  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.549  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.20	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	0.30	0.30	0.350	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	2.00	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.235  
 SUBAREA AREA (ACRES) = 11.50 SUBAREA RUNOFF (CFS) = 15.30  
 EFFECTIVE AREA (ACRES) = 52.10 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA (ACRES) = 52.1 PEAK FLOW RATE (CFS) = 68.38

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 21.02  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.549  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.40	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
CONDOMINIUMS	B	0.70	0.30	0.350	56

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RESIDENTIAL
"5-7 DWELLINGS/ACRE"      B      6.40   0.30   0.500   56
CONDOMINIUMS              B      0.90   0.30   0.350   56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"      B      5.20   0.30   0.500   56
CONDOMINIUMS              B      0.80   0.30   0.350   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.481
SUBAREA AREA (ACRES) = 13.30   SUBAREA RUNOFF (CFS) = 16.81
EFFECTIVE AREA (ACRES) = 65.40   AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.34
TOTAL AREA (ACRES) = 65.4   PEAK FLOW RATE (CFS) = 85.19

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FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 463.00   DOWNSTREAM(FEET) = 425.00
FLOW LENGTH(FEET) = 639.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 21.87
ESTIMATED PIPE DIAMETER (INCH) = 30.00   NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 85.19
PIPE TRAVEL TIME (MIN.) = 0.49   Tc (MIN.) = 21.51
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 226.00 = 4884.00 FEET.

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FLOW PROCESS FROM NODE 226.00 TO NODE 226.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 21.51
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.529
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B       2.90     0.30     0.200    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B       2.90     0.30     0.500    56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B       6.30     0.30     0.200    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B       6.00     0.30     0.500    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348
SUBAREA AREA (ACRES) = 18.10   SUBAREA RUNOFF (CFS) = 23.21
EFFECTIVE AREA (ACRES) = 83.50   AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.34
TOTAL AREA (ACRES) = 83.5   PEAK FLOW RATE (CFS) = 107.24

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*****
FLOW PROCESS FROM NODE 226.00 TO NODE 243.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 425.00   DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 653.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 20.98
ESTIMATED PIPE DIAMETER (INCH) = 33.00   NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 107.24
PIPE TRAVEL TIME (MIN.) = 0.52   Tc (MIN.) = 22.03
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 243.00 = 5537.00 FEET.

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 22.03
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.508
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B       2.90     0.30     0.200    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B       1.60     0.30     0.500    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307
SUBAREA AREA (ACRES) = 4.50   SUBAREA RUNOFF (CFS) = 5.73
EFFECTIVE AREA (ACRES) = 88.00   AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.34
TOTAL AREA (ACRES) = 88.0   PEAK FLOW RATE (CFS) = 111.40

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 22.03
RAINFALL INTENSITY (INCH/HR) = 1.51
AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.34
EFFECTIVE STREAM AREA (ACRES) = 88.00
TOTAL STREAM AREA (ACRES) = 88.00
PEAK FLOW RATE (CFS) AT CONFLUENCE = 111.40

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*****
FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 550.00   DOWNSTREAM(FEET) = 547.50

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.751

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\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.819  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 APARTMENTS B 0.60 0.30 0.200 56 8.75  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF (CFS) = 1.49  
 TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 1.49

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 547.50 DOWNSTREAM (FEET) = 541.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 802.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 3.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.312

SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 APARTMENTS B 0.20 0.30 0.200 56  
 COMMERCIAL B 5.90 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.79  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.85  
 AVERAGE FLOW DEPTH (FEET) = 0.90 TRAVEL TIME (MIN.) = 2.75  
 Tc (MIN.) = 11.50  
 SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 12.52  
 EFFECTIVE AREA (ACRES) = 6.70 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA (ACRES) = 6.7 PEAK FLOW RATE (CFS) = 13.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.11 FLOW VELOCITY (FEET/SEC.) = 5.58  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1132.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 541.00 DOWNSTREAM (FEET) = 533.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 849.00 CHANNEL SLOPE = 0.0094  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH (FEET) = 5.00  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.051  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 14.90 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.31  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.03  
 AVERAGE FLOW DEPTH (FEET) = 1.39 TRAVEL TIME (MIN.) = 2.01  
 Tc (MIN.) = 13.52  
 SUBAREA AREA (ACRES) = 14.90 SUBAREA RUNOFF (CFS) = 27.11  
 EFFECTIVE AREA (ACRES) = 21.60 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 21.6 PEAK FLOW RATE (CFS) = 39.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.60 FLOW VELOCITY (FEET/SEC.) = 7.70  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1981.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 13.52  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.051  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 APARTMENTS B 0.20 0.30 0.200 56  
 COMMERCIAL B 1.80 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 3.81  
 EFFECTIVE AREA (ACRES) = 23.70 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA (ACRES) = 23.7 PEAK FLOW RATE (CFS) = 43.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 13.52  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.051  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.40 0.30 0.100 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 COMMERCIAL B 1.30 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.117  
 SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 3.27  
 EFFECTIVE AREA (ACRES) = 25.50 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA (ACRES) = 25.5 PEAK FLOW RATE (CFS) = 46.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31  
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 537.00 DOWNSTREAM(FEET) = 510.00
FLOW LENGTH(FEET) = 513.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.82
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 46.35
PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 14.00
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2494.00 FEET.

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.989
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        1.70     0.30     0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B        1.60     0.30     0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 5.50
EFFECTIVE AREA(ACRES) = 41.40 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21
TOTAL AREA(ACRES) = 41.4 PEAK FLOW RATE(CFS) = 70.03

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.989
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        0.70     0.30     0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B        2.50     0.30     0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 5.42
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 66.15

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 478.00
FLOW LENGTH(FEET) = 474.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.61
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 66.15
PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 14.36
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 2968.00 FEET.

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*****
FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.36
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.942
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        1.70     0.30     0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B        1.60     0.30     0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 5.50
EFFECTIVE AREA(ACRES) = 41.40 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21
TOTAL AREA(ACRES) = 41.4 PEAK FLOW RATE(CFS) = 70.03

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*****
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 478.00 DOWNSTREAM(FEET) = 471.00
FLOW LENGTH(FEET) = 473.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.34
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 70.03
PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 15.00
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 3441.00 FEET.

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*****
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.859
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        1.40     0.30     0.200    56
RESIDENTIAL

```

"8-10 DWELLINGS/ACRE" B 7.10 0.30 0.400 56  
 APARTMENTS B 2.70 0.30 0.200 56  
 COMMERCIAL B 1.10 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
 SUBAREA AREA (ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 19.56  
 EFFECTIVE AREA(ACRES) = 53.70 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA(ACRES) = 53.7 PEAK FLOW RATE(CFS) = 86.51

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.859  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.90 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 5.40 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
 COMMERCIAL B 0.60 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.378  
 SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 15.55  
 EFFECTIVE AREA(ACRES) = 63.60 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 63.6 PEAK FLOW RATE(CFS) = 102.06

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 471.00 DOWNSTREAM(FEET) = 468.00  
 FLOW LENGTH(FEET) = 283.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.04  
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 102.06  
 PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 15.39  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 237.00 = 3724.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.39  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.838  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 6.10 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.60 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.218  
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 10.69  
 EFFECTIVE AREA(ACRES) = 70.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 70.3 PEAK FLOW RATE(CFS) = 111.54

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 468.00 DOWNSTREAM(FEET) = 461.00  
 FLOW LENGTH(FEET) = 698.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.85  
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 111.54  
 PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 16.37  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 238.00 = 4422.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.37  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.785  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 8.40 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.220  
 SUBAREA AREA(ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 13.92  
 EFFECTIVE AREA(ACRES) = 79.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 79.3 PEAK FLOW RATE(CFS) = 122.13

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.37  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.785  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.10 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 3.26  
 EFFECTIVE AREA(ACRES) = 81.40 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA (ACRES) = 81.4 PEAK FLOW RATE (CFS) = 125.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 461.00 DOWNSTREAM(FEET) = 440.00  
 FLOW LENGTH(FEET) = 582.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.10  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 125.39  
 PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 16.86  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 5004.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 16.86  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.759  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 5.00 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 7.65  
 EFFECTIVE AREA(ACRES) = 86.40 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 86.4 PEAK FLOW RATE (CFS) = 131.13

\*\*\*\*\*

FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 418.00  
 FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.68  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 131.13  
 PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 17.41  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 5654.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 17.41  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.730  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 5.30 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA (ACRES) = 5.30 SUBAREA RUNOFF(CFS) = 7.96  
 EFFECTIVE AREA(ACRES) = 91.70 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 136.79

\*\*\*\*\*

FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 17.41  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.730  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 1.20 0.30 0.200 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186  
 SUBAREA AREA (ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.11  
 EFFECTIVE AREA(ACRES) = 93.10 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 93.1 PEAK FLOW RATE (CFS) = 138.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 17.41  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.730  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 1.20 0.30 0.200 56  
 SCHOOL B 0.70 0.30 0.600 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347  
 SUBAREA AREA (ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 2.78  
 EFFECTIVE AREA(ACRES) = 95.00 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 95.0 PEAK FLOW RATE (CFS) = 141.68

\*\*\*\*\*

FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 418.00 DOWNSTREAM(FEET) = 404.00
FLOW LENGTH(FEET) = 1279.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 39.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.93
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 141.68
PIPE TRAVEL TIME(MIN.) = 1.65 Tc(MIN.) = 19.05
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 241.00 = 6933.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.05

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.641

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Residential, Commercial, Public Park, School, and Residential with various values.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 18.80 SUBAREA RUNOFF(CFS) = 25.29
EFFECTIVE AREA(ACRES) = 113.80 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 113.8 PEAK FLOW RATE(CFS) = 159.38

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.05

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.641

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Public Park and School.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.666
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 19.06
EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33

TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 178.45

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 403.00
FLOW LENGTH(FEET) = 66.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.74
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 178.45
PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 19.12
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 6999.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.12

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.637

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Residential, Commercial, Residential, and Commercial.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.193
SUBAREA AREA(ACRES) = 19.10 SUBAREA RUNOFF(CFS) = 27.15
EFFECTIVE AREA(ACRES) = 147.60 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 147.6 PEAK FLOW RATE(CFS) = 205.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 1270.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 48.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.08
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 205.16
PIPE TRAVEL TIME(MIN.) = 1.75 Tc(MIN.) = 20.88
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

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FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 20.88
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.555
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B        1.00   0.30   0.200  56
PUBLIC PARK          B        2.00   0.30   0.850  56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B        2.80   0.30   0.200  56
COMMERCIAL          B        1.50   0.30   0.100  56
CONDOMINIUMS        B        0.10   0.30   0.350  56
PUBLIC PARK          B        1.10   0.30   0.850  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.421
SUBAREA AREA(ACRES) = 8.50   SUBAREA RUNOFF(CFS) = 10.93
EFFECTIVE AREA(ACRES) = 156.10   AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 156.1   PEAK FLOW RATE(CFS) = 205.16
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 20.88
RAINFALL INTENSITY(INCH/HR) = 1.55
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA(ACRES) = 156.10
TOTAL STREAM AREA(ACRES) = 156.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 205.16

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\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	111.40	22.03	1.508	0.30( 0.10)	0.34	88.0	220.50
2	205.16	20.88	1.555	0.30( 0.09)	0.32	156.1	230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	314.22	20.88	1.555	0.30( 0.10)	0.32	239.5	230.00
2	310.01	22.03	1.508	0.30( 0.10)	0.32	244.1	220.50

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

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PEAK FLOW RATE(CFS) = 314.22   Tc(MIN.) = 20.88
EFFECTIVE AREA(ACRES) = 239.49   AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.32

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TOTAL AREA(ACRES) = 244.1
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

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FLOW PROCESS FROM NODE 243.00 TO NODE 244.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 394.00   DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 849.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 31.01
ESTIMATED PIPE DIAMETER(INCH) = 48.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 314.22
PIPE TRAVEL TIME(MIN.) = 0.46   Tc(MIN.) = 21.33
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 244.00 = 9118.00 FEET.

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FLOW PROCESS FROM NODE 244.00 TO NODE 244.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 21.33
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.536
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B        0.10   0.30   0.200  56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B        1.70   0.30   0.500  56
PUBLIC PARK          B        0.30   0.30   0.850  56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B        0.80   0.30   0.500  56
PUBLIC PARK          B        0.10   0.30   0.850  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.537
SUBAREA AREA(ACRES) = 3.00   SUBAREA RUNOFF(CFS) = 3.71
EFFECTIVE AREA(ACRES) = 242.49   AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 247.1   PEAK FLOW RATE(CFS) = 314.22
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 244.00 TO NODE 245.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 340.00   DOWNSTREAM(FEET) = 315.00
FLOW LENGTH(FEET) = 777.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 41.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.92
ESTIMATED PIPE DIAMETER(INCH) = 54.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 314.22
PIPE TRAVEL TIME(MIN.) = 0.54   Tc(MIN.) = 21.88
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

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FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.88

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.514

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56

PUBLIC PARK B 0.20 0.30 0.850 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56

PUBLIC PARK B 0.10 0.30 0.850 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631

SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 0.95

EFFECTIVE AREA(ACRES) = 243.29 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33

TOTAL AREA(ACRES) = 247.9 PEAK FLOW RATE(CFS) = 314.22

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	314.22	21.88	1.514	0.30( 0.10)	0.33	243.3	230.00
2	310.01	23.03	1.468	0.30( 0.10)	0.33	247.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	195.18	17.93	1.702	0.30( 0.13)	0.44	138.2	210.00
2	179.35	21.17	1.543	0.30( 0.13)	0.44	141.3	200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	486.75	17.93	1.702	0.30( 0.11)	0.37	337.6	210.00
2	489.59	21.17	1.543	0.30( 0.11)	0.37	376.8	200.00
3	489.97	21.88	1.514	0.30( 0.11)	0.37	384.6	230.00
4	479.83	23.03	1.468	0.30( 0.11)	0.37	389.2	220.50

TOTAL AREA(ACRES) = 389.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 489.97 Tc(MIN.) = 21.875

EFFECTIVE AREA(ACRES) = 384.59 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 389.2

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 3 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 246.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 306.00

FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 75.0 INCH PIPE IS 56.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 19.94

ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 489.97

PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 22.39

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 246.00 = 10514.00 FEET.

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FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.39

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.493

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.90 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.50 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56

CONDOMINIUMS B 9.10 0.30 0.350 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.80 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.410

SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 20.10

EFFECTIVE AREA(ACRES) = 400.89 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 405.5 PEAK FLOW RATE(CFS) = 498.72

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	497.21	18.45	1.674	0.30( 0.11)	0.38	353.9	210.00
2	498.95	21.69	1.522	0.30( 0.11)	0.37	393.1	200.00
3	498.72	22.39	1.493	0.30( 0.11)	0.37	400.9	230.00

4 487.31 23.56 1.446 0.30( 0.11) 0.37 405.5 220.50  
NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 498.95 Tc(MIN.) = 21.69  
AREA-AVERAGED Fm(INCH/HR) = 0.11 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.37 EFFECTIVE AREA(ACRES) = 393.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 21.69  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.522  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.60	0.30	0.400	56
CONDOMINIUMS	B	7.40	0.30	0.350	56
PUBLIC PARK	B	0.30	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.375  
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 11.80  
EFFECTIVE AREA(ACRES) = 402.40 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 414.8 PEAK FLOW RATE(CFS) = 510.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 246.00 TO NODE 247.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 306.00 DOWNSTREAM(FEET) = 300.00  
FLOW LENGTH(FEET) = 185.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 66.0 INCH PIPE IS 48.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.29  
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 510.74  
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 21.80  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 247.00 = 10699.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 21.80  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.517  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
PUBLIC PARK	B	0.10	0.30	0.850	56

RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 1.30 0.30 0.400 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.413  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 2.51  
EFFECTIVE AREA(ACRES) = 404.40 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 416.8 PEAK FLOW RATE(CFS) = 511.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 21.80  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.517  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.40	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.80	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.365  
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 3.29  
EFFECTIVE AREA(ACRES) = 407.00 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 419.4 PEAK FLOW RATE(CFS) = 514.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 247.00 TO NODE 248.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 271.00  
FLOW LENGTH(FEET) = 859.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 63.0 INCH PIPE IS 51.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.23  
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 514.89  
PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 22.33  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 22.33  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.496

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.60	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.60	0.30	0.400	56
COMMERCIAL	B	1.00	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356  
SUBAREA AREA(ACRES) = 4.80 SUBAREA RUNOFF(CFS) = 6.00  
EFFECTIVE AREA(ACRES) = 411.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 424.2 PEAK FLOW RATE(CFS) = 514.89  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.33

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.496

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.50	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.12  
EFFECTIVE AREA(ACRES) = 412.70 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 425.1 PEAK FLOW RATE(CFS) = 514.89  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.33

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.496

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.70	0.30	0.400	56

RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.20	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.80	0.30	0.400	56
CONDOMINIUMS	B	0.20	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	3.20	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.466  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 10.01  
EFFECTIVE AREA(ACRES) = 420.90 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 433.3 PEAK FLOW RATE(CFS) = 524.24

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (INCH/HR)	Ae (ACRES)	HEADWATER NODE
1	524.27	19.08	1.639	0.30( 0.11)	0.38	381.7	210.00
2	524.24	22.33	1.496	0.30( 0.11)	0.37	420.9	200.00
3	523.12	23.03	1.468	0.30( 0.11)	0.37	428.7	230.00
4	510.38	24.20	1.420	0.30( 0.11)	0.37	433.3	220.50

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 524.27 Tc(MIN.) = 19.08

AREA-AVERAGED Fm(INCH/HR) = 0.11 AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.38 EFFECTIVE AREA(ACRES) = 381.71

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.08

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.639

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	5.70	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 7.79  
EFFECTIVE AREA(ACRES) = 387.41 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA(ACRES) = 439.0 PEAK FLOW RATE(CFS) = 532.07

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.08

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.639

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	6.40	0.30	1.000	66
NATURAL FAIR COVER					

"OPEN BRUSH" B 1.40 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.60 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 10.13  
 EFFECTIVE AREA (ACRES) = 395.81 AREA-AVERAGED Fm (INCH/HR) = 0.12  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA (ACRES) = 447.4 PEAK FLOW RATE (CFS) = 542.19

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 413.04 DOWNSTREAM (FEET) = 405.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.928  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.275  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
CONDOMINIUMS	B	0.20	0.30	0.350	56	7.70
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56	6.93
CONDOMINIUMS	B	0.10	0.30	0.350	56	7.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.312  
 SUBAREA RUNOFF (CFS) = 1.15  
 TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 1.15

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

\*\*\*\*\*  
 UPSTREAM ELEVATION (FEET) = 405.00 DOWNSTREAM ELEVATION (FEET) = 385.00  
 STREET LENGTH (FEET) = 587.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.22  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.28  
 HALFSTREET FLOOD WIDTH (FEET) = 6.72  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.54  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.00  
 STREET FLOW TRAVEL TIME (MIN.) = 2.77 Tc (MIN.) = 9.69  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.583

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.20	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.224  
 SUBAREA AREA (ACRES) = 2.70 SUBAREA RUNOFF (CFS) = 6.11  
 EFFECTIVE AREA (ACRES) = 3.10 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 3.1 PEAK FLOW RATE (CFS) = 7.01

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.32 HALFSTREET FLOOD WIDTH (FEET) = 8.91  
 FLOW VELOCITY (FEET/SEC.) = 3.89 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.25  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 917.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

\*\*\*\*\*  
 ELEVATION DATA: UPSTREAM (FEET) = 385.00 DOWNSTREAM (FEET) = 378.50  
 FLOW LENGTH (FEET) = 162.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.4 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.30  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 7.01  
 PIPE TRAVEL TIME (MIN.) = 0.26 Tc (MIN.) = 9.96  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1079.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
 MAINLINE Tc (MIN.) = 9.96  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.518  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56

COMMERCIAL B 1.30 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA (ACRES) = 2.40 SUBAREA RUNOFF (CFS) = 5.37  
 EFFECTIVE AREA (ACRES) = 5.50 AREA-AVERAGED Fm (INCH/HR) = 0.05  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
 TOTAL AREA (ACRES) = 5.5 PEAK FLOW RATE (CFS) = 12.20

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 378.50 DOWNSTREAM (FEET) = 348.50  
 FLOW LENGTH (FEET) = 637.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.61  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 12.20  
 PIPE TRAVEL TIME (MIN.) = 0.84 Tc (MIN.) = 10.80  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 1716.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 10.80  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.404  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.60	0.30	0.500	56
COMMERCIAL	B	1.70	0.30	0.100	56
CONDOMINIUMS	B	1.00	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
COMMERCIAL	B	0.70	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.240  
 SUBAREA AREA (ACRES) = 4.50 SUBAREA RUNOFF (CFS) = 9.44  
 EFFECTIVE AREA (ACRES) = 10.00 AREA-AVERAGED Fm (INCH/HR) = 0.06  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA (ACRES) = 10.0 PEAK FLOW RATE (CFS) = 21.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 304.00 TO NODE 421.10 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 348.50 DOWNSTREAM (FEET) = 306.00  
 FLOW LENGTH (FEET) = 944.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.7 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 13.64  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 21.08  
 PIPE TRAVEL TIME (MIN.) = 1.15 Tc (MIN.) = 11.95  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 11.95  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.254  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.20	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.50	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.90	0.30	0.400	56
COMMERCIAL	B	2.00	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
 SUBAREA AREA (ACRES) = 7.30 SUBAREA RUNOFF (CFS) = 14.12  
 EFFECTIVE AREA (ACRES) = 17.30 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.27  
 TOTAL AREA (ACRES) = 17.3 PEAK FLOW RATE (CFS) = 33.86

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 11.95  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.254  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	4.40	0.30	0.200	56
COMMERCIAL	B	0.10	0.30	0.100	56
APARTMENTS	B	6.70	0.30	0.200	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.199  
 SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 22.12  
 EFFECTIVE AREA (ACRES) = 28.50 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 28.5 PEAK FLOW RATE (CFS) = 55.98

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 11.95  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.254  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 3.10 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 5.45  
 EFFECTIVE AREA(ACRES) = 31.60 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 61.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 11.95  
 RAINFALL INTENSITY(INCH/HR) = 2.25  
 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.31  
 EFFECTIVE STREAM AREA(ACRES) = 31.60  
 TOTAL STREAM AREA(ACRES) = 31.60  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 61.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 400.00 TO NODE 420.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 300.40  
 ELEVATION DATA: UPSTREAM(FEET) = 312.80 DOWNSTREAM(FEET) = 310.80

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.115  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.978  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 COMMERCIAL B 0.50 0.30 0.100 56 8.11  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF(CFS) = 1.33  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.33

\*\*\*\*\*

FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 307.00

STREET LENGTH(FEET) = 266.50 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 67.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 62.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.00

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.31  
 HALFSTREET FLOOD WIDTH(FEET) = 8.60  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.43  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.75  
 STREET FLOW TRAVEL TIME(MIN.) = 1.83 Tc(MIN.) = 9.95  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.520

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.60 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.34  
 EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 2.47

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 9.63  
 FLOW VELOCITY(FEET/SEC.) = 2.51 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.82  
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.00 = 566.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 307.00 DOWNSTREAM(FEET) = 305.50  
 FLOW LENGTH(FEET) = 105.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.31  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 2.47  
 PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 10.28  
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.10 = 671.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

\*\*\*\*\*

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 10.28  
 RAINFALL INTENSITY (INCH/HR) = 2.47  
 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.10  
 EFFECTIVE STREAM AREA (ACRES) = 1.10  
 TOTAL STREAM AREA (ACRES) = 1.10  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 2.47

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	61.43	11.95	2.254	0.30 (0.09)	0.31	31.6	300.00
2	2.47	10.28	2.471	0.30 (0.03)	0.10	1.1	400.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	60.59	10.28	2.471	0.30 (0.09)	0.31	28.3	400.00
2	63.67	11.95	2.254	0.30 (0.09)	0.31	32.7	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 63.67 Tc (MIN.) = 11.95  
 EFFECTIVE AREA (ACRES) = 32.70 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA (ACRES) = 32.7  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 421.10 TO NODE 426.10 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 305.50 DOWNSTREAM (FEET) = 301.00  
 FLOW LENGTH (FEET) = 261.40 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.1 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.63  
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 63.67  
 PIPE TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 12.30  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.10 = 2921.40 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 426.10 TO NODE 426.10 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc (MIN.) = 12.30  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.209  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.38  
 EFFECTIVE AREA (ACRES) = 32.90 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA (ACRES) = 32.9 PEAK FLOW RATE (CFS) = 63.67  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 426.10 TO NODE 426.20 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 301.00 DOWNSTREAM (FEET) = 289.00  
 FLOW LENGTH (FEET) = 448.56 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 21.8 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.26  
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 63.67  
 PIPE TRAVEL TIME (MIN.) = 0.49 Tc (MIN.) = 12.79  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.20 = 3369.96 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 426.20 TO NODE 426.20 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc (MIN.) = 12.79  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.146  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 0.50 SUBAREA RUNOFF (CFS) = 0.91  
 EFFECTIVE AREA (ACRES) = 33.40 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA (ACRES) = 33.4 PEAK FLOW RATE (CFS) = 63.67  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 426.20 TO NODE 426.30 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 289.00 DOWNSTREAM (FEET) = 282.00  
 FLOW LENGTH (FEET) = 260.45 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.5 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.81  
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 63.67  
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 13.08  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.30 = 3630.41 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.30 TO NODE 426.30 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.08

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.108

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.80	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400

SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 1.97

EFFECTIVE AREA(ACRES) = 34.50 AREA-AVERAGED Fm(INCH/HR) = 0.09

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31

TOTAL AREA(ACRES) = 34.5 PEAK FLOW RATE(CFS) = 63.67

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.30 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 271.00

FLOW LENGTH(FEET) = 411.44 MANNING'S N = 0.013

DEPTH OF FLOW IN 33.0 INCH PIPE IS 21.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.26

ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 63.67

PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 13.53

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 13.53

RAINFALL INTENSITY(INCH/HR) = 2.05

AREA-AVERAGED Fm(INCH/HR) = 0.09

AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.31

EFFECTIVE STREAM AREA(ACRES) = 34.50

TOTAL STREAM AREA(ACRES) = 34.50

PEAK FLOW RATE(CFS) AT CONFLUENCE = 63.67

\*\*\*\*\*

FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 233.60

ELEVATION DATA: UPSTREAM(FEET) = 306.50 DOWNSTREAM(FEET) = 301.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.882

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.536

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.20	0.30	0.100	56	5.88
COMMERCIAL	B	0.20	0.30	0.100	56	5.88

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF(CFS) = 1.26

TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.26

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.00 TO NODE 427.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STANDARD CURB SECTION USED)<<<<

UPSTREAM ELEVATION(FEET) = 301.80 DOWNSTREAM ELEVATION(FEET) = 294.00

STREET LENGTH(FEET) = 478.70 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.13

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.31

HALFSTREET FLOOD WIDTH(FEET) = 8.64

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.56

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.80

STREET FLOW TRAVEL TIME(MIN.) = 3.11 Tc(MIN.) = 8.99

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.759

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.20	0.30	0.100	56
COMMERCIAL	B	0.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.72

EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.03

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10



TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 2.70

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.33 HALFSTREET FLOOD WIDTH (FEET) = 9.73
FLOW VELOCITY (FEET/SEC.) = 2.70 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.89
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 427.00 = 712.30 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 427.00 TO NODE 428.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION (FEET) = 294.00 DOWNSTREAM ELEVATION (FEET) = 286.00
STREET LENGTH (FEET) = 300.80 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 55.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.25

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.33
HALFSTREET FLOOD WIDTH (FEET) = 9.46
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.39
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.10
STREET FLOW TRAVEL TIME (MIN.) = 1.48 Tc (MIN.) = 10.47
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.446

SUBAREA LOSS RATE DATA (AMC II):

Table with 6 columns: DEVELOPMENT TYPE/, SCS SOIL, AREA, Fp, Ap, SCS. Rows include COMMERCIAL with values B, 0.10, 0.30, 0.100, 56 and another COMMERCIAL with values B, 0.40, 0.30, 0.100, 56.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.50 SUBAREA RUNOFF (CFS) = 1.09
EFFECTIVE AREA (ACRES) = 1.60 AREA-AVERAGED Fm (INCH/HR) = 0.03
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 1.6 PEAK FLOW RATE (CFS) = 3.48

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.33 HALFSTREET FLOOD WIDTH (FEET) = 9.78
FLOW VELOCITY (FEET/SEC.) = 3.45 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.14
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 428.00 = 1013.10 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 428.00 TO NODE 429.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION (FEET) = 286.00 DOWNSTREAM ELEVATION (FEET) = 276.00

STREET LENGTH (FEET) = 242.40 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 55.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.89

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.32
HALFSTREET FLOOD WIDTH (FEET) = 9.24
AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.22
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.36
STREET FLOW TRAVEL TIME (MIN.) = 0.96 Tc (MIN.) = 11.43
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.322

SUBAREA LOSS RATE DATA (AMC II):

Table with 6 columns: DEVELOPMENT TYPE/, SCS SOIL, AREA, Fp, Ap, SCS. Rows include COMMERCIAL with values B, 0.40, 0.30, 0.100, 56.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.83
EFFECTIVE AREA (ACRES) = 2.00 AREA-AVERAGED Fm (INCH/HR) = 0.03
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 4.13

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.33 HALFSTREET FLOOD WIDTH (FEET) = 9.57
FLOW VELOCITY (FEET/SEC.) = 4.24 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.39
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 429.00 = 1255.50 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 429.00 TO NODE 429.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 11.43
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.322

SUBAREA LOSS RATE DATA (AMC II):

Table with 6 columns: DEVELOPMENT TYPE/, SCS SOIL, AREA, Fp, Ap, SCS. Rows include RESIDENTIAL with values B, 0.50, 0.30, 0.400, 56 and another RESIDENTIAL with values B, 1.50, 0.30, 0.400, 56.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 3.96
EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.08
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25
TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 8.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 429.00 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 273.00
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.61
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.09
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 11.60
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 248.00 = 1355.50 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 11.60
RAINFALL INTENSITY(INCH/HR) = 2.30
AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.25
EFFECTIVE STREAM AREA(ACRES) = 4.00
TOTAL STREAM AREA(ACRES) = 4.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.09

\*\* CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 60.59 11.89 2.262 0.30( 0.09) 0.31 30.1 400.00
1 63.67 13.53 2.050 0.30( 0.09) 0.31 34.5 300.00
2 8.09 11.60 2.300 0.30( 0.08) 0.25 4.0 425.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 68.23 11.60 2.300 0.30( 0.09) 0.30 33.3 425.00
2 68.54 11.89 2.262 0.30( 0.09) 0.30 34.1 400.00
3 70.85 13.53 2.050 0.30( 0.09) 0.31 38.5 300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 70.85 Tc(MIN.) = 13.53
EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 38.5
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 68.23 11.60 2.300 0.30( 0.09) 0.30 33.3 425.00
2 68.54 11.89 2.262 0.30( 0.09) 0.30 34.1 400.00
3 70.85 13.53 2.050 0.30( 0.09) 0.31 38.5 300.00
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 542.19 19.08 1.639 0.30( 0.12) 0.39 395.8 210.00
2 540.34 22.33 1.496 0.30( 0.12) 0.39 435.0 200.00
3 538.86 23.03 1.468 0.30( 0.12) 0.38 442.8 230.00
4 525.52 24.20 1.420 0.30( 0.12) 0.38 447.4 220.50
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 540.80 11.60 2.300 0.30( 0.11) 0.38 273.9 425.00
2 544.54 11.89 2.262 0.30( 0.11) 0.38 280.6 400.00
3 558.86 13.53 2.050 0.30( 0.11) 0.38 319.1 300.00
4 598.20 19.08 1.639 0.30( 0.11) 0.38 434.3 210.00
5 591.15 22.33 1.496 0.30( 0.11) 0.38 473.5 200.00
6 588.65 23.03 1.468 0.30( 0.11) 0.38 481.3 230.00
7 573.61 24.20 1.420 0.30( 0.11) 0.38 485.9 220.50
TOTAL AREA(ACRES) = 485.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 598.20 Tc(MIN.) = 19.084
EFFECTIVE AREA(ACRES) = 434.31 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 485.9
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 249.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 261.00
FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 55.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.80
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 598.20

PIPE TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 19.30  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 429.00 TO NODE 430.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 262.70

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.459

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.392

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.20	0.30	0.100	56	6.46
COMMERCIAL	B	0.40	0.30	0.100	56	6.46

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF(CFS) = 1.82

TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

\*\*\*\*\*  
UPSTREAM ELEVATION(FEET) = 262.70 DOWNSTREAM ELEVATION(FEET) = 258.98  
STREET LENGTH(FEET) = 345.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.55

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.34

HALFSTREET FLOOD WIDTH(FEET) = 10.43

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.28

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.78

STREET FLOW TRAVEL TIME(MIN.) = 2.53 Tc(MIN.) = 8.99

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.761

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.50	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.47

EFFECTIVE AREA(ACRES) = 1.20 AREA-AVERAGED Fm(INCH/HR) = 0.03

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 2.95

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.23

FLOW VELOCITY(FEET/SEC.) = 2.33 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.83

LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.00 = 675.60 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.00 TO NODE 431.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 258.98 DOWNSTREAM(FEET) = 258.00

FLOW LENGTH(FEET) = 91.03 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 5.05

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 2.95

PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 9.29

LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.10 = 766.63 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

\*\*\*\*\*  
TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 9.29

RAINFALL INTENSITY(INCH/HR) = 2.69

AREA-AVERAGED Fm(INCH/HR) = 0.03

AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.10

EFFECTIVE STREAM AREA(ACRES) = 1.20

TOTAL STREAM AREA(ACRES) = 1.20

PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.95

\*\*\*\*\*  
FLOW PROCESS FROM NODE 410.00 TO NODE 440.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 299.70

ELEVATION DATA: UPSTREAM(FEET) = 312.69 DOWNSTREAM(FEET) = 310.80

Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.196  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.958  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.40	0.30	0.100	56	8.20

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF(CFS) = 1.05  
 TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.05

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 61  
 \*\*\*\*\*

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 306.50  
 STREET LENGTH(FEET) = 299.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.49  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.29  
 HALfstREET FLOOD WIDTH(FEET) = 7.31  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.30  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.66  
 STREET FLOW TRAVEL TIME(MIN.) = 2.17 Tc(MIN.) = 10.37  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.460

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.87  
 EFFECTIVE AREA(ACRES) = 0.80 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 1.75

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.30 HALfstREET FLOOD WIDTH(FEET) = 7.95  
 FLOW VELOCITY(FEET/SEC.) = 2.39 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.71  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 441.00 = 598.70 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 61  
 \*\*\*\*\*

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 306.50 DOWNSTREAM ELEVATION(FEET) = 299.00  
 STREET LENGTH(FEET) = 341.60 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.34  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.31  
 HALfstREET FLOOD WIDTH(FEET) = 8.34  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.97  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.91  
 STREET FLOW TRAVEL TIME(MIN.) = 1.91 Tc(MIN.) = 12.28  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.212

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.20	0.30	0.100	56
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.18  
 EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 2.75

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.32 HALfstREET FLOOD WIDTH(FEET) = 9.13  
 FLOW VELOCITY(FEET/SEC.) = 3.04 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.97  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 442.00 = 940.30 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 61  
 \*\*\*\*\*

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 299.00 DOWNSTREAM ELEVATION(FEET) = 288.50  
 STREET LENGTH(FEET) = 390.10 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.27  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 9.43  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.44  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.12  
STREET FLOW TRAVEL TIME(MIN.) = 1.89 Tc(MIN.) = 14.17  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.967

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.30 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.05  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 3.49

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 9.73  
FLOW VELOCITY(FEET/SEC.) = 3.48 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.15  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 443.00 = 1330.40 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 443.00 TO NODE 444.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 288.50 DOWNSTREAM ELEVATION(FEET) = 281.00  
STREET LENGTH(FEET) = 272.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.81  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 10.13  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.57  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.20  
STREET FLOW TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 15.44  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.835

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

COMMERCIAL B 0.40 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.65  
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 3.90

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 10.23  
FLOW VELOCITY(FEET/SEC.) = 3.59 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.22  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 444.00 = 1603.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 444.00 TO NODE 445.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 281.00 DOWNSTREAM ELEVATION(FEET) = 268.10  
STREET LENGTH(FEET) = 462.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017  
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.43  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 10.83  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.72  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.30  
STREET FLOW TRAVEL TIME(MIN.) = 2.07 Tc(MIN.) = 17.52  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.724

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.70 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.07  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 4.72

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 11.13  
FLOW VELOCITY(FEET/SEC.) = 3.79 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.34  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 445.00 = 2065.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 445.00 TO NODE 446.00 IS CODE = 61  
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-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 268.10 DOWNSTREAM ELEVATION(FEET) = 257.00  
STREET LENGTH(FEET) = 532.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.43  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 12.68  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.47  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.32  
STREET FLOW TRAVEL TIME(MIN.) = 2.56 Tc(MIN.) = 20.08  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.587

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.10 0.30 0.100 56  
COMMERCIAL B 0.60 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 1.40  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 5.75

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 13.00  
FLOW VELOCITY(FEET/SEC.) = 3.52 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.36  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 446.00 = 2598.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 446.00 TO NODE 431.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 257.00 DOWNSTREAM(FEET) = 256.50  
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.44  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 5.75  
PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 20.45  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 20.45  
RAINFALL INTENSITY(INCH/HR) = 1.57  
AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 4.10  
TOTAL STREAM AREA(ACRES) = 4.10  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.75

\*\* CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 2.95 9.29 2.685 0.30( 0.03) 0.10 1.2 429.00  
2 5.75 20.45 1.572 0.30( 0.03) 0.10 4.1 410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 7.44 9.29 2.685 0.30( 0.03) 0.10 3.1 429.00  
2 7.46 20.45 1.572 0.30( 0.03) 0.10 5.3 410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 7.46 Tc(MIN.) = 20.45  
EFFECTIVE AREA(ACRES) = 5.30 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 5.3  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 249.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 258.00 DOWNSTREAM(FEET) = 257.00  
FLOW LENGTH(FEET) = 230.42 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.52  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 7.46  
PIPE TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 21.30  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

=====  
\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	7.44	10.14	2.489	0.30( 0.03)	0.10	3.1	429.00
2	7.46	21.30	1.537	0.30( 0.03)	0.10	5.3	410.00

LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	540.80	11.82	2.271	0.30( 0.11)	0.38	273.9	425.00
2	544.54	12.10	2.234	0.30( 0.11)	0.38	280.6	400.00
3	558.86	13.74	2.022	0.30( 0.11)	0.38	319.1	300.00
4	598.20	19.30	1.628	0.30( 0.11)	0.38	434.3	210.00
5	591.15	22.55	1.487	0.30( 0.11)	0.38	473.5	200.00
6	588.65	23.25	1.459	0.30( 0.11)	0.38	481.3	230.00
7	573.61	24.41	1.412	0.30( 0.11)	0.38	485.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	518.09	10.14	2.489	0.30( 0.11)	0.38	237.9	429.00
2	548.24	11.82	2.271	0.30( 0.11)	0.38	277.3	425.00
3	551.99	12.10	2.234	0.30( 0.11)	0.38	284.1	400.00
4	566.31	13.74	2.022	0.30( 0.11)	0.38	322.9	300.00
5	605.65	19.30	1.628	0.30( 0.11)	0.38	439.2	210.00
6	601.31	21.30	1.537	0.30( 0.11)	0.38	463.8	410.00
7	598.36	22.55	1.487	0.30( 0.11)	0.38	478.8	200.00
8	595.72	23.25	1.459	0.30( 0.11)	0.38	486.6	230.00
9	580.44	24.41	1.412	0.30( 0.11)	0.37	491.2	220.50

TOTAL AREA (ACRES) = 491.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 605.65 Tc (MIN.) = 19.298  
EFFECTIVE AREA (ACRES) = 439.21 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA (ACRES) = 491.2  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<<

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 491.2 TC (MIN.) = 19.30  
EFFECTIVE AREA (ACRES) = 439.21 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.380  
PEAK FLOW RATE (CFS) = 605.65

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	518.09	10.14	2.489	0.30( 0.11)	0.38	237.9	429.00

2	548.24	11.82	2.271	0.30( 0.11)	0.38	277.3	425.00
3	551.99	12.10	2.234	0.30( 0.11)	0.38	284.1	400.00
4	566.31	13.74	2.022	0.30( 0.11)	0.38	322.9	300.00
5	605.65	19.30	1.628	0.30( 0.11)	0.38	439.2	210.00
6	601.31	21.30	1.537	0.30( 0.11)	0.38	463.8	410.00
7	598.36	22.55	1.487	0.30( 0.11)	0.38	478.8	200.00
8	595.72	23.25	1.459	0.30( 0.11)	0.38	486.6	230.00
9	580.44	24.41	1.412	0.30( 0.11)	0.37	491.2	220.50

=====  
END OF RATIONAL METHOD ANALYSIS  
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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

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FILE NAME: 0506101E.DAT  
TIME/DATE OF STUDY: 12:42 04/15/2013  
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--\*TIME-OF-CONCENTRATION MODEL\*--  
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5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10100.00 TO NODE 10101.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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FLOW PROCESS FROM NODE 10101.00 TO NODE 10102.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.50      0.30      1.000      -
USER-DEFINED  -        0.30      0.30      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.80  SUBAREA RUNOFF (CFS) = 1.32
EFFECTIVE AREA (ACRES) = 1.20  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.2  PEAK FLOW RATE (CFS) = 1.98

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FLOW PROCESS FROM NODE 10102.00 TO NODE 10103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 790.00  DOWNSTREAM(FEET) = 762.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00  CHANNEL SLOPE = 0.1400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1.98
FLOW VELOCITY(FEET/SEC.) = 4.47  FLOW DEPTH(FEET) = 0.38
TRAVEL TIME(MIN.) = 0.75  Tc(MIN.) = 10.99
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10103.00 = 679.00 FEET.

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FLOW PROCESS FROM NODE 10103.00 TO NODE 10103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 10.99
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.051
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.40  0.30  1.000  -
USER-DEFINED      -        0.80  0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.20  SUBAREA RUNOFF (CFS) = 1.89
EFFECTIVE AREA (ACRES) = 2.40  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 2.4  PEAK FLOW RATE (CFS) = 3.78

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 762.00  DOWNSTREAM(FEET) = 754.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 124.00  CHANNEL SLOPE = 0.0645
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.78
FLOW VELOCITY(FEET/SEC.) = 3.91  FLOW DEPTH(FEET) = 0.57
TRAVEL TIME(MIN.) = 0.53  Tc(MIN.) = 11.52
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10104.00 = 803.00 FEET.

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.52
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.998
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.70  0.30  1.000  -
USER-DEFINED      -        1.10  0.30  1.000  -
USER-DEFINED      -        0.10  0.30  1.000  -
USER-DEFINED      -        0.40  0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 3.51
EFFECTIVE AREA (ACRES) = 4.70  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.7  PEAK FLOW RATE (CFS) = 7.18

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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ELEVATION DATA: UPSTREAM(FEET) = 754.00  DOWNSTREAM(FEET) = 740.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00  CHANNEL SLOPE = 0.0255
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.18
FLOW VELOCITY(FEET/SEC.) = 3.26  FLOW DEPTH(FEET) = 0.86
TRAVEL TIME(MIN.) = 2.81  Tc(MIN.) = 14.34
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10105.00 = 1353.00 FEET.

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.34
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.766
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        3.40  0.30  1.000  -
USER-DEFINED      -        0.60  0.30  1.000  -
USER-DEFINED      -        6.00  0.30  1.000  -
USER-DEFINED      -        0.60  0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 10.60  SUBAREA RUNOFF (CFS) = 13.99
EFFECTIVE AREA (ACRES) = 15.30  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 15.3  PEAK FLOW RATE (CFS) = 20.19

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10106.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 740.00 DOWNSTREAM(FEET) = 623.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 929.00 CHANNEL SLOPE = 0.1259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 20.19
FLOW VELOCITY(FEET/SEC.) = 7.69 FLOW DEPTH(FEET) = 0.94
TRAVEL TIME(MIN.) = 2.01 Tc(MIN.) = 16.35
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10106.00 = 2282.00 FEET.
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10106.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.35
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.650
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 10.40 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 4.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 18.83
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 37.42
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 592.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 417.00 CHANNEL SLOPE = 0.0743
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 37.42
FLOW VELOCITY(FEET/SEC.) = 7.36 FLOW DEPTH(FEET) = 1.30
TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 17.30
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10107.00 = 2699.00 FEET.
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10107.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.30

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* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.601
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 5.10 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 2.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 11.12
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 47.18
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 592.00 DOWNSTREAM(FEET) = 590.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0333
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.000
CHANNEL FLOW THRU SUBAREA(CFS) = 47.18
FLOW VELOCITY(FEET/SEC.) = 5.77 FLOW DEPTH(FEET) = 1.65
TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 17.47
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10108.00 = 2759.00 FEET.
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.47
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.592
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 7.00 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 7.50 0.30 1.000 -
USER-DEFINED - 1.80 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 21.04
EFFECTIVE AREA(ACRES) = 58.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.4 PEAK FLOW RATE(CFS) = 67.89
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 17.47
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.592
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.20     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20     SUBAREA RUNOFF(CFS) = 0.23
EFFECTIVE AREA(ACRES) = 58.60   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.6     PEAK FLOW RATE(CFS) = 68.13

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*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10109.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 590.00  DOWNSTREAM(FEET) = 526.00
CHANNEL LENGTH THRU SUBAREA( FEET) = 973.00  CHANNEL SLOPE = 0.0658
CHANNEL BASE( FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH( FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 68.13
FLOW VELOCITY( FEET/SEC.) = 8.16  FLOW DEPTH( FEET) = 1.67
TRAVEL TIME(MIN.) = 1.99  Tc(MIN.) = 19.46
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10109.00 = 3732.00 FEET.

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*****
FLOW PROCESS FROM NODE 10109.00 TO NODE 10109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 19.46
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.488
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -        16.40     0.30     1.000     -
USER-DEFINED        -         0.60     0.30     1.000     -
USER-DEFINED        -         3.00     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.00     SUBAREA RUNOFF(CFS) = 21.39
EFFECTIVE AREA(ACRES) = 78.60   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.6     PEAK FLOW RATE(CFS) = 84.07

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*****
FLOW PROCESS FROM NODE 10109.00 TO NODE 10110.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 526.00  DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA( FEET) = 1045.00  CHANNEL SLOPE = 0.0679

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CHANNEL BASE( FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH( FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 84.07
FLOW VELOCITY( FEET/SEC.) = 8.69  FLOW DEPTH( FEET) = 1.80
TRAVEL TIME(MIN.) = 2.00  Tc(MIN.) = 21.46
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10110.00 = 4777.00 FEET.

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*****
FLOW PROCESS FROM NODE 10110.00 TO NODE 10110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 21.46
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.410
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         1.00     0.30     1.000     -
USER-DEFINED        -         0.50     0.30     1.000     -
USER-DEFINED        -        31.60     0.30     1.000     -
USER-DEFINED        -         1.60     0.30     1.000     -
USER-DEFINED        -         0.40     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.10     SUBAREA RUNOFF(CFS) = 35.08
EFFECTIVE AREA(ACRES) = 113.70  AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.7     PEAK FLOW RATE(CFS) = 113.63

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*****
FLOW PROCESS FROM NODE 10110.00 TO NODE 10111.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 455.00  DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA( FEET) = 675.00  CHANNEL SLOPE = 0.0667
CHANNEL BASE( FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH( FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 113.63
FLOW VELOCITY( FEET/SEC.) = 9.31  FLOW DEPTH( FEET) = 2.02
TRAVEL TIME(MIN.) = 1.21  Tc(MIN.) = 22.67
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10111.00 = 5452.00 FEET.

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*****
FLOW PROCESS FROM NODE 10111.00 TO NODE 10111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 22.67
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.369
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap        SCS
LAND USE            GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         7.40     0.30     1.000     -
USER-DEFINED        -         6.00     0.30     1.000     -
USER-DEFINED        -        24.80     0.30     1.000     -
USER-DEFINED        -         0.90     0.30     1.000     -

```

USER-DEFINED - 4.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 43.20 SUBAREA RUNOFF (CFS) = 41.58  
EFFECTIVE AREA (ACRES) = 156.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 156.9 PEAK FLOW RATE (CFS) = 151.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10111.00 TO NODE 10112.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	410.00	DOWNSTREAM (FEET) =	405.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	143.00	CHANNEL SLOPE =	0.0350
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	4.00
CHANNEL FLOW THRU SUBAREA (CFS) =	151.01		
FLOW VELOCITY (FEET/SEC.) =	7.86	FLOW DEPTH (FEET) =	2.53
TRAVEL TIME (MIN.) =	0.30	Tc (MIN.) =	22.97
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10112.00 =	5595.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 22.97

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.359

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	7.90	0.30	1.000	-
USER-DEFINED	-	25.90	0.30	1.000	-
USER-DEFINED	-	19.30	0.30	1.000	-
USER-DEFINED	-	2.10	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 56.20 SUBAREA RUNOFF (CFS) = 53.57

EFFECTIVE AREA (ACRES) = 213.10 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 213.1 PEAK FLOW RATE (CFS) = 203.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10113.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	405.00	DOWNSTREAM (FEET) =	363.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	1642.00	CHANNEL SLOPE =	0.0256
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	203.12		
FLOW VELOCITY (FEET/SEC.) =	7.52	FLOW DEPTH (FEET) =	3.00

TRAVEL TIME (MIN.) = 3.64 Tc (MIN.) = 26.61  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10113.00 = 7237.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 26.61

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.248

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	33.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 35.40 SUBAREA RUNOFF (CFS) = 30.21  
EFFECTIVE AREA (ACRES) = 248.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 248.5 PEAK FLOW RATE (CFS) = 212.06

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10114.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	363.00	DOWNSTREAM (FEET) =	340.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	918.00	CHANNEL SLOPE =	0.0251
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	212.06		
FLOW VELOCITY (FEET/SEC.) =	7.54	FLOW DEPTH (FEET) =	3.06
TRAVEL TIME (MIN.) =	2.03	Tc (MIN.) =	28.64
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10114.00 =	8155.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 28.64

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.195

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	10.10	0.30	1.000	-
USER-DEFINED	-	17.70	0.30	1.000	-
USER-DEFINED	-	52.90	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 83.10 SUBAREA RUNOFF (CFS) = 66.97

EFFECTIVE AREA(ACRES) = 331.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 331.6 PEAK FLOW RATE(CFS) = 267.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 28.64  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.195  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 1.21  
EFFECTIVE AREA(ACRES) = 333.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 333.1 PEAK FLOW RATE(CFS) = 268.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10114.00 TO NODE 10115.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 301.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1467.00 CHANNEL SLOPE = 0.0266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 268.43  
FLOW VELOCITY(FEET/SEC.) = 8.18 FLOW DEPTH(FEET) = 3.31  
TRAVEL TIME(MIN.) = 2.99 Tc(MIN.) = 31.63  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10115.00 = 9622.00 FEET.

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FLOW PROCESS FROM NODE 10115.00 TO NODE 10115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 31.63  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.132  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.60 0.30 1.000 -  
USER-DEFINED - 24.30 0.30 1.000 -  
USER-DEFINED - 47.70 0.30 1.000 -  
USER-DEFINED - 9.80 0.30 1.000 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 94.00 SUBAREA RUNOFF(CFS) = 70.41  
EFFECTIVE AREA(ACRES) = 427.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 427.1 PEAK FLOW RATE(CFS) = 319.94

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FLOW PROCESS FROM NODE 10115.00 TO NODE 10116.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 272.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1696.00 CHANNEL SLOPE = 0.0171  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 319.94  
FLOW VELOCITY(FEET/SEC.) = 7.25 FLOW DEPTH(FEET) = 3.83  
TRAVEL TIME(MIN.) = 3.90 Tc(MIN.) = 35.53  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10116.00 = 11318.00 FEET.

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FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 35.53  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.066  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.90 0.30 1.000 -  
USER-DEFINED - 4.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 32.00 0.30 1.000 -  
USER-DEFINED - 3.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 45.60 SUBAREA RUNOFF(CFS) = 31.44  
EFFECTIVE AREA(ACRES) = 472.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 472.7 PEAK FLOW RATE(CFS) = 325.91

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FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 35.53  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.066  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 1.000 -  
USER-DEFINED - 7.70 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.70 SUBAREA RUNOFF(CFS) = 6.69  
EFFECTIVE AREA(ACRES) = 482.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 482.4 PEAK FLOW RATE(CFS) = 332.59

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*****
FLOW PROCESS FROM NODE 10116.00 TO NODE 10117.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 272.00 DOWNSTREAM(FEET) = 252.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 878.00 CHANNEL SLOPE = 0.0228
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 332.59
FLOW VELOCITY(FEET/SEC.) = 8.14 FLOW DEPTH(FEET) = 3.69
TRAVEL TIME(MIN.) = 1.80 Tc(MIN.) = 37.33
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10117.00 = 12196.00 FEET.
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 37.33
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.035
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 8.20 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 8.17
EFFECTIVE AREA(ACRES) = 494.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 494.7 PEAK FLOW RATE(CFS) = 332.59
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 37.33
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.035
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 14.60 0.30 1.000 -
USER-DEFINED - 6.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 3.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996
SUBAREA AREA(ACRES) = 25.00 SUBAREA RUNOFF(CFS) = 16.57
EFFECTIVE AREA(ACRES) = 519.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

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AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 519.7 PEAK FLOW RATE(CFS) = 344.07
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10118.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 252.00 DOWNSTREAM(FEET) = 249.00
FLOW LENGTH(FEET) = 280.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 52.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.23
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 344.07
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 37.61
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10118.00 = 12476.00 FEET.
*****
FLOW PROCESS FROM NODE 10118.00 TO NODE 10119.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 249.00 DOWNSTREAM(FEET) = 240.00
FLOW LENGTH(FEET) = 892.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.79
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 344.07
PIPE TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 38.56
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10119.00 = 13368.00 FEET.
*****
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 38.56
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.015
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.100 -
USER-DEFINED - 1.00 0.30 0.600 -
USER-DEFINED - 0.80 0.30 0.850 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.706
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 2.60
EFFECTIVE AREA(ACRES) = 523.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 523.3 PEAK FLOW RATE(CFS) = 344.07
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****

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FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 38.56  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.015  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	9.60	0.30	0.600	-
USER-DEFINED	-	1.00	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.627  
 SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 10.12  
 EFFECTIVE AREA(ACRES) = 536.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 536.9 PEAK FLOW RATE(CFS) = 347.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 38.56  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.015  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.06  
 EFFECTIVE AREA(ACRES) = 537.00 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 537.0 PEAK FLOW RATE(CFS) = 347.08

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10119.00 TO NODE 10120.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 240.00 DOWNSTREAM(FEET) = 239.00  
 FLOW LENGTH(FEET) = 120.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 55.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.76  
 ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 347.08  
 PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 38.69  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10120.00 = 13488.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 38.69  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.012  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.657  
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 4.11  
 EFFECTIVE AREA(ACRES) = 542.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 542.6 PEAK FLOW RATE(CFS) = 350.08

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 38.69  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.012  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.717  
 SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 3.66  
 EFFECTIVE AREA(ACRES) = 547.70 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA(ACRES) = 547.7 PEAK FLOW RATE(CFS) = 353.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 38.69  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.012  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	2.70	0.30	1.000	-
USER-DEFINED	-	11.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 10.13  
EFFECTIVE AREA(ACRES) = 563.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 563.5 PEAK FLOW RATE(CFS) = 363.87

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10121.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	239.00	DOWNSTREAM(FEET) =	213.00
FLOW LENGTH(FEET) =	194.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	45.0 INCH PIPE IS	32.4 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) =	42.81		
ESTIMATED PIPE DIAMETER(INCH) =	45.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	363.87		
PIPE TRAVEL TIME(MIN.) =	0.08	Tc(MIN.) =	38.77
LONGEST FLOWPATH FROM NODE	10100.00 TO NODE	10121.00 =	13682.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10121.00 TO NODE 10122.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	213.00	DOWNSTREAM(FEET) =	176.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	995.00	CHANNEL SLOPE =	0.0372
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	6.00
CHANNEL FLOW THRU SUBAREA(CFS) =	363.87		
FLOW VELOCITY(FEET/SEC.) =	10.00	FLOW DEPTH(FEET) =	3.48
TRAVEL TIME(MIN.) =	1.66	Tc(MIN.) =	40.42
LONGEST FLOWPATH FROM NODE	10100.00 TO NODE	10122.00 =	14677.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	40.42				
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	0.985				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	4.80	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	1.000				
SUBAREA AREA(ACRES) =	7.30	SUBAREA RUNOFF(CFS) =	4.50		
EFFECTIVE AREA(ACRES) =	570.80	AREA-AVERAGED Fm(INCH/HR) =	0.29		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.98		

TOTAL AREA(ACRES) = 570.8 PEAK FLOW RATE(CFS) = 363.87  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	40.42				
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	0.985				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	3.00	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	1.000				
SUBAREA AREA(ACRES) =	10.50	SUBAREA RUNOFF(CFS) =	6.47		
EFFECTIVE AREA(ACRES) =	581.30	AREA-AVERAGED Fm(INCH/HR) =	0.29		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.98		
TOTAL AREA(ACRES) =	581.3	PEAK FLOW RATE(CFS) =	363.87		
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE					

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	40.42				
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	0.985				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	1.000				
SUBAREA AREA(ACRES) =	7.90	SUBAREA RUNOFF(CFS) =	4.87		
EFFECTIVE AREA(ACRES) =	589.20	AREA-AVERAGED Fm(INCH/HR) =	0.30		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.98		
TOTAL AREA(ACRES) =	589.2	PEAK FLOW RATE(CFS) =	365.84		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	40.42				
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	0.985				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN

USER-DEFINED - 1.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$  (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 1.11  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.98  
TOTAL AREA (ACRES) = 591.0 PEAK FLOW RATE (CFS) = 366.95

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 591.0 TC (MIN.) = 40.42  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.984  
PEAK FLOW RATE (CFS) = 366.95

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2007 Advanced Engineering Software (aes)  
Ver. 13.4 Release Date: 01/25/2007 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506102E.DAT  
TIME/DATE OF STUDY: 13:59 01/08/2009  
=====

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.120
- 2) 10.00; 2.158
- 3) 15.00; 1.718
- 4) 20.00; 1.461
- 5) 25.00; 1.289
- 6) 30.00; 1.180
- 7) 40.00; 0.990
- 8) 50.00; 0.873
- 9) 60.00; 0.780
- 10) 90.00; 0.628
- 11) 120.00; 0.534
- 12) 180.00; 0.437
- 13) 360.00; 0.302
- 14) 1440.00; 0.126

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH	LIP	HIKE	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10200.00 TO NODE 10201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 293.00  
ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 617.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.991  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.160

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	-	0.73	0.30	0.600	0	9.99

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA RUNOFF(CFS) = 1.30  
TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 1.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10201.00 TO NODE 10202.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 617.00 DOWNSTREAM ELEVATION(FEET) = 613.00  
STREET LENGTH(FEET) = 323.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.01  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 8.10  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.38  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.76  
STREET FLOW TRAVEL TIME(MIN.) = 2.26 Tc(MIN.) = 12.25  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.960

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.88	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 1.42  
EFFECTIVE AREA(ACRES) = 1.62 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 2.59

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 9.19  
FLOW VELOCITY(FEET/SEC.) = 2.50 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.86  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10202.00 = 616.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10202.00 TO NODE 10203.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 613.00 DOWNSTREAM ELEVATION(FEET) = 594.00  
STREET LENGTH(FEET) = 613.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.86  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 8.92  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.92  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.32  
STREET FLOW TRAVEL TIME(MIN.) = 2.61 Tc(MIN.) = 14.86  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.730

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.82 0.30 0.614 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.614  
SUBAREA AREA(ACRES) = 1.82 SUBAREA RUNOFF(CFS) = 2.54  
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 4.79

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 9.90  
FLOW VELOCITY(FEET/SEC.) = 4.09 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.46  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10203.00 = 1229.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10203.00 TO NODE 10204.00 IS CODE = 63  
-----

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 594.00 DOWNSTREAM ELEVATION(FEET) = 578.00  
STREET LENGTH(FEET) = 433.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.58  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 10.23  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.51  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.64  
STREET FLOW TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 16.46  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.643

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.21 0.30 0.655 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.655  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 1.57  
EFFECTIVE AREA(ACRES) = 4.64 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 6.09

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.61  
FLOW VELOCITY(FEET/SEC.) = 4.63 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.72  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10204.00 = 1662.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 578.00 DOWNSTREAM(FEET) = 575.00  
FLOW LENGTH(FEET) = 147.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.74  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 6.09  
PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 16.78  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10205.00 = 1809.00 FEET.

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*****
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.78
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.627
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         3.61     0.30    0.917   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917
SUBAREA AREA(ACRES) = 3.61     SUBAREA RUNOFF(CFS) = 4.39
EFFECTIVE AREA(ACRES) = 8.25   AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75
TOTAL AREA(ACRES) = 8.3       PEAK FLOW RATE(CFS) = 10.41
*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 563.00
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.94
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.41
PIPE TRAVEL TIME(MIN.) = 1.05 Tc(MIN.) = 17.83
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10206.00 = 2374.00 FEET.
*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.83
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.573
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         4.75     0.30    0.669   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.669
SUBAREA AREA(ACRES) = 4.75     SUBAREA RUNOFF(CFS) = 5.86
EFFECTIVE AREA(ACRES) = 13.00  AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 13.0       PEAK FLOW RATE(CFS) = 15.87
*****
FLOW PROCESS FROM NODE 10206.00 TO NODE 10207.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 563.00 DOWNSTREAM(FEET) = 547.00

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FLOW LENGTH(FEET) = 599.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.50
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 15.87
PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 18.78
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10207.00 = 2973.00 FEET.
*****
FLOW PROCESS FROM NODE 10206.10 TO NODE 10207.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.78
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.524
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         4.59     0.30    0.664   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.664
SUBAREA AREA(ACRES) = 4.59     SUBAREA RUNOFF(CFS) = 5.47
EFFECTIVE AREA(ACRES) = 17.58  AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 17.6       PEAK FLOW RATE(CFS) = 20.76
*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 516.00
FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.54
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.76
PIPE TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 19.47
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10208.00 = 3573.00 FEET.
*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.47
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.488
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         3.60     0.30    0.697   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.697
SUBAREA AREA(ACRES) = 3.60     SUBAREA RUNOFF(CFS) = 4.14
EFFECTIVE AREA(ACRES) = 21.18  AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 21.2       PEAK FLOW RATE(CFS) = 24.35

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*****
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 516.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 604.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.32
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 24.35
PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 20.08
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10209.00 = 4177.00 FEET.

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*****
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.08
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.458
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 8.21 0.30 0.645 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645
SUBAREA AREA(ACRES) = 8.21 SUBAREA RUNOFF(CFS) = 9.35
EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 33.12

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*****
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 678.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.56
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 33.12
PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 20.73
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10210.00 = 4855.00 FEET.

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*****
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.73
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.436
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 10.49 0.30 0.986 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 10.49 SUBAREA RUNOFF(CFS) = 10.77
EFFECTIVE AREA(ACRES) = 39.89 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 39.9 PEAK FLOW RATE(CFS) = 43.30

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*****
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 280.00
FLOW LENGTH(FEET) = 2662.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.60
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 43.30
PIPE TRAVEL TIME(MIN.) = 2.39 Tc(MIN.) = 23.11
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10211.00 = 7517.00 FEET.

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*****
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 23.11
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.354
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 10.00 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 9.49
EFFECTIVE AREA(ACRES) = 49.89 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 49.9 PEAK FLOW RATE(CFS) = 49.85

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*****
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 280.00 DOWNSTREAM(FEET) = 176.00
FLOW LENGTH(FEET) = 935.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 17.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.76
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 49.85
PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 23.77
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10212.00 = 8452.00 FEET.

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FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.77
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.331
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 18.37 0.30 0.926 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.926
SUBAREA AREA(ACRES) = 18.37 SUBAREA RUNOFF(CFS) = 17.42
EFFECTIVE AREA(ACRES) = 68.26 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 68.3 PEAK FLOW RATE(CFS) = 66.25

\*\*\*\*\*
FLOW PROCESS FROM NODE 10212.00 TO NODE 10242.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 176.00 DOWNSTREAM(FEET) = 169.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00 CHANNEL SLOPE = 0.0211
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.295
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.97 0.30 0.970 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 67.14
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.30
AVERAGE FLOW DEPTH(FEET) = 2.06 TRAVEL TIME(MIN.) = 1.04
Tc(MIN.) = 24.81
SUBAREA AREA(ACRES) = 1.97 SUBAREA RUNOFF(CFS) = 1.78
EFFECTIVE AREA(ACRES) = 70.23 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 66.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.04 FLOW VELOCITY(FEET/SEC.) = 5.30
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<

\*\*\*\*\*
FLOW PROCESS FROM NODE 10220.00 TO NODE 10221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 308.00 DOWNSTREAM(FEET) = 300.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.111
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.712
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"GRASS" - 1.03 0.30 1.000 0 15.11
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.31
TOTAL AREA(ACRES) = 1.03 PEAK FLOW RATE(CFS) = 1.31

\*\*\*\*\*
FLOW PROCESS FROM NODE 10221.10 TO NODE 10222.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 300.00 DOWNSTREAM ELEVATION(FEET) = 261.00
STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.31
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.20
HALFSTREET FLOOD WIDTH(FEET) = 2.00
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.51
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.29
STREET FLOW TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 16.22
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.655

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.64 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 2.00
EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 3.25

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.22 HALFSTREET FLOOD WIDTH(FEET) = 3.04  
FLOW VELOCITY(FEET/SEC.) = 5.77 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.26  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10222.00 = 764.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10221.20 TO NODE 10222.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 16.22  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.655  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.12 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.12 SUBAREA RUNOFF(CFS) = 3.80  
EFFECTIVE AREA(ACRES) = 5.78 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 7.05

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.10 TO NODE 10223.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 261.00 DOWNSTREAM ELEVATION(FEET) = 208.00  
STREET LENGTH(FEET) = 622.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.05

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.30  
HALFSTREET FLOOD WIDTH(FEET) = 7.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.92  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.77  
STREET FLOW TRAVEL TIME(MIN.) = 1.75 Tc(MIN.) = 17.97  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.565

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.75 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 2.00  
EFFECTIVE AREA(ACRES) = 7.54 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.5 PEAK FLOW RATE(CFS) = 8.58

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.26  
FLOW VELOCITY(FEET/SEC.) = 5.99 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.82  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10223.00 = 1386.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.20 TO NODE 10223.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 17.97  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.565  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.91 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.91 SUBAREA RUNOFF(CFS) = 9.01  
EFFECTIVE AREA(ACRES) = 15.45 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 17.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 10223.10 TO NODE 10224.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 208.00 DOWNSTREAM ELEVATION(FEET) = 204.00  
STREET LENGTH(FEET) = 758.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.82

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.55  
HALFSTREET FLOOD WIDTH(FEET) = 19.60  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.46  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.35  
STREET FLOW TRAVEL TIME(MIN.) = 5.14 Tc(MIN.) = 23.11  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.354

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.70 0.30 1.000 -



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 4.46  
EFFECTIVE AREA(ACRES) = 20.15 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.1 PEAK FLOW RATE(CFS) = 19.11

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 19.31  
FLOW VELOCITY(FEET/SEC.) = 2.44 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.33  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10224.00 = 2144.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.20 TO NODE 10224.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 23.11  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.354  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.21	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 1.15  
EFFECTIVE AREA(ACRES) = 21.35 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 20.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 204.00 DOWNSTREAM(FEET) = 201.00  
FLOW LENGTH(FEET) = 422.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.95  
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 20.26  
PIPE TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 24.12  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10225.00 = 2566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 24.12  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.319  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.81	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 4.81 SUBAREA RUNOFF(CFS) = 4.42  
EFFECTIVE AREA(ACRES) = 26.17 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 26.2 PEAK FLOW RATE(CFS) = 24.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 201.00 DOWNSTREAM(FEET) = 197.00  
FLOW LENGTH(FEET) = 799.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.32  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 24.01  
PIPE TRAVEL TIME(MIN.) = 2.11 Tc(MIN.) = 26.23  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10238.00 = 3365.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 26.23  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.262  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.24	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.24 SUBAREA RUNOFF(CFS) = 3.67  
EFFECTIVE AREA(ACRES) = 30.41 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.4 PEAK FLOW RATE(CFS) = 26.34

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 26.23  
RAINFALL INTENSITY(INCH/HR) = 1.26  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 30.41  
TOTAL STREAM AREA(ACRES) = 30.41  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 26.34

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10230.00 TO NODE 10231.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 276.00
ELEVATION DATA: UPSTREAM (FEET) = 503.00 DOWNSTREAM (FEET) = 390.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.944
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.938

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

AGRICULTURAL POOR COVER
"FALLOW" - 0.95 0.30 1.000 0 5.94

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 2.26

TOTAL AREA (ACRES) = 0.95 PEAK FLOW RATE (CFS) = 2.26

\*\*\*\*\*
FLOW PROCESS FROM NODE 10231.10 TO NODE 10232.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 390.00 DOWNSTREAM (FEET) = 301.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 394.00 CHANNEL SLOPE = 0.2259

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.779

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 1.68 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.14

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.94

AVERAGE FLOW DEPTH (FEET) = 0.42 TRAVEL TIME (MIN.) = 0.83

Tc (MIN.) = 6.77

SUBAREA AREA (ACRES) = 1.68 SUBAREA RUNOFF (CFS) = 3.76

EFFECTIVE AREA (ACRES) = 2.63 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 2.6 PEAK FLOW RATE (CFS) = 5.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.48 FLOW VELOCITY (FEET/SEC.) = 8.65

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10232.00 = 670.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10231.20 TO NODE 10232.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 6.77

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.779

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 6.38 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 6.38 SUBAREA RUNOFF (CFS) = 14.23
EFFECTIVE AREA (ACRES) = 9.01 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 9.0 PEAK FLOW RATE (CFS) = 20.11

\*\*\*\*\*
FLOW PROCESS FROM NODE 10232.00 TO NODE 10233.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION (FEET) = 301.00 DOWNSTREAM ELEVATION (FEET) = 277.00

STREET LENGTH (FEET) = 341.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.61

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.77

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.41

HALFSTREET FLOOD WIDTH (FEET) = 12.38

AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.90

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.80

STREET FLOW TRAVEL TIME (MIN.) = 0.82 Tc (MIN.) = 7.60

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.621

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 3.50 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 3.50 SUBAREA RUNOFF (CFS) = 7.32

EFFECTIVE AREA (ACRES) = 12.52 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 12.5 PEAK FLOW RATE (CFS) = 26.14

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 12.89

FLOW VELOCITY (FEET/SEC.) = 7.06 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.94

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10233.00 = 1011.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10233.10 TO NODE 10234.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 277.00 DOWNSTREAM ELEVATION(FEET) = 226.00  
STREET LENGTH(FEET) = 682.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.04

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.43  
HALFSTREET FLOOD WIDTH(FEET) = 13.50  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.46  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.20  
STREET FLOW TRAVEL TIME(MIN.) = 1.52 Tc(MIN.) = 9.12

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.328

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.27	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 4.27 SUBAREA RUNOFF(CFS) = 7.79					
EFFECTIVE AREA(ACRES) = 16.78 AREA-AVERAGED Fm(INCH/HR) = 0.30					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 30.63					

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 13.60  
FLOW VELOCITY(FEET/SEC.) = 7.51 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.23  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10234.00 = 1693.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10233.20 TO NODE 10234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.12

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.328

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.60	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 28.47					
EFFECTIVE AREA(ACRES) = 32.38 AREA-AVERAGED Fm(INCH/HR) = 0.30					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 59.10					

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.10 TO NODE 10235.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 3 USED)<<<<

UPSTREAM ELEVATION(FEET) = 226.00 DOWNSTREAM ELEVATION(FEET) = 205.00  
STREET LENGTH(FEET) = 759.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 62.84

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.60  
HALFSTREET FLOOD WIDTH(FEET) = 22.30  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.08  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.68  
STREET FLOW TRAVEL TIME(MIN.) = 2.08 Tc(MIN.) = 11.20

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.053

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.74	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 7.48					
EFFECTIVE AREA(ACRES) = 37.13 AREA-AVERAGED Fm(INCH/HR) = 0.30					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00					
TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 59.10					

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 21.76  
FLOW VELOCITY(FEET/SEC.) = 6.00 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.56  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10235.00 = 2452.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.20 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.20

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.053

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.02	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 8.02 SUBAREA RUNOFF(CFS) = 12.65					
EFFECTIVE AREA(ACRES) = 45.15 AREA-AVERAGED Fm(INCH/HR) = 0.30					

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.1 PEAK FLOW RATE (CFS) = 71.21

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.30 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.20  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.053  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.62 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.62 SUBAREA RUNOFF (CFS) = 4.12  
EFFECTIVE AREA (ACRES) = 47.76 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 75.34

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.00 TO NODE 10236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 205.00 DOWNSTREAM (FEET) = 201.00  
FLOW LENGTH (FEET) = 489.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.11  
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 75.34  
PIPE TRAVEL TIME (MIN.) = 0.81 Tc (MIN.) = 12.00  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10236.00 = 2941.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.10 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 12.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.982  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.89 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.89 SUBAREA RUNOFF (CFS) = 4.38  
EFFECTIVE AREA (ACRES) = 50.65 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 50.7 PEAK FLOW RATE (CFS) = 76.67

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.20 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 12.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.982  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.84 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.84 SUBAREA RUNOFF (CFS) = 7.32  
EFFECTIVE AREA (ACRES) = 55.49 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 83.99

\*\*\*\*\*

FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 201.00 DOWNSTREAM (FEET) = 199.00  
FLOW LENGTH (FEET) = 278.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.3 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.91  
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 83.99  
PIPE TRAVEL TIME (MIN.) = 0.47 Tc (MIN.) = 12.47  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10237.00 = 3219.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 12.47  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.941  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.62 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.62 SUBAREA RUNOFF (CFS) = 2.39  
EFFECTIVE AREA (ACRES) = 57.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 57.1 PEAK FLOW RATE (CFS) = 84.33

\*\*\*\*\*

FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 199.00 DOWNSTREAM (FEET) = 197.00  
FLOW LENGTH (FEET) = 345.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.6 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.01  
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 84.33  
 PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 13.11  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.11  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.884  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.38 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.38 SUBAREA RUNOFF(CFS) = 1.97  
 EFFECTIVE AREA(ACRES) = 58.49 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 84.33  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 13.11  
 RAINFALL INTENSITY(INCH/HR) = 1.88  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 58.49  
 TOTAL STREAM AREA(ACRES) = 58.49  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 84.33

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	26.34	26.23	1.262	0.30( 0.30)	1.00	30.4	10220.00
2	84.33	13.11	1.884	0.30( 0.30)	1.00	58.5	10230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	106.00	13.11	1.884	0.30( 0.30)	1.00	73.7	10230.00
2	77.55	26.23	1.262	0.30( 0.30)	1.00	88.9	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 106.00 Tc(MIN.) = 13.11  
 EFFECTIVE AREA(ACRES) = 73.69 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 88.9  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.00 TO NODE 10239.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 197.00 DOWNSTREAM(FEET) = 193.00  
 FLOW LENGTH(FEET) = 753.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.32  
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 106.00  
 PIPE TRAVEL TIME(MIN.) = 1.35 Tc(MIN.) = 14.46  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10239.00 = 4317.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.10 TO NODE 10239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.46  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.766  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.72 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.72 SUBAREA RUNOFF(CFS) = 3.59  
 EFFECTIVE AREA(ACRES) = 76.41 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 91.6 PEAK FLOW RATE(CFS) = 106.00  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.20 TO NODE 10239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.46  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.766  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 34.37 0.30 0.991 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991  
 SUBAREA AREA(ACRES) = 34.37 SUBAREA RUNOFF(CFS) = 45.43  
 EFFECTIVE AREA(ACRES) = 110.78 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 126.0 PEAK FLOW RATE(CFS) = 146.24

\*\*\*\*\*

FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 193.00 DOWNSTREAM(FEET) = 191.00
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 42.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.89
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 146.24
PIPE TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 14.92
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10240.00 = 4618.00 FEET.

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*****
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.92
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.725
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.22   0.30  0.916 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.916
SUBAREA AREA(ACRES) = 2.22 SUBAREA RUNOFF(CFS) = 2.90
EFFECTIVE AREA(ACRES) = 113.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 128.2 PEAK FLOW RATE(CFS) = 146.24
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10240.00 TO NODE 10241.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 191.00 DOWNSTREAM(FEET) = 180.00
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.23
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 146.24
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 15.01
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10241.00 = 4768.00 FEET.

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*****
FLOW PROCESS FROM NODE 10241.00 TO NODE 10242.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 169.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 267.00 CHANNEL SLOPE = 0.0412
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.695

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.16   0.30  0.958 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.958
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 147.61
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.31
AVERAGE FLOW DEPTH(FEET) = 2.18 TRAVEL TIME(MIN.) = 0.43
Tc(MIN.) = 15.44
SUBAREA AREA(ACRES) = 2.16 SUBAREA RUNOFF(CFS) = 2.74
EFFECTIVE AREA(ACRES) = 115.16 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 130.4 PEAK FLOW RATE(CFS) = 146.24
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.18 FLOW VELOCITY(FEET/SEC.) = 10.28
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

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*****
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 11
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>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<
=====

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** MAIN STREAM CONFLUENCE DATA **
STREAM   Q   Tc  Intensity  Fp(Fm)  Ap   Ae  HEADWATER
NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1       146.24 15.44  1.695  0.30( 0.30) 0.99 115.2 10230.00
2       106.60 28.76  1.207  0.30( 0.30) 1.00 130.4 10220.00
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

```

```

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM   Q   Tc  Intensity  Fp(Fm)  Ap   Ae  HEADWATER
NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1       66.25 24.81  1.295  0.30( 0.25) 0.85  70.2 10200.00
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

```

```

** PEAK FLOW RATE TABLE **
STREAM   Q   Tc  Intensity  Fp(Fm)  Ap   Ae  HEADWATER
NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1       203.30 15.44  1.695  0.30( 0.29) 0.95 158.9 10230.00
2       184.59 24.81  1.295  0.30( 0.28) 0.94 196.1 10200.00
3       167.24 28.76  1.207  0.30( 0.28) 0.94 200.6 10220.00
TOTAL AREA(ACRES) = 200.6

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```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 203.30 Tc(MIN.) = 15.440
EFFECTIVE AREA(ACRES) = 158.86 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 200.6
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

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*****
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 12
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>>>>CLEAR MEMORY BANK # 1 <<<<

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*****
FLOW PROCESS FROM NODE 10242.00 TO NODE 10256.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 169.00 DOWNSTREAM(FEET) = 163.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 315.00 CHANNEL SLOPE = 0.0190
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.663
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 9.10 0.30 0.995 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 208.89
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.40
AVERAGE FLOW DEPTH(FEET) = 2.88 TRAVEL TIME(MIN.) = 0.63
Tc(MIN.) = 16.06
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 11.18
EFFECTIVE AREA(ACRES) = 167.97 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 209.7 PEAK FLOW RATE(CFS) = 208.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.87 FLOW VELOCITY(FEET/SEC.) = 8.40
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

*****
FLOW PROCESS FROM NODE 10243.00 TO NODE 10256.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 16.06
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.663
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.01 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.01 SUBAREA RUNOFF(CFS) = 8.60
EFFECTIVE AREA(ACRES) = 174.97 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 216.7 PEAK FLOW RATE(CFS) = 216.67

*****
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 16.06

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RAINFALL INTENSITY(INCH/HR) = 1.66
AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 174.97
TOTAL STREAM AREA(ACRES) = 216.71
PEAK FLOW RATE(CFS) AT CONFLUENCE = 216.67

*****
FLOW PROCESS FROM NODE 10250.00 TO NODE 10251.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----
INITIAL SUBAREA FLOW-LENGTH(FEET) = 284.00
ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 243.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.802
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.625
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"WOODLAND,GRASS" - 1.04 0.30 1.000 0 16.80
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.24
TOTAL AREA(ACRES) = 1.04 PEAK FLOW RATE(CFS) = 1.24

*****
FLOW PROCESS FROM NODE 10251.00 TO NODE 10252.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 243.00 DOWNSTREAM ELEVATION(FEET) = 240.00
STREET LENGTH(FEET) = 301.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.03
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.27
HALFSTREET FLOOD WIDTH(FEET) = 5.78
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.94
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.53
STREET FLOW TRAVEL TIME(MIN.) = 2.59 Tc(MIN.) = 19.39
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.492

```

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.47	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 1.58  
EFFECTIVE AREA(ACRES) = 2.51 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 2.69

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 6.91  
FLOW VELOCITY(FEET/SEC.) = 2.02 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.60  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10252.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10252.00 TO NODE 10253.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 240.00 DOWNSTREAM ELEVATION(FEET) = 234.00  
STREET LENGTH(FEET) = 544.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.87

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 9.16  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.37  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.81

STREET FLOW TRAVEL TIME(MIN.) = 3.83 Tc(MIN.) = 23.22  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.350

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.60 SUBAREA RUNOFF(CFS) = 4.35  
EFFECTIVE AREA(ACRES) = 7.12 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 6.73

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.66  
FLOW VELOCITY(FEET/SEC.) = 2.53 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.94

LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10253.00 = 1129.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 234.00 DOWNSTREAM(FEET) = 219.00  
FLOW LENGTH(FEET) = 362.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.31  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 6.73  
PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 23.80  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10254.00 = 1491.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.80  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.330  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.55	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 7.93  
EFFECTIVE AREA(ACRES) = 15.66 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.7 PEAK FLOW RATE(CFS) = 14.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 10254.00 TO NODE 10255.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 219.00 DOWNSTREAM(FEET) = 182.00  
FLOW LENGTH(FEET) = 716.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.60  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 14.52  
PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 24.68  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10255.00 = 2207.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10255.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 182.00 DOWNSTREAM(FEET) = 163.00



CHANNEL LENGTH THRU SUBAREA (FEET) = 228.00 CHANNEL SLOPE = 0.0833  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.286  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	13.88	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 20.68  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.17  
 AVERAGE FLOW DEPTH (FEET) = 0.92 TRAVEL TIME (MIN.) = 0.46  
 Tc (MIN.) = 25.14  
 SUBAREA AREA (ACRES) = 13.88 SUBAREA RUNOFF (CFS) = 12.32  
 EFFECTIVE AREA (ACRES) = 29.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 29.5 PEAK FLOW RATE (CFS) = 26.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.00 FLOW VELOCITY (FEET/SEC.) = 8.70  
 LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10256.00 = 2435.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 25.14  
 RAINFALL INTENSITY (INCH/HR) = 1.29  
 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 29.54  
 TOTAL STREAM AREA (ACRES) = 29.54  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 26.21

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	216.67	16.06	1.663	0.30 ( 0.29)	0.96	175.0	10230.00
1	190.09	25.45	1.279	0.30 ( 0.28)	0.95	212.2	10200.00
1	177.22	29.41	1.193	0.30 ( 0.28)	0.95	216.7	10220.00
2	26.21	25.14	1.286	0.30 ( 0.30)	1.00	29.5	10250.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	239.83	16.06	1.663	0.30 ( 0.29)	0.96	193.8	10230.00
2	217.18	25.14	1.286	0.30 ( 0.29)	0.95	240.5	10250.00
3	216.13	25.45	1.279	0.30 ( 0.29)	0.95	241.8	10200.00
4	200.96	29.41	1.193	0.30 ( 0.29)	0.95	246.3	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 239.83 Tc (MIN.) = 16.06  
 EFFECTIVE AREA (ACRES) = 193.85 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 246.3  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 246.3 TC (MIN.) = 16.06  
 EFFECTIVE AREA (ACRES) = 193.85 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.962  
 PEAK FLOW RATE (CFS) = 239.83

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	239.83	16.06	1.663	0.30 ( 0.29)	0.96	193.8	10230.00
2	217.18	25.14	1.286	0.30 ( 0.29)	0.95	240.5	10250.00
3	216.13	25.45	1.279	0.30 ( 0.29)	0.95	241.8	10200.00
4	200.96	29.41	1.193	0.30 ( 0.29)	0.95	246.3	10220.00

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

FILE NAME: 0506103E.DAT
TIME/DATE OF STUDY: 12:44 04/15/2013

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 3.190
2) 6.00; 2.880
3) 7.00; 2.640
4) 8.00; 2.450
5) 9.00; 2.290
6) 10.00; 2.160
7) 11.00; 2.050
8) 12.00; 1.950
9) 13.00; 1.860
10) 14.00; 1.790
11) 15.00; 1.720
12) 20.00; 1.460
13) 25.00; 1.290
14) 30.00; 1.160
15) 40.00; 0.990
16) 50.00; 0.870
17) 60.00; 0.790
18) 90.00; 0.630
19) 120.00; 0.530
20) 180.00; 0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

Table with columns: NO., HALF WIDTH (FT), CROWN CROSSFALL (FT), STREET-CROSSFALL IN-/OUT-SIDE, CURB HEIGHT (FT), GUTTER WIDTH (FT), GEOMETRIES LIP HIKE (FT), MANNING FACTOR (n). Rows 1-4.

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10300.00 TO NODE 10301.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00
ELEVATION DATA: UPSTREAM(FEET) = 627.00 DOWNSTREAM(FEET) = 540.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.147
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.144
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.20 0.30 0.500 95 5.15
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 3.23
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 3.23

\*\*\*\*\*

FLOW PROCESS FROM NODE 10301.00 TO NODE 10302.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 510.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.2609
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.23
FLOW VELOCITY(FEET/SEC.) = 6.44 FLOW DEPTH(FEET) = 0.41
TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 5.44
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10302.00 = 443.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10302.00 TO NODE 10302.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 5.44
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.052
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.50 0.30 0.500 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 3.92  
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 7.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10302.00 TO NODE 10303.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 467.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.2575  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.05  
FLOW VELOCITY(FEET/SEC.) = 7.71 FLOW DEPTH(FEET) = 0.55  
TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 5.81  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10303.00 = 610.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10303.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.81  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.940  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 5.52  
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 12.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10304.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 467.00 DOWNSTREAM(FEET) = 446.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 12.30  
FLOW VELOCITY(FEET/SEC.) = 7.75 FLOW DEPTH(FEET) = 0.73  
TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 6.05  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10304.00 = 725.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10304.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.05  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.867  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.500 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 5.82  
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 17.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10305.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 446.00 DOWNSTREAM(FEET) = 366.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 423.00 CHANNEL SLOPE = 0.1891  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 17.80  
FLOW VELOCITY(FEET/SEC.) = 8.68 FLOW DEPTH(FEET) = 0.83  
TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 6.87  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10305.00 = 1148.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10305.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.87  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.672  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.912  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 7.34  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.65  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 23.86

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10306.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 300.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 574.00 CHANNEL SLOPE = 0.1150  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 23.86  
 FLOW VELOCITY (FEET/SEC.) = 7.77 FLOW DEPTH (FEET) = 1.01  
 TRAVEL TIME (MIN.) = 1.23 Tc (MIN.) = 8.10  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10306.00 = 1722.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10306.00 TO NODE 10306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 8.10  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.434  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
 SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 6.93  
 EFFECTIVE AREA (ACRES) = 14.30 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 14.3 PEAK FLOW RATE (CFS) = 28.50

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10306.00 TO NODE 10307.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 300.00 DOWNSTREAM (FEET) = 293.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0350  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 28.50  
 FLOW VELOCITY (FEET/SEC.) = 5.17 FLOW DEPTH (FEET) = 1.36  
 TRAVEL TIME (MIN.) = 0.64 Tc (MIN.) = 8.74  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10307.00 = 1922.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10307.00 TO NODE 10307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 8.74  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.331  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.28  
 EFFECTIVE AREA (ACRES) = 15.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
 TOTAL AREA (ACRES) = 15.0 PEAK FLOW RATE (CFS) = 28.50  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10307.00 TO NODE 10308.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 293.00 DOWNSTREAM (FEET) = 276.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0850  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 28.50  
 FLOW VELOCITY (FEET/SEC.) = 9.00 FLOW DEPTH (FEET) = 1.03  
 TRAVEL TIME (MIN.) = 0.37 Tc (MIN.) = 9.11  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10308.00 = 2122.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10308.00 TO NODE 10308.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 9.11  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.275  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	8.50	0.30	0.500	-
USER-DEFINED	-	3.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.696  
 SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 26.04  
 EFFECTIVE AREA (ACRES) = 29.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 29.0 PEAK FLOW RATE (CFS) = 53.73

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10308.00 TO NODE 10309.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 250.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 600.00 CHANNEL SLOPE = 0.0433  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 53.73  
 FLOW VELOCITY (FEET/SEC.) = 8.14 FLOW DEPTH (FEET) = 1.48  
 TRAVEL TIME (MIN.) = 1.23 Tc (MIN.) = 10.34  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10309.00 = 2722.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.34
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.123
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         6.00     0.30     0.600    -
USER-DEFINED        -         1.80     0.30     0.850    -
USER-DEFINED        -         1.40     0.30     1.000    -
USER-DEFINED        -         0.70     0.30     1.000    -
USER-DEFINED        -         3.40     0.30     0.500    -
USER-DEFINED        -         2.10     0.30     0.600    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.662
SUBAREA AREA(ACRES) = 15.40   SUBAREA RUNOFF(CFS) = 26.67
EFFECTIVE AREA(ACRES) = 44.40   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 44.4     PEAK FLOW RATE(CFS) = 76.41

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*****
FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.34
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.123
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.50     0.30     0.850    -
USER-DEFINED        -         8.80     0.30     1.000    -
USER-DEFINED        -         3.50     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.967
SUBAREA AREA(ACRES) = 15.80   SUBAREA RUNOFF(CFS) = 26.06
EFFECTIVE AREA(ACRES) = 60.20   AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 60.2     PEAK FLOW RATE(CFS) = 102.47

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*****
FLOW PROCESS FROM NODE 10309.00 TO NODE 10310.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 250.00   DOWNSTREAM(FEET) = 208.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1021.00   CHANNEL SLOPE = 0.0411
CHANNEL BASE(FEET) = 0.00   "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 102.47
FLOW VELOCITY(FEET/SEC.) = 9.42   FLOW DEPTH(FEET) = 1.90
TRAVEL TIME(MIN.) = 1.81   Tc(MIN.) = 12.15
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10310.00 = 3743.00 FEET.

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*****
FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.15
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.937
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     0.100    -
USER-DEFINED        -         0.10     0.30     0.500    -
USER-DEFINED        -         4.00     0.30     0.600    -
USER-DEFINED        -         1.80     0.30     0.850    -
USER-DEFINED        -         0.40     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     0.100    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.668
SUBAREA AREA(ACRES) = 6.60   SUBAREA RUNOFF(CFS) = 10.31
EFFECTIVE AREA(ACRES) = 66.80   AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.76
TOTAL AREA(ACRES) = 66.8     PEAK FLOW RATE(CFS) = 102.72

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*****
FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.15
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.937
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     0.500    -
USER-DEFINED        -         8.00     0.30     0.600    -
USER-DEFINED        -         7.10     0.30     0.850    -
USER-DEFINED        -         8.20     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814
SUBAREA AREA(ACRES) = 23.50   SUBAREA RUNOFF(CFS) = 35.80
EFFECTIVE AREA(ACRES) = 90.30   AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 90.3     PEAK FLOW RATE(CFS) = 138.52

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*****
FLOW PROCESS FROM NODE 10310.00 TO NODE 10335.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 208.00   DOWNSTREAM(FEET) = 189.00
FLOW LENGTH(FEET) = 1595.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.45
ESTIMATED PIPE DIAMETER(INCH) = 48.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 138.52
PIPE TRAVEL TIME(MIN.) = 1.98   Tc(MIN.) = 14.12
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10335.00 = 5338.00 FEET.

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*****
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 14.12
RAINFALL INTENSITY(INCH/HR) = 1.78
AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.77
EFFECTIVE STREAM AREA(ACRES) = 90.30
TOTAL STREAM AREA(ACRES) = 90.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 138.52

*****
FLOW PROCESS FROM NODE 10320.00 TO NODE 10321.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----
INITIAL SUBAREA FLOW-LENGTH( FEET) = 330.00
ELEVATION DATA: UPSTREAM( FEET) = 671.00 DOWNSTREAM( FEET) = 622.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.795
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.944
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.00 0.30 0.500 95 5.79
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 2.51
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.51

*****
FLOW PROCESS FROM NODE 10321.00 TO NODE 10322.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM( FEET) = 622.00 DOWNSTREAM( FEET) = 599.00
CHANNEL LENGTH THRU SUBAREA( FEET) = 227.00 CHANNEL SLOPE = 0.1013
CHANNEL BASE( FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH( FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.51
FLOW VELOCITY( FEET/SEC.) = 5.20 FLOW DEPTH( FEET) = 0.40
TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 6.52
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10322.00 = 557.00 FEET.

*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10322.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 6.52
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.755
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.30 0.500 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 3.28
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 5.63

*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10323.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM( FEET) = 599.00 DOWNSTREAM( FEET) = 539.00
FLOW LENGTH( FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.7 INCHES
PIPE-FLOW VELOCITY( FEET/SEC.) = 21.46
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.63
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 6.65
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10323.00 = 719.00 FEET.

*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10323.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 6.65
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.724
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.30 0.500 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.16
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 6.72

*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10324.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM( FEET) = 539.00 DOWNSTREAM( FEET) = 530.00
CHANNEL LENGTH THRU SUBAREA( FEET) = 97.00 CHANNEL SLOPE = 0.0928
CHANNEL BASE( FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH( FEET) = 1.00

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CHANNEL FLOW THRU SUBAREA(CFS) = 6.72  
FLOW VELOCITY(FEET/SEC.) = 5.16 FLOW DEPTH(FEET) = 0.66  
TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 6.96  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10324.00 = 816.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10324.00 TO NODE 10324.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 6.96  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.649  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.80 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.05  
EFFECTIVE AREA(ACRES) = 4.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.7 PEAK FLOW RATE(CFS) = 10.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10324.00 TO NODE 10325.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 530.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 210.00 CHANNEL SLOPE = 0.1429  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.57  
FLOW VELOCITY(FEET/SEC.) = 6.80 FLOW DEPTH(FEET) = 0.72  
TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 7.48  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10325.00 = 1026.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10325.00 TO NODE 10325.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 7.48  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.549  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 3.67  
EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 13.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10325.00 TO NODE 10326.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 460.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 345.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 13.82  
FLOW VELOCITY(FEET/SEC.) = 6.74 FLOW DEPTH(FEET) = 0.83  
TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 8.33  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10326.00 = 1371.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10326.00 TO NODE 10326.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 8.33  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.397  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.90 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 3.84  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 16.79

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10326.00 TO NODE 10327.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 430.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 263.00 CHANNEL SLOPE = 0.1141  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 16.79  
FLOW VELOCITY(FEET/SEC.) = 7.07 FLOW DEPTH(FEET) = 0.89  
TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 8.95  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10327.00 = 1634.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10327.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 8.95  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.298  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30



SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 7.93  
EFFECTIVE AREA (ACRES) = 12.40 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 12.4 PEAK FLOW RATE (CFS) = 23.97

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10328.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 430.00 DOWNSTREAM (FEET) = 375.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 437.00 CHANNEL SLOPE = 0.1259  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 23.97  
FLOW VELOCITY (FEET/SEC.) = 9.92 FLOW DEPTH (FEET) = 0.90  
TRAVEL TIME (MIN.) = 0.73 Tc (MIN.) = 9.68  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10328.00 = 2071.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 9.68  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.201  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.500 -  
USER-DEFINED - 1.20 0.30 0.850 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.772  
SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 5.67  
EFFECTIVE AREA (ACRES) = 15.60 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 15.6 PEAK FLOW RATE (CFS) = 28.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10329.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 375.00 DOWNSTREAM (FEET) = 372.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 224.00 CHANNEL SLOPE = 0.0134  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 28.56  
FLOW VELOCITY (FEET/SEC.) = 4.47 FLOW DEPTH (FEET) = 1.46  
TRAVEL TIME (MIN.) = 0.84 Tc (MIN.) = 10.52  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10329.00 = 2295.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10329.00 TO NODE 10329.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 10.52  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.103  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.20 0.30 0.500 -  
USER-DEFINED - 1.40 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.571  
SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 19.47  
EFFECTIVE AREA (ACRES) = 26.80 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 26.8 PEAK FLOW RATE (CFS) = 46.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10329.00 TO NODE 10330.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 372.00 DOWNSTREAM (FEET) = 300.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 452.00 CHANNEL SLOPE = 0.1593  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 46.66  
FLOW VELOCITY (FEET/SEC.) = 12.82 FLOW DEPTH (FEET) = 1.10  
TRAVEL TIME (MIN.) = 0.59 Tc (MIN.) = 11.11  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10330.00 = 2747.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10330.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 11.11  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.039  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 4.20 0.30 0.500 -  
USER-DEFINED - 2.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.673  
SUBAREA AREA (ACRES) = 7.80 SUBAREA RUNOFF (CFS) = 12.90  
EFFECTIVE AREA (ACRES) = 34.60 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 34.6 PEAK FLOW RATE (CFS) = 58.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10331.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 295.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 182.00 CHANNEL SLOPE = 0.0275  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 58.02  
FLOW VELOCITY(FEET/SEC.) = 7.02 FLOW DEPTH(FEET) = 1.66  
TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 11.54  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10331.00 = 2929.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10331.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 11.54  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.996  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.850	-
USER-DEFINED	-	11.30	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	4.20	0.30	0.850	-
USER-DEFINED	-	1.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.652  
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 30.79  
EFFECTIVE AREA(ACRES) = 53.60 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 53.6 PEAK FLOW RATE(CFS) = 87.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10332.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 295.00 DOWNSTREAM(FEET) = 245.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.00 CHANNEL SLOPE = 0.0542  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 87.46  
FLOW VELOCITY(FEET/SEC.) = 10.02 FLOW DEPTH(FEET) = 1.71  
TRAVEL TIME(MIN.) = 1.53 Tc(MIN.) = 13.07  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10332.00 = 3851.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10332.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 13.07  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.855  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 1.40 0.30 0.500 -  
USER-DEFINED - 15.40 0.30 0.850 -  
USER-DEFINED - 8.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.881  
SUBAREA AREA(ACRES) = 25.60 SUBAREA RUNOFF(CFS) = 36.65  
EFFECTIVE AREA(ACRES) = 79.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 79.2 PEAK FLOW RATE(CFS) = 117.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10333.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 199.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 564.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 117.30  
FLOW VELOCITY(FEET/SEC.) = 12.55 FLOW DEPTH(FEET) = 1.77  
TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 13.82  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10333.00 = 4415.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10333.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 13.82  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.802  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.500	-
USER-DEFINED	-	0.50	0.30	0.850	-
USER-DEFINED	-	0.60	0.30	0.500	-
USER-DEFINED	-	5.70	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.761  
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 11.76  
EFFECTIVE AREA(ACRES) = 87.50 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 87.5 PEAK FLOW RATE(CFS) = 125.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10334.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 195.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 454.00 CHANNEL SLOPE = 0.0088  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 125.32

FLOW VELOCITY(FEET/SEC.) = 5.55 FLOW DEPTH(FEET) = 2.74  
TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 15.19  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10334.00 = 4869.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10334.00 TO NODE 10334.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.19  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.710  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.800 -  
USER-DEFINED - 2.60 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 4.86  
EFFECTIVE AREA(ACRES) = 91.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71  
TOTAL AREA(ACRES) = 91.2 PEAK FLOW RATE(CFS) = 125.32  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10334.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 195.00 DOWNSTREAM(FEET) = 189.00  
FLOW LENGTH(FEET) = 1291.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.12  
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 125.32  
PIPE TRAVEL TIME(MIN.) = 2.36 Tc(MIN.) = 17.55  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 17.55  
RAINFALL INTENSITY(INCH/HR) = 1.59  
AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.71  
EFFECTIVE STREAM AREA(ACRES) = 91.20  
TOTAL STREAM AREA(ACRES) = 91.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 125.32

\*\* CONFLUENCE DATA \*\*

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
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NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	138.52	14.12	1.781	0.30( 0.23)	0.77	90.3 10300.00
2	125.32	17.55	1.588	0.30( 0.21)	0.71	91.2 10320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	253.60	14.12	1.781	0.30( 0.22)	0.75	163.7	10300.00
2	246.50	17.55	1.588	0.30( 0.22)	0.74	181.5	10320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 253.60 Tc(MIN.) = 14.12  
EFFECTIVE AREA(ACRES) = 163.71 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA(ACRES) = 181.5  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10336.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 189.00 DOWNSTREAM(FEET) = 188.00  
FLOW LENGTH(FEET) = 103.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.52  
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 253.60  
PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 14.24  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10336.00 = 6263.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10336.00 TO NODE 10337.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.99  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 253.60  
PIPE TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 14.39  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10337.00 = 6475.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10337.00 TO NODE 10338.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 161.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0218

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 253.60  
FLOW VELOCITY (FEET/SEC.) = 9.29 FLOW DEPTH (FEET) = 3.02  
TRAVEL TIME (MIN.) = 1.56 Tc (MIN.) = 15.95  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10338.00 = 7347.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 15.95  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.670  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.943  
SUBAREA AREA (ACRES) = 4.20 SUBAREA RUNOFF (CFS) = 5.25  
EFFECTIVE AREA (ACRES) = 167.91 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 185.7 PEAK FLOW RATE (CFS) = 253.60  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 15.95  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.670  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 6.17  
EFFECTIVE AREA (ACRES) = 172.91 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 190.7 PEAK FLOW RATE (CFS) = 253.60  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10339.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 161.00 DOWNSTREAM (FEET) = 159.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 328.00 CHANNEL SLOPE = 0.0061  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 253.60  
FLOW VELOCITY (FEET/SEC.) = 5.75 FLOW DEPTH (FEET) = 3.83  
TRAVEL TIME (MIN.) = 0.95 Tc (MIN.) = 16.90  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10339.00 = 7675.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 16.90  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.621  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.500	-
USER-DEFINED	-	2.30	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.767  
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 8.64  
EFFECTIVE AREA (ACRES) = 179.81 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 253.60  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 16.90  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.621  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.500	-
USER-DEFINED	-	6.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.876  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 11.25  
EFFECTIVE AREA (ACRES) = 189.01 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 206.8 PEAK FLOW RATE (CFS) = 253.60  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10390.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 159.00 DOWNSTREAM(FEET) = 155.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 782.00 CHANNEL SLOPE = 0.0051
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 253.60
FLOW VELOCITY(FEET/SEC.) = 5.40 FLOW DEPTH(FEET) = 3.96
TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 19.32
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

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FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 19.32
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.495
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.30   0.30   0.800  -
USER-DEFINED        -         3.70   0.30   0.850  -
USER-DEFINED        -         0.10   0.30   1.000  -
USER-DEFINED        -         2.10   0.30   1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.901
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 6.84
EFFECTIVE AREA(ACRES) = 195.21 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 213.0 PEAK FLOW RATE(CFS) = 253.60
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
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*****
FLOW PROCESS FROM NODE 10340.00 TO NODE 10341.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 585.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.581
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.096
SUBAREA Tc AND LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"1 DWELLING/ACRE"	-	0.10	0.30	0.800	95	10.58
PUBLIC PARK	-	0.50	0.30	0.850	95	10.90

```

AGRICULTURAL GOOD COVER
"ROW CROPS,STRAIGHT ROW" - 0.40 0.30 1.000 95 21.09
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA RUNOFF(CFS) = 1.64
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 1.64

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*****
FLOW PROCESS FROM NODE 10341.00 TO NODE 10342.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
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UPSTREAM ELEVATION(FEET) = 585.00 DOWNSTREAM ELEVATION(FEET) = 570.00
STREET LENGTH(FEET) = 250.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.27
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.24
HALFSTREET FLOOD WIDTH(FEET) = 4.11
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.56
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.10
STREET FLOW TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 11.49
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.001
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	0.800	-
USER-DEFINED	-	1.40	0.30	1.000	-

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 3.25
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 4.81

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 5.68
FLOW VELOCITY(FEET/SEC.) = 4.69 DEPTH*VELOCITY(FT*FT/SEC.) = 1.28
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10342.00 = 558.00 FEET.

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*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
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UPSTREAM ELEVATION(FEET) = 570.00 DOWNSTREAM ELEVATION(FEET) = 560.00  
STREET LENGTH(FEET) = 415.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.51

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.33  
HALFSTREET FLOOD WIDTH(FEET) = 8.73  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.42  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.14  
STREET FLOW TRAVEL TIME(MIN.) = 2.02 Tc(MIN.) = 13.51

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.824

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.800	-
USER-DEFINED	-	1.20	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.825

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 3.41

EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88

TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 7.72

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 9.49  
FLOW VELOCITY(FEET/SEC.) = 3.54 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.23  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10343.00 = 973.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10343.00 TO NODE 10344.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 560.00 DOWNSTREAM ELEVATION(FEET) = 550.00  
STREET LENGTH(FEET) = 616.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.53

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.47  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.17  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.23  
STREET FLOW TRAVEL TIME(MIN.) = 3.24 Tc(MIN.) = 16.76

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.629

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.30	0.800	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814

SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 3.61

EFFECTIVE AREA(ACRES) = 8.40 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86

TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 10.37

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 11.88  
FLOW VELOCITY(FEET/SEC.) = 3.24 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.28  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10344.00 = 1589.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10344.00 TO NODE 10345.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 550.00 DOWNSTREAM ELEVATION(FEET) = 510.00  
STREET LENGTH(FEET) = 474.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.15

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.33  
HALFSTREET FLOOD WIDTH(FEET) = 8.73  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.39  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.13  
STREET FLOW TRAVEL TIME(MIN.) = 1.24 Tc(MIN.) = 18.00

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.564

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.80	0.30	0.800	-

USER-DEFINED - 0.20 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803  
SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 3.57  
EFFECTIVE AREA (ACRES) = 11.40 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA (ACRES) = 11.4 PEAK FLOW RATE (CFS) = 13.45

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.34 HALFSTREET FLOOD WIDTH (FEET) = 9.19  
FLOW VELOCITY (FEET/SEC.) = 6.51 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.23  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10345.00 = 2063.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10345.00 TO NODE 10346.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 510.00 DOWNSTREAM ELEVATION (FEET) = 484.00  
STREET LENGTH (FEET) = 231.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.54

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 14.86  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.34  
HALFSTREET FLOOD WIDTH (FEET) = 8.98  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.45  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.52  
STREET FLOW TRAVEL TIME (MIN.) = 0.52 Tc (MIN.) = 18.51  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.537

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.40 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 2.40 SUBAREA RUNOFF (CFS) = 2.80  
EFFECTIVE AREA (ACRES) = 13.80 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA (ACRES) = 13.8 PEAK FLOW RATE (CFS) = 15.98

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.34 HALFSTREET FLOOD WIDTH (FEET) = 9.29  
FLOW VELOCITY (FEET/SEC.) = 7.60 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.61  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10346.00 = 2294.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10346.00 TO NODE 10347.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 484.00 DOWNSTREAM ELEVATION (FEET) = 378.00  
STREET LENGTH (FEET) = 995.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.55

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.19  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.36  
HALFSTREET FLOOD WIDTH (FEET) = 10.00  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.65  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.74  
STREET FLOW TRAVEL TIME (MIN.) = 2.17 Tc (MIN.) = 20.68  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.437

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 4.42  
EFFECTIVE AREA (ACRES) = 17.90 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA (ACRES) = 17.9 PEAK FLOW RATE (CFS) = 19.15

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.36 HALFSTREET FLOOD WIDTH (FEET) = 10.25  
FLOW VELOCITY (FEET/SEC.) = 7.72 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.80  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10347.00 = 3289.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10347.00 TO NODE 10348.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 378.00 DOWNSTREAM ELEVATION (FEET) = 303.00  
STREET LENGTH (FEET) = 751.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.56

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.37

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.37  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.88  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.04

STREET FLOW TRAVEL TIME(MIN.) = 1.59 Tc(MIN.) = 22.27

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.383

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.20	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800

SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 8.43

EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82

TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 26.71

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 12.08  
FLOW VELOCITY(FEET/SEC.) = 8.10 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.24  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10348.00 = 4040.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10348.00 TO NODE 10349.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 303.00 DOWNSTREAM ELEVATION(FEET) = 252.00

STREET LENGTH(FEET) = 607.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.79

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.43  
HALFSTREET FLOOD WIDTH(FEET) = 13.50  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.90  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.38

STREET FLOW TRAVEL TIME(MIN.) = 1.28 Tc(MIN.) = 23.55

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.339

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.30	0.30	0.800	-
USER-DEFINED	-	3.00	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.815  
SUBAREA AREA(ACRES) = 10.30 SUBAREA RUNOFF(CFS) = 10.15  
EFFECTIVE AREA(ACRES) = 36.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 36.4 PEAK FLOW RATE(CFS) = 35.84

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 14.21  
FLOW VELOCITY(FEET/SEC.) = 8.11 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.59  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10349.00 = 4647.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10349.00 TO NODE 10350.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 252.00 DOWNSTREAM ELEVATION(FEET) = 246.00

STREET LENGTH(FEET) = 224.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.18

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.54  
HALFSTREET FLOOD WIDTH(FEET) = 19.19  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.45  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.95

STREET FLOW TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 24.23

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.316

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	12.60	0.30	0.800	-
USER-DEFINED	-	0.50	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.802

SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 12.68

EFFECTIVE AREA(ACRES) = 49.50 AREA-AVERAGED Fm(INCH/HR) = 0.24

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81

TOTAL AREA(ACRES) = 49.5 PEAK FLOW RATE(CFS) = 47.76

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.56 HALFSTREET FLOOD WIDTH(FEET) = 20.13



FLOW VELOCITY(FEET/SEC.) = 5.63 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.16  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10350.00 = 4871.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10350.00 TO NODE 10351.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 237.00  
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.86  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 47.76  
PIPE TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 24.96  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10351.00 = 5390.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10351.00 TO NODE 10351.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 24.96  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.291  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	5.60	0.30	0.800	-
USER-DEFINED	-	0.70	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.784  
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 6.18  
EFFECTIVE AREA(ACRES) = 56.00 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 56.0 PEAK FLOW RATE(CFS) = 52.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10351.00 TO NODE 10352.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 237.00 DOWNSTREAM(FEET) = 230.00  
FLOW LENGTH(FEET) = 675.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.17  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 52.83  
PIPE TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 26.07  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10352.00 = 6065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 26.07  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.262  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.300  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.48  
EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 52.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 26.07  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.262  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	0.100	-
USER-DEFINED	-	9.40	0.30	0.800	-
USER-DEFINED	-	1.10	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755  
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 10.53  
EFFECTIVE AREA(ACRES) = 68.70 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
TOTAL AREA(ACRES) = 68.7 PEAK FLOW RATE(CFS) = 63.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10352.00 TO NODE 10353.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 230.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 30.34  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 63.38  
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 26.23  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10353.00 = 6366.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10353.00 TO NODE 10353.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 26.23  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.258  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 6.00 0.30 0.800 -  
 USER-DEFINED - 1.30 0.30 0.850 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.799  
 SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 6.78  
 EFFECTIVE AREA(ACRES) = 76.10 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 76.1 PEAK FLOW RATE(CFS) = 69.89

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10353.00 TO NODE 10354.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 172.00  
 FLOW LENGTH(FEET) = 458.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.24  
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 69.89  
 PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 26.81  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10354.00 = 6824.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10354.00 TO NODE 10390.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 172.00 DOWNSTREAM(FEET) = 155.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00 CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 69.89  
 FLOW VELOCITY(FEET/SEC.) = 8.53 FLOW DEPTH(FEET) = 1.65  
 TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 27.62  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 27.62  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.222  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 0.100 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.100 -  
 USER-DEFINED - 0.90 0.30 0.850 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 1.92  
 EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
 TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 69.89  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 27.62  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.222  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 2.10 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.964  
 SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 3.19  
 EFFECTIVE AREA(ACRES) = 81.90 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 81.9 PEAK FLOW RATE(CFS) = 72.53

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 27.62  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.222  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.50 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 2.07  
 EFFECTIVE AREA(ACRES) = 84.40 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 84.4 PEAK FLOW RATE(CFS) = 74.61

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
 =====  
 \*\* MAIN STREAM CONFLUENCE DATA \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 74.61 27.62 1.222 0.30( 0.24) 0.80 84.4 10340.00  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	253.60	19.32	1.495	0.30 ( 0.23)	0.77	195.2	10300.00
2	246.50	22.78	1.366	0.30 ( 0.23)	0.76	213.0	10320.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	320.32	19.32	1.495	0.30 ( 0.23)	0.78	254.2	10300.00
2	317.03	22.78	1.366	0.30 ( 0.23)	0.77	282.6	10320.00
3	289.96	27.62	1.222	0.30 ( 0.23)	0.77	297.4	10340.00

TOTAL AREA (ACRES) = 297.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 320.32 Tc (MIN.) = 19.317  
EFFECTIVE AREA (ACRES) = 254.24 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
TOTAL AREA (ACRES) = 297.4  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10360.00 TO NODE 10361.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
ELEVATION DATA: UPSTREAM (FEET) = 337.00 DOWNSTREAM (FEET) = 292.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.697

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.083

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.30	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"GRASS"	-	0.50	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.10	0.30	1.000	95	10.70

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 1.44  
TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 1.44

\*\*\*\*\*

FLOW PROCESS FROM NODE 10361.00 TO NODE 10362.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 292.00 DOWNSTREAM (FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 199.00 CHANNEL SLOPE = 0.0101  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 1.44  
FLOW VELOCITY (FEET/SEC.) = 1.92 FLOW DEPTH (FEET) = 0.50  
TRAVEL TIME (MIN.) = 1.73 Tc (MIN.) = 12.42  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10362.00 = 529.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.42

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.912

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.986

SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 1.60

EFFECTIVE AREA (ACRES) = 2.00 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 2.91

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10363.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 290.00 DOWNSTREAM (FEET) = 288.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.91  
FLOW VELOCITY (FEET/SEC.) = 2.56 FLOW DEPTH (FEET) = 0.62  
TRAVEL TIME (MIN.) = 0.96 Tc (MIN.) = 13.38  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10363.00 = 676.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10363.00 TO NODE 10363.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.38  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.833  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 3.32  
 EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 6.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10363.00 TO NODE 10364.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 288.00 DOWNSTREAM(FEET) = 286.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 6.08  
 FLOW VELOCITY(FEET/SEC.) = 3.06 FLOW DEPTH(FEET) = 0.81  
 TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 14.18  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10364.00 = 823.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10364.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.18  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.777  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
 SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 2.53  
 EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 8.40

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10365.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 286.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.40  
 FLOW VELOCITY(FEET/SEC.) = 2.73 FLOW DEPTH(FEET) = 1.01  
 TRAVEL TIME(MIN.) = 1.51 Tc(MIN.) = 15.69  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10365.00 = 1071.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10365.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.69  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.684  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.50	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 4.37  
 EFFECTIVE AREA(ACRES) = 9.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 12.24

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10366.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 12.24  
 FLOW VELOCITY(FEET/SEC.) = 3.01 FLOW DEPTH(FEET) = 1.16  
 TRAVEL TIME(MIN.) = 1.37 Tc(MIN.) = 17.07  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10366.00 = 1319.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10366.00 TO NODE 10366.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.07  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.613  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	2.30	0.30	1.000	-

USER-DEFINED - 0.20 0.30 0.850 -  
 USER-DEFINED - 2.70 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995  
 SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 10.05  
 EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 21.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 10366.00 TO NODE 10367.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 279.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 292.00 CHANNEL SLOPE = 0.0103  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 21.66  
 FLOW VELOCITY (FEET/SEC.) = 3.77 FLOW DEPTH (FEET) = 1.38  
 TRAVEL TIME (MIN.) = 1.29 Tc (MIN.) = 18.36  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10367.00 = 1611.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10367.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 18.36  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.545  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972  
 SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 1.81  
 EFFECTIVE AREA (ACRES) = 19.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 19.9 PEAK FLOW RATE (CFS) = 22.36

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10368.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 279.00 DOWNSTREAM (FEET) = 276.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 378.00 CHANNEL SLOPE = 0.0079  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 22.36  
 FLOW VELOCITY (FEET/SEC.) = 3.46 FLOW DEPTH (FEET) = 1.47

TRAVEL TIME (MIN.) = 1.82 Tc (MIN.) = 20.18  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10368.00 = 1989.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10368.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 20.18  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.454  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.973  
 SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 2.30  
 EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 23.03

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10369.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 247.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 229.00 CHANNEL SLOPE = 0.1266  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 23.03  
 FLOW VELOCITY (FEET/SEC.) = 9.86 FLOW DEPTH (FEET) = 0.88  
 TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 20.56  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10369.00 = 2218.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10369.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 20.56  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.441  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	9.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996  
 SUBAREA AREA (ACRES) = 11.60 SUBAREA RUNOFF (CFS) = 11.92  
 EFFECTIVE AREA (ACRES) = 33.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 33.7 PEAK FLOW RATE (CFS) = 34.69

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FLOW PROCESS FROM NODE 10369.00 TO NODE 10370.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 247.00 DOWNSTREAM(FEET) = 226.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 179.00 CHANNEL SLOPE = 0.1173
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 34.69
FLOW VELOCITY(FEET/SEC.) = 10.64 FLOW DEPTH(FEET) = 1.04
TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 20.84
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10370.00 = 2397.00 FEET.

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FLOW PROCESS FROM NODE 10370.00 TO NODE 10370.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.84

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.431

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 0.850 -
USER-DEFINED - 3.60 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 5.60 0.30 1.000 -
USER-DEFINED - 1.50 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997

SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 11.31

EFFECTIVE AREA(ACRES) = 44.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 44.8 PEAK FLOW RATE(CFS) = 45.71

\*\*\*\*\*

FLOW PROCESS FROM NODE 10370.00 TO NODE 10371.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 226.00 DOWNSTREAM(FEET) = 188.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 434.00 CHANNEL SLOPE = 0.0876
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 45.71
FLOW VELOCITY(FEET/SEC.) = 10.18 FLOW DEPTH(FEET) = 1.22
TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 21.55
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10371.00 = 2831.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10371.00 TO NODE 10371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.55

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.407

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 0.100 -
USER-DEFINED - 1.20 0.30 0.850 -
USER-DEFINED - 1.60 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 0.20 0.30 0.100 -
USER-DEFINED - 7.20 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958

SUBAREA AREA(ACRES) = 10.70 SUBAREA RUNOFF(CFS) = 10.78

EFFECTIVE AREA(ACRES) = 55.50 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 55.5 PEAK FLOW RATE(CFS) = 55.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 10371.00 TO NODE 10389.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 157.00
FLOW LENGTH(FEET) = 1918.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.10
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 55.52
PIPE TRAVEL TIME(MIN.) = 2.64 Tc(MIN.) = 24.20
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 24.20

RAINFALL INTENSITY(INCH/HR) = 1.32

AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.99

EFFECTIVE STREAM AREA(ACRES) = 55.50

TOTAL STREAM AREA(ACRES) = 55.50

PEAK FLOW RATE(CFS) AT CONFLUENCE = 55.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 10380.00 TO NODE 10381.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 241.00

ELEVATION DATA: UPSTREAM(FEET) = 275.00 DOWNSTREAM(FEET) = 273.00

Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.110  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.619  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.30	0.100	95	7.11
PUBLIC PARK	-	1.10	0.30	0.850	95	11.30

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.735  
 SUBAREA RUNOFF(CFS) = 2.81  
 TOTAL AREA(ACRES) = 1.30 PEAK FLOW RATE(CFS) = 2.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10381.00 TO NODE 10382.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 273.00 DOWNSTREAM ELEVATION(FEET) = 271.00  
 STREET LENGTH(FEET) = 238.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.39  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.35  
 HALFSTREET FLOOD WIDTH(FEET) = 9.34  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.07  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.71  
 STREET FLOW TRAVEL TIME(MIN.) = 1.92 Tc(MIN.) = 9.03  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.286

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	1.40	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.718  
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 3.17  
 EFFECTIVE AREA(ACRES) = 3.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 5.59

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.43  
 FLOW VELOCITY(FEET/SEC.) = 2.19 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.80  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10382.00 = 479.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10382.00 TO NODE 10383.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 271.00 DOWNSTREAM ELEVATION(FEET) = 268.00  
 STREET LENGTH(FEET) = 357.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.10  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.40  
 HALFSTREET FLOOD WIDTH(FEET) = 12.30  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.38  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.96  
 STREET FLOW TRAVEL TIME(MIN.) = 2.50 Tc(MIN.) = 11.53  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.997

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	1.30	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.452  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.03  
 EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 9.83

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 13.40  
 FLOW VELOCITY(FEET/SEC.) = 2.48 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.06  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10383.00 = 836.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10383.00 TO NODE 10384.00 IS CODE = 63  
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 268.00 DOWNSTREAM ELEVATION(FEET) = 264.00  
 STREET LENGTH(FEET) = 473.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.91  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.46  
 HALFSTREET FLOOD WIDTH(FEET) = 14.96  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.66  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.22  
 STREET FLOW TRAVEL TIME(MIN.) = 2.96 Tc(MIN.) = 14.50  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.755

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.60	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 6.16  
 EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.57  
 TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 14.68

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 15.82  
 FLOW VELOCITY(FEET/SEC.) = 2.73 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.29  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10384.00 = 1309.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10384.00 TO NODE 10385.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 264.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
 STREET LENGTH(FEET) = 463.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.71  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.53  
 HALFSTREET FLOOD WIDTH(FEET) = 18.40  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.62  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.38  
 STREET FLOW TRAVEL TIME(MIN.) = 2.95 Tc(MIN.) = 17.44  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.593

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.600	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.650  
 SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 8.05  
 EFFECTIVE AREA(ACRES) = 16.70 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.7 PEAK FLOW RATE(CFS) = 21.23

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 19.34  
 FLOW VELOCITY(FEET/SEC.) = 2.70 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.47  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10385.00 = 1772.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10385.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 17.44  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.593  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.26  
 EFFECTIVE AREA(ACRES) = 16.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.9 PEAK FLOW RATE(CFS) = 21.49

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10386.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 261.00 DOWNSTREAM(FEET) = 200.00  
 FLOW LENGTH(FEET) = 712.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 18.05  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 21.49  
 PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 18.10



LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10386.00 = 2484.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.10

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.561

SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.75

EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60

TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 22.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.10

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	1.70	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.544

SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 5.15

EFFECTIVE AREA(ACRES) = 22.40 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59

TOTAL AREA(ACRES) = 22.4 PEAK FLOW RATE(CFS) = 27.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.10

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

USER-DEFINED	-	2.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223

SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 4.70

EFFECTIVE AREA(ACRES) = 25.90 AREA-AVERAGED Fm(INCH/HR) = 0.16

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54

TOTAL AREA(ACRES) = 25.9 PEAK FLOW RATE(CFS) = 32.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.10

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.228

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 2.68

EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52

TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 35.25

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.10

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	0.850	-
USER-DEFINED	-	2.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225

SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 4.03

EFFECTIVE AREA(ACRES) = 30.90 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49

TOTAL AREA(ACRES) = 30.9 PEAK FLOW RATE(CFS) = 39.28

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.10
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.559
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.00 0.30 0.100 -
USER-DEFINED - 1.50 0.30 0.600 -
USER-DEFINED - 1.70 0.30 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.204
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 9.70
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 48.98

\*\*\*\*\*
FLOW PROCESS FROM NODE 10386.00 TO NODE 10387.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 200.00 DOWNSTREAM(FEET) = 163.00
FLOW LENGTH(FEET) = 1145.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.08
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 48.98
PIPE TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 19.37
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10387.00 = 3629.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.37
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.493
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.30 0.100 -
USER-DEFINED - 23.80 0.30 0.850 -
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 0.80 0.30 1.000 -
USER-DEFINED - 0.60 0.30 0.100 -
USER-DEFINED - 6.90 0.30 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.830
SUBAREA AREA(ACRES) = 32.90 SUBAREA RUNOFF(CFS) = 36.83
EFFECTIVE AREA(ACRES) = 71.00 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62
TOTAL AREA(ACRES) = 71.0 PEAK FLOW RATE(CFS) = 83.56

\*\*\*\*\*
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.37
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.493
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 0.20 0.30 0.850 -
USER-DEFINED - 1.20 0.30 0.100 -
USER-DEFINED - 1.70 0.30 0.850 -
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.641
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 4.45
EFFECTIVE AREA(ACRES) = 74.80 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62
TOTAL AREA(ACRES) = 74.8 PEAK FLOW RATE(CFS) = 88.01

\*\*\*\*\*
FLOW PROCESS FROM NODE 10387.00 TO NODE 10388.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 163.00 DOWNSTREAM(FEET) = 158.00
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.56
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 88.01
PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 19.51
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10388.00 = 3779.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.51
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.486
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.80 0.30 0.100 -
USER-DEFINED - 0.40 0.30 0.400 -
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 7.79
EFFECTIVE AREA(ACRES) = 80.90 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59
TOTAL AREA(ACRES) = 80.9 PEAK FLOW RATE(CFS) = 95.30

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*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.51
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.486
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
    LAND USE         GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.10     0.30     0.100    -
USER-DEFINED         -        10.70     0.30     0.400    -
USER-DEFINED         -         2.30     0.30     0.850    -
USER-DEFINED         -         0.50     0.30     1.000    -
USER-DEFINED         -         0.30     0.30     1.000    -
USER-DEFINED         -         0.70     0.30     0.400    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.502
SUBAREA AREA(ACRES) = 14.60   SUBAREA RUNOFF(CFS) = 17.54
EFFECTIVE AREA(ACRES) = 95.50  AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 95.5     PEAK FLOW RATE(CFS) = 112.84

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.51
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.486
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
    LAND USE         GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.70     0.30     0.850    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.70   SUBAREA RUNOFF(CFS) = 0.78
EFFECTIVE AREA(ACRES) = 96.20  AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 96.2     PEAK FLOW RATE(CFS) = 113.62

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10389.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 158.00  DOWNSTREAM(FEET) = 157.00
FLOW LENGTH(FEET) = 51.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.59
ESTIMATED PIPE DIAMETER(INCH) = 42.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 113.62
PIPE TRAVEL TIME(MIN.) = 0.05  Tc(MIN.) = 19.56
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10389.00 = 3830.00 FEET.

*****
FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 19.56
RAINFALL INTENSITY(INCH/HR) = 1.48
AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.58
EFFECTIVE STREAM AREA(ACRES) = 96.20
TOTAL STREAM AREA(ACRES) = 96.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 113.62

** CONFLUENCE DATA **
STREAM   Q      Tc  Intensity  Fp(Fm)   Ap   Ae   HEADWATER
NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1        55.52 24.20  1.317  0.30( 0.30) 0.99  55.5 10360.00
2       113.62 19.56  1.483  0.30( 0.17) 0.58  96.2 10380.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM   Q      Tc  Intensity  Fp(Fm)   Ap   Ae   HEADWATER
NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1       165.77 19.56  1.483  0.30( 0.21) 0.71 141.1 10380.00
2       154.79 24.20  1.317  0.30( 0.22) 0.73 151.7 10360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 165.77  Tc(MIN.) = 19.56
EFFECTIVE AREA(ACRES) = 141.07  AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 151.7
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

*****
FLOW PROCESS FROM NODE 10389.00 TO NODE 10390.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 157.00  DOWNSTREAM(FEET) = 155.00
FLOW LENGTH(FEET) = 312.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 44.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.09
ESTIMATED PIPE DIAMETER(INCH) = 57.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 165.77
PIPE TRAVEL TIME(MIN.) = 0.47  Tc(MIN.) = 20.03
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.03

```

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.459  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 5.70 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.997  
 SUBAREA AREA (ACRES) = 9.50 SUBAREA RUNOFF (CFS) = 9.92  
 EFFECTIVE AREA (ACRES) = 150.57 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 161.2 PEAK FLOW RATE (CFS) = 168.21

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 20.03  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.459  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.20 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 2.29  
 EFFECTIVE AREA (ACRES) = 152.77 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 163.4 PEAK FLOW RATE (CFS) = 170.50

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	170.50	20.03	1.459	0.30 (0.22)	0.73	152.8	10380.00
2	158.45	24.67	1.301	0.30 (0.22)	0.75	163.4	10360.00

LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	320.32	19.32	1.495	0.30 (0.23)	0.78	254.2	10300.00
2	317.03	22.78	1.366	0.30 (0.23)	0.77	282.6	10320.00
3	289.96	27.62	1.222	0.30 (0.23)	0.77	297.4	10340.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM	Q	Tc	Intensity	Fp (Fm)	Ap	Ae	HEADWATER
--------	---	----	-----------	---------	----	----	-----------

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	489.59	19.32	1.495	0.30 (0.23)	0.76	401.6 10300.00
2	490.14	20.03	1.459	0.30 (0.23)	0.76	412.9 10380.00
3	480.40	22.78	1.366	0.30 (0.23)	0.76	441.7 10320.00
4	464.91	24.67	1.301	0.30 (0.23)	0.76	451.8 10360.00
5	436.74	27.62	1.222	0.30 (0.23)	0.76	460.8 10340.00
TOTAL AREA (ACRES) =			460.8			

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 490.14 Tc (MIN.) = 20.033  
 EFFECTIVE AREA (ACRES) = 412.87 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA (ACRES) = 460.8  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12  
 -----

>>>>CLEAR MEMORY BANK # 1<<<<

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 460.8 TC (MIN.) = 20.03  
 EFFECTIVE AREA (ACRES) = 412.87 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.758  
 PEAK FLOW RATE (CFS) = 490.14

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	489.59	19.32	1.495	0.30 (0.23)	0.76	401.6	10300.00
2	490.14	20.03	1.459	0.30 (0.23)	0.76	412.9	10380.00
3	480.40	22.78	1.366	0.30 (0.23)	0.76	441.7	10320.00
4	464.91	24.67	1.301	0.30 (0.23)	0.76	451.8	10360.00
5	436.74	27.62	1.222	0.30 (0.23)	0.76	460.8	10340.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506104E.DAT  
TIME/DATE OF STUDY: 12:47 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 3.190
- 2) 6.00; 2.880
- 3) 7.00; 2.640
- 4) 8.00; 2.450
- 5) 9.00; 2.290
- 6) 10.00; 2.160
- 7) 11.00; 2.050
- 8) 12.00; 1.950
- 9) 13.00; 1.860
- 10) 14.00; 1.790
- 11) 15.00; 1.720
- 12) 20.00; 1.460
- 13) 25.00; 1.290
- 14) 30.00; 1.160
- 15) 40.00; 0.990
- 16) 50.00; 0.870
- 17) 60.00; 0.790
- 18) 90.00; 0.630
- 19) 120.00; 0.530
- 20) 180.00; 0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10400.00 TO NODE 10401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00  
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.434  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.776  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
PUBLIC PARK	-	0.50	0.30	0.850	95	6.43

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.850  
 SUBAREA RUNOFF(CFS) = 1.13  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.13

\*\*\*\*\*

FLOW PROCESS FROM NODE 10401.00 TO NODE 10402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.3419  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.13  
 FLOW VELOCITY(FEET/SEC.) = 5.42 FLOW DEPTH(FEET) = 0.26  
 TRAVEL TIME(MIN.) = 0.36  $T_c$ (MIN.) = 6.79  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10402.00 = 424.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 6.79  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.690  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.940  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.08  
EFFECTIVE AREA(ACRES) = 1.00 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 2.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10402.00 TO NODE 10403.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.2439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.18  
FLOW VELOCITY(FEET/SEC.) = 5.56 FLOW DEPTH(FEET) = 0.36  
TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 7.16  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10403.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10403.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 7.16  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.609  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.89  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 4.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10404.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 420.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 266.00 CHANNEL SLOPE = 0.1880  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.00  
FLOW VELOCITY(FEET/SEC.) = 5.88 FLOW DEPTH(FEET) = 0.48  
TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 7.92  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10404.00 = 813.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10404.00 IS CODE = 81  
-----

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc(MIN.) = 7.92  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.466  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.863  
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 4.57  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 8.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10405.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 370.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 289.00 CHANNEL SLOPE = 0.1730  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 8.32  
FLOW VELOCITY(FEET/SEC.) = 6.98 FLOW DEPTH(FEET) = 0.63  
TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 8.61  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10405.00 = 1102.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10405.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 8.61  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.353  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 7.55  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 15.45

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10406.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 367.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 23.00 CHANNEL SLOPE = 0.1304

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 15.45  
FLOW VELOCITY (FEET/SEC.) = 7.26 FLOW DEPTH (FEET) = 0.84  
TRAVEL TIME (MIN.) = 0.05 Tc (MIN.) = 8.66  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10406.00 = 1125.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.66  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.345  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 3.95  
EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 19.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 367.00 DOWNSTREAM (FEET) = 344.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 214.00 CHANNEL SLOPE = 0.1075  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 19.33  
FLOW VELOCITY (FEET/SEC.) = 7.16 FLOW DEPTH (FEET) = 0.95  
TRAVEL TIME (MIN.) = 0.50 Tc (MIN.) = 9.16  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10407.00 = 1339.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.16  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.270  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 3.63  
EFFECTIVE AREA (ACRES) = 12.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 22.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 344.00 DOWNSTREAM (FEET) = 327.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 919.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 22.27  
FLOW VELOCITY (FEET/SEC.) = 4.76 FLOW DEPTH (FEET) = 1.25  
TRAVEL TIME (MIN.) = 3.22 Tc (MIN.) = 12.37  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10408.00 = 2258.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10408.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 12.37  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.916  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.800 -  
USER-DEFINED - 7.90 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.849  
SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 11.96  
EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 30.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 327.00 DOWNSTREAM (FEET) = 314.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 807.00 CHANNEL SLOPE = 0.0161  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 30.32  
FLOW VELOCITY (FEET/SEC.) = 4.88 FLOW DEPTH (FEET) = 1.44  
TRAVEL TIME (MIN.) = 2.76 Tc (MIN.) = 15.13  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10409.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10409.00 TO NODE 10409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.13  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.713  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS



LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.90 0.30 0.800 -  
 USER-DEFINED - 5.70 0.30 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.823  
 SUBAREA AREA (ACRES) = 12.60 SUBAREA RUNOFF (CFS) = 16.63  
 EFFECTIVE AREA (ACRES) = 32.90 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA (ACRES) = 32.9 PEAK FLOW RATE (CFS) = 43.24

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10409.00 TO NODE 10410.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 314.00 DOWNSTREAM(FEET) = 266.00  
 FLOW LENGTH(FEET) = 213.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 30.35  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 43.24  
 PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 15.25  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10410.00 = 3278.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10410.00 TO NODE 10411.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 266.00 DOWNSTREAM(FEET) = 170.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1470.00 CHANNEL SLOPE = 0.0653  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 43.24  
 FLOW VELOCITY(FEET/SEC.) = 9.03 FLOW DEPTH(FEET) = 1.26  
 TRAVEL TIME(MIN.) = 2.71 Tc(MIN.) = 17.96  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10411.00 = 4748.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10411.00 TO NODE 10411.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.96  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.566  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	6.60	0.30	0.800	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.723  
 SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 10.32

EFFECTIVE AREA (ACRES) = 41.40 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 41.4 PEAK FLOW RATE (CFS) = 49.20

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10411.00 TO NODE 10412.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 170.00 DOWNSTREAM(FEET) = 161.00  
 FLOW LENGTH(FEET) = 1129.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.00  
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 49.20  
 PIPE TRAVEL TIME(MIN.) = 2.09 Tc(MIN.) = 20.05  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10412.00 = 5877.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10412.00 TO NODE 10413.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 161.00 DOWNSTREAM(FEET) = 141.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 360.00 CHANNEL SLOPE = 0.0556  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 49.20  
 FLOW VELOCITY(FEET/SEC.) = 8.76 FLOW DEPTH(FEET) = 1.37  
 TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 20.74  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10413.00 = 6237.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10413.00 TO NODE 10413.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 20.74  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.435  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.509  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 3.35  
 EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA (ACRES) = 44.3 PEAK FLOW RATE (CFS) = 49.20  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 44.3 TC (MIN.) = 20.74  
EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.798  
PEAK FLOW RATE (CFS) = 49.20

=====  
=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506105L.DAT  
TIME/DATE OF STUDY: 12:50 04/15/2013  
=====

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 3.190
- 2) 6.00; 2.880
- 3) 7.00; 2.640
- 4) 8.00; 2.450
- 5) 9.00; 2.290
- 6) 10.00; 2.160
- 7) 11.00; 2.050
- 8) 12.00; 1.950
- 9) 13.00; 1.860
- 10) 14.00; 1.790
- 11) 15.00; 1.720
- 12) 20.00; 1.460
- 13) 25.00; 1.290
- 14) 30.00; 1.160
- 15) 40.00; 0.990
- 16) 50.00; 0.870
- 17) 60.00; 0.790
- 18) 90.00; 0.630
- 19) 120.00; 0.530
- 20) 180.00; 0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE (FT)	FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10500.00 TO NODE 10501.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 1123.00 DOWNSTREAM(FEET) = 1085.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.984  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.052  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.20	0.30	1.000	95	10.98
NATURAL FAIR COVER "GRASS"	-	0.30	0.30	1.000	95	10.98

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.79  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 0.79

\*\*\*\*\*

FLOW PROCESS FROM NODE 10501.00 TO NODE 10502.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 1085.00 DOWNSTREAM(FEET) = 1050.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 181.00 CHANNEL SLOPE = 0.1934  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.79  
FLOW VELOCITY(FEET/SEC.) = 3.99 FLOW DEPTH(FEET) = 0.26  
TRAVEL TIME(MIN.) = 0.76  $T_c$ (MIN.) = 11.74  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10502.00 = 507.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10502.00 TO NODE 10502.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 11.74  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.976  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.10     0.30      1.000     -
USER-DEFINED  -        0.80     0.30      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 1.36
EFFECTIVE AREA (ACRES) = 1.40  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.4    PEAK FLOW RATE (CFS) = 2.11

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*****
FLOW PROCESS FROM NODE 10502.00 TO NODE 10503.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1025.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 193.00  CHANNEL SLOPE = 0.1295
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.11
FLOW VELOCITY(FEET/SEC.) = 4.41  FLOW DEPTH(FEET) = 0.40
TRAVEL TIME(MIN.) = 0.73  Tc(MIN.) = 12.47
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10503.00 = 700.00 FEET.

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10503.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.47
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.908
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.50  0.30  1.000  -
USER-DEFINED      -        1.80  0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 3.33
EFFECTIVE AREA (ACRES) = 3.70  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 3.7    PEAK FLOW RATE (CFS) = 5.35

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10504.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 1025.00  DOWNSTREAM(FEET) = 1020.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00  CHANNEL SLOPE = 0.0151
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.35
FLOW VELOCITY(FEET/SEC.) = 3.09  FLOW DEPTH(FEET) = 0.76
TRAVEL TIME(MIN.) = 1.79  Tc(MIN.) = 14.26
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10504.00 = 1032.00 FEET.

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10504.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN.) = 14.26
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.772
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.10  0.30  1.000  -
USER-DEFINED      -        0.80  0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 1.19
EFFECTIVE AREA (ACRES) = 4.60  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.6    PEAK FLOW RATE (CFS) = 6.09

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```

*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10505.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 1020.00  DOWNSTREAM(FEET) = 975.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 397.00  CHANNEL SLOPE = 0.1134
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 6.09
FLOW VELOCITY(FEET/SEC.) = 6.80  FLOW DEPTH(FEET) = 0.55
TRAVEL TIME(MIN.) = 0.97  Tc(MIN.) = 15.23
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10505.00 = 1429.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10505.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----

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```

MAINLINE Tc(MIN.) = 15.23
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.708
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.20  0.30  1.000  -
USER-DEFINED      -        1.20  0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.40  SUBAREA RUNOFF (CFS) = 1.77
EFFECTIVE AREA (ACRES) = 6.00  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.0    PEAK FLOW RATE (CFS) = 7.60

```

```

*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10506.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

```

```
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 905.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 334.00 CHANNEL SLOPE = 0.2096
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.60
FLOW VELOCITY(FEET/SEC.) = 9.05 FLOW DEPTH(FEET) = 0.53
TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 15.85
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10506.00 = 1763.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10506.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.85
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.676
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.10 0.30 1.000 -
USER-DEFINED - 3.70 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 12.14
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 19.57
```

```
*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10507.00 IS CODE = 51
-----
```

```
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 790.00 CHANNEL SLOPE = 0.0380
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 19.57
FLOW VELOCITY(FEET/SEC.) = 4.87 FLOW DEPTH(FEET) = 1.16
TRAVEL TIME(MIN.) = 2.70 Tc(MIN.) = 18.55
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10507.00 = 2553.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10507.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.55
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.535
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.70 0.30 1.000 -
USER-DEFINED - 6.30 0.30 1.000 -
USER-DEFINED - 0.30 0.30 1.000 -
```

```
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 10.34
EFFECTIVE AREA(ACRES) = 25.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 27.91
```

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10508.00 IS CODE = 51
-----
```

```
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 755.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 27.91
FLOW VELOCITY(FEET/SEC.) = 7.86 FLOW DEPTH(FEET) = 1.09
TRAVEL TIME(MIN.) = 2.38 Tc(MIN.) = 20.93
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10508.00 = 3673.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10508.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.93
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.428
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.80 0.30 1.000 -
USER-DEFINED - 11.10 0.30 1.000 -
USER-DEFINED - 3.10 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 15.24
EFFECTIVE AREA(ACRES) = 40.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 40.73
```

```
*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10509.00 IS CODE = 51
-----
```

```
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 755.00 DOWNSTREAM(FEET) = 533.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1578.00 CHANNEL SLOPE = 0.1407
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 40.73
FLOW VELOCITY(FEET/SEC.) = 9.54 FLOW DEPTH(FEET) = 1.19
TRAVEL TIME(MIN.) = 2.76 Tc(MIN.) = 23.68
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10509.00 = 5251.00 FEET.
```

```
*****
```

FLOW PROCESS FROM NODE 10509.00 TO NODE 10509.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.68

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.335

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.80	0.30	1.000	-
USER-DEFINED	-	11.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	8.30	0.30	1.000	-
USER-DEFINED	-	38.10	0.30	1.000	-
USER-DEFINED	-	8.70	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 77.40 SUBAREA RUNOFF (CFS) = 72.09

EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 109.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10509.00 TO NODE 10510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 415.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1236.00 CHANNEL SLOPE = 0.0955  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 109.43  
 FLOW VELOCITY (FEET/SEC.) = 10.56 FLOW DEPTH (FEET) = 1.86  
 TRAVEL TIME (MIN.) = 1.95 Tc (MIN.) = 25.63  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10510.00 = 6487.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 25.63

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.273

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	30.10	0.30	1.000	-
USER-DEFINED	-	15.30	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	11.30	0.30	1.000	-
USER-DEFINED	-	5.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 64.90 SUBAREA RUNOFF (CFS) = 56.87

EFFECTIVE AREA (ACRES) = 182.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 182.4 PEAK FLOW RATE (CFS) = 159.82

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10511.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1161.00 CHANNEL SLOPE = 0.0973  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 159.82  
 FLOW VELOCITY (FEET/SEC.) = 11.71 FLOW DEPTH (FEET) = 2.13  
 TRAVEL TIME (MIN.) = 1.65 Tc (MIN.) = 27.29  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10511.00 = 7648.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10511.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 27.29

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.231

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.50	0.30	1.000	-
USER-DEFINED	-	10.80	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	22.10	0.30	1.000	-
USER-DEFINED	-	4.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 54.80 SUBAREA RUNOFF (CFS) = 45.90

EFFECTIVE AREA (ACRES) = 237.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 237.2 PEAK FLOW RATE (CFS) = 198.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 302.00 DOWNSTREAM (FEET) = 190.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1644.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 198.66  
 FLOW VELOCITY (FEET/SEC.) = 10.80 FLOW DEPTH (FEET) = 2.48  
 TRAVEL TIME (MIN.) = 2.54 Tc (MIN.) = 29.83  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10512.00 = 9292.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10512.00 TO NODE 10512.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 29.83
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.165
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50   0.30   1.000   -
USER-DEFINED        -         0.20   0.30   1.000   -
USER-DEFINED        -         1.70   0.30   1.000   -
USER-DEFINED        -         0.10   0.30   1.000   -
USER-DEFINED        -        14.20   0.30   1.000   -
USER-DEFINED        -         2.80   0.30   1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 19.50   SUBAREA RUNOFF(CFS) = 15.17
EFFECTIVE AREA(ACRES) = 256.70   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 256.7   PEAK FLOW RATE(CFS) = 199.75

*****
FLOW PROCESS FROM NODE 10512.00 TO NODE 10513.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 190.00   DOWNSTREAM(FEET) = 183.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 86.00   CHANNEL SLOPE = 0.0814
CHANNEL BASE(FEET) = 0.00   "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) = 4.00
CHANNEL FLOW THRU SUBAREA(CFS) = 199.75
FLOW VELOCITY(FEET/SEC.) = 11.56   FLOW DEPTH(FEET) = 2.40
TRAVEL TIME(MIN.) = 0.12   Tc(MIN.) = 29.95
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10513.00 = 9378.00 FEET.

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 29.95
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.161
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.30   0.100   -
USER-DEFINED        -         1.30   0.30   1.000   -
USER-DEFINED        -        29.90   0.30   1.000   -
USER-DEFINED        -        11.90   0.30   1.000   -
USER-DEFINED        -         1.70   0.30   1.000   -
USER-DEFINED        -         0.60   0.30   0.100   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 45.50   SUBAREA RUNOFF(CFS) = 35.44
EFFECTIVE AREA(ACRES) = 302.20   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 302.2   PEAK FLOW RATE(CFS) = 234.45

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FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 29.95
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.161
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         9.30   0.30   1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30   SUBAREA RUNOFF(CFS) = 7.21
EFFECTIVE AREA(ACRES) = 311.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 311.5   PEAK FLOW RATE(CFS) = 241.65

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10514.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 183.00   DOWNSTREAM(FEET) = 171.00
FLOW LENGTH(FEET) = 1209.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 48.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.29
ESTIMATED PIPE DIAMETER(INCH) = 60.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 241.65
PIPE TRAVEL TIME(MIN.) = 1.41   Tc(MIN.) = 31.36
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10514.00 = 10587.00 FEET.

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10514.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 31.36
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.137
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.30   0.100   -
USER-DEFINED        -         0.40   0.30   1.000   -
USER-DEFINED        -         1.70   0.30   0.100   -
USER-DEFINED        -        31.30   0.30   1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 33.60   SUBAREA RUNOFF(CFS) = 25.77
EFFECTIVE AREA(ACRES) = 345.10   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 345.1   PEAK FLOW RATE(CFS) = 260.58

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10515.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

ELEVATION DATA: UPSTREAM(FEET) = 171.00 DOWNSTREAM(FEET) = 165.00  
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 63.0 INCH PIPE IS 46.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.16  
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 260.58  
PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 31.98  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10515.00 = 11152.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10515.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 31.98  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.126  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 1.30 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 15.30 0.30 0.100 -  
USER-DEFINED - 1.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.202  
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 18.41  
EFFECTIVE AREA(ACRES) = 364.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 364.3 PEAK FLOW RATE(CFS) = 275.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10525.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 709.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 63.0 INCH PIPE IS 50.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.72  
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 275.71  
PIPE TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 32.78  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 32.78  
RAINFALL INTENSITY(INCH/HR) = 1.11  
AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.95  
EFFECTIVE STREAM AREA(ACRES) = 364.30  
TOTAL STREAM AREA(ACRES) = 364.30  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 275.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10520.00 TO NODE 10521.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 289.00  
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 180.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.311  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.581  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL - 0.30 0.30 0.100 95 7.31  
PUBLIC PARK - 1.20 0.30 0.850 95 11.62  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.700  
SUBAREA RUNOFF(CFS) = 3.20  
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 3.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10521.00 TO NODE 10522.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

\*\*\*\*\*  
UPSTREAM ELEVATION(FEET) = 180.00 DOWNSTREAM ELEVATION(FEET) = 176.00  
STREET LENGTH(FEET) = 408.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.43  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 9.97  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.29  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.82  
STREET FLOW TRAVEL TIME(MIN.) = 2.96 Tc(MIN.) = 10.27  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.130

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS



LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.60	0.30	0.100	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 4.44  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 7.03

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 11.21  
 FLOW VELOCITY(FEET/SEC.) = 2.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.93  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10522.00 = 697.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10522.00 TO NODE 10523.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 176.00 DOWNSTREAM ELEVATION(FEET) = 173.00  
 STREET LENGTH(FEET) = 333.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.61  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.44  
 HALFSTREET FLOOD WIDTH(FEET) = 14.18  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.64  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.17  
 STREET FLOW TRAVEL TIME(MIN.) = 2.10 Tc(MIN.) = 12.38  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.916

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	4.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.109  
 SUBAREA AREA(ACRES) = 5.40 SUBAREA RUNOFF(CFS) = 9.15  
 EFFECTIVE AREA(ACRES) = 9.40 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 9.4 PEAK FLOW RATE(CFS) = 15.42

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 15.90  
 FLOW VELOCITY(FEET/SEC.) = 2.84 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.35  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10523.00 = 1030.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10523.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.90	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	0.100	-
USER-DEFINED	-	4.80	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	4.90	0.30	0.850	-

MAINLINE Tc(MIN.) = 12.38  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.916  
 SUBAREA LOSS RATE DATA(AMC II):  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.785  
 SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 19.21  
 EFFECTIVE AREA(ACRES) = 22.10 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA(ACRES) = 22.1 PEAK FLOW RATE(CFS) = 34.62

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10524.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 173.00 DOWNSTREAM(FEET) = 165.00  
 FLOW LENGTH(FEET) = 736.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.28  
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 34.62  
 PIPE TRAVEL TIME(MIN.) = 1.32 Tc(MIN.) = 13.70  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10524.00 = 1766.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10524.00 TO NODE 10524.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.850	-

MAINLINE Tc(MIN.) = 13.70  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.811  
 SUBAREA LOSS RATE DATA(AMC II):  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.109  
 SUBAREA AREA(ACRES) = 5.40 SUBAREA RUNOFF(CFS) = 9.15  
 EFFECTIVE AREA(ACRES) = 9.40 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 9.4 PEAK FLOW RATE(CFS) = 15.42

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.308  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 2.78  
EFFECTIVE AREA(ACRES) = 23.90 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 23.9 PEAK FLOW RATE(CFS) = 35.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10524.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 623.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.44  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 35.32  
PIPE TRAVEL TIME(MIN.) = 1.10 Tc(MIN.) = 14.80  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10525.00 = 2389.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.80  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.734  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	6.80	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 12.11  
EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64  
TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 45.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.80  
RAINFALL INTENSITY(INCH/HR) = 1.73  
AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.64  
EFFECTIVE STREAM AREA(ACRES) = 33.00

TOTAL STREAM AREA(ACRES) = 33.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 45.77

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	275.71	32.78	1.113	0.30( 0.29)	0.95	364.3	10500.00
2	45.77	14.80	1.734	0.30( 0.19)	0.64	33.0	10520.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	263.72	14.80	1.734	0.30( 0.27)	0.90	197.4	10520.00
2	303.03	32.78	1.113	0.30( 0.28)	0.93	397.3	10500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 303.03 Tc(MIN.) = 32.78  
EFFECTIVE AREA(ACRES) = 397.30 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
TOTAL AREA(ACRES) = 397.3  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10526.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 158.00 DOWNSTREAM(FEET) = 148.00  
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 57.78  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 303.03  
PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 32.79  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10526.00 = 11891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10526.00 TO NODE 10527.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 148.00 DOWNSTREAM(FEET) = 135.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 296.00 CHANNEL SLOPE = 0.0439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 303.03  
FLOW VELOCITY(FEET/SEC.) = 12.63 FLOW DEPTH(FEET) = 2.83  
TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 33.18  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10527.00 = 12187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 33.18  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.106  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.02  
 EFFECTIVE AREA(ACRES) = 398.70 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 398.7 PEAK FLOW RATE(CFS) = 303.03  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 33.18  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.106  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
 SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 3.58  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 403.6 PEAK FLOW RATE(CFS) = 303.03  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 403.6 TC(MIN.) = 33.18  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.927  
 PEAK FLOW RATE(CFS) = 303.03

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	263.73	15.21	1.709	0.30( 0.27)	0.90	203.7	10520.00
2	303.03	33.18	1.106	0.30( 0.28)	0.93	403.6	10500.00

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

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FILE NAME: 0506106E.DAT  
TIME/DATE OF STUDY: 12:52 04/15/2013  
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--\*TIME-OF-CONCENTRATION MODEL\*--  
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5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10600.00 TO NODE 10601.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

=====

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.602

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.094

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

RESIDENTIAL

"5-7 DWELLINGS/ACRE" - 0.50 0.30 0.500 95 10.60

PUBLIC PARK - 0.60 0.30 0.850 95 13.16

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.691

SUBAREA RUNOFF(CFS) = 1.87

TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 1.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 10601.00 TO NODE 10602.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

=====

UPSTREAM ELEVATION(FEET) = 164.00 DOWNSTREAM ELEVATION(FEET) = 162.00

STREET LENGTH(FEET) = 220.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.53

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.32

HALFSTREET FLOOD WIDTH(FEET) = 8.22

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.04

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.66  
 STREET FLOW TRAVEL TIME (MIN.) = 1.80 Tc (MIN.) = 12.40  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.914  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.517  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 3.32  
 EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.17  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 5.01

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.35 HALFSTREET FLOOD WIDTH (FEET) = 9.72  
 FLOW VELOCITY (FEET/SEC.) = 2.21 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.78  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10602.00 = 531.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10602.00 TO NODE 10603.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 162.00 DOWNSTREAM ELEVATION (FEET) = 159.00  
 STREET LENGTH (FEET) = 328.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.80  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.40  
 HALFSTREET FLOOD WIDTH (FEET) = 11.91  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.42  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.96  
 STREET FLOW TRAVEL TIME (MIN.) = 2.25 Tc (MIN.) = 14.65  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.744

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.500	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	2.40	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527  
 SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 5.57

EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 10.09

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 13.32  
 FLOW VELOCITY (FEET/SEC.) = 2.57 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.09  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10603.00 = 859.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10603.00 TO NODE 10604.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 159.00 DOWNSTREAM ELEVATION (FEET) = 155.00  
 STREET LENGTH (FEET) = 465.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 14.95  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.47  
 HALFSTREET FLOOD WIDTH (FEET) = 15.82  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.78  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.32  
 STREET FLOW TRAVEL TIME (MIN.) = 2.79 Tc (MIN.) = 17.44  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.593

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.30	0.500	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.513  
 SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 9.71  
 EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 18.84

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.51 HALFSTREET FLOOD WIDTH (FEET) = 17.38  
 FLOW VELOCITY (FEET/SEC.) = 2.93 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.48  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10604.00 = 1324.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10604.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.44
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.593
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.30    0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.10    SUBAREA RUNOFF(CFS) = 0.12
EFFECTIVE AREA(ACRES) = 14.70  AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 14.7    PEAK FLOW RATE(CFS) = 18.96

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10605.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 155.00  DOWNSTREAM(FEET) = 140.00
FLOW LENGTH(FEET) = 214.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.24
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 18.96
PIPE TRAVEL TIME(MIN.) = 0.22  Tc(MIN.) = 17.66
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10605.00 = 1538.00 FEET.

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10605.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.66
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.581
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20    0.30    0.100    -
USER-DEFINED        -         1.70    0.30    0.100    -
USER-DEFINED        -        10.20    0.30    0.800    -
USER-DEFINED        -         2.90    0.30    0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.682
SUBAREA AREA(ACRES) = 16.00  SUBAREA RUNOFF(CFS) = 19.83
EFFECTIVE AREA(ACRES) = 30.70  AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 30.7    PEAK FLOW RATE(CFS) = 38.64

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10606.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

```

```

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 140.00  DOWNSTREAM(FEET) = 133.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00  CHANNEL SLOPE = 0.0400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 38.64
FLOW VELOCITY(FEET/SEC.) = 7.28  FLOW DEPTH(FEET) = 1.33
TRAVEL TIME(MIN.) = 0.40  Tc(MIN.) = 18.06
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10606.00 = 1713.00 FEET.

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.06
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.561
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.30    0.500    -
USER-DEFINED        -         0.30    0.30    0.850    -
USER-DEFINED        -         0.10    0.30    1.000    -
USER-DEFINED        -         1.10    0.30    1.000    -
USER-DEFINED        -         0.10    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 1.80  SUBAREA RUNOFF(CFS) = 2.08
EFFECTIVE AREA(ACRES) = 32.50  AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 32.5    PEAK FLOW RATE(CFS) = 40.14

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.06
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.561
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.30    0.850    -
USER-DEFINED        -         1.20    0.30    1.000    -
USER-DEFINED        -         0.10    0.30    1.000    -
USER-DEFINED        -         1.80    0.30    1.000    -
USER-DEFINED        -         0.10    0.30    0.850    -
USER-DEFINED        -         0.20    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980
SUBAREA AREA(ACRES) = 3.80  SUBAREA RUNOFF(CFS) = 4.33
EFFECTIVE AREA(ACRES) = 36.30  AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.66
TOTAL AREA(ACRES) = 36.3    PEAK FLOW RATE(CFS) = 44.47

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81

```

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 18.06

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.561

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.68

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.67

TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 45.15  
=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 36.9 TC(MIN.) = 18.06

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.670

PEAK FLOW RATE(CFS) = 45.15  
=====

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 2 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 10-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P201XX10.DAT  
TIME/DATE OF STUDY: 10:20 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.000; 3.190  
2) 6.000; 2.880  
3) 7.000; 2.640  
4) 8.000; 2.450  
5) 9.000; 2.290  
6) 10.000; 2.160  
7) 11.000; 2.050  
8) 12.000; 1.950  
9) 13.000; 1.860  
10) 14.000; 1.790  
11) 15.000; 1.720  
12) 20.000; 1.460  
13) 25.000; 1.290  
14) 30.000; 1.160  
15) 40.000; 0.990  
16) 50.000; 0.870  
17) 60.000; 0.790  
18) 90.000; 0.630  
19) 120.000; 0.530  
20) 180.000; 0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20100.00 TO NODE 20101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 830.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.230  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.260  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.30	1.000	95	9.23
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.23

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.06  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.06

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20101.00 TO NODE 20102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 276.00 CHANNEL SLOPE = 0.2899  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.06  
FLOW VELOCITY(FEET/SEC.) = 5.06 FLOW DEPTH(FEET) = 0.26  
TRAVEL TIME(MIN.) = 0.91  $T_c$ (MIN.) = 10.14  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20102.00 = 595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20102.00 TO NODE 20102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<



```

=====
MAINLINE Tc(MIN) = 10.14
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.145
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         0.80    0.30    1.000   -
USER-DEFINED       -         0.20    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.00    SUBAREA RUNOFF(CFS) = 1.66
EFFECTIVE AREA(ACRES) = 1.60    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6        PEAK FLOW RATE(CFS) = 2.66

```

```

*****
FLOW PROCESS FROM NODE 20102.00 TO NODE 20103.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.1863
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.66
FLOW VELOCITY(FEET/SEC.) = 5.34 FLOW DEPTH(FEET) = 0.41
TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 10.64
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20103.00 = 756.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20103.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 10.64
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.089
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         0.50    0.30    1.000   -
USER-DEFINED       -         0.10    0.30    1.000   -
USER-DEFINED       -         0.30    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90    SUBAREA RUNOFF(CFS) = 1.45
EFFECTIVE AREA(ACRES) = 2.50    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.5        PEAK FLOW RATE(CFS) = 4.03

```

```

*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20104.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 690.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 64.00 CHANNEL SLOPE = 0.4688

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CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.03
FLOW VELOCITY(FEET/SEC.) = 8.41 FLOW DEPTH(FEET) = 0.40
TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 10.77
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20104.00 = 820.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20104.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

```

=====
MAINLINE Tc(MIN) = 10.77
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.075
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         0.40    0.30    1.000   -
USER-DEFINED       -         3.30    0.30    1.000   -
USER-DEFINED       -         0.10    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 6.07
EFFECTIVE AREA(ACRES) = 6.30    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.3        PEAK FLOW RATE(CFS) = 10.07

```

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20105.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 690.00 DOWNSTREAM(FEET) = 670.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 159.00 CHANNEL SLOPE = 0.1258
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.07
FLOW VELOCITY(FEET/SEC.) = 6.44 FLOW DEPTH(FEET) = 0.72
TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 11.18
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20105.00 = 979.00 FEET.

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FLOW PROCESS FROM NODE 20105.00 TO NODE 20105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN) = 11.18
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.032
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         0.20    0.30    1.000   -
USER-DEFINED       -         1.50    0.30    1.000   -
USER-DEFINED       -         2.20    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90    SUBAREA RUNOFF(CFS) = 6.08

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EFFECTIVE AREA (ACRES) = 10.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 10.2 PEAK FLOW RATE (CFS) = 15.90

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FLOW PROCESS FROM NODE 20105.00 TO NODE 20106.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 670.00 DOWNSTREAM (FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 192.00 CHANNEL SLOPE = 0.1042  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 15.90  
FLOW VELOCITY (FEET/SEC.) = 6.72 FLOW DEPTH (FEET) = 0.89  
TRAVEL TIME (MIN.) = 0.48 Tc (MIN.) = 11.66  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20106.00 = 1171.00 FEET.

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FLOW PROCESS FROM NODE 20106.00 TO NODE 20106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 11.66  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.984  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.10 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 3.80 SUBAREA RUNOFF (CFS) = 5.76  
EFFECTIVE AREA (ACRES) = 14.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 14.0 PEAK FLOW RATE (CFS) = 21.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 650.00 DOWNSTREAM (FEET) = 640.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 156.00 CHANNEL SLOPE = 0.0641  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 21.22  
FLOW VELOCITY (FEET/SEC.) = 6.06 FLOW DEPTH (FEET) = 1.08  
TRAVEL TIME (MIN.) = 0.43 Tc (MIN.) = 12.09  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20107.00 = 1327.00 FEET.

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FLOW PROCESS FROM NODE 20107.00 TO NODE 20107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc (MIN) = 12.09  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.942

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.20 0.30 1.000 -  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 5.91  
EFFECTIVE AREA (ACRES) = 18.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 18.0 PEAK FLOW RATE (CFS) = 26.61

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FLOW PROCESS FROM NODE 20107.00 TO NODE 20108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 640.00 DOWNSTREAM (FEET) = 609.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 512.00 CHANNEL SLOPE = 0.0605  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 26.61  
FLOW VELOCITY (FEET/SEC.) = 6.23 FLOW DEPTH (FEET) = 1.19  
TRAVEL TIME (MIN.) = 1.37 Tc (MIN.) = 13.46  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20108.00 = 1839.00 FEET.

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 13.46  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.828  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.200 -  
USER-DEFINED - 1.50 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970  
SUBAREA AREA (ACRES) = 2.70 SUBAREA RUNOFF (CFS) = 3.74  
EFFECTIVE AREA (ACRES) = 20.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.7 PEAK FLOW RATE (CFS) = 28.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 600.00  
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.19  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 28.49  
PIPE TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 13.67  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20109.00 = 2033.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20109.00 TO NODE 20109.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN) = 13.67  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.813  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.200 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.10  
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 29.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20109.00 TO NODE 20110.00 IS CODE = 31  
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 594.00  
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.53  
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 29.32  
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 14.24  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20110.00 = 2393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20110.00 TO NODE 20110.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN) = 14.24  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.773  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 0.100 -  
USER-DEFINED - 3.50 0.30 0.200 -  
USER-DEFINED - 2.70 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.20 0.30 1.000 -

USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 11.70  
EFFECTIVE AREA(ACRES) = 29.60 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 29.6 PEAK FLOW RATE(CFS) = 40.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20110.00 TO NODE 20111.00 IS CODE = 31  
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 594.00 DOWNSTREAM(FEET) = 590.00  
FLOW LENGTH(FEET) = 246.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.26  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 40.25  
PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 14.60  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20111.00 = 2639.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20111.00 TO NODE 20111.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN) = 14.60  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.748  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 2.10 0.30 0.200 -  
USER-DEFINED - 2.10 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 4.70 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.792  
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 15.09  
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 54.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20111.00 TO NODE 20112.00 IS CODE = 31  
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 580.00  
FLOW LENGTH(FEET) = 628.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.99  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 54.66

PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 15.47  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20112.00 = 3267.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.47

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.695

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.200	-
USER-DEFINED	-	4.40	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	7.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.797

SUBAREA AREA(ACRES) = 15.20 SUBAREA RUNOFF(CFS) = 19.92

EFFECTIVE AREA(ACRES) = 55.90 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 55.9 PEAK FLOW RATE(CFS) = 72.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.47

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.695

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 3.05

EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 75.71

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20113.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 580.00 DOWNSTREAM(FEET) = 570.00

FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 13.98

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 75.71  
PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 16.09  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20113.00 = 3786.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.09

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.663

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.100	-
USER-DEFINED	-	4.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.877

SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 15.88

EFFECTIVE AREA(ACRES) = 70.90 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 89.89

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.09

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.663

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	1.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.787

SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 4.62

EFFECTIVE AREA(ACRES) = 74.50 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 74.5 PEAK FLOW RATE(CFS) = 94.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20114.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00

FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.68

ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 94.52  
PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 17.04  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20114.00 = 4393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.04

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.614

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	4.00	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.747

SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 9.88

EFFECTIVE AREA(ACRES) = 82.40 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 82.4 PEAK FLOW RATE(CFS) = 101.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.04

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.614

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	1.000	-
USER-DEFINED	-	8.20	0.30	1.000	-
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	3.70	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.932

SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 21.01

EFFECTIVE AREA(ACRES) = 99.90 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 99.9 PEAK FLOW RATE(CFS) = 122.11

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20115.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 560.00  
FLOW LENGTH(FEET) = 461.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.70  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 122.11  
PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 17.65  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20115.00 = 4854.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.65

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.582

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.60	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	0.100	-
USER-DEFINED	-	6.20	0.30	0.850	-
USER-DEFINED	-	2.20	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798

SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 15.47

EFFECTIVE AREA(ACRES) = 112.70 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 112.7 PEAK FLOW RATE(CFS) = 134.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.65

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.582

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.81

EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 135.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20116.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 560.00 DOWNSTREAM(FEET) = 528.00  
FLOW LENGTH(FEET) = 219.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 34.34

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 135.56  
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 17.75  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20116.00 = 5073.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20116.00 TO NODE 20117.00 IS CODE = 51

=====  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====  
ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 489.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 174.00 CHANNEL SLOPE = 0.2241  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 135.56  
FLOW VELOCITY(FEET/SEC.) = 19.10 FLOW DEPTH(FEET) = 1.54  
TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 17.90  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20117.00 = 5247.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====  
MAINLINE Tc(MIN) = 17.90  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.569  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.40 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.910  
SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 2.92  
EFFECTIVE AREA(ACRES) = 115.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 115.9 PEAK FLOW RATE(CFS) = 137.11

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====  
MAINLINE Tc(MIN) = 17.90  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.569  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 0.200 -  
USER-DEFINED - 3.30 0.30 0.850 -  
USER-DEFINED - 0.90 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 6.50 0.30 1.000 -

USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.855  
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 15.12  
EFFECTIVE AREA(ACRES) = 128.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 128.7 PEAK FLOW RATE(CFS) = 152.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====  
MAINLINE Tc(MIN) = 17.90  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.569  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 5.85  
EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 133.8 PEAK FLOW RATE(CFS) = 158.08

=====  
END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 133.8 TC(MIN.) = 17.90  
EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.854  
PEAK FLOW RATE(CFS) = 158.08

=====  
END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 10-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P501XX10.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.000; 3.190  
2) 6.000; 2.880  
3) 7.000; 2.640  
4) 8.000; 2.450  
5) 9.000; 2.290  
6) 10.000; 2.160  
7) 11.000; 2.050  
8) 12.000; 1.950  
9) 13.000; 1.860  
10) 14.000; 1.790  
11) 15.000; 1.720  
12) 20.000; 1.460  
13) 25.000; 1.290  
14) 30.000; 1.160  
15) 40.000; 0.990  
16) 50.000; 0.870  
17) 60.000; 0.790  
18) 90.000; 0.630  
19) 120.000; 0.530  
20) 180.000; 0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50100.00 TO NODE 50101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 424.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.479  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.373  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL						
"8-10 DWELLINGS/ACRE"	-	0.10	0.30	0.400	95	8.48
RESIDENTIAL						
"8-10 DWELLINGS/ACRE"	-	0.90	0.30	0.400	95	8.48

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 0.400  
SUBAREA RUNOFF(CFS) = 2.03  
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.03

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50101.00 TO NODE 50102.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 424.00 DOWNSTREAM ELEVATION(FEET) = 420.00  
STREET LENGTH(FEET) = 115.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67



```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.93
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.25
HALFSTREET FLOOD WIDTH(FEET) = 4.78
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.51
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.89
STREET FLOW TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 9.03
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.287
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.30   0.30   0.100   -
USER-DEFINED        -         0.10   0.30   0.400   -
USER-DEFINED        -         0.40   0.30   0.100   -
USER-DEFINED        -         0.10   0.30   0.500   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.178
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.81
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 3.76

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.27 HALFSTREET FLOOD WIDTH(FEET) = 5.78
FLOW VELOCITY(FEET/SEC.) = 3.59 DEPTH*VELOCITY(FT*FT/SEC.) = 0.98
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50102.00 = 445.00 FEET.

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*****
FLOW PROCESS FROM NODE 50102.00 TO NODE 50103.00 IS CODE = 63
-----

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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 420.00 DOWNSTREAM ELEVATION(FEET) = 418.00
STREET LENGTH(FEET) = 84.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.89
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.31
HALFSTREET FLOOD WIDTH(FEET) = 7.59
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.19
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.99
STREET FLOW TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 9.46
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.230
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.90   0.30   0.500   -
USER-DEFINED        -         0.50   0.30   0.500   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.55
EFFECTIVE AREA(ACRES) = 4.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 4.5 PEAK FLOW RATE(CFS) = 8.34

```

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LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.30   0.100   -
USER-DEFINED        -         0.10   0.30   0.100   -
USER-DEFINED        -         0.90   0.30   0.500   -
USER-DEFINED        -         0.10   0.30   0.500   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.433
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 2.27
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 5.93

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.34
FLOW VELOCITY(FEET/SEC.) = 3.35 DEPTH*VELOCITY(FT*FT/SEC.) = 1.09
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50103.00 = 529.00 FEET.

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*****
FLOW PROCESS FROM NODE 50103.00 TO NODE 50104.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 418.00 DOWNSTREAM ELEVATION(FEET) = 416.00
STREET LENGTH(FEET) = 84.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      7.21
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.34
HALFSTREET FLOOD WIDTH(FEET) = 9.22
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.47
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.19
STREET FLOW TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 9.87
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.177
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.90   0.30   0.500   -
USER-DEFINED        -         0.50   0.30   0.500   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.55
EFFECTIVE AREA(ACRES) = 4.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 4.5 PEAK FLOW RATE(CFS) = 8.34

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END OF SUBAREA STREET FLOW HYDRAULICS:

```

DEPTH (FEET) = 0.36 HALFSTREET FLOOD WIDTH (FEET) = 9.84  
FLOW VELOCITY (FEET/SEC.) = 3.60 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.28  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50104.00 = 613.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50104.00 TO NODE 50105.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

-----  
UPSTREAM ELEVATION (FEET) = 416.00 DOWNSTREAM ELEVATION (FEET) = 400.00  
STREET LENGTH (FEET) = 513.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.11

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.37  
HALFSTREET FLOOD WIDTH (FEET) = 10.59  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.24  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.57  
STREET FLOW TRAVEL TIME (MIN.) = 2.02 Tc (MIN.) = 11.89  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.961

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	0.500	-
USER-DEFINED	-	0.40	0.30	0.600	-
USER-DEFINED	-	2.40	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.512  
SUBAREA AREA (ACRES) = 3.40 SUBAREA RUNOFF (CFS) = 5.53  
EFFECTIVE AREA (ACRES) = 7.90 AREA-AVERAGED Fm (INCH/HR) = 0.13  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45  
TOTAL AREA (ACRES) = 7.9 PEAK FLOW RATE (CFS) = 13.00

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.39 HALFSTREET FLOOD WIDTH (FEET) = 11.37  
FLOW VELOCITY (FEET/SEC.) = 4.39 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.69  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50105.00 = 1126.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50105.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN) = 11.89  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.961  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	2.50	0.30	0.600	-
USER-DEFINED	-	1.00	0.30	0.500	-
USER-DEFINED	-	3.00	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 10.61  
EFFECTIVE AREA (ACRES) = 14.50 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.51  
TOTAL AREA (ACRES) = 14.5 PEAK FLOW RATE (CFS) = 23.61

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50106.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

-----  
UPSTREAM ELEVATION (FEET) = 400.00 DOWNSTREAM ELEVATION (FEET) = 390.00  
STREET LENGTH (FEET) = 562.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 30.93

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.53  
HALFSTREET FLOOD WIDTH (FEET) = 18.40  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.33  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.28  
STREET FLOW TRAVEL TIME (MIN.) = 2.16 Tc (MIN.) = 14.05  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.787

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	3.70	0.30	0.600	-
USER-DEFINED	-	1.10	0.30	0.500	-
USER-DEFINED	-	5.20	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.588  
SUBAREA AREA (ACRES) = 10.10 SUBAREA RUNOFF (CFS) = 14.64  
EFFECTIVE AREA (ACRES) = 24.60 AREA-AVERAGED Fm (INCH/HR) = 0.16  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54  
TOTAL AREA (ACRES) = 24.6 PEAK FLOW RATE (CFS) = 35.96

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.55 HALFSTREET FLOOD WIDTH (FEET) = 19.49  
FLOW VELOCITY (FEET/SEC.) = 4.51 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.47

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50106.00 = 1688.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50106.00 TO NODE 50107.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 390.00 DOWNSTREAM ELEVATION(FEET) = 381.00
STREET LENGTH(FEET) = 252.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 40.80

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.52
HALFSTREET FLOOD WIDTH(FEET) = 17.85
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.04
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.11
STREET FLOW TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 14.74

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.738

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include USER-DEFINED and SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30.

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.53 HALFSTREET FLOOD WIDTH(FEET) = 18.48
FLOW VELOCITY(FEET/SEC.) = 6.18 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.26
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50107.00 = 1940.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50107.00 TO NODE 50108.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 381.00 DOWNSTREAM(FEET) = 345.00
FLOW LENGTH(FEET) = 109.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 35.82
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 44.56
PIPE TRAVEL TIME(MIN.) = 0.05 Tc(MIN.) = 14.80
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50108.00 = 2049.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50108.00 TO NODE 50109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 315.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 220.00 CHANNEL SLOPE = 0.1364
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 44.56
FLOW VELOCITY(FEET/SEC.) = 9.65 FLOW DEPTH(FEET) = 1.24
TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 15.18
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50109.00 = 2269.00 FEET.

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FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 15.18
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.711
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 0.600 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 0.600 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.667
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.82
EFFECTIVE AREA(ACRES) = 32.10 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56
TOTAL AREA(ACRES) = 32.1 PEAK FLOW RATE(CFS) = 44.61

\*\*\*\*\*

FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 15.18
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.711
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 0.100 -
USER-DEFINED - 2.30 0.30 0.600 -
USER-DEFINED - 0.70 0.30 1.000 -
USER-DEFINED - 8.30 0.30 1.000 -
USER-DEFINED - 6.90 0.30 1.000 -
USER-DEFINED - 13.20 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.965
SUBAREA AREA(ACRES) = 31.60 SUBAREA RUNOFF(CFS) = 40.42

EFFECTIVE AREA(ACRES) = 63.70 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 63.7 PEAK FLOW RATE(CFS) = 85.03

FLOW VELOCITY(FEET/SEC.) = 8.40 FLOW DEPTH(FEET) = 2.82  
TRAVEL TIME(MIN.) = 1.77 Tc(MIN.) = 16.95  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50119.00 = 3162.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 15.18  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.711  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.600	-
USER-DEFINED	-	4.30	0.30	1.000	-
USER-DEFINED	-	4.10	0.30	1.000	-
USER-DEFINED	-	37.30	0.30	1.000	-
USER-DEFINED	-	37.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990  
SUBAREA AREA(ACRES) = 84.90 SUBAREA RUNOFF(CFS) = 108.04  
EFFECTIVE AREA(ACRES) = 148.60 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
TOTAL AREA(ACRES) = 148.6 PEAK FLOW RATE(CFS) = 193.07

=====

MAINLINE Tc(MIN) = 16.95  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.619  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	5.30	0.30	1.000	-
USER-DEFINED	-	2.70	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.904  
SUBAREA AREA(ACRES) = 14.00 SUBAREA RUNOFF(CFS) = 16.98  
EFFECTIVE AREA(ACRES) = 168.10 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 168.1 PEAK FLOW RATE(CFS) = 204.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN) = 15.18  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.711  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	1.20	0.30	1.000	-
USER-DEFINED	-	4.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.985  
SUBAREA AREA(ACRES) = 5.50 SUBAREA RUNOFF(CFS) = 7.01  
EFFECTIVE AREA(ACRES) = 154.10 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
TOTAL AREA(ACRES) = 154.1 PEAK FLOW RATE(CFS) = 200.08

=====

MAINLINE Tc(MIN) = 16.95  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.619  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	0.850	-
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980  
SUBAREA AREA(ACRES) = 8.40 SUBAREA RUNOFF(CFS) = 10.01  
EFFECTIVE AREA(ACRES) = 176.50 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 176.5 PEAK FLOW RATE(CFS) = 214.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50119.00 IS CODE = 51

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 1

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 284.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 893.00 CHANNEL SLOPE = 0.0347  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 200.08

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 16.95

RAINFALL INTENSITY(INCH/HR) = 1.62  
AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.90  
EFFECTIVE STREAM AREA(ACRES) = 176.50  
TOTAL STREAM AREA(ACRES) = 176.50  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 214.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50110.00 TO NODE 50111.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 420.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.342  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.575

SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" - 1.20 0.30 0.500 95 7.34  
RESIDENTIAL  
"3-4 DWELLINGS/ACRE" - 0.20 0.30 0.600 95 7.78  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" - 0.10 0.30 0.500 95 7.34  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.513  
SUBAREA RUNOFF(CFS) = 3.27  
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 3.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50111.00 TO NODE 50112.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 420.00 DOWNSTREAM ELEVATION(FEET) = 415.00  
STREET LENGTH(FEET) = 122.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.72  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.29  
HALFSTREET FLOOD WIDTH(FEET) = 6.34

AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.99  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.14  
STREET FLOW TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 7.85  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.478

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.600 -  
USER-DEFINED - 0.30 0.30 0.500 -  
USER-DEFINED - 0.50 0.30 0.600 -  
USER-DEFINED - 0.10 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.571  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.91  
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54  
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 6.04

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 7.34  
FLOW VELOCITY(FEET/SEC.) = 4.15 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.27  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50112.00 = 452.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50112.00 TO NODE 50113.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 415.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
STREET LENGTH(FEET) = 122.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.65  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 8.28  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.37  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.41  
STREET FLOW TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 8.32  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.399

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.600 -  
USER-DEFINED - 0.10 0.30 0.500 -  
USER-DEFINED - 1.00 0.30 0.600 -  
USER-DEFINED - 0.20 0.30 0.500 -

USER-DEFINED - 0.10 0.30 0.600 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.581  
SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 3.20  
EFFECTIVE AREA (ACRES) = 4.50 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 4.5 PEAK FLOW RATE (CFS) = 9.04

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.34 HALFSTREET FLOOD WIDTH (FEET) = 9.03  
FLOW VELOCITY (FEET/SEC.) = 4.50 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.52  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50113.00 = 574.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50113.00 TO NODE 50113.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN) = 8.32

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.399

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.500	-
USER-DEFINED	-	1.90	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.575

SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 5.61

EFFECTIVE AREA (ACRES) = 7.30 AREA-AVERAGED Fm (INCH/HR) = 0.17

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56

TOTAL AREA (ACRES) = 7.3 PEAK FLOW RATE (CFS) = 14.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50113.00 TO NODE 50114.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<<

-----  
UPSTREAM ELEVATION (FEET) = 410.00 DOWNSTREAM ELEVATION (FEET) = 400.00  
STREET LENGTH (FEET) = 238.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.49

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.40

HALFSTREET FLOOD WIDTH (FEET) = 12.15

AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.25  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.11  
STREET FLOW TRAVEL TIME (MIN.) = 0.76 Tc (MIN.) = 9.07  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.280

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.600	-
USER-DEFINED	-	1.90	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600

SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 5.67

EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.17

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.57

TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 19.54

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.41 HALFSTREET FLOOD WIDTH (FEET) = 12.70

FLOW VELOCITY (FEET/SEC.) = 5.43 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.24

LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50114.00 = 812.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50114.00 TO NODE 50115.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<<

-----  
UPSTREAM ELEVATION (FEET) = 400.00 DOWNSTREAM ELEVATION (FEET) = 390.00  
STREET LENGTH (FEET) = 241.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 24.60

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.44

HALFSTREET FLOOD WIDTH (FEET) = 14.10

AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.65

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.49

STREET FLOW TRAVEL TIME (MIN.) = 0.71 Tc (MIN.) = 9.78

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.188

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	1.50	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.607

SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 10.11

EFFECTIVE AREA (ACRES) = 15.90 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 15.9 PEAK FLOW RATE (CFS) = 28.80

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.46 HALFSTREET FLOOD WIDTH (FEET) = 15.04  
FLOW VELOCITY (FEET/SEC.) = 5.87 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.70  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50115.00 = 1053.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50115.00 TO NODE 50116.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 390.00 DOWNSTREAM ELEVATION (FEET) = 380.00  
STREET LENGTH (FEET) = 268.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 32.51

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.48  
HALFSTREET FLOOD WIDTH (FEET) = 16.13  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.82  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.80  
STREET FLOW TRAVEL TIME (MIN.) = 0.77 Tc (MIN.) = 10.55  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.099

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	0.600	-
USER-DEFINED	-	3.50	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600

SUBAREA AREA (ACRES) = 4.30 SUBAREA RUNOFF (CFS) = 7.43  
EFFECTIVE AREA (ACRES) = 20.20 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 20.2 PEAK FLOW RATE (CFS) = 34.96

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.49 HALFSTREET FLOOD WIDTH (FEET) = 16.60  
FLOW VELOCITY (FEET/SEC.) = 5.93 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.91  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50116.00 = 1321.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50116.00 TO NODE 50117.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 380.00 DOWNSTREAM ELEVATION (FEET) = 355.00  
STREET LENGTH (FEET) = 507.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.64

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 46.59

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.51  
HALFSTREET FLOOD WIDTH (FEET) = 17.62  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.07  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.61  
STREET FLOW TRAVEL TIME (MIN.) = 1.19 Tc (MIN.) = 11.75  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.975

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.80	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	6.10	0.30	0.600	-
USER-DEFINED	-	1.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.644

SUBAREA AREA (ACRES) = 14.50 SUBAREA RUNOFF (CFS) = 23.26  
EFFECTIVE AREA (ACRES) = 34.70 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA (ACRES) = 34.7 PEAK FLOW RATE (CFS) = 55.96

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.54 HALFSTREET FLOOD WIDTH (FEET) = 19.02  
FLOW VELOCITY (FEET/SEC.) = 7.35 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.96  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50117.00 = 1828.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50117.00 TO NODE 50118.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 355.00 DOWNSTREAM (FEET) = 315.00  
FLOW LENGTH (FEET) = 171.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 33.34  
ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 55.96  
PIPE TRAVEL TIME (MIN.) = 0.09 Tc (MIN.) = 11.83

LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50118.00 = 1999.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50118.00 TO NODE 50119.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 284.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 180.00 CHANNEL SLOPE = 0.1722
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 55.96
FLOW VELOCITY(FEET/SEC.) = 11.14 FLOW DEPTH(FEET) = 1.29
TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 12.10
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50119.00 = 2179.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 12.10
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.941
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 0.600 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 2.30 0.30 0.600 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.688
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 5.00
EFFECTIVE AREA(ACRES) = 37.90 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62
TOTAL AREA(ACRES) = 37.9 PEAK FLOW RATE(CFS) = 59.88

\*\*\*\*\*

FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 12.10
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.941
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.89
EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62
TOTAL AREA(ACRES) = 38.5 PEAK FLOW RATE(CFS) = 60.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 12.10
RAINFALL INTENSITY(INCH/HR) = 1.94
AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.62
EFFECTIVE STREAM AREA(ACRES) = 38.50
TOTAL STREAM AREA(ACRES) = 38.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 60.77

\*\* CONFLUENCE DATA \*\*

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 263.89 Tc(MIN.) = 16.95
EFFECTIVE AREA(ACRES) = 215.00 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 215.0
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50119.00 = 3162.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50119.00 TO NODE 50120.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 240.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00 CHANNEL SLOPE = 0.0437
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00
CHANNEL FLOW THRU SUBAREA(CFS) = 263.89
FLOW VELOCITY(FEET/SEC.) = 9.80 FLOW DEPTH(FEET) = 3.00
TRAVEL TIME(MIN.) = 1.71 Tc(MIN.) = 18.66
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50120.00 = 4170.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50120.00 TO NODE 50120.00 IS CODE = 81



>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 18.66

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.530

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.640

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 2.41

EFFECTIVE AREA(ACRES) = 217.00 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 217.0 PEAK FLOW RATE(CFS) = 263.89

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50120.00 TO NODE 50120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 18.66

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.530

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	1.70	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	2.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.929

SUBAREA AREA(ACRES) = 5.30 SUBAREA RUNOFF(CFS) = 5.97

EFFECTIVE AREA(ACRES) = 222.30 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 222.3 PEAK FLOW RATE(CFS) = 263.89

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50120.00 TO NODE 50120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 18.66

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.530

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.00

EFFECTIVE AREA(ACRES) = 223.20 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 223.2 PEAK FLOW RATE(CFS) = 263.89

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 223.2 TC(MIN.) = 18.66

EFFECTIVE AREA(ACRES) = 223.20 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.851

PEAK FLOW RATE(CFS) = 263.89

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	250.32	13.83	1.802	0.30( 0.25)	0.84	172.7	50110.00
2	263.89	18.66	1.530	0.30( 0.26)	0.85	223.2	50100.00

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PA3 & PA4 ROMP \*  
\* REGIONAL WATERSHED S29 - FREE DRAINING - ULTIMATE CONDITION \*  
\* 25-YR RM EV JULY 2018 CCHI \*  
\*\*\*\*\*

FILE NAME: P503XX10.DAT  
TIME/DATE OF STUDY: 14:16 03/26/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.00;	3.190
2)	6.00;	2.880
3)	7.00;	2.640
4)	8.00;	2.450
5)	9.00;	2.290
6)	10.00;	2.160
7)	11.00;	2.050
8)	12.00;	1.950
9)	13.00;	1.860
10)	14.00;	1.790
11)	15.00;	1.720
12)	20.00;	1.460
13)	25.00;	1.290
14)	30.00;	1.160
15)	40.00;	0.990
16)	50.00;	0.870
17)	60.00;	0.790
18)	90.00;	0.630
19)	120.00;	0.530
20)	180.00;	0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50300.00 TO NODE 50301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 660.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.792  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.187  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.70	0.30	1.000	69	9.79
NATURAL FAIR COVER						
"GRASS"	-	0.40	0.30	1.000	69	9.79
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.20	0.30	1.000	69	9.79
NATURAL FAIR COVER						
"GRASS"	-	0.10	0.30	1.000	69	9.79

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.38  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 2.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50301.00 TO NODE 50302.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 660.00 DOWNSTREAM ELEVATION(FEET) = 650.00  
STREET LENGTH(FEET) = 259.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.81  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.27  
HALFSTREET FLOOD WIDTH(FEET) = 5.59  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.79  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.02  
STREET FLOW TRAVEL TIME(MIN.) = 1.14 Tc(MIN.) = 10.93  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.058

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 0.50 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.700 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.967  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 2.86  
EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 5.08

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 6.72  
FLOW VELOCITY(FEET/SEC.) = 3.96 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.16  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50302.00 = 589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50302.00 TO NODE 50303.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 650.00 DOWNSTREAM ELEVATION(FEET) = 630.00  
STREET LENGTH(FEET) = 298.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.18  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.29  
HALFSTREET FLOOD WIDTH(FEET) = 6.41

AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.15  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.47  
STREET FLOW TRAVEL TIME(MIN.) = 0.96 Tc(MIN.) = 11.90  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.960  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.30 0.30 0.700 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.721  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.20  
EFFECTIVE AREA(ACRES) = 4.60 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 7.00

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 6.91  
FLOW VELOCITY(FEET/SEC.) = 5.25 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.56  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50303.00 = 887.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50303.00 TO NODE 50304.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 630.00 DOWNSTREAM ELEVATION(FEET) = 590.00  
STREET LENGTH(FEET) = 724.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.62

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.18  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 9.28  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.32  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.83  
STREET FLOW TRAVEL TIME(MIN.) = 2.27 Tc(MIN.) = 14.16  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.779

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.40 0.30 0.700 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 0.700 -  
USER-DEFINED - 0.50 0.30 1.000 -  
USER-DEFINED - 1.00 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.848  
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 8.37  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 14.61

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.51  
FLOW VELOCITY(FEET/SEC.) = 5.65 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.08  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50304.00 = 1611.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50304.00 TO NODE 50304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.16

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.779

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.13

EFFECTIVE AREA(ACRES) = 10.80 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87

TOTAL AREA(ACRES) = 10.8 PEAK FLOW RATE(CFS) = 14.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50304.00 TO NODE 50305.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<

UPSTREAM ELEVATION(FEET) = 590.00 DOWNSTREAM ELEVATION(FEET) = 550.00

STREET LENGTH(FEET) = 788.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.63

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.24

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.42

HALFSTREET FLOOD WIDTH(FEET) = 12.93

AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.97

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.49

STREET FLOW TRAVEL TIME(MIN.) = 2.20 Tc(MIN.) = 16.36

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.649

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.60	0.30	0.600	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.30	0.30	0.600	-
USER-DEFINED	-	2.20	0.30	1.000	-
USER-DEFINED	-	4.00	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835

SUBAREA AREA(ACRES) = 11.90 SUBAREA RUNOFF(CFS) = 14.98

EFFECTIVE AREA(ACRES) = 22.70 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 22.7 PEAK FLOW RATE(CFS) = 28.47

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 14.34

FLOW VELOCITY(FEET/SEC.) = 6.34 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.82

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50305.00 = 2399.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.36

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.649

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.700	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.74

EFFECTIVE AREA(ACRES) = 23.30 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86

TOTAL AREA(ACRES) = 23.3 PEAK FLOW RATE(CFS) = 29.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.36

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.649

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.30	0.600	-
USER-DEFINED	-	1.20	0.30	0.700	-
USER-DEFINED	-	2.50	0.30	0.600	-
USER-DEFINED	-	7.60	0.30	0.700	-
USER-DEFINED	-	0.50	0.30	0.600	-
USER-DEFINED	-	1.30	0.30	0.700	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.666  
 SUBAREA AREA (ACRES) = 15.20 SUBAREA RUNOFF (CFS) = 19.83  
 EFFECTIVE AREA (ACRES) = 38.50 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
 TOTAL AREA (ACRES) = 38.5 PEAK FLOW RATE (CFS) = 49.03

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50305.00 TO NODE 50306.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 510.00  
 FLOW LENGTH(FEET) = 813.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 18.00  
 ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 49.03  
 PIPE TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 17.12  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50306.00 = 3212.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.12  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.610  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	2.80	0.30	0.600	-
USER-DEFINED	-	2.00	0.30	0.100	-
USER-DEFINED	-	10.00	0.30	0.600	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.536  
 SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 20.74  
 EFFECTIVE AREA(ACRES) = 54.40 AREA-AVERAGED Fm(INCH/HR) = 0.21  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71  
 TOTAL AREA(ACRES) = 54.4 PEAK FLOW RATE(CFS) = 68.41

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.12  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.610  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 2.12

EFFECTIVE AREA(ACRES) = 56.20 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA(ACRES) = 56.2 PEAK FLOW RATE(CFS) = 70.53

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50306.00 TO NODE 50307.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 470.00  
 FLOW LENGTH(FEET) = 919.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 18.63  
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 70.53  
 PIPE TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 17.94  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50307.00 = 4131.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.94  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.567  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.30	0.600	-
USER-DEFINED	-	2.20	0.30	0.100	-
USER-DEFINED	-	1.50	0.30	0.400	-
USER-DEFINED	-	10.50	0.30	0.600	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.533  
 SUBAREA AREA(ACRES) = 17.90 SUBAREA RUNOFF(CFS) = 22.67  
 EFFECTIVE AREA(ACRES) = 74.10 AREA-AVERAGED Fm(INCH/HR) = 0.20  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.67  
 TOTAL AREA(ACRES) = 74.1 PEAK FLOW RATE(CFS) = 91.04

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.94  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.567  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 3.42  
 EFFECTIVE AREA(ACRES) = 77.10 AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA (ACRES) = 77.1 PEAK FLOW RATE (CFS) = 94.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50307.00 TO NODE 50308.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 425.00  
FLOW LENGTH (FEET) = 1006.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.3 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 20.19  
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 94.46  
PIPE TRAVEL TIME (MIN.) = 0.83 Tc (MIN.) = 18.77  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50308.00 = 5137.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 18.77  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.524  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.100	-
USER-DEFINED	-	2.10	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	0.100	-
USER-DEFINED	-	2.50	0.30	0.400	-
USER-DEFINED	-	6.30	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.495  
SUBAREA AREA (ACRES) = 12.90 SUBAREA RUNOFF (CFS) = 15.97  
EFFECTIVE AREA (ACRES) = 90.00 AREA-AVERAGED Fm (INCH/HR) = 0.20  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.66  
TOTAL AREA (ACRES) = 90.0 PEAK FLOW RATE (CFS) = 107.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 18.77  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.524  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.893  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 0.79  
EFFECTIVE AREA (ACRES) = 90.70 AREA-AVERAGED Fm (INCH/HR) = 0.20  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.66

TOTAL AREA (ACRES) = 90.7 PEAK FLOW RATE (CFS) = 108.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 18.77  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.524  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	0.400	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	5.20	0.30	0.100	-
USER-DEFINED	-	11.00	0.30	0.400	-
USER-DEFINED	-	8.80	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.419  
SUBAREA AREA (ACRES) = 26.80 SUBAREA RUNOFF (CFS) = 33.73  
EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 141.96

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 18.77  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.524  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.60	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	2.80	0.30	0.400	-
USER-DEFINED	-	0.20	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.749  
SUBAREA AREA (ACRES) = 13.70 SUBAREA RUNOFF (CFS) = 16.02  
EFFECTIVE AREA (ACRES) = 131.20 AREA-AVERAGED Fm (INCH/HR) = 0.19  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA (ACRES) = 131.2 PEAK FLOW RATE (CFS) = 157.98

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50309.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 425.00 DOWNSTREAM (FEET) = 410.00  
FLOW LENGTH (FEET) = 296.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 24.04  
ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 157.98

PIPE TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 18.97  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 5433.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 10

-----  
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<<  
=====

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 15.1

-----  
>>>>DEFINE MEMORY BANK # 2 <<<<<<  
=====

PEAK FLOWRATE TABLE FILE NAME: P502XX10.DNA

MEMORY BANK # 2 DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	643.83	13.84	0.30 ( 0.23)	0.76	449.7	50240.00
2	666.00	17.76	0.30 ( 0.23)	0.76	547.0	50280.00
3	655.02	20.54	0.30 ( 0.23)	0.76	595.3	50220.00
4	601.01	25.79	0.30 ( 0.23)	0.76	641.4	50260.00
5	577.56	27.54	0.30 ( 0.23)	0.76	645.2	50200.00
TOTAL AREA(ACRES) =						645.2

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 14.0

-----  
>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<<<  
=====

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	643.83	13.84	0.30 ( 0.23)	0.76	449.7	50240.00
2	666.00	17.76	0.30 ( 0.23)	0.76	547.0	50280.00
3	655.02	20.54	0.30 ( 0.23)	0.76	595.3	50220.00
4	601.01	25.79	0.30 ( 0.23)	0.76	641.4	50260.00
5	577.56	27.54	0.30 ( 0.23)	0.76	645.2	50200.00
TOTAL AREA(ACRES) =						645.2

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 12

-----  
>>>>CLEAR MEMORY BANK # 2 <<<<<<  
=====

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 11

-----  
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<<  
=====

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	643.83	13.84	1.801	0.30 ( 0.23)	0.76	449.7	50240.00
2	666.00	17.76	1.577	0.30 ( 0.23)	0.76	547.0	50280.00

3	655.02	20.54	1.442	0.30 ( 0.23)	0.76	595.3	50220.00
4	601.01	25.79	1.269	0.30 ( 0.23)	0.76	641.4	50260.00
5	577.56	27.54	1.224	0.30 ( 0.23)	0.76	645.2	50200.00

LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50309.00 = 11241.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	157.98	18.97	1.513	0.30 ( 0.19)	0.62	131.2	50300.00

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 5433.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	784.06	13.84	1.801	0.30 ( 0.22)	0.74	545.4	50240.00
2	820.90	17.76	1.577	0.30 ( 0.22)	0.74	669.8	50280.00
3	819.19	18.97	1.513	0.30 ( 0.22)	0.74	699.3	50300.00
4	804.45	20.54	1.442	0.30 ( 0.22)	0.74	726.5	50220.00
5	729.95	25.79	1.269	0.30 ( 0.22)	0.74	772.6	50260.00
6	701.09	27.54	1.224	0.30 ( 0.22)	0.74	776.4	50200.00
TOTAL AREA(ACRES) =						776.4	

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 820.90 Tc(MIN.) = 17.760  
EFFECTIVE AREA(ACRES) = 669.77 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
TOTAL AREA(ACRES) = 776.4  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50309.00 = 11241.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 12

-----  
>>>>CLEAR MEMORY BANK # 1 <<<<<<  
=====

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50310.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 407.00  
FLOW LENGTH(FEET) = 898.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 120.0 INCH PIPE IS 89.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.07  
ESTIMATED PIPE DIAMETER(INCH) = 120.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 820.90  
PIPE TRAVEL TIME(MIN.) = 1.14 Tc(MIN.) = 18.90  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50310.00 = 12139.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE Tc(MIN.) = 18.90  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.517  
SUBAREA LOSS RATE DATA(AMC II):



DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.20 0.30 0.100 -  
 USER-DEFINED - 4.60 0.30 0.400 -  
 USER-DEFINED - 2.60 0.30 0.850 -  
 USER-DEFINED - 1.00 0.30 0.100 -  
 USER-DEFINED - 9.60 0.30 0.400 -  
 USER-DEFINED - 0.50 0.30 0.500 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.446  
 SUBAREA AREA (ACRES) = 18.50 SUBAREA RUNOFF (CFS) = 23.03  
 EFFECTIVE AREA (ACRES) = 688.27 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 794.9 PEAK FLOW RATE (CFS) = 820.90  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 18.90  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.517  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.600 -  
 USER-DEFINED - 10.70 0.30 0.850 -  
 USER-DEFINED - 3.20 0.30 0.400 -  
 USER-DEFINED - 0.50 0.30 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.749  
 SUBAREA AREA (ACRES) = 14.50 SUBAREA RUNOFF (CFS) = 16.87  
 EFFECTIVE AREA (ACRES) = 702.77 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 809.4 PEAK FLOW RATE (CFS) = 820.90  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50310.00 TO NODE 50345.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 407.00 DOWNSTREAM (FEET) = 403.00  
 FLOW LENGTH (FEET) = 1487.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 126.0 INCH PIPE IS 92.2 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.09  
 ESTIMATED PIPE DIAMETER (INCH) = 126.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 820.90  
 PIPE TRAVEL TIME (MIN.) = 2.05 Tc (MIN.) = 20.95  
 LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50345.00 = 13626.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50320.00 TO NODE 50321.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 322.00  
 ELEVATION DATA: UPSTREAM (FEET) = 1110.00 DOWNSTREAM (FEET) = 1035.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.517  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.223

SUBAREA Tc AND LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 NATURAL FAIR COVER  
 "GRASS" - 0.60 0.30 1.000 69 9.52  
 NATURAL FAIR COVER  
 "WOODLAND, GRASS" - 0.30 0.30 1.000 69 9.52  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 1.56  
 TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 1.56

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50321.00 TO NODE 50322.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1035.00 DOWNSTREAM (FEET) = 960.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 225.00 CHANNEL SLOPE = 0.3333  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1.56  
 FLOW VELOCITY (FEET/SEC.) = 5.75 FLOW DEPTH (FEET) = 0.30  
 TRAVEL TIME (MIN.) = 0.65 Tc (MIN.) = 10.17  
 LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50322.00 = 547.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50322.00 TO NODE 50322.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 10.17  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.141  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 1.00 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 1.82  
 EFFECTIVE AREA (ACRES) = 2.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 3.31

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*****
FLOW PROCESS FROM NODE 50322.00 TO NODE 50323.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 955.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 33.00 CHANNEL SLOPE = 0.1515
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.31
FLOW VELOCITY(FEET/SEC.) = 5.21 FLOW DEPTH(FEET) = 0.46
TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 10.27
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50323.00 = 580.00 FEET.

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*****
FLOW PROCESS FROM NODE 50323.00 TO NODE 50323.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.27
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.130
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         1.70   0.30  1.000  -
USER-DEFINED       -         1.50   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 5.27
EFFECTIVE AREA(ACRES) = 5.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 5.2 PEAK FLOW RATE(CFS) = 8.56

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*****
FLOW PROCESS FROM NODE 50323.00 TO NODE 50324.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 955.00 DOWNSTREAM(FEET) = 915.00
FLOW LENGTH(FEET) = 254.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.87
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.56
PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 10.51
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50324.00 = 834.00 FEET.

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*****
FLOW PROCESS FROM NODE 50324.00 TO NODE 50324.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.51
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.104

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         2.00   0.30  0.800  -
USER-DEFINED       -         0.20   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.818
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 3.68
EFFECTIVE AREA(ACRES) = 7.40 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 7.4 PEAK FLOW RATE(CFS) = 12.12

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*****
FLOW PROCESS FROM NODE 50324.00 TO NODE 50324.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.51
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.104
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         2.80   0.30  0.800  -
USER-DEFINED       -         0.10   0.30  1.000  -
USER-DEFINED       -         2.00   0.30  0.800  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.804
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 8.21
EFFECTIVE AREA(ACRES) = 12.30 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89
TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 20.34

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```

*****
FLOW PROCESS FROM NODE 50324.00 TO NODE 50325.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 880.00
FLOW LENGTH(FEET) = 548.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.86
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.34
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 11.09
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50325.00 = 1382.00 FEET.

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*****
FLOW PROCESS FROM NODE 50325.00 TO NODE 50325.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 11.09
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.041
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -         3.90   0.30  0.800  -

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 3.90 SUBAREA RUNOFF(CFS) = 6.32  
EFFECTIVE AREA(ACRES) = 16.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 16.2 PEAK FLOW RATE(CFS) = 25.97

\*\*\*\*\*

FLOW PROCESS FROM NODE 50325.00 TO NODE 50326.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 880.00 DOWNSTREAM(FEET) = 850.00  
FLOW LENGTH(FEET) = 441.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.77  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 25.97  
PIPE TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 11.53  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50326.00 = 1823.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50326.00 TO NODE 50326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.53  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.997

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.30	0.30	0.800	-
USER-DEFINED	-	1.20	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 7.12  
EFFECTIVE AREA(ACRES) = 20.70 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 20.7 PEAK FLOW RATE(CFS) = 32.44

\*\*\*\*\*

FLOW PROCESS FROM NODE 50326.00 TO NODE 50327.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 810.00  
FLOW LENGTH(FEET) = 616.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.86  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 32.44  
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 12.10  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50327.00 = 2439.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50327.00 TO NODE 50327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.10  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.941

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.20	0.30	0.800	-
USER-DEFINED	-	5.00	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 11.02  
EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 42.42

\*\*\*\*\*

FLOW PROCESS FROM NODE 50327.00 TO NODE 50328.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 760.00  
FLOW LENGTH(FEET) = 724.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.71  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 42.42  
PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 12.71  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50328.00 = 3163.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50328.00 TO NODE 50328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.71  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.886

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.30	0.800	-
USER-DEFINED	-	6.30	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 9.20 SUBAREA RUNOFF(CFS) = 13.63  
EFFECTIVE AREA(ACRES) = 37.10 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 54.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 50328.00 TO NODE 50328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.71  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.886

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.30	0.800	-
USER-DEFINED	-	3.10	0.30	0.800	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 6.00 SUBAREA RUNOFF(CFS) = 8.89  
EFFECTIVE AREA(ACRES) = 43.10 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA(ACRES) = 43.1 PEAK FLOW RATE(CFS) = 63.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50328.00 TO NODE 50329.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 760.00 DOWNSTREAM(FEET) = 700.00  
FLOW LENGTH(FEET) = 769.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.79  
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 63.55  
PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 13.27  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50329.00 = 3932.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50329.00 TO NODE 50329.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 13.27  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.841  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.10	0.30	0.800	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 10.23  
EFFECTIVE AREA(ACRES) = 50.20 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 50.2 PEAK FLOW RATE(CFS) = 72.03

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50329.00 TO NODE 50340.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 660.00  
FLOW LENGTH(FEET) = 478.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.98  
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 72.03  
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 13.61

LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50340.00 = 4410.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 13.61  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.818  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.70	0.30	0.800	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.70 SUBAREA RUNOFF(CFS) = 12.35  
EFFECTIVE AREA(ACRES) = 58.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 58.9 PEAK FLOW RATE(CFS) = 83.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 13.61  
RAINFALL INTENSITY(INCH/HR) = 1.82  
AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.82  
EFFECTIVE STREAM AREA(ACRES) = 58.90  
TOTAL STREAM AREA(ACRES) = 58.90  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 83.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50330.00 TO NODE 50331.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 294.00  
ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 965.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.457  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.553  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "1 DWELLING/ACRE"	-	1.60	0.30	0.800	69	7.46

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA RUNOFF(CFS) = 3.33  
TOTAL AREA(ACRES) = 1.60 PEAK FLOW RATE(CFS) = 3.33

\*\*\*\*\*

FLOW PROCESS FROM NODE 50331.00 TO NODE 50332.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 965.00 DOWNSTREAM ELEVATION(FEET) = 960.00
STREET LENGTH(FEET) = 285.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.72
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.34
HALFSTREET FLOOD WIDTH(FEET) = 8.84
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.94
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.99

STREET FLOW TRAVEL TIME(MIN.) = 1.61 Tc(MIN.) = 9.07
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.281

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include USER-DEFINED and SUBAREA AVERAGE PVIOUS LOSS RATE.

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 4.78
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 7.71

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 10.20
FLOW VELOCITY(FEET/SEC.) = 3.14 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.14
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50332.00 = 579.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50332.00 TO NODE 50333.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 960.00 DOWNSTREAM ELEVATION(FEET) = 940.00
STREET LENGTH(FEET) = 364.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.62

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.13
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.34
HALFSTREET FLOOD WIDTH(FEET) = 9.28
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.29
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.82
STREET FLOW TRAVEL TIME(MIN.) = 1.15 Tc(MIN.) = 10.22
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.136

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include USER-DEFINED and SUBAREA AVERAGE PVIOUS LOSS RATE.

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.35
FLOW VELOCITY(FEET/SEC.) = 5.55 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.03
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50333.00 = 943.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50333.00 TO NODE 50334.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 940.00 DOWNSTREAM ELEVATION(FEET) = 920.00
STREET LENGTH(FEET) = 405.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.14
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.40
HALFSTREET FLOOD WIDTH(FEET) = 12.15
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.75
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.31
STREET FLOW TRAVEL TIME(MIN.) = 1.17 Tc(MIN.) = 11.39

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.011  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 5.50 0.30 0.800 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.831  
SUBAREA AREA (ACRES) = 6.50 SUBAREA RUNOFF (CFS) = 10.31  
EFFECTIVE AREA (ACRES) = 14.70 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA (ACRES) = 14.7 PEAK FLOW RATE (CFS) = 23.37

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 13.24  
FLOW VELOCITY (FEET/SEC.) = 6.01 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.54  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50334.00 = 1348.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50334.00 TO NODE 50335.00 IS CODE = 63  
-----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
>>>> (STREET TABLE SECTION # 5 USED) <<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 920.00 DOWNSTREAM ELEVATION (FEET) = 905.00  
STREET LENGTH (FEET) = 270.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.62

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 40.55  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.48  
HALFSTREET FLOOD WIDTH (FEET) = 16.29  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.13  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.45  
STREET FLOW TRAVEL TIME (MIN.) = 0.63 Tc (MIN.) = 12.02  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.948

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 12.90 0.30 0.800 -  
USER-DEFINED - 4.00 0.30 1.000 -  
USER-DEFINED - 5.40 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.886  
SUBAREA AREA (ACRES) = 22.70 SUBAREA RUNOFF (CFS) = 34.37  
EFFECTIVE AREA (ACRES) = 37.40 AREA-AVERAGED Fm (INCH/HR) = 0.26

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 37.4 PEAK FLOW RATE (CFS) = 56.90

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.53 HALFSTREET FLOOD WIDTH (FEET) = 18.63  
FLOW VELOCITY (FEET/SEC.) = 7.77 DEPTH\*VELOCITY (FT\*FT/SEC.) = 4.13  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50335.00 = 1618.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50335.00 TO NODE 50336.00 IS CODE = 31  
-----

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
>>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 905.00 DOWNSTREAM (FEET) = 870.00  
FLOW LENGTH (FEET) = 898.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.7 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 16.63  
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 56.90  
PIPE TRAVEL TIME (MIN.) = 0.90 Tc (MIN.) = 12.92  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50336.00 = 2516.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50336.00 TO NODE 50336.00 IS CODE = 81  
-----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<<<  
=====

MAINLINE Tc (MIN.) = 12.92  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.867  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 6.40 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 6.40 SUBAREA RUNOFF (CFS) = 9.37  
EFFECTIVE AREA (ACRES) = 43.80 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA (ACRES) = 43.8 PEAK FLOW RATE (CFS) = 63.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50336.00 TO NODE 50337.00 IS CODE = 31  
-----

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
>>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 870.00 DOWNSTREAM (FEET) = 820.00  
FLOW LENGTH (FEET) = 799.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 20.80  
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 63.55  
PIPE TRAVEL TIME (MIN.) = 0.64 Tc (MIN.) = 13.56  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50337.00 = 3315.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50337.00 TO NODE 50337.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 13.56  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.821  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.800 -  
USER-DEFINED - 7.20 0.30 0.800 -  
USER-DEFINED - 1.50 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.839  
SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 16.10  
EFFECTIVE AREA(ACRES) = 55.20 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 55.2 PEAK FLOW RATE(CFS) = 77.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50337.00 TO NODE 50338.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 750.00  
FLOW LENGTH(FEET) = 1063.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.49  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 77.82  
PIPE TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 14.35  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50338.00 = 4378.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50338.00 TO NODE 50338.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 14.35  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.765  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.70 0.30 0.800 -  
USER-DEFINED - 4.20 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 12.22  
EFFECTIVE AREA(ACRES) = 64.10 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 64.1 PEAK FLOW RATE(CFS) = 87.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50338.00 TO NODE 50339.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

=====  
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 685.00  
FLOW LENGTH(FEET) = 1107.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.81  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 87.30  
PIPE TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 15.20  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50339.00 = 5485.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50339.00 TO NODE 50339.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 15.20  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.710  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 6.10 0.30 0.800 -  
USER-DEFINED - 1.20 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 9.66  
EFFECTIVE AREA(ACRES) = 71.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 71.4 PEAK FLOW RATE(CFS) = 93.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50339.00 TO NODE 50340.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 685.00 DOWNSTREAM(FEET) = 660.00  
FLOW LENGTH(FEET) = 592.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.67  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 93.74  
PIPE TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 15.70  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50340.00 = 6077.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 15.70  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.684  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 5.00 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 6.50

EFFECTIVE AREA(ACRES) = 76.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA(ACRES) = 76.4 PEAK FLOW RATE(CFS) = 98.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS =	2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:	
TIME OF CONCENTRATION(MIN.) =	15.70
RAINFALL INTENSITY(INCH/HR) =	1.68
AREA-AVERAGED Fm(INCH/HR) =	0.25
AREA-AVERAGED Fp(INCH/HR) =	0.30
AREA-AVERAGED Ap =	0.83
EFFECTIVE STREAM AREA(ACRES) =	76.40
TOTAL STREAM AREA(ACRES) =	76.40
PEAK FLOW RATE(CFS) AT CONFLUENCE =	98.56

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	83.33	13.61	1.818	0.30( 0.25)	0.82	58.9	50320.00
2	98.56	15.70	1.684	0.30( 0.25)	0.83	76.4	50330.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	176.74	13.61	1.818	0.30( 0.25)	0.83	125.1	50320.00
2	174.80	15.70	1.684	0.30( 0.25)	0.83	135.3	50330.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 176.74 Tc(MIN.) = 13.61  
EFFECTIVE AREA(ACRES) = 125.12 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA(ACRES) = 135.3  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50340.00 = 6077.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50340.00 TO NODE 50341.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	660.00	DOWNSTREAM(FEET) =	575.00
FLOW LENGTH(FEET) =	1133.00	MANNING'S N =	0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS	27.0 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	28.88		
ESTIMATED PIPE DIAMETER(INCH) =	39.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	176.74		
PIPE TRAVEL TIME(MIN.) =	0.65	Tc(MIN.) =	14.26
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50341.00 =	7210.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50341.00 TO NODE 50341.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	14.26				
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	1.772				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.30	0.30	0.600	-
USER-DEFINED	-	3.10	0.30	0.800	-
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =	0.684				
SUBAREA AREA(ACRES) =	7.40	SUBAREA RUNOFF(CFS) =	10.43		
EFFECTIVE AREA(ACRES) =	132.52	AREA-AVERAGED Fm(INCH/HR) =	0.25		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.82		
TOTAL AREA(ACRES) =	142.7	PEAK FLOW RATE(CFS) =	182.02		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50341.00 TO NODE 50342.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	575.00	DOWNSTREAM(FEET) =	540.00
FLOW LENGTH(FEET) =	495.00	MANNING'S N =	0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS	28.2 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	28.30		
ESTIMATED PIPE DIAMETER(INCH) =	39.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	182.02		
PIPE TRAVEL TIME(MIN.) =	0.29	Tc(MIN.) =	14.55
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50342.00 =	7705.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50342.00 TO NODE 50342.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	14.55				
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	1.751				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	0.600	-
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =	0.600				
SUBAREA AREA(ACRES) =	2.10	SUBAREA RUNOFF(CFS) =	2.97		
EFFECTIVE AREA(ACRES) =	134.62	AREA-AVERAGED Fm(INCH/HR) =	0.24		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.82		
TOTAL AREA(ACRES) =	144.8	PEAK FLOW RATE(CFS) =	182.56		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50342.00 TO NODE 50342.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<



MAINLINE Tc(MIN.) = 14.55  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.751  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 7.10 0.30 0.600 -  
 USER-DEFINED - 17.00 0.30 0.800 -  
 USER-DEFINED - 0.90 0.30 0.600 -  
 USER-DEFINED - 0.90 0.30 0.800 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.738  
 SUBAREA AREA(ACRES) = 25.90 SUBAREA RUNOFF(CFS) = 35.66  
 EFFECTIVE AREA(ACRES) = 160.52 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 170.7 PEAK FLOW RATE(CFS) = 218.22

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50342.00 TO NODE 50343.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 470.00  
 FLOW LENGTH(FEET) = 894.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 30.12  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 218.22  
 PIPE TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 15.05  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50343.00 = 8599.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50343.00 TO NODE 50343.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 15.05  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.718  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.60 0.30 0.600 -  
 USER-DEFINED - 0.10 0.30 0.800 -  
 USER-DEFINED - 0.20 0.30 0.600 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.603  
 SUBAREA AREA(ACRES) = 6.90 SUBAREA RUNOFF(CFS) = 9.54  
 EFFECTIVE AREA(ACRES) = 167.42 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 177.6 PEAK FLOW RATE(CFS) = 222.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50343.00 TO NODE 50343.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 15.05  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.718

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.30 0.500 -  
 USER-DEFINED - 1.80 0.30 0.600 -  
 USER-DEFINED - 17.90 0.30 0.800 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.777  
 SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 26.72  
 EFFECTIVE AREA(ACRES) = 187.42 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 197.6 PEAK FLOW RATE(CFS) = 249.60

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50343.00 TO NODE 50344.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 416.00  
 FLOW LENGTH(FEET) = 780.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 34.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 29.76  
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 249.60  
 PIPE TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 15.48  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50344.00 = 9379.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50344.00 TO NODE 50344.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 15.48  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.695  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.60 0.30 0.500 -  
 USER-DEFINED - 0.20 0.30 0.600 -  
 USER-DEFINED - 1.90 0.30 0.100 -  
 USER-DEFINED - 0.10 0.30 0.400 -  
 USER-DEFINED - 14.70 0.30 0.500 -  
 USER-DEFINED - 33.20 0.30 0.600 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA(ACRES) = 53.70 SUBAREA RUNOFF(CFS) = 73.97  
 EFFECTIVE AREA(ACRES) = 241.12 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
 TOTAL AREA(ACRES) = 251.3 PEAK FLOW RATE(CFS) = 319.74

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50344.00 TO NODE 50344.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 15.48  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.695

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.30	0.800	-
USER-DEFINED	-	0.40	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.773  
SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 6.72  
EFFECTIVE AREA (ACRES) = 246.22 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
TOTAL AREA (ACRES) = 256.4 PEAK FLOW RATE (CFS) = 326.45

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50344.00 TO NODE 50345.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 416.00 DOWNSTREAM(FEET) = 403.00  
FLOW LENGTH(FEET) = 526.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.77  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 326.45  
PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 15.89  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50345.00 = 9905.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
=====

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	326.45	15.89	1.674	0.30( 0.22)	0.74	246.2	50320.00
2	314.57	17.98	1.565	0.30( 0.22)	0.74	256.4	50330.00

LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50345.00 = 9905.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	784.06	17.12	1.610	0.30( 0.22)	0.73	578.4	50240.00
2	820.90	20.95	1.428	0.30( 0.22)	0.73	702.8	50280.00
3	819.19	22.17	1.386	0.30( 0.22)	0.73	732.3	50300.00
4	808.66	23.79	1.331	0.30( 0.22)	0.73	759.5	50220.00
5	738.65	29.08	1.184	0.30( 0.22)	0.73	805.6	50260.00
6	708.80	30.90	1.145	0.30( 0.22)	0.73	809.4	50200.00

LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50345.00 = 13626.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1087.60	15.89	1.674	0.30( 0.22)	0.73	783.0	50320.00
2	1103.52	17.12	1.610	0.30( 0.22)	0.73	830.6	50240.00
3	1106.91	17.98	1.565	0.30( 0.22)	0.73	862.8	50330.00

4	1103.25	20.95	1.428	0.30( 0.22)	0.73	959.2	50280.00
5	1091.87	22.17	1.386	0.30( 0.22)	0.73	988.7	50300.00
6	1068.43	23.79	1.331	0.30( 0.22)	0.73	1015.9	50220.00
7	963.88	29.08	1.184	0.30( 0.22)	0.74	1062.0	50260.00
8	924.87	30.90	1.145	0.30( 0.22)	0.74	1065.8	50200.00
TOTAL AREA (ACRES) =							1065.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 1106.91 Tc(MIN.) = 17.981  
EFFECTIVE AREA(ACRES) = 862.76 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1065.8  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50345.00 = 13626.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 12  
-----

>>>>CLEAR MEMORY BANK # 1 <<<<<  
=====

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 17.98  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.565  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.40	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	6.30	0.30	0.100	-
USER-DEFINED	-	8.70	0.30	0.400	-
USER-DEFINED	-	10.80	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.376  
SUBAREA AREA(ACRES) = 27.40 SUBAREA RUNOFF(CFS) = 35.81  
EFFECTIVE AREA(ACRES) = 890.16 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA(ACRES) = 1093.2 PEAK FLOW RATE(CFS) = 1106.91  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 17.98  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.565  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.600	-
USER-DEFINED	-	1.60	0.30	0.850	-
USER-DEFINED	-	1.80	0.30	0.100	-
USER-DEFINED	-	6.20	0.30	0.400	-

USER-DEFINED - 2.80 0.30 0.500 -  
USER-DEFINED - 0.20 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.456  
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 17.61  
EFFECTIVE AREA(ACRES) = 903.86 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA(ACRES) = 1106.9 PEAK FLOW RATE(CFS) = 1106.91  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50345.00 TO NODE 50346.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	403.00	DOWNSTREAM(FEET) =	350.00
FLOW LENGTH(FEET) =	1031.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	78.0 INCH PIPE IS	62.7 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) =	38.74		
ESTIMATED PIPE DIAMETER(INCH) =	78.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	1106.91		
PIPE TRAVEL TIME(MIN.) =	0.44	Tc(MIN.) =	18.42
LONGEST FLOWPATH FROM NODE	50220.00 TO NODE	50346.00 =	14657.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50346.00 TO NODE 50346.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	18.42				
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	1.542				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	1.40	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	0.500	-
USER-DEFINED	-	2.40	0.30	0.600	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.423				
SUBAREA AREA(ACRES) =	6.00	SUBAREA RUNOFF(CFS) =	7.64		
EFFECTIVE AREA(ACRES) =	909.86	AREA-AVERAGED Fm(INCH/HR) =	0.21		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.72		
TOTAL AREA(ACRES) =	1112.9	PEAK FLOW RATE(CFS) =	1106.91		
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE					

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50346.00 TO NODE 50347.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	350.00	DOWNSTREAM(FEET) =	313.00
FLOW LENGTH(FEET) =	240.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	66.0 INCH PIPE IS	48.3 INCHES	

PIPE-FLOW VELOCITY(FEET/SEC.) = 59.45  
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 1106.91  
PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 18.49  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50347.00 = 14897.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50347.00 TO NODE 50347.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	18.49				
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	1.538				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	1.00	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	0.500	-
USER-DEFINED	-	1.90	0.30	0.800	-
USER-DEFINED	-	1.00	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.749				
SUBAREA AREA(ACRES) =	5.10	SUBAREA RUNOFF(CFS) =	6.03		
EFFECTIVE AREA(ACRES) =	914.96	AREA-AVERAGED Fm(INCH/HR) =	0.21		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.72		
TOTAL AREA(ACRES) =	1118.0	PEAK FLOW RATE(CFS) =	1106.91		
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE					

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50347.00 TO NODE 50347.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	18.49				
* 10 YEAR RAINFALL INTENSITY(INCH/HR) =	1.538				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	1.40	0.30	0.500	-
USER-DEFINED	-	1.00	0.30	0.500	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.500				
SUBAREA AREA(ACRES) =	2.40	SUBAREA RUNOFF(CFS) =	3.00		
EFFECTIVE AREA(ACRES) =	917.36	AREA-AVERAGED Fm(INCH/HR) =	0.21		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.72		
TOTAL AREA(ACRES) =	1120.4	PEAK FLOW RATE(CFS) =	1106.91		
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE					

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50347.00 TO NODE 50348.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	313.00	DOWNSTREAM(FEET) =	233.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	1690.00	CHANNEL SLOPE =	0.0473

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 7.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1106.91  
 FLOW VELOCITY (FEET/SEC.) = 14.48 FLOW DEPTH (FEET) = 5.05  
 TRAVEL TIME (MIN.) = 1.95 Tc (MIN.) = 20.44  
 LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50348.00 = 16587.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
 MAINLINE Tc (MIN.) = 20.44  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.445  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	5.50	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.949  
 SUBAREA AREA (ACRES) = 7.30 SUBAREA RUNOFF (CFS) = 7.62  
 EFFECTIVE AREA (ACRES) = 924.66 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 1127.7 PEAK FLOW RATE (CFS) = 1106.91  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
 MAINLINE Tc (MIN.) = 20.44  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.445  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.600	-
USER-DEFINED	-	42.40	0.30	0.800	-
USER-DEFINED	-	3.00	0.30	1.000	-
USER-DEFINED	-	4.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.827  
 SUBAREA AREA (ACRES) = 54.60 SUBAREA RUNOFF (CFS) = 58.83  
 EFFECTIVE AREA (ACRES) = 979.26 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 1182.3 PEAK FLOW RATE (CFS) = 1106.91  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
 MAINLINE Tc (MIN.) = 20.44  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.445  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.90	0.30	1.000	-
USER-DEFINED	-	3.70	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	4.10	0.30	0.800	-
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.948  
 SUBAREA AREA (ACRES) = 21.10 SUBAREA RUNOFF (CFS) = 22.04  
 EFFECTIVE AREA (ACRES) = 1000.36 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 1203.4 PEAK FLOW RATE (CFS) = 1106.91  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1099.84	18.36	1.546	0.30 ( 0.22)	0.73	920.6	50320.00
2	1103.52	19.58	1.482	0.30 ( 0.22)	0.73	968.2	50240.00
3	1106.91	20.44	1.445	0.30 ( 0.22)	0.73	1000.4	50330.00
4	1110.43	23.42	1.344	0.30 ( 0.22)	0.73	1096.8	50280.00
5	1098.37	24.63	1.302	0.30 ( 0.22)	0.73	1126.3	50300.00
6	1077.58	26.27	1.257	0.30 ( 0.22)	0.73	1153.5	50220.00
7	985.69	31.63	1.132	0.30 ( 0.22)	0.73	1199.6	50260.00
8	954.88	33.46	1.101	0.30 ( 0.22)	0.73	1203.4	50200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1110.43 Tc (MIN.) = 23.42  
 AREA-AVERAGED Fm (INCH/HR) = 0.22 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.73 EFFECTIVE AREA (ACRES) = 1096.77

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
 MAINLINE Tc (MIN.) = 23.42  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.344  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.19  
 EFFECTIVE AREA (ACRES) = 1096.97 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 1203.6 PEAK FLOW RATE (CFS) = 1110.61

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 23.42  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.344  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	1.70	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	4.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.944  
 SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 8.50  
 EFFECTIVE AREA(ACRES) = 1105.87 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 1212.5 PEAK FLOW RATE(CFS) = 1119.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 23.42  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.344  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.66  
 EFFECTIVE AREA(ACRES) = 1106.57 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 1213.2 PEAK FLOW RATE(CFS) = 1119.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 23.42  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.344  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	3.50	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.556  
 SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 4.77  
 EFFECTIVE AREA(ACRES) = 1111.07 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 1217.7 PEAK FLOW RATE(CFS) = 1124.54

\*\*\*\*\*

FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 23.42  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.344  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.80	0.30	0.600	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.732  
 SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 13.76  
 EFFECTIVE AREA(ACRES) = 1124.67 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 1231.3 PEAK FLOW RATE(CFS) = 1138.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 23.42  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.344  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 1.60  
 EFFECTIVE AREA(ACRES) = 1126.37 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 1233.0 PEAK FLOW RATE(CFS) = 1139.89

\*\*\*\*\*

FLOW PROCESS FROM NODE 50348.00 TO NODE 50349.00 IS CODE = 51

-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 233.00 DOWNSTREAM(FEET) = 214.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1010.00 CHANNEL SLOPE = 0.0188  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 8.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1139.89  
 FLOW VELOCITY(FEET/SEC.) = 12.79 FLOW DEPTH(FEET) = 5.45  
 TRAVEL TIME(MIN.) = 1.32 Tc(MIN.) = 24.73

LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50349.00 = 17597.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 24.73

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.299

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.817

SUBAREA AREA(ACRES) = 6.90 SUBAREA RUNOFF(CFS) = 6.54

EFFECTIVE AREA(ACRES) = 1133.27 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73

TOTAL AREA(ACRES) = 1239.9 PEAK FLOW RATE(CFS) = 1139.89

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 24.73

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.299

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	5.10	0.30	0.850	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	7.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958

SUBAREA AREA(ACRES) = 18.40 SUBAREA RUNOFF(CFS) = 16.75

EFFECTIVE AREA(ACRES) = 1151.67 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74

TOTAL AREA(ACRES) = 1258.3 PEAK FLOW RATE(CFS) = 1139.89

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 24.73

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.299

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.18  
EFFECTIVE AREA(ACRES) = 1151.87 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
TOTAL AREA(ACRES) = 1258.5 PEAK FLOW RATE(CFS) = 1139.89  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 24.73

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.299

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.70	0.30	0.100	-
USER-DEFINED	-	3.50	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	3.00	0.30	1.000	-
USER-DEFINED	-	11.70	0.30	1.000	-
USER-DEFINED	-	12.40	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.874

SUBAREA AREA(ACRES) = 34.10 SUBAREA RUNOFF(CFS) = 31.82

EFFECTIVE AREA(ACRES) = 1185.97 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74

TOTAL AREA(ACRES) = 1292.6 PEAK FLOW RATE(CFS) = 1149.83

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1140.90	19.67	1.477	0.30( 0.22)	0.74	1009.8	50320.00
2	1149.47	20.90	1.430	0.30( 0.22)	0.74	1057.4	50240.00
3	1155.76	21.75	1.400	0.30( 0.22)	0.74	1089.6	50330.00
4	1149.83	24.73	1.299	0.30( 0.22)	0.74	1186.0	50280.00
5	1141.46	25.95	1.265	0.30( 0.22)	0.74	1215.5	50300.00
6	1119.26	27.59	1.223	0.30( 0.22)	0.74	1242.7	50220.00
7	1029.14	32.98	1.109	0.30( 0.22)	0.74	1288.8	50260.00
8	995.52	34.83	1.078	0.30( 0.22)	0.74	1292.6	50200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1155.76 Tc(MIN.) = 21.75

AREA-AVERAGED Fm(INCH/HR) = 0.22 AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.74 EFFECTIVE AREA(ACRES) = 1089.56

\*\*\*\*\*

FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.75

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.400

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.00 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 6.00 SUBAREA RUNOFF (CFS) = 5.94  
 EFFECTIVE AREA (ACRES) = 1095.56 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
 TOTAL AREA (ACRES) = 1298.6 PEAK FLOW RATE (CFS) = 1161.70

=====  
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1298.6 TC (MIN.) = 21.75  
 EFFECTIVE AREA (ACRES) = 1095.56 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.741  
 PEAK FLOW RATE (CFS) = 1161.70

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1147.25	19.67	1.477	0.30 ( 0.22)	0.74	1015.8	50320.00
2	1155.57	20.90	1.430	0.30 ( 0.22)	0.74	1063.4	50240.00
3	1161.70	21.75	1.400	0.30 ( 0.22)	0.74	1095.6	50330.00
4	1155.23	24.73	1.299	0.30 ( 0.22)	0.74	1192.0	50280.00
5	1146.67	25.95	1.265	0.30 ( 0.22)	0.74	1221.5	50300.00
6	1124.24	27.59	1.223	0.30 ( 0.22)	0.74	1248.7	50220.00
7	1033.51	32.98	1.109	0.30 ( 0.22)	0.74	1294.8	50260.00
8	999.73	34.83	1.078	0.30 ( 0.22)	0.74	1298.6	50200.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2013 Advanced Engineering Software (aes)  
Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PA3 & PA4 ROMP \*  
\* REGIONAL WATERSHED S29 - FREE DRAINING - ULTIMATE CONDITION \*  
\* 25-YR EM EV 2018 CCHI \*  
\*\*\*\*\*

FILE NAME: P504XX10.DAT  
TIME/DATE OF STUDY: 14:16 03/26/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.00;	3.190
2)	6.00;	2.880
3)	7.00;	2.640
4)	8.00;	2.450
5)	9.00;	2.290
6)	10.00;	2.160
7)	11.00;	2.050
8)	12.00;	1.950
9)	13.00;	1.860
10)	14.00;	1.790
11)	15.00;	1.720
12)	20.00;	1.460
13)	25.00;	1.290
14)	30.00;	1.160
15)	40.00;	0.990
16)	50.00;	0.870
17)	60.00;	0.790
18)	90.00;	0.630
19)	120.00;	0.530
20)	180.00;	0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.963  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.649  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "1 DWELLING/ACRE"	-	0.50	0.30	0.800	69	6.96

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.800  
SUBAREA RUNOFF(CFS) = 1.08  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.08

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.08  
FLOW VELOCITY(FEET/SEC.) = 4.69 FLOW DEPTH(FEET) = 0.28  
TRAVEL TIME(MIN.) = 0.93  $T_c$ (MIN.) = 7.89  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN.) = 7.89



\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.470  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.30 0.800 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.80  
 EFFECTIVE AREA (ACRES) = 0.90 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 1.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 239.00 CHANNEL SLOPE = 0.4184  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1.81  
 FLOW VELOCITY (FEET/SEC.) = 6.59 FLOW DEPTH (FEET) = 0.30  
 TRAVEL TIME (MIN.) = 0.60 Tc (MIN.) = 8.50  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50403.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----  
 MAINLINE Tc (MIN.) = 8.50  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.370  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.30 0.800 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.76  
 EFFECTIVE AREA (ACRES) = 1.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 1.3 PEAK FLOW RATE (CFS) = 2.49

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00 CHANNEL SLOPE = 0.7042  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 2.49  
 FLOW VELOCITY (FEET/SEC.) = 8.63 FLOW DEPTH (FEET) = 0.31

TRAVEL TIME (MIN.) = 0.14 Tc (MIN.) = 8.64  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50404.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----  
 MAINLINE Tc (MIN.) = 8.64  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.348  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.90 0.30 0.800 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.862  
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 2.45  
 EFFECTIVE AREA (ACRES) = 2.60 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA (ACRES) = 2.6 PEAK FLOW RATE (CFS) = 4.91

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 145.00 CHANNEL SLOPE = 0.3448  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 4.91  
 FLOW VELOCITY (FEET/SEC.) = 7.90 FLOW DEPTH (FEET) = 0.45  
 TRAVEL TIME (MIN.) = 0.31 Tc (MIN.) = 8.94  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50405.00 TO NODE 50405.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----  
 MAINLINE Tc (MIN.) = 8.94  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.299  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.20 0.30 0.800 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.964  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 1.99  
 EFFECTIVE AREA (ACRES) = 3.70 AREA-AVERAGED Fm (INCH/HR) = 0.26  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
 TOTAL AREA (ACRES) = 3.7 PEAK FLOW RATE (CFS) = 6.78

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*****
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 6.78
FLOW VELOCITY(FEET/SEC.) = 8.25 FLOW DEPTH(FEET) = 0.52
TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 9.26
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

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*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50406.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.26
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.256
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.30    1.000  -
USER-DEFINED        -         0.20    0.30    1.000  -
USER-DEFINED        -         0.80    0.30    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 2.11
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 8.75

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*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.2193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 8.75
FLOW VELOCITY(FEET/SEC.) = 7.71 FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 9.75
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

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*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50407.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.75
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.192
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.70    0.30    0.800  -
USER-DEFINED        -         1.00    0.30    1.000  -
USER-DEFINED        -         1.60    0.30    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.883
SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 10.93
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 19.40

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*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 325.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 490.00 CHANNEL SLOPE = 0.1531
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 19.40
FLOW VELOCITY(FEET/SEC.) = 8.17 FLOW DEPTH(FEET) = 0.89
TRAVEL TIME(MIN.) = 1.00 Tc(MIN.) = 10.75
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

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*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.75
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.077
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10    0.30    1.000  -
USER-DEFINED        -         0.10    0.30    1.000  -
USER-DEFINED        -         0.60    0.30    1.000  -
USER-DEFINED        -         1.40    0.30    1.000  -
USER-DEFINED        -         0.50    0.30    1.000  -
USER-DEFINED        -         1.20    0.30    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90 SUBAREA RUNOFF(CFS) = 6.24
EFFECTIVE AREA(ACRES) = 15.10 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 15.1 PEAK FLOW RATE(CFS) = 24.48

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*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.75
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.077
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.44  
EFFECTIVE AREA(ACRES) = 16.00 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
TOTAL AREA(ACRES) = 16.0 PEAK FLOW RATE(CFS) = 25.92

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 25.92  
FLOW VELOCITY(FEET/SEC.) = 6.48 FLOW DEPTH(FEET) = 1.15  
TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 10.94  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 10.94  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.056  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	4.30	0.30	0.800	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	3.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.910  
SUBAREA AREA(ACRES) = 9.60 SUBAREA RUNOFF(CFS) = 15.41  
EFFECTIVE AREA(ACRES) = 25.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
TOTAL AREA(ACRES) = 25.6 PEAK FLOW RATE(CFS) = 41.03

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 10.94  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.056  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.30	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 5.90 SUBAREA RUNOFF(CFS) = 9.33  
EFFECTIVE AREA(ACRES) = 31.50 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
TOTAL AREA(ACRES) = 31.5 PEAK FLOW RATE(CFS) = 50.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 50.35  
FLOW VELOCITY(FEET/SEC.) = 8.10 FLOW DEPTH(FEET) = 1.44  
TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 11.15  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 11.15  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.035  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 9.99  
EFFECTIVE AREA(ACRES) = 37.90 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 37.9 PEAK FLOW RATE(CFS) = 59.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 11.15  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.035  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA (ACRES) =		0.60	SUBAREA RUNOFF (CFS) =		0.94
EFFECTIVE AREA (ACRES) =		38.50	AREA-AVERAGED Fm (INCH/HR) =		0.28
AREA-AVERAGED Fp (INCH/HR) =		0.30	AREA-AVERAGED Ap =		0.95
TOTAL AREA (ACRES) =		38.5	PEAK FLOW RATE (CFS) =		60.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	312.00	DOWNSTREAM (FEET) =	282.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	566.00	CHANNEL SLOPE =	0.0530
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	3.00
CHANNEL FLOW THRU SUBAREA (CFS) =	60.67		
FLOW VELOCITY (FEET/SEC.) =	7.29	FLOW DEPTH (FEET) =	1.67
TRAVEL TIME (MIN.) =	1.29	Tc (MIN.) =	12.45
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 12.45					
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.910					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658					
SUBAREA AREA (ACRES) =		5.00	SUBAREA RUNOFF (CFS) =		7.71
EFFECTIVE AREA (ACRES) =		43.50	AREA-AVERAGED Fm (INCH/HR) =		0.27
AREA-AVERAGED Fp (INCH/HR) =		0.30	AREA-AVERAGED Ap =		0.91
TOTAL AREA (ACRES) =		43.5	PEAK FLOW RATE (CFS) =		64.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 12.45					
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.910					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	5.80	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA (ACRES) =		10.50	SUBAREA RUNOFF (CFS) =		15.21
EFFECTIVE AREA (ACRES) =		54.00	AREA-AVERAGED Fm (INCH/HR) =		0.28
AREA-AVERAGED Fp (INCH/HR) =		0.30	AREA-AVERAGED Ap =		0.93
TOTAL AREA (ACRES) =		54.0	PEAK FLOW RATE (CFS) =		79.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	282.00	DOWNSTREAM (FEET) =	216.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	954.00	CHANNEL SLOPE =	0.0692
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH (FEET) =	3.00
CHANNEL FLOW THRU SUBAREA (CFS) =	79.26		
FLOW VELOCITY (FEET/SEC.) =	10.74	FLOW DEPTH (FEET) =	1.57
TRAVEL TIME (MIN.) =	1.48	Tc (MIN.) =	13.93
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 13.93					
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.795					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875					
SUBAREA AREA (ACRES) =		3.60	SUBAREA RUNOFF (CFS) =		4.97
EFFECTIVE AREA (ACRES) =		57.60	AREA-AVERAGED Fm (INCH/HR) =		0.28
AREA-AVERAGED Fp (INCH/HR) =		0.30	AREA-AVERAGED Ap =		0.93
TOTAL AREA (ACRES) =		57.6	PEAK FLOW RATE (CFS) =		79.26
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE					

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 13.93					
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.795					
SUBAREA LOSS RATE DATA (AMC II):					

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	9.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 SUBAREA AREA (ACRES) = 10.60      SUBAREA RUNOFF (CFS) = 14.27  
 EFFECTIVE AREA (ACRES) = 68.20      AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.94  
 TOTAL AREA (ACRES) = 68.2      PEAK FLOW RATE (CFS) = 92.92

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 13.93  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.795  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.934  
 SUBAREA AREA (ACRES) = 2.50      SUBAREA RUNOFF (CFS) = 3.41  
 EFFECTIVE AREA (ACRES) = 70.70      AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.94  
 TOTAL AREA (ACRES) = 70.7      PEAK FLOW RATE (CFS) = 96.33

END OF STUDY SUMMARY:  
 TOTAL AREA (ACRES) = 70.7      TC (MIN.) = 13.93  
 EFFECTIVE AREA (ACRES) = 70.70      AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.938  
 PEAK FLOW RATE (CFS) = 96.33

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2006 Advanced Engineering Software (aes)  
Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 5 \*  
\* HYDROLOGIC ANALYSIS - 10-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P505XX10.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	3.190
2)	6.000;	2.880
3)	7.000;	2.640
4)	8.000;	2.450
5)	9.000;	2.290
6)	10.000;	2.160
7)	11.000;	2.050
8)	12.000;	1.950
9)	13.000;	1.860
10)	14.000;	1.790
11)	15.000;	1.720
12)	20.000;	1.460
13)	25.000;	1.290
14)	30.000;	1.160
15)	40.000;	0.990
16)	50.000;	0.870
17)	60.000;	0.790
18)	90.000;	0.630
19)	120.000;	0.530
20)	180.000;	0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50500.00 TO NODE 50501.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 254.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 779.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.543  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.750  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "1 DWELLING/ACRE"	-	2.00	0.30	0.800	95	6.54

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.800  
SUBAREA RUNOFF(CFS) = 4.52  
TOTAL AREA(ACRES) = 2.00 PEAK FLOW RATE(CFS) = 4.52

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50501.00 TO NODE 50502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 779.00 DOWNSTREAM(FEET) = 765.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 382.00 CHANNEL SLOPE = 0.0366  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.52  
FLOW VELOCITY(FEET/SEC.) = 3.31 FLOW DEPTH(FEET) = 0.67  
TRAVEL TIME(MIN.) = 1.92  $T_c$ (MIN.) = 8.47  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50502.00 = 636.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50502.00 TO NODE 50502.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 8.47

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.376  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.60 0.30 0.800 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.840  
 SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 3.82  
 EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 7.67

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50502.00 TO NODE 50503.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 765.00 DOWNSTREAM (FEET) = 750.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 355.00 CHANNEL SLOPE = 0.0423  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 7.67  
 FLOW VELOCITY (FEET/SEC.) = 4.01 FLOW DEPTH (FEET) = 0.80  
 TRAVEL TIME (MIN.) = 1.48 Tc (MIN.) = 9.94  
 LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50503.00 = 991.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50503.00 TO NODE 50503.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----  
 MAINLINE Tc (MIN) = 9.94  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.168  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.70 0.30 0.800 -  
 USER-DEFINED - 1.30 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.890  
 SUBAREA AREA (ACRES) = 3.10 SUBAREA RUNOFF (CFS) = 5.30  
 EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.26  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 12.22

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50503.00 TO NODE 50504.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 750.00 DOWNSTREAM (FEET) = 712.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 261.00 CHANNEL SLOPE = 0.1456  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 12.22  
 FLOW VELOCITY (FEET/SEC.) = 7.20 FLOW DEPTH (FEET) = 0.75  
 TRAVEL TIME (MIN.) = 0.60 Tc (MIN.) = 10.55  
 LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50504.00 = 1252.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50504.00 TO NODE 50504.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----  
 MAINLINE Tc (MIN) = 10.55  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.100  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.90 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 10.21  
 EFFECTIVE AREA (ACRES) = 13.40 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
 TOTAL AREA (ACRES) = 13.4 PEAK FLOW RATE (CFS) = 22.00

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50504.00 TO NODE 50505.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 464.00 CHANNEL SLOPE = 0.2414  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 22.00  
 FLOW VELOCITY (FEET/SEC.) = 9.97 FLOW DEPTH (FEET) = 0.86  
 TRAVEL TIME (MIN.) = 0.78 Tc (MIN.) = 11.32  
 LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50505.00 = 1716.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50505.00 TO NODE 50505.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----  
 MAINLINE Tc (MIN) = 11.32  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.018  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.50 0.30 1.000 -  
 USER-DEFINED - 0.70 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.60 SUBAREA RUNOFF (CFS) = 4.02  
 EFFECTIVE AREA (ACRES) = 16.00 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93

TOTAL AREA (ACRES) = 16.0 PEAK FLOW RATE (CFS) = 25.03

\*\*\*\*\*

FLOW PROCESS FROM NODE 50505.00 TO NODE 50506.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 535.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 310.00 CHANNEL SLOPE = 0.2097
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 25.03
FLOW VELOCITY (FEET/SEC.) = 9.85 FLOW DEPTH (FEET) = 0.92
TRAVEL TIME (MIN.) = 0.52 Tc (MIN.) = 11.85
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50506.00 = 2026.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50506.00 TO NODE 50506.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 11.85
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.965
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.80 0.30 0.800 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.70 0.30 1.000 -
USER-DEFINED - 2.70 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.941
SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 9.24
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.28
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 33.51

\*\*\*\*\*

FLOW PROCESS FROM NODE 50506.00 TO NODE 50507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 405.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.2658
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 33.51
FLOW VELOCITY (FEET/SEC.) = 11.47 FLOW DEPTH (FEET) = 0.99
TRAVEL TIME (MIN.) = 0.71 Tc (MIN.) = 12.56
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50507.00 = 2515.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50507.00 TO NODE 50507.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 12.56
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.900
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.800 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 1.30 0.30 1.000 -
USER-DEFINED - 2.80 0.30 1.000 -
USER-DEFINED - 5.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988
SUBAREA AREA (ACRES) = 10.00 SUBAREA RUNOFF (CFS) = 14.43
EFFECTIVE AREA (ACRES) = 32.10 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 46.64

\*\*\*\*\*

FLOW PROCESS FROM NODE 50507.00 TO NODE 50508.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 285.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 706.00 CHANNEL SLOPE = 0.1700
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 46.64
FLOW VELOCITY (FEET/SEC.) = 10.61 FLOW DEPTH (FEET) = 1.21
TRAVEL TIME (MIN.) = 1.11 Tc (MIN.) = 13.66
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50508.00 = 3221.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50508.00 TO NODE 50508.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 13.66
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.813
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.40 0.30 0.100 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 5.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.945
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 9.09
EFFECTIVE AREA (ACRES) = 38.70 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA (ACRES) = 38.7 PEAK FLOW RATE (CFS) = 53.23

\*\*\*\*\*

FLOW PROCESS FROM NODE 50508.00 TO NODE 50509.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<



```

=====
ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 238.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1169.00 CHANNEL SLOPE = 0.0402
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 53.23
FLOW VELOCITY(FEET/SEC.) = 7.90 FLOW DEPTH(FEET) = 1.50
TRAVEL TIME(MIN.) = 2.46 Tc(MIN.) = 16.13
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50509.00 = 4390.00 FEET.

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*****
FLOW PROCESS FROM NODE 50509.00 TO NODE 50509.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 16.13
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.661
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED           -         0.10    0.30     1.000    -
USER-DEFINED           -         1.30    0.30     1.000    -
USER-DEFINED           -         6.90    0.30     1.000    -
USER-DEFINED           -         1.10    0.30     0.100    -
USER-DEFINED           -         0.80    0.30     1.000    -
USER-DEFINED           -         2.10    0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.920
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 15.34
EFFECTIVE AREA(ACRES) = 51.00 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 51.0 PEAK FLOW RATE(CFS) = 63.27

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*****
FLOW PROCESS FROM NODE 50509.00 TO NODE 50509.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN) = 16.13
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.661
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED           -         9.40    0.30     1.000    -
USER-DEFINED           -         0.70    0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.10 SUBAREA RUNOFF(CFS) = 12.37
EFFECTIVE AREA(ACRES) = 61.10 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 61.1 PEAK FLOW RATE(CFS) = 75.64

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*****
FLOW PROCESS FROM NODE 50509.00 TO NODE 50510.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 238.00 DOWNSTREAM(FEET) = 209.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1026.00 CHANNEL SLOPE = 0.0283
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 75.64
FLOW VELOCITY(FEET/SEC.) = 7.56 FLOW DEPTH(FEET) = 1.83
TRAVEL TIME(MIN.) = 2.26 Tc(MIN.) = 18.39
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50510.00 = 5416.00 FEET.

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 18.39
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.544
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED           -         0.10    0.30     1.000    -
USER-DEFINED           -         1.40    0.30     1.000    -
USER-DEFINED           -         4.40    0.30     1.000    -
USER-DEFINED           -         0.20    0.30     1.000    -
USER-DEFINED           -         1.50    0.30     1.000    -
USER-DEFINED           -        10.00   0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 17.60 SUBAREA RUNOFF(CFS) = 19.70
EFFECTIVE AREA(ACRES) = 78.70 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 78.7 PEAK FLOW RATE(CFS) = 88.87

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN) = 18.39
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.544
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE             GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED           -         1.70    0.30     0.100    -
USER-DEFINED           -        13.10   0.30     1.000    -
USER-DEFINED           -         1.60    0.30     1.000    -
USER-DEFINED           -        12.70   0.30     1.000    -
USER-DEFINED           -         0.60    0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.948
SUBAREA AREA(ACRES) = 29.70 SUBAREA RUNOFF(CFS) = 33.66
EFFECTIVE AREA(ACRES) = 108.40 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 108.4 PEAK FLOW RATE(CFS) = 122.53

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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=====
MAINLINE Tc(MIN) = 18.39
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.544
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.90     0.30     1.000    -
USER-DEFINED        -         1.70     0.30     1.000    -
USER-DEFINED        -         0.40     0.30     0.850    -
USER-DEFINED        -         3.40     0.30     1.000    -
USER-DEFINED        -         2.10     0.30     1.000    -
USER-DEFINED        -         1.10     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.994
SUBAREA AREA(ACRES) = 10.60      SUBAREA RUNOFF(CFS) = 11.88
EFFECTIVE AREA(ACRES) = 119.00   AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 119.0       PEAK FLOW RATE(CFS) = 134.41

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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=====
MAINLINE Tc(MIN) = 18.39
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.544
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50     0.30     0.100    -
USER-DEFINED        -         0.30     0.30     1.000    -
USER-DEFINED        -         4.80     0.30     1.000    -
USER-DEFINED        -         2.60     0.30     1.000    -
USER-DEFINED        -         0.90     0.30     1.000    -
USER-DEFINED        -         7.50     0.30     0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA AREA(ACRES) = 16.60      SUBAREA RUNOFF(CFS) = 19.01
EFFECTIVE AREA(ACRES) = 135.60   AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 135.6       PEAK FLOW RATE(CFS) = 153.42

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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=====
MAINLINE Tc(MIN) = 18.39
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.544
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         8.00     0.30     1.000    -
USER-DEFINED        -         2.80     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.80      SUBAREA RUNOFF(CFS) = 12.09
EFFECTIVE AREA(ACRES) = 146.40   AREA-AVERAGED Fm(INCH/HR) = 0.29

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=====
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 146.4       PEAK FLOW RATE(CFS) = 165.51
=====

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END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 146.4 TC(MIN.) = 18.39
EFFECTIVE AREA(ACRES) = 146.40 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.959
PEAK FLOW RATE(CFS) = 165.51
=====

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END OF RATIONAL METHOD ANALYSIS

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\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2006 Advanced Engineering Software (aes)  
Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 6 \*  
\* HYDROLOGIC ANALYSIS - 10-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P506XX10.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	3.190
2)	6.000;	2.880
3)	7.000;	2.640
4)	8.000;	2.450
5)	9.000;	2.290
6)	10.000;	2.160
7)	11.000;	2.050
8)	12.000;	1.950
9)	13.000;	1.860
10)	14.000;	1.790
11)	15.000;	1.720
12)	20.000;	1.460
13)	25.000;	1.290
14)	30.000;	1.160
15)	40.000;	0.990
16)	50.000;	0.870
17)	60.000;	0.790
18)	90.000;	0.630
19)	120.000;	0.530
20)	180.000;	0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50600.00 TO NODE 50601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00  
ELEVATION DATA: UPSTREAM(FEET) = 780.00 DOWNSTREAM(FEET) = 730.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.166  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.142  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	1.40	0.30	1.000	95	10.17

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 2.32  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 2.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50601.00 TO NODE 50602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.1541  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.32  
FLOW VELOCITY(FEET/SEC.) = 4.80 FLOW DEPTH(FEET) = 0.40  
TRAVEL TIME(MIN.) = 1.24  $T_c$ (MIN.) = 11.41  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50602.00 = 671.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50602.00 TO NODE 50602.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.41

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.009  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.30 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 2.00  
 EFFECTIVE AREA (ACRES) = 2.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.7 PEAK FLOW RATE (CFS) = 4.15

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50602.00 TO NODE 50603.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 258.00 CHANNEL SLOPE = 0.2907  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 4.15  
 FLOW VELOCITY (FEET/SEC.) = 7.16 FLOW DEPTH (FEET) = 0.44  
 TRAVEL TIME (MIN.) = 0.60 Tc (MIN.) = 12.01  
 LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50603.00 = 929.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50603.00 TO NODE 50603.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.01  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.949  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.30 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 1.93  
 EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 5.94

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50603.00 TO NODE 50604.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 585.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 116.00 CHANNEL SLOPE = 0.1293  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 5.94  
 FLOW VELOCITY (FEET/SEC.) = 5.68 FLOW DEPTH (FEET) = 0.59  
 TRAVEL TIME (MIN.) = 0.34 Tc (MIN.) = 12.35

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50604.00 = 1045.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50604.00 TO NODE 50604.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.35  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.919  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.60 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 2.33  
 EFFECTIVE AREA (ACRES) = 5.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.6 PEAK FLOW RATE (CFS) = 8.16

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50604.00 TO NODE 50605.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 585.00 DOWNSTREAM (FEET) = 584.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 16.00 CHANNEL SLOPE = 0.0625  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 8.16  
 FLOW VELOCITY (FEET/SEC.) = 4.71 FLOW DEPTH (FEET) = 0.76  
 TRAVEL TIME (MIN.) = 0.06 Tc (MIN.) = 12.40  
 LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50605.00 = 1061.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50605.00 TO NODE 50605.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.40  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.914  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.00 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 7.26  
 EFFECTIVE AREA (ACRES) = 10.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 10.6 PEAK FLOW RATE (CFS) = 15.40

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50605.00 TO NODE 50606.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 584.00 DOWNSTREAM(FEET) = 579.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 122.00 CHANNEL SLOPE = 0.0410
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 15.40
FLOW VELOCITY(FEET/SEC.) = 4.72 FLOW DEPTH(FEET) = 1.04
TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 12.83
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50606.00 = 1183.00 FEET.

*****
FLOW PROCESS FROM NODE 50606.00 TO NODE 50606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.83
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.875
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 5.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 7.37
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 22.40

*****
FLOW PROCESS FROM NODE 50606.00 TO NODE 50607.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 579.00 DOWNSTREAM(FEET) = 528.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 637.00 CHANNEL SLOPE = 0.0801
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 22.40
FLOW VELOCITY(FEET/SEC.) = 6.67 FLOW DEPTH(FEET) = 1.06
TRAVEL TIME(MIN.) = 1.59 Tc(MIN.) = 14.42
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50607.00 = 1820.00 FEET.

*****
FLOW PROCESS FROM NODE 50607.00 TO NODE 50607.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.42
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.760
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 9.59
EFFECTIVE AREA(ACRES) = 23.10 AREA-AVERAGED Fm(INCH/HR) = 0.30

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```

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 23.1 PEAK FLOW RATE(CFS) = 30.36

*****
FLOW PROCESS FROM NODE 50607.00 TO NODE 50608.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 422.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 529.00 CHANNEL SLOPE = 0.2004
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 30.36
FLOW VELOCITY(FEET/SEC.) = 10.07 FLOW DEPTH(FEET) = 1.00
TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 15.30
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50608.00 = 2349.00 FEET.

*****
FLOW PROCESS FROM NODE 50608.00 TO NODE 50608.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 15.30
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.704
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.30 0.30 1.000 -
USER-DEFINED - 0.70 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 3.79
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 32.99

*****
FLOW PROCESS FROM NODE 50608.00 TO NODE 50609.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 422.00 DOWNSTREAM(FEET) = 297.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 708.00 CHANNEL SLOPE = 0.1766
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 32.99
FLOW VELOCITY(FEET/SEC.) = 9.87 FLOW DEPTH(FEET) = 1.06
TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 16.50
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50609.00 = 3057.00 FEET.

*****
FLOW PROCESS FROM NODE 50609.00 TO NODE 50609.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 16.50

```

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.642  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.60	0.30	0.100	-
USER-DEFINED	-	7.90	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.880  
 SUBAREA AREA (ACRES) = 12.00 SUBAREA RUNOFF (CFS) = 14.89  
 EFFECTIVE AREA (ACRES) = 38.10 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 38.1 PEAK FLOW RATE (CFS) = 46.42

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50609.00 TO NODE 50610.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 297.00 DOWNSTREAM (FEET) = 207.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1321.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 46.42  
 FLOW VELOCITY (FEET/SEC.) = 9.35 FLOW DEPTH (FEET) = 1.29  
 TRAVEL TIME (MIN.) = 2.36 Tc (MIN.) = 18.85  
 LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50610.00 = 4378.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN) = 18.85  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.520  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	4.40	0.30	1.000	-
USER-DEFINED	-	3.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.974  
 SUBAREA AREA (ACRES) = 10.20 SUBAREA RUNOFF (CFS) = 11.27  
 EFFECTIVE AREA (ACRES) = 48.30 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 48.3 PEAK FLOW RATE (CFS) = 53.49

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN) = 18.85

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.520  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.11  
 EFFECTIVE AREA (ACRES) = 48.40 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 53.60

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN) = 18.85  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.520  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 1.21  
 EFFECTIVE AREA (ACRES) = 49.50 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 49.5 PEAK FLOW RATE (CFS) = 54.80

END OF STUDY SUMMARY:  
 TOTAL AREA (ACRES) = 49.5 TC (MIN.) = 18.85  
 EFFECTIVE AREA (ACRES) = 49.50 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.965  
 PEAK FLOW RATE (CFS) = 54.80  
 =====

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 7 \*  
\* HYDROLOGIC ANALYSIS - 10-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P507XX10.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.000; 3.190  
2) 6.000; 2.880  
3) 7.000; 2.640  
4) 8.000; 2.450  
5) 9.000; 2.290  
6) 10.000; 2.160  
7) 11.000; 2.050  
8) 12.000; 1.950  
9) 13.000; 1.860  
10) 14.000; 1.790  
11) 15.000; 1.720  
12) 20.000; 1.460  
13) 25.000; 1.290  
14) 30.000; 1.160  
15) 40.000; 0.990  
16) 50.000; 0.870  
17) 60.000; 0.790  
18) 90.000; 0.630  
19) 120.000; 0.530  
20) 180.000; 0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50700.00 TO NODE 50701.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 925.00 DOWNSTREAM(FEET) = 815.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.946  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.299  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.20	0.30	1.000	95	8.95
NATURAL FAIR COVER "GRASS"	-	0.20	0.30	1.000	95	8.95
NATURAL FAIR COVER "OPEN BRUSH"	-	0.20	0.30	1.000	95	8.95

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.08  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.08

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50701.00 TO NODE 50702.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 815.00 DOWNSTREAM(FEET) = 800.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 169.00 CHANNEL SLOPE = 0.0888  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.08  
FLOW VELOCITY(FEET/SEC.) = 3.25 FLOW DEPTH(FEET) = 0.33  
TRAVEL TIME(MIN.) = 0.87  $T_c$ (MIN.) = 9.81  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50702.00 = 499.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50702.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.81  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.184  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 1.70  
EFFECTIVE AREA(ACRES) = 1.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 2.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50703.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====  
ELEVATION DATA: UPSTREAM(FEET) = 800.00 DOWNSTREAM(FEET) = 785.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 128.00 CHANNEL SLOPE = 0.1172  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.71  
FLOW VELOCITY(FEET/SEC.) = 4.52 FLOW DEPTH(FEET) = 0.45  
TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 10.29  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50703.00 = 627.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50703.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.29  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.129  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 2.63  
EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 5.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50704.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 775.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 5.27  
FLOW VELOCITY(FEET/SEC.) = 4.11 FLOW DEPTH(FEET) = 0.65  
TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 10.97  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50704.00 = 797.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50704.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.97  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.053  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 1.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 4.89  
EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 9.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50705.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====  
ELEVATION DATA: UPSTREAM(FEET) = 775.00 DOWNSTREAM(FEET) = 772.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 162.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.94  
FLOW VELOCITY(FEET/SEC.) = 3.14 FLOW DEPTH(FEET) = 1.03  
TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 11.83  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50705.00 = 959.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50705.00 TO NODE 50705.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 11.83  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.967  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -

USER-DEFINED - 2.50 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 4.30 SUBAREA RUNOFF (CFS) = 6.45  
 EFFECTIVE AREA (ACRES) = 10.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 10.6 PEAK FLOW RATE (CFS) = 15.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 50705.00 TO NODE 50706.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 772.00 DOWNSTREAM (FEET) = 745.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 357.00 CHANNEL SLOPE = 0.0756  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 15.90  
 FLOW VELOCITY (FEET/SEC.) = 5.98 FLOW DEPTH (FEET) = 0.94  
 TRAVEL TIME (MIN.) = 0.99 Tc (MIN.) = 12.83  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50706.00 = 1316.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50706.00 TO NODE 50706.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 12.83  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.875

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 3.50 SUBAREA RUNOFF (CFS) = 4.96  
 EFFECTIVE AREA (ACRES) = 14.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 14.1 PEAK FLOW RATE (CFS) = 19.99

\*\*\*\*\*

FLOW PROCESS FROM NODE 50706.00 TO NODE 50707.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 745.00 DOWNSTREAM (FEET) = 733.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 444.00 CHANNEL SLOPE = 0.0270  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 19.99  
 FLOW VELOCITY (FEET/SEC.) = 4.29 FLOW DEPTH (FEET) = 1.25  
 TRAVEL TIME (MIN.) = 1.73 Tc (MIN.) = 14.55

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50707.00 = 1760.00 FEET.

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FLOW PROCESS FROM NODE 50707.00 TO NODE 50707.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 14.55  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.751

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.40	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 5.50 SUBAREA RUNOFF (CFS) = 7.18  
 EFFECTIVE AREA (ACRES) = 19.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 19.6 PEAK FLOW RATE (CFS) = 25.60

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FLOW PROCESS FROM NODE 50707.00 TO NODE 50708.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 733.00 DOWNSTREAM (FEET) = 675.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 467.00 CHANNEL SLOPE = 0.1242  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 25.60  
 FLOW VELOCITY (FEET/SEC.) = 8.09 FLOW DEPTH (FEET) = 1.03  
 TRAVEL TIME (MIN.) = 0.96 Tc (MIN.) = 15.52  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50708.00 = 2227.00 FEET.

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FLOW PROCESS FROM NODE 50708.00 TO NODE 50708.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 15.52  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.693

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 4.20 SUBAREA RUNOFF (CFS) = 5.27  
 EFFECTIVE AREA (ACRES) = 23.80 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 23.8 PEAK FLOW RATE (CFS) = 29.84

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FLOW PROCESS FROM NODE 50708.00 TO NODE 50709.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 619.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 516.00 CHANNEL SLOPE = 0.1085
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 29.84
FLOW VELOCITY(FEET/SEC.) = 7.98 FLOW DEPTH(FEET) = 1.12
TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 16.59
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50709.00 = 2743.00 FEET.

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FLOW PROCESS FROM NODE 50709.00 TO NODE 50709.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 16.59
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.637
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 17.70 0.30 1.000 -
USER-DEFINED - 2.00 0.30 1.000 -
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.20 SUBAREA RUNOFF(CFS) = 24.31
EFFECTIVE AREA(ACRES) = 44.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 44.0 PEAK FLOW RATE(CFS) = 52.95

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FLOW PROCESS FROM NODE 50709.00 TO NODE 50710.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 619.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 650.00 CHANNEL SLOPE = 0.0292
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 52.95
FLOW VELOCITY(FEET/SEC.) = 6.98 FLOW DEPTH(FEET) = 1.59
TRAVEL TIME(MIN.) = 1.55 Tc(MIN.) = 18.15
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50710.00 = 3393.00 FEET.

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FLOW PROCESS FROM NODE 50710.00 TO NODE 50710.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 18.15
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.556
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.60 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 8.48
EFFECTIVE AREA(ACRES) = 51.50 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 51.5 PEAK FLOW RATE(CFS) = 58.24

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FLOW PROCESS FROM NODE 50710.00 TO NODE 50711.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 528.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 794.00 CHANNEL SLOPE = 0.0907
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 58.24
FLOW VELOCITY(FEET/SEC.) = 10.97 FLOW DEPTH(FEET) = 1.33
TRAVEL TIME(MIN.) = 1.21 Tc(MIN.) = 19.35
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50711.00 = 4187.00 FEET.

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FLOW PROCESS FROM NODE 50711.00 TO NODE 50711.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 19.35
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.494
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 33.10 0.30 1.000 -
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 1.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 34.90 SUBAREA RUNOFF(CFS) = 37.50
EFFECTIVE AREA(ACRES) = 86.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 86.4 PEAK FLOW RATE(CFS) = 92.83

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FLOW PROCESS FROM NODE 50711.00 TO NODE 50712.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 423.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1215.00 CHANNEL SLOPE = 0.0864
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 92.83
FLOW VELOCITY(FEET/SEC.) = 12.10 FLOW DEPTH(FEET) = 1.60
TRAVEL TIME(MIN.) = 1.67 Tc(MIN.) = 21.03

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LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50712.00 = 5402.00 FEET.

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FLOW PROCESS FROM NODE 50712.00 TO NODE 50712.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 21.03

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.425

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.900	-
USER-DEFINED	-	18.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.998

SUBAREA AREA(ACRES) = 18.60 SUBAREA RUNOFF(CFS) = 18.84

EFFECTIVE AREA(ACRES) = 105.00 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 105.0 PEAK FLOW RATE(CFS) = 106.34

\*\*\*\*\*

FLOW PROCESS FROM NODE 50712.00 TO NODE 50713.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 319.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 768.00 CHANNEL SLOPE = 0.1354

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00

CHANNEL FLOW THRU SUBAREA(CFS) = 106.34

FLOW VELOCITY(FEET/SEC.) = 14.83 FLOW DEPTH(FEET) = 1.55

TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 21.89

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50713.00 = 6170.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50713.00 TO NODE 50713.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 21.89

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.396

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	4.60	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.966

SUBAREA AREA(ACRES) = 5.30 SUBAREA RUNOFF(CFS) = 5.28

EFFECTIVE AREA(ACRES) = 110.30 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 110.3 PEAK FLOW RATE(CFS) = 108.84

\*\*\*\*\*

FLOW PROCESS FROM NODE 50713.00 TO NODE 50714.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 319.00 DOWNSTREAM(FEET) = 182.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 1513.00 CHANNEL SLOPE = 0.0905

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00

CHANNEL FLOW THRU SUBAREA(CFS) = 108.84

FLOW VELOCITY(FEET/SEC.) = 12.83 FLOW DEPTH(FEET) = 1.68

TRAVEL TIME(MIN.) = 1.96 Tc(MIN.) = 23.85

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50714.00 = 7683.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 23.85

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.329

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	5.20	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	7.70	0.30	1.000	-
USER-DEFINED	-	2.60	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867

SUBAREA AREA(ACRES) = 17.60 SUBAREA RUNOFF(CFS) = 16.93

EFFECTIVE AREA(ACRES) = 127.90 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98

TOTAL AREA(ACRES) = 127.9 PEAK FLOW RATE(CFS) = 119.14

\*\*\*\*\*

FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 23.85

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.329

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	0.900	-
USER-DEFINED	-	52.70	0.30	1.000	-
USER-DEFINED	-	7.00	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999

SUBAREA AREA(ACRES) = 61.30 SUBAREA RUNOFF(CFS) = 56.79

EFFECTIVE AREA(ACRES) = 189.20 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 189.2 PEAK FLOW RATE(CFS) = 175.93

\*\*\*\*\*

FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 23.85

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.329

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	6.20	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 15.10

EFFECTIVE AREA(ACRES) = 205.50 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 205.5 PEAK FLOW RATE(CFS) = 191.03

\*\*\*\*\*

FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 23.85

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.329

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	7.60	0.30	1.000	-
USER-DEFINED	-	10.40	0.30	1.000	-
USER-DEFINED	-	7.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997

SUBAREA AREA(ACRES) = 25.90 SUBAREA RUNOFF(CFS) = 24.01

EFFECTIVE AREA(ACRES) = 231.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 231.4 PEAK FLOW RATE(CFS) = 215.04

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 231.4 TC(MIN.) = 23.85

EFFECTIVE AREA(ACRES) = 231.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.988

PEAK FLOW RATE(CFS) = 215.04

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 8 \*  
\* HYDROLOGIC ANALYSIS - 10-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P508XX10.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.000; 3.190
- 2) 6.000; 2.880
- 3) 7.000; 2.640
- 4) 8.000; 2.450
- 5) 9.000; 2.290
- 6) 10.000; 2.160
- 7) 11.000; 2.050
- 8) 12.000; 1.950
- 9) 13.000; 1.860
- 10) 14.000; 1.790
- 11) 15.000; 1.720
- 12) 20.000; 1.460
- 13) 25.000; 1.290
- 14) 30.000; 1.160
- 15) 40.000; 0.990
- 16) 50.000; 0.870
- 17) 60.000; 0.790
- 18) 90.000; 0.630
- 19) 120.000; 0.530
- 20) 180.000; 0.430

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50800.00 TO NODE 50801.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00  
ELEVATION DATA: UPSTREAM(FEET) = 795.00 DOWNSTREAM(FEET) = 745.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.302  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.127  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.60	0.30	1.000	95	10.30

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 0.99  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 0.99

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50801.00 TO NODE 50802.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 725.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 245.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.99  
FLOW VELOCITY(FEET/SEC.) = 3.11 FLOW DEPTH(FEET) = 0.33  
TRAVEL TIME(MIN.) = 1.31  $T_c$ (MIN.) = 11.62  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50802.00 = 566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50802.00 TO NODE 50802.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.62

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.988  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 5.02  
 EFFECTIVE AREA (ACRES) = 3.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.9 PEAK FLOW RATE (CFS) = 5.93

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50802.00 TO NODE 50803.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 725.00 DOWNSTREAM (FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 325.00 CHANNEL SLOPE = 0.0769  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 5.93  
 FLOW VELOCITY (FEET/SEC.) = 4.66 FLOW DEPTH (FEET) = 0.65  
 TRAVEL TIME (MIN.) = 1.16 Tc (MIN.) = 12.78  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50803.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50803.00 TO NODE 50803.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----  
 MAINLINE Tc (MIN) = 12.78  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.880  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.50 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.50 SUBAREA RUNOFF (CFS) = 2.13  
 EFFECTIVE AREA (ACRES) = 5.40 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.4 PEAK FLOW RATE (CFS) = 7.68

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50803.00 TO NODE 50804.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 652.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 594.00 CHANNEL SLOPE = 0.0808  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 7.68  
 FLOW VELOCITY (FEET/SEC.) = 5.13 FLOW DEPTH (FEET) = 0.71

TRAVEL TIME (MIN.) = 1.93 Tc (MIN.) = 14.71  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50804.00 = 1485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50804.00 TO NODE 50804.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----  
 MAINLINE Tc (MIN) = 14.71  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.740  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 7.91  
 EFFECTIVE AREA (ACRES) = 11.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 11.5 PEAK FLOW RATE (CFS) = 14.91

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50804.00 TO NODE 50805.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 652.00 DOWNSTREAM (FEET) = 542.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 499.00 CHANNEL SLOPE = 0.2204  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 14.91  
 FLOW VELOCITY (FEET/SEC.) = 8.78 FLOW DEPTH (FEET) = 0.75  
 TRAVEL TIME (MIN.) = 0.95 Tc (MIN.) = 15.66  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50805.00 = 1984.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50805.00 TO NODE 50805.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----  
 MAINLINE Tc (MIN) = 15.66  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.686  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.70 0.30 1.000 -  
 USER-DEFINED - 1.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 5.20 SUBAREA RUNOFF (CFS) = 6.49  
 EFFECTIVE AREA (ACRES) = 16.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 16.7 PEAK FLOW RATE (CFS) = 20.83

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50805.00 TO NODE 50806.00 IS CODE = 51



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-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 542.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 650.00 CHANNEL SLOPE = 0.1415
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 20.83
FLOW VELOCITY(FEET/SEC.) = 8.10 FLOW DEPTH(FEET) = 0.93
TRAVEL TIME(MIN.) = 1.34 Tc(MIN.) = 17.00
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50806.00 = 2634.00 FEET.

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*****
FLOW PROCESS FROM NODE 50806.00 TO NODE 50806.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 17.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.616
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.20 0.30 1.000 -
USER-DEFINED - 1.50 0.30 1.000 -
USER-DEFINED - 0.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 6.16
EFFECTIVE AREA(ACRES) = 21.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 21.9 PEAK FLOW RATE(CFS) = 25.94

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*****
FLOW PROCESS FROM NODE 50806.00 TO NODE 50807.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 639.00 CHANNEL SLOPE = 0.0782
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 25.94
FLOW VELOCITY(FEET/SEC.) = 6.84 FLOW DEPTH(FEET) = 1.12
TRAVEL TIME(MIN.) = 1.56 Tc(MIN.) = 18.55
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50807.00 = 3273.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 50807.00 TO NODE 50807.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 18.55
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.535
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

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```

USER-DEFINED - 15.50 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 17.68
EFFECTIVE AREA(ACRES) = 37.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 42.03

```

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*****
FLOW PROCESS FROM NODE 50807.00 TO NODE 50808.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 350.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 448.00 CHANNEL SLOPE = 0.1116
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 42.03
FLOW VELOCITY(FEET/SEC.) = 8.80 FLOW DEPTH(FEET) = 1.26
TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 19.40
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50808.00 = 3721.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50808.00 TO NODE 50808.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 19.40
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.491
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.90 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 8.04
EFFECTIVE AREA(ACRES) = 45.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 45.3 PEAK FLOW RATE(CFS) = 48.57

```

```

*****
FLOW PROCESS FROM NODE 50808.00 TO NODE 50809.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 283.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 438.00 CHANNEL SLOPE = 0.1530
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 48.57
FLOW VELOCITY(FEET/SEC.) = 10.29 FLOW DEPTH(FEET) = 1.25
TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 20.11
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50809.00 = 4159.00 FEET.

```

```
*****
FLOW PROCESS FROM NODE 50809.00 TO NODE 50809.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 20.11
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.456
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.30    0.100   -
USER-DEFINED        -         5.70    0.30    1.000   -
USER-DEFINED        -         1.30    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.975
SUBAREA AREA(ACRES) = 7.20    SUBAREA RUNOFF(CFS) = 7.54
EFFECTIVE AREA(ACRES) = 52.50  AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 52.5    PEAK FLOW RATE(CFS) = 54.69
```

```
*****
FLOW PROCESS FROM NODE 50809.00 TO NODE 50810.00 IS CODE = 51
-----
```

```
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 283.00  DOWNSTREAM(FEET) = 243.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.00  CHANNEL SLOPE = 0.0602
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 54.69
FLOW VELOCITY(FEET/SEC.) = 9.29  FLOW DEPTH(FEET) = 1.40
TRAVEL TIME(MIN.) = 1.19  Tc(MIN.) = 21.30
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50810.00 = 4824.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 50810.00 TO NODE 50810.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 21.30
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.416
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20    0.30    0.100   -
USER-DEFINED        -        41.90    0.30    1.000   -
USER-DEFINED        -         4.90    0.30    1.000   -
USER-DEFINED        -         4.40    0.30    1.000   -
USER-DEFINED        -         9.90    0.30    1.000   -
USER-DEFINED        -         1.20    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.983
SUBAREA AREA(ACRES) = 63.50    SUBAREA RUNOFF(CFS) = 64.06
EFFECTIVE AREA(ACRES) = 116.00  AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 116.0    PEAK FLOW RATE(CFS) = 116.83
```

```
*****
FLOW PROCESS FROM NODE 50810.00 TO NODE 50811.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 243.00  DOWNSTREAM(FEET) = 173.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1122.00  CHANNEL SLOPE = 0.0624
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 116.83
FLOW VELOCITY(FEET/SEC.) = 9.15  FLOW DEPTH(FEET) = 2.06
TRAVEL TIME(MIN.) = 2.04  Tc(MIN.) = 23.35
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50811.00 = 5946.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 23.35
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.346
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         4.00    0.30    1.000   -
USER-DEFINED        -         0.40    0.30    1.000   -
USER-DEFINED        -         2.70    0.30    1.000   -
USER-DEFINED        -         0.30    0.30    0.100   -
USER-DEFINED        -         3.00    0.30    1.000   -
USER-DEFINED        -         1.10    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.977
SUBAREA AREA(ACRES) = 11.50    SUBAREA RUNOFF(CFS) = 10.90
EFFECTIVE AREA(ACRES) = 127.50  AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 127.5    PEAK FLOW RATE(CFS) = 120.47
```

```
*****
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 23.35
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.346
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.30    1.000   -
USER-DEFINED        -         1.90    0.30    1.000   -
USER-DEFINED        -         0.20    0.30    1.000   -
USER-DEFINED        -         0.80    0.30    1.000   -
USER-DEFINED        -         0.20    0.30    1.000   -
USER-DEFINED        -         0.10    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.40    SUBAREA RUNOFF(CFS) = 3.20
```

EFFECTIVE AREA (ACRES) = 130.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 130.9 PEAK FLOW RATE (CFS) = 123.68

\*\*\*\*\*

FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 23.35  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.346

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.38

EFFECTIVE AREA (ACRES) = 131.30 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 131.3 PEAK FLOW RATE (CFS) = 124.05

-----

END OF STUDY SUMMARY:  
TOTAL AREA (ACRES) = 131.3 TC (MIN.) = 23.35

EFFECTIVE AREA (ACRES) = 131.30 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.988

PEAK FLOW RATE (CFS) = 124.05

-----  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S31 \*  
\* Rational Method Hydrology Analysis - 10-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S31.DAT  
TIME/DATE OF STUDY: 16:17 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.120
- 2) 10.00; 2.158
- 3) 15.00; 1.718
- 4) 20.00; 1.461
- 5) 25.00; 1.289
- 6) 30.00; 1.180
- 7) 40.00; 0.990
- 8) 50.00; 0.873
- 9) 60.00; 0.780
- 10) 90.00; 0.628
- 11) 120.00; 0.534
- 12) 180.00; 0.437
- 13) 360.00; 0.302
- 14) 1440.00; 0.126

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13100.00 TO NODE 13101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.58  
ELEVATION DATA: UPSTREAM(FEET) = 1069.66 DOWNSTREAM(FEET) = 969.92

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.312  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.482  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.94	0.30	1.000	0	8.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.85  
TOTAL AREA(ACRES) = 0.94 PEAK FLOW RATE(CFS) = 1.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13101.00 TO NODE 13102.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 969.92 DOWNSTREAM(FEET) = 807.20  
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.89 CHANNEL SLOPE = 0.2444  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.21  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.060  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.67	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.98  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.97  
AVERAGE FLOW DEPTH(FEET) = 0.19 TRAVEL TIME(MIN.) = 2.80  
Tc(MIN.) = 11.11  
SUBAREA AREA(ACRES) = 7.67 SUBAREA RUNOFF(CFS) = 12.15  
EFFECTIVE AREA(ACRES) = 8.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 13.64  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.26 FLOW VELOCITY(FEET/SEC.) = 4.90  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13102.00 = 948.47 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13102.00 TO NODE 13103.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 807.20 DOWNSTREAM(FEET) = 769.94  
CHANNEL LENGTH THRU SUBAREA(FEET) = 691.01 CHANNEL SLOPE = 0.0539  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.66  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.800

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 20.65 0.30 0.999 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.65  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.90  
AVERAGE FLOW DEPTH(FEET) = 0.63 TRAVEL TIME(MIN.) = 2.96  
Tc(MIN.) = 14.06

SUBAREA AREA(ACRES) = 20.65 SUBAREA RUNOFF(CFS) = 27.89  
EFFECTIVE AREA(ACRES) = 29.26 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 29.3 PEAK FLOW RATE(CFS) = 39.51  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.78 FLOW VELOCITY(FEET/SEC.) = 4.38  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13103.00 = 1639.48 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 769.94 DOWNSTREAM(FEET) = 693.88  
FLOW LENGTH(FEET) = 1563.10 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 13.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.99  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 39.51  
PIPE TRAVEL TIME(MIN.) = 1.53 Tc(MIN.) = 15.60  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13104.00 = 3202.58 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.60  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.687

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 28.00 0.30 0.750 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750  
SUBAREA AREA(ACRES) = 28.00 SUBAREA RUNOFF(CFS) = 36.85  
EFFECTIVE AREA(ACRES) = 57.26 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 57.3 PEAK FLOW RATE(CFS) = 73.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 693.88 DOWNSTREAM(FEET) = 645.69  
FLOW LENGTH(FEET) = 1068.98 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 19.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.43  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 73.39  
PIPE TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 16.52  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13105.00 = 4271.56 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.52  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.640  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 35.28 0.30 0.867 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867  
SUBAREA AREA(ACRES) = 35.28 SUBAREA RUNOFF(CFS) = 43.82  
EFFECTIVE AREA(ACRES) = 92.54 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 114.79

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 645.69 DOWNSTREAM(FEET) = 608.48  
FLOW LENGTH(FEET) = 1127.55 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 29.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.54  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 114.79  
 PIPE TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 17.53  
 LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.53  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.588  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 37.68 0.30 0.889 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.889  
 SUBAREA AREA(ACRES) = 37.68 SUBAREA RUNOFF(CFS) = 44.82  
 EFFECTIVE AREA(ACRES) = 130.22 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
 TOTAL AREA(ACRES) = 130.2 PEAK FLOW RATE(CFS) = 155.28

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 15.1

>>>>DEFINE MEMORY BANK # 2 <<<<<

PEAK FLOWRATE TABLE FILE NAME: S30.DNA  
 MEMORY BANK # 2 DEFINED AS FOLLOWS:  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1311.19	41.63	0.30( 0.24)	0.81	1997.4	13000.00
2	1279.41	43.72	0.30( 0.24)	0.81	2016.1	13010.00
TOTAL AREA(ACRES) =						2016.1

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 14.0

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<<

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1311.19	41.63	0.30( 0.24)	0.81	1997.4	13000.00
2	1279.41	43.72	0.30( 0.24)	0.81	2016.1	13010.00
TOTAL AREA(ACRES) =						2016.1

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13026.00 TO NODE 13106.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 662.66 DOWNSTREAM(FEET) = 608.48  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 3098.88 CHANNEL SLOPE = 0.0175  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.26  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.913

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	75.28	0.30	0.755	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1334.45  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.39  
 AVERAGE FLOW DEPTH(FEET) = 2.26 TRAVEL TIME(MIN.) = 4.97  
 Tc(MIN.) = 46.60  
 SUBAREA AREA(ACRES) = 75.28 SUBAREA RUNOFF(CFS) = 46.51  
 EFFECTIVE AREA(ACRES) = 2072.73 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 2091.4 PEAK FLOW RATE(CFS) = 1311.19

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.24 FLOW VELOCITY(FEET/SEC.) = 10.33  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1311.19	46.60	0.913	0.30( 0.24)	0.80	2072.7	13000.00
2	1279.41	48.74	0.888	0.30( 0.24)	0.80	2091.4	13010.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1311.19 Tc(MIN.) = 46.60  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA(ACRES) = 2072.73

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1311.19	46.60	0.913	0.30( 0.24)	0.80	2072.7	13000.00
2	1279.41	48.74	0.888	0.30( 0.24)	0.80	2091.4	13010.00
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.							

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	155.28	17.53	1.588	0.30( 0.26)	0.88	130.2	13100.00

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1144.18	17.53	1.588	0.30 ( 0.24)	0.81	909.9	13100.00
2	1387.33	46.60	0.913	0.30 ( 0.24)	0.81	2202.9	13000.00
3	1352.62	48.74	0.888	0.30 ( 0.24)	0.81	2221.6	13010.00
TOTAL AREA (ACRES) =		2221.6					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1387.33 Tc (MIN.) = 46.599  
EFFECTIVE AREA (ACRES) = 2202.95 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA (ACRES) = 2221.6  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13106.00 TO NODE 13107.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 608.48 DOWNSTREAM (FEET) = 584.29  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1650.20 CHANNEL SLOPE = 0.0147  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT (FEET) = 2.50  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.881  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 190.45 0.30 0.755 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1443.44  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.08  
AVERAGE FLOW DEPTH (FEET) = 2.49 TRAVEL TIME (MIN.) = 2.73  
Tc (MIN.) = 49.33

SUBAREA AREA (ACRES) = 190.45 SUBAREA RUNOFF (CFS) = 112.21  
EFFECTIVE AREA (ACRES) = 2393.40 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA (ACRES) = 2412.1 PEAK FLOW RATE (CFS) = 1387.33  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT (FEET) = 2.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.44 FLOW VELOCITY (FEET/SEC.) = 9.93  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13107.00 = 20924.84 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1194.92	20.40	1.448	0.30 ( 0.24)	0.80	1100.4	13100.00
2	1387.33	49.33	0.881	0.30 ( 0.24)	0.80	2393.4	13000.00
3	1352.62	51.49	0.859	0.30 ( 0.24)	0.80	2412.1	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1387.33 Tc (MIN.) = 49.33  
AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA (ACRES) = 2393.40

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13107.00 TO NODE 13108.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 584.29 DOWNSTREAM (FEET) = 563.78  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1061.67 CHANNEL SLOPE = 0.0193  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT (FEET) = 2.33  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.865  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 314.12 0.30 0.939 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.939  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1469.75  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.10  
AVERAGE FLOW DEPTH (FEET) = 2.32 TRAVEL TIME (MIN.) = 1.59  
Tc (MIN.) = 50.92  
SUBAREA AREA (ACRES) = 314.12 SUBAREA RUNOFF (CFS) = 164.83  
EFFECTIVE AREA (ACRES) = 2707.52 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA (ACRES) = 2726.2 PEAK FLOW RATE (CFS) = 1508.10  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT (FEET) = 2.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.36 FLOW VELOCITY (FEET/SEC.) = 11.19  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13108.00 = 21986.51 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1452.54	22.04	1.391	0.30 ( 0.25)	0.83	1414.5	13100.00
2	1508.10	50.92	0.865	0.30 ( 0.25)	0.82	2707.5	13000.00
3	1468.97	53.10	0.844	0.30 ( 0.25)	0.82	2726.2	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1508.10 Tc (MIN.) = 50.92  
AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2707.52

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13108.00 TO NODE 13109.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 563.78 DOWNSTREAM (FEET) = 541.61  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1657.28 CHANNEL SLOPE = 0.0134

GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.68  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.839  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	203.63	0.30	0.785	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1563.41  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.05  
 AVERAGE FLOW DEPTH (FEET) = 2.68 TRAVEL TIME (MIN.) = 2.75  
 Tc (MIN.) = 53.67  
 SUBAREA AREA (ACRES) = 203.63 SUBAREA RUNOFF (CFS) = 110.62  
 EFFECTIVE AREA (ACRES) = 2911.15 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 2929.8 PEAK FLOW RATE (CFS) = 1556.24  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.67

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.67 FLOW VELOCITY (FEET/SEC.) = 10.03  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13109.00 = 23643.79 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap (INCH/HR)	Ae (ACRES)	HEADWATER NODE
1	1525.99	24.80	1.296	0.30 ( 0.25)	0.83	1618.1	13100.00
2	1556.24	53.67	0.839	0.30 ( 0.25)	0.82	2911.1	13000.00
3	1512.41	55.87	0.819	0.30 ( 0.24)	0.82	2929.8	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1556.24 Tc (MIN.) = 53.67  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2911.15

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13109.00 TO NODE 13110.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 541.61 DOWNSTREAM (FEET) = 509.94  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 2016.96 CHANNEL SLOPE = 0.0157  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.62  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.810  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	283.06	0.30	0.791	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.791  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1629.18  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 10.75  
 AVERAGE FLOW DEPTH (FEET) = 2.62 TRAVEL TIME (MIN.) = 3.13

Tc (MIN.) = 56.80  
 SUBAREA AREA (ACRES) = 283.06 SUBAREA RUNOFF (CFS) = 145.88  
 EFFECTIVE AREA (ACRES) = 3194.21 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3212.9 PEAK FLOW RATE (CFS) = 1625.67  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.62 FLOW VELOCITY (FEET/SEC.) = 10.73  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13110.00 = 25660.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap (INCH/HR)	Ae (ACRES)	HEADWATER NODE
1	1674.98	27.91	1.226	0.30 ( 0.25)	0.82	1901.2	13100.00
2	1625.67	56.80	0.810	0.30 ( 0.24)	0.81	3194.2	13000.00
3	1575.31	59.03	0.789	0.30 ( 0.24)	0.81	3212.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1674.98 Tc (MIN.) = 27.91  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 1901.17

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13110.00 TO NODE 13111.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 509.94 DOWNSTREAM (FEET) = 461.07  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 3058.95 CHANNEL SLOPE = 0.0160  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 2.75  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.132  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	248.05	0.30	0.783	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1775.19  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.12  
 AVERAGE FLOW DEPTH (FEET) = 2.74 TRAVEL TIME (MIN.) = 4.58  
 Tc (MIN.) = 32.50

SUBAREA AREA (ACRES) = 248.05 SUBAREA RUNOFF (CFS) = 200.40  
 EFFECTIVE AREA (ACRES) = 2149.22 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 3460.9 PEAK FLOW RATE (CFS) = 1716.14  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.69

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.69 FLOW VELOCITY (FEET/SEC.) = 10.99  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13111.00 = 28719.70 FEET.



\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1716.14	32.50	1.132	0.30 ( 0.25)	0.82	2149.2	13100.00
2	1638.51	61.46	0.773	0.30 ( 0.24)	0.81	3442.3	13000.00
3	1611.59	63.74	0.761	0.30 ( 0.24)	0.81	3460.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1716.14 Tc(MIN.) = 32.50  
 AREA-AVERAGED Fm(INCH/HR) = 0.25 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA(ACRES) = 2149.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 13111.00 TO NODE 13112.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 461.07 DOWNSTREAM(FEET) = 452.77  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1781.78 CHANNEL SLOPE = 0.0047  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.92

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.056

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	179.91	0.30	0.694	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.694

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1784.80

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.39

AVERAGE FLOW DEPTH(FEET) = 3.91 TRAVEL TIME(MIN.) = 4.02

Tc(MIN.) = 36.52

SUBAREA AREA(ACRES) = 179.91 SUBAREA RUNOFF(CFS) = 137.31

EFFECTIVE AREA(ACRES) = 2329.13 AREA-AVERAGED Fm(INCH/HR) = 0.24

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81

TOTAL AREA(ACRES) = 3640.9 PEAK FLOW RATE(CFS) = 1716.14

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.83 FLOW VELOCITY(FEET/SEC.) = 7.30

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13112.00 = 30501.48 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1716.14	36.52	1.056	0.30 ( 0.24)	0.81	2329.1	13100.00
2	1662.11	65.56	0.752	0.30 ( 0.24)	0.81	3622.2	13000.00
3	1632.52	67.86	0.740	0.30 ( 0.24)	0.81	3640.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1716.14 Tc(MIN.) = 36.52  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 2329.13

\*\*\*\*\*

FLOW PROCESS FROM NODE 13112.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 452.77 DOWNSTREAM(FEET) = 427.51

CHANNEL LENGTH THRU SUBAREA(FEET) = 1625.01 CHANNEL SLOPE = 0.0155

GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.76

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.009

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	155.96	0.30	0.836	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.836

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1769.39

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.01

AVERAGE FLOW DEPTH(FEET) = 2.76 TRAVEL TIME(MIN.) = 2.46

Tc(MIN.) = 38.98

SUBAREA AREA(ACRES) = 155.96 SUBAREA RUNOFF(CFS) = 106.49

EFFECTIVE AREA(ACRES) = 2485.09 AREA-AVERAGED Fm(INCH/HR) = 0.24

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81

TOTAL AREA(ACRES) = 3796.8 PEAK FLOW RATE(CFS) = 1716.14

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.71 FLOW VELOCITY(FEET/SEC.) = 10.91

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13222.00 = 32126.49 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1716.14	38.98	1.009	0.30 ( 0.24)	0.81	2485.1	13100.00
2	1689.35	68.05	0.739	0.30 ( 0.24)	0.81	3778.1	13000.00
3	1657.69	70.37	0.727	0.30 ( 0.24)	0.81	3796.8	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1716.14 Tc(MIN.) = 38.98

AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 2485.09

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 3796.8 TC(MIN.) = 38.98

EFFECTIVE AREA(ACRES) = 2485.09 AREA-AVERAGED Fm(INCH/HR) = 0.24

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.810

PEAK FLOW RATE(CFS) = 1716.14

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1716.14	38.98	1.009	0.30 ( 0.24)	0.81	2485.1	13100.00
2	1689.35	68.05	0.739	0.30 ( 0.24)	0.81	3778.1	13000.00
3	1657.69	70.37	0.727	0.30 ( 0.24)	0.81	3796.8	13010.00

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S32 \*  
\* Rational Method Hydrology Analysis - 10-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S32.DAT  
TIME/DATE OF STUDY: 16:17 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.120
- 2) 10.00; 2.158
- 3) 15.00; 1.718
- 4) 20.00; 1.461
- 5) 25.00; 1.289
- 6) 30.00; 1.180
- 7) 40.00; 0.990
- 8) 50.00; 0.873
- 9) 60.00; 0.780
- 10) 90.00; 0.628
- 11) 120.00; 0.534
- 12) 180.00; 0.437
- 13) 360.00; 0.302
- 14) 1440.00; 0.126

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13200.00 TO NODE 13201.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 298.57  
ELEVATION DATA: UPSTREAM(FEET) = 1069.04 DOWNSTREAM(FEET) = 1005.76

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.271  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.67	0.30	1.000	0	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.19  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 1.19

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13201.00 TO NODE 13202.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.76 DOWNSTREAM(FEET) = 896.98  
CHANNEL LENGTH THRU SUBAREA(FEET) = 747.55 CHANNEL SLOPE = 0.1455  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.22  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.855  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.46  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.09  
AVERAGE FLOW DEPTH(FEET) = 0.20 TRAVEL TIME(MIN.) = 4.04  
Tc(MIN.) = 13.45  
SUBAREA AREA(ACRES) = 7.42 SUBAREA RUNOFF(CFS) = 10.38  
EFFECTIVE AREA(ACRES) = 8.09 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.1 PEAK FLOW RATE(CFS) = 11.32  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.28

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.28 FLOW VELOCITY(FEET/SEC.) = 3.86  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13202.00 = 1046.12 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 896.98 DOWNSTREAM(FEET) = 840.27  
FLOW LENGTH(FEET) = 1789.59 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 7.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.20  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 11.32  
PIPE TRAVEL TIME(MIN.) = 2.92 Tc(MIN.) = 16.37  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13203.00 = 2835.71 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.37  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.648  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.89 0.30 0.731 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.731  
SUBAREA AREA(ACRES) = 38.89 SUBAREA RUNOFF(CFS) = 50.00  
EFFECTIVE AREA(ACRES) = 46.98 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
TOTAL AREA(ACRES) = 47.0 PEAK FLOW RATE(CFS) = 59.81

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 840.27 DOWNSTREAM(FEET) = 782.97  
FLOW LENGTH(FEET) = 992.54 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 15.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.22  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 59.81  
PIPE TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 17.19  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13204.00 = 3828.25 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.19  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.606  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 83.09 0.30 0.645 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645  
SUBAREA AREA(ACRES) = 83.09 SUBAREA RUNOFF(CFS) = 105.62  
EFFECTIVE AREA(ACRES) = 130.07 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 130.1 PEAK FLOW RATE(CFS) = 163.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 782.97 DOWNSTREAM(FEET) = 692.52  
FLOW LENGTH(FEET) = 2046.57 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.63  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 163.65  
PIPE TRAVEL TIME(MIN.) = 1.51 Tc(MIN.) = 18.69  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13205.00 = 5874.82 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.69  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.528  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 88.51 0.30 0.679 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.679  
SUBAREA AREA(ACRES) = 88.51 SUBAREA RUNOFF(CFS) = 105.53  
EFFECTIVE AREA(ACRES) = 218.58 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 218.6 PEAK FLOW RATE(CFS) = 260.14

\*\*\*\*\*

FLOW PROCESS FROM NODE 13205.00 TO NODE 13206.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 692.52 DOWNSTREAM(FEET) = 605.24  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2704.69 CHANNEL SLOPE = 0.0323  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.47  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.344

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	163.73	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 340.38  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.55  
AVERAGE FLOW DEPTH(FEET) = 2.41 TRAVEL TIME(MIN.) = 4.72  
Tc(MIN.) = 23.41  
SUBAREA AREA(ACRES) = 163.73 SUBAREA RUNOFF(CFS) = 160.11  
EFFECTIVE AREA(ACRES) = 382.31 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 382.3 PEAK FLOW RATE(CFS) = 383.93  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.57 FLOW VELOCITY(FEET/SEC.) = 9.89  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13206.00 = 8579.51 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13206.00 TO NODE 13207.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 605.24 DOWNSTREAM(FEET) = 555.41  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2479.15 CHANNEL SLOPE = 0.0201  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.18  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.220

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 445.54  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.71  
AVERAGE FLOW DEPTH(FEET) = 3.14 TRAVEL TIME(MIN.) = 4.74  
Tc(MIN.) = 28.16  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 123.13  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 464.53  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.21 FLOW VELOCITY(FEET/SEC.) = 8.82  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13207.00 = 11058.66 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 555.41 DOWNSTREAM(FEET) = 505.65  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1734.55 CHANNEL SLOPE = 0.0287  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.10  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.162

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 514.83  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.31  
AVERAGE FLOW DEPTH(FEET) = 3.09 TRAVEL TIME(MIN.) = 2.80  
Tc(MIN.) = 30.96  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 100.58  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 537.42  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.16 FLOW VELOCITY(FEET/SEC.) = 10.44  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 30.96  
RAINFALL INTENSITY(INCH/HR) = 1.16  
AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.81  
EFFECTIVE STREAM AREA(ACRES) = 649.28  
TOTAL STREAM AREA(ACRES) = 649.28  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 537.42

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13210.00 TO NODE 13211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.51  
ELEVATION DATA: UPSTREAM(FEET) = 949.80 DOWNSTREAM(FEET) = 828.64

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.525  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.441  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"OPEN BRUSH" - 1.96 0.30 1.000 0 8.53  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 3.78  
TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 3.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13211.00 TO NODE 13212.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 828.64 DOWNSTREAM(FEET) = 767.94  
CHANNEL LENGTH THRU SUBAREA(FEET) = 652.49 CHANNEL SLOPE = 0.0930  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.38

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.017  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 11.95 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.10  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.54  
AVERAGE FLOW DEPTH(FEET) = 0.35 TRAVEL TIME(MIN.) = 3.07  
Tc(MIN.) = 11.60  
SUBAREA AREA(ACRES) = 11.95 SUBAREA RUNOFF(CFS) = 18.47  
EFFECTIVE AREA(ACRES) = 13.91 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 21.50  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.46 FLOW VELOCITY(FEET/SEC.) = 4.25  
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13212.00 = 967.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13212.00 TO NODE 13213.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 767.94 DOWNSTREAM(FEET) = 706.43  
CHANNEL LENGTH THRU SUBAREA(FEET) = 967.91 CHANNEL SLOPE = 0.0635  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.77  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.712

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 27.07 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.77  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.60  
AVERAGE FLOW DEPTH(FEET) = 0.74 TRAVEL TIME(MIN.) = 3.51  
Tc(MIN.) = 15.11  
SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 34.41  
EFFECTIVE AREA(ACRES) = 40.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 41.0 PEAK FLOW RATE(CFS) = 52.09  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 0.87 FLOW VELOCITY(FEET/SEC.) = 5.08  
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13213.00 = 1934.91 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13213.00 TO NODE 13214.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 706.43 DOWNSTREAM(FEET) = 659.31  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.11 CHANNEL SLOPE = 0.0497  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.05  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.550

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.09 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 62.27  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.99  
AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 3.17  
Tc(MIN.) = 18.28  
SUBAREA AREA(ACRES) = 18.09 SUBAREA RUNOFF(CFS) = 20.35  
EFFECTIVE AREA(ACRES) = 59.07 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 66.45  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 1.08 FLOW VELOCITY(FEET/SEC.) = 5.07  
LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13214.00 = 2883.02 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13214.00 TO NODE 13215.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 659.31 DOWNSTREAM(FEET) = 628.91  
CHANNEL LENGTH THRU SUBAREA(FEET) = 970.24 CHANNEL SLOPE = 0.0313  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.61

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.409

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	71.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 102.13

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.96

AVERAGE FLOW DEPTH(FEET) = 1.57 TRAVEL TIME(MIN.) = 3.26

Tc(MIN.) = 21.54

SUBAREA AREA(ACRES) = 71.42 SUBAREA RUNOFF(CFS) = 71.26

EFFECTIVE AREA(ACRES) = 130.49 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 130.5 PEAK FLOW RATE(CFS) = 130.20

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.79 FLOW VELOCITY(FEET/SEC.) = 5.36

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13215.00 = 3853.26 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13215.00 TO NODE 13216.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 628.91 DOWNSTREAM(FEET) = 598.39  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.63 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.89

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.315

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	36.33	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 146.80

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.67

AVERAGE FLOW DEPTH(FEET) = 1.88 TRAVEL TIME(MIN.) = 2.71

Tc(MIN.) = 24.25

SUBAREA AREA(ACRES) = 36.33 SUBAREA RUNOFF(CFS) = 33.19

EFFECTIVE AREA(ACRES) = 166.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 166.8 PEAK FLOW RATE(CFS) = 152.42

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.93 FLOW VELOCITY(FEET/SEC.) = 5.72

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13216.00 = 4775.89 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13216.00 TO NODE 13217.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 598.39 DOWNSTREAM(FEET) = 568.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.40 CHANNEL SLOPE = 0.0470  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.87

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.271

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	42.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 171.00

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.71

AVERAGE FLOW DEPTH(FEET) = 1.86 TRAVEL TIME(MIN.) = 1.58

Tc(MIN.) = 25.83

SUBAREA AREA(ACRES) = 42.51 SUBAREA RUNOFF(CFS) = 37.16

EFFECTIVE AREA(ACRES) = 209.33 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 209.3 PEAK FLOW RATE(CFS) = 182.97

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.93 FLOW VELOCITY(FEET/SEC.) = 6.83

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13217.00 = 5412.29 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 568.48 DOWNSTREAM(FEET) = 505.65  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1896.50 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.32

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.164

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	73.24	0.30	0.951	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.951  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 211.95  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.31  
 AVERAGE FLOW DEPTH(FEET) = 2.30 TRAVEL TIME(MIN.) = 5.01  
 Tc(MIN.) = 30.84  
 SUBAREA AREA(ACRES) = 73.24 SUBAREA RUNOFF(CFS) = 57.93  
 EFFECTIVE AREA(ACRES) = 282.57 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 282.6 PEAK FLOW RATE(CFS) = 220.72  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.35 FLOW VELOCITY(FEET/SEC.) = 6.38  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13220.00 = 7308.79 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 30.84  
 RAINFALL INTENSITY(INCH/HR) = 1.16  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.99  
 EFFECTIVE STREAM AREA(ACRES) = 282.57  
 TOTAL STREAM AREA(ACRES) = 282.57  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 220.72

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	537.42	30.96	1.162	0.30( 0.24)	0.81	649.3	13200.00
2	220.72	30.84	1.164	0.30( 0.30)	0.99	282.6	13210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	757.39	30.84	1.164	0.30( 0.26)	0.86	929.4	13210.00
2	757.56	30.96	1.162	0.30( 0.26)	0.86	931.8	13200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 757.56 Tc(MIN.) = 30.96  
 EFFECTIVE AREA(ACRES) = 931.85 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA(ACRES) = 931.8  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13220.00 TO NODE 13221.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 505.65 DOWNSTREAM(FEET) = 478.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1949.14 CHANNEL SLOPE = 0.0137  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 4.04  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.106

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 108.50 0.30 0.637 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.637  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 802.21  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.98  
 AVERAGE FLOW DEPTH(FEET) = 4.04 TRAVEL TIME(MIN.) = 2.96  
 Tc(MIN.) = 33.92

SUBAREA AREA(ACRES) = 108.50 SUBAREA RUNOFF(CFS) = 89.30  
 EFFECTIVE AREA(ACRES) = 1040.35 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA(ACRES) = 1040.3 PEAK FLOW RATE(CFS) = 799.71  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 4.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 4.03 FLOW VELOCITY(FEET/SEC.) = 10.98  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13221.00 = 14742.35 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	799.87	33.80	1.108	0.30( 0.25)	0.84	1037.9	13210.00
2	799.71	33.92	1.106	0.30( 0.25)	0.84	1040.3	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 799.87 Tc(MIN.) = 33.80  
 AREA-AVERAGED Fm(INCH/HR) = 0.25 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.84 EFFECTIVE AREA(ACRES) = 1037.87

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13221.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 478.94 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2078.70 CHANNEL SLOPE = 0.0247  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.54  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.060

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN



USER-DEFINED - 87.26 0.30 0.699 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.699  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 833.26  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.75  
 AVERAGE FLOW DEPTH (FEET) = 3.54 TRAVEL TIME (MIN.) = 2.52  
 Tc (MIN.) = 36.32  
 SUBAREA AREA (ACRES) = 87.26 SUBAREA RUNOFF (CFS) = 66.77  
 EFFECTIVE AREA (ACRES) = 1125.13 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA (ACRES) = 1127.6 PEAK FLOW RATE (CFS) = 821.94  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.52 FLOW VELOCITY (FEET/SEC.) = 13.69  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13222.00 = 16821.05 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	821.94	36.32	1.060	0.30 (0.25)	0.83	1125.1	13210.00
2	821.47	36.44	1.058	0.30 (0.25)	0.83	1127.6	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 821.94 Tc (MIN.) = 36.32  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.83 EFFECTIVE AREA (ACRES) = 1125.13

=====  
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1127.6 TC (MIN.) = 36.32  
 EFFECTIVE AREA (ACRES) = 1125.13 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.828  
 PEAK FLOW RATE (CFS) = 821.94

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	821.94	36.32	1.060	0.30 (0.25)	0.83	1125.1	13210.00
2	821.47	36.44	1.058	0.30 (0.25)	0.83	1127.6	13200.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S35 \*  
\* Rational Method Hydrology Analysis - 10-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S35.DAT  
TIME/DATE OF STUDY: 16:17 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.120
- 2) 10.00; 2.158
- 3) 15.00; 1.718
- 4) 20.00; 1.461
- 5) 25.00; 1.289
- 6) 30.00; 1.180
- 7) 40.00; 0.990
- 8) 50.00; 0.873
- 9) 60.00; 0.780
- 10) 90.00; 0.628
- 11) 120.00; 0.534
- 12) 180.00; 0.437
- 13) 360.00; 0.302
- 14) 1440.00; 0.126

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP HEIGHT (FT)	HIKE FACTOR	MANNING (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.00 TO NODE 13500.50 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 548.43  
ELEVATION DATA: UPSTREAM(FEET) = 1183.47 DOWNSTREAM(FEET) = 1065.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.986  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	5.11	0.30	1.000	0	11.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 7.75  
TOTAL AREA(ACRES) = 5.11 PEAK FLOW RATE(CFS) = 7.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.50 TO NODE 13501.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1033.15  
CHANNEL LENGTH THRU SUBAREA(FEET) = 431.71 CHANNEL SLOPE = 0.0738  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.39  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.795  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.87	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.74  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.32  
AVERAGE FLOW DEPTH(FEET) = 0.38 TRAVEL TIME(MIN.) = 2.17  
Tc(MIN.) = 14.12  
SUBAREA AREA(ACRES) = 8.87 SUBAREA RUNOFF(CFS) = 11.94  
EFFECTIVE AREA(ACRES) = 13.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 18.81  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.46

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.46 FLOW VELOCITY(FEET/SEC.) = 3.74  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13501.00 = 980.14 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13501.00 TO NODE 13502.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1033.15 DOWNSTREAM(FEET) = 990.26  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.63 CHANNEL SLOPE = 0.0452  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.70

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.543

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.82	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 28.26

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.69

AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 4.28

Tc(MIN.) = 18.40

SUBAREA AREA(ACRES) = 16.82 SUBAREA RUNOFF(CFS) = 18.82

EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 34.47

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.76 FLOW VELOCITY(FEET/SEC.) = 3.95

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13502.00 = 1928.77 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13502.00 TO NODE 13503.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.26 DOWNSTREAM(FEET) = 956.06

CHANNEL LENGTH THRU SUBAREA(FEET) = 940.98 CHANNEL SLOPE = 0.0363

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.11

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.393

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	46.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 57.14

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.36

AVERAGE FLOW DEPTH(FEET) = 1.08 TRAVEL TIME(MIN.) = 3.60

Tc(MIN.) = 22.00

SUBAREA AREA(ACRES) = 46.02 SUBAREA RUNOFF(CFS) = 45.25

EFFECTIVE AREA(ACRES) = 76.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 76.8 PEAK FLOW RATE(CFS) = 75.54

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.26 FLOW VELOCITY(FEET/SEC.) = 4.77

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13503.00 = 2869.75 FEET.

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FLOW PROCESS FROM NODE 13503.00 TO NODE 13504.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 956.06 DOWNSTREAM(FEET) = 889.48

CHANNEL LENGTH THRU SUBAREA(FEET) = 2131.31 CHANNEL SLOPE = 0.0312

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.58

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.197

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	58.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 99.21

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.93

AVERAGE FLOW DEPTH(FEET) = 1.54 TRAVEL TIME(MIN.) = 7.20

Tc(MIN.) = 29.20

SUBAREA AREA(ACRES) = 58.46 SUBAREA RUNOFF(CFS) = 47.22

EFFECTIVE AREA(ACRES) = 135.28 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 135.3 PEAK FLOW RATE(CFS) = 109.27

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.63 FLOW VELOCITY(FEET/SEC.) = 5.06

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13504.00 = 5001.06 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13504.00 TO NODE 13505.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 889.48 DOWNSTREAM(FEET) = 848.10

CHANNEL LENGTH THRU SUBAREA(FEET) = 1661.97 CHANNEL SLOPE = 0.0249

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.90

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.088  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	49.30	0.30	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 126.76  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.90  
 AVERAGE FLOW DEPTH (FEET) = 1.88 TRAVEL TIME (MIN.) = 5.65  
 Tc (MIN.) = 34.86  
 SUBAREA AREA (ACRES) = 49.30 SUBAREA RUNOFF (CFS) = 34.95  
 EFFECTIVE AREA (ACRES) = 184.58 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 184.6 PEAK FLOW RATE (CFS) = 130.87  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 1.91  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.91 FLOW VELOCITY (FEET/SEC.) = 4.95  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.00 = 6663.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13505.00 TO NODE 13505.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 848.10 DOWNSTREAM (FEET) = 811.10  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1234.61 CHANNEL SLOPE = 0.0300  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 1.92  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.016  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.35	0.30	0.811	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.811  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 144.55  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.44  
 AVERAGE FLOW DEPTH (FEET) = 1.92 TRAVEL TIME (MIN.) = 3.78  
 Tc (MIN.) = 38.64  
 SUBAREA AREA (ACRES) = 39.35 SUBAREA RUNOFF (CFS) = 27.36  
 EFFECTIVE AREA (ACRES) = 223.93 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 223.9 PEAK FLOW RATE (CFS) = 146.29  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 1.93  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.93 FLOW VELOCITY (FEET/SEC.) = 5.46  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.50 = 7897.64 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13505.50 TO NODE 13506.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 811.10 DOWNSTREAM (FEET) = 781.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1415.98 CHANNEL SLOPE = 0.0213  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.26  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.951  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	54.33	0.30	0.738	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.738  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 164.12  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.00  
 AVERAGE FLOW DEPTH (FEET) = 2.26 TRAVEL TIME (MIN.) = 4.72  
 Tc (MIN.) = 43.36  
 SUBAREA AREA (ACRES) = 54.33 SUBAREA RUNOFF (CFS) = 35.67  
 EFFECTIVE AREA (ACRES) = 278.26 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
 TOTAL AREA (ACRES) = 278.3 PEAK FLOW RATE (CFS) = 168.84  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.29  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.29 FLOW VELOCITY (FEET/SEC.) = 5.05  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.00 = 9313.62 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13506.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 781.00 DOWNSTREAM (FEET) = 743.17  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1542.62 CHANNEL SLOPE = 0.0245  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.34  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.896  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	61.33	0.30	0.783	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 187.08  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.47  
 AVERAGE FLOW DEPTH (FEET) = 2.33 TRAVEL TIME (MIN.) = 4.70  
 Tc (MIN.) = 48.06  
 SUBAREA AREA (ACRES) = 61.33 SUBAREA RUNOFF (CFS) = 36.49  
 EFFECTIVE AREA (ACRES) = 339.59 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90

TOTAL AREA (ACRES) = 339.6 PEAK FLOW RATE (CFS) = 191.60  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.36  
  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.36 FLOW VELOCITY (FEET/SEC.) = 5.51  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.50 = 10856.24 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.50 TO NODE 13520.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 743.17 DOWNSTREAM (FEET) = 717.04  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1370.93 CHANNEL SLOPE = 0.0191  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.61  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 0.850  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.86	0.30	0.848	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.848  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 202.28  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.11  
 AVERAGE FLOW DEPTH (FEET) = 2.60 TRAVEL TIME (MIN.) = 4.47  
 Tc (MIN.) = 52.53  
 SUBAREA AREA (ACRES) = 39.86 SUBAREA RUNOFF (CFS) = 21.36  
 EFFECTIVE AREA (ACRES) = 379.45 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
 TOTAL AREA (ACRES) = 379.5 PEAK FLOW RATE (CFS) = 198.81  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.58 FLOW VELOCITY (FEET/SEC.) = 5.09  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 52.53  
 RAINFALL INTENSITY (INCH/HR) = 0.85  
 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.89  
 EFFECTIVE STREAM AREA (ACRES) = 379.45  
 TOTAL STREAM AREA (ACRES) = 379.45  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 198.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13510.00 TO NODE 13511.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

ELEVATION DATA: UPSTREAM (FEET) = 1216.90 DOWNSTREAM (FEET) = 1022.78

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.615  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.752  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	6.66	0.30	1.000	0	14.62

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 8.70  
 TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 8.70

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13511.00 TO NODE 13512.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1022.78 DOWNSTREAM (FEET) = 954.27  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1027.63 CHANNEL SLOPE = 0.0667  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.56  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.511  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.30	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 22.66  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 3.87  
 AVERAGE FLOW DEPTH (FEET) = 0.53 TRAVEL TIME (MIN.) = 4.42  
 Tc (MIN.) = 19.04  
 SUBAREA AREA (ACRES) = 25.40 SUBAREA RUNOFF (CFS) = 27.68  
 EFFECTIVE AREA (ACRES) = 32.06 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 34.94  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.68 FLOW VELOCITY (FEET/SEC.) = 4.51  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13512.00 = 1931.31 FEET.

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FLOW PROCESS FROM NODE 13512.00 TO NODE 13513.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 954.27 DOWNSTREAM(FEET) = 872.45
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.42 CHANNEL SLOPE = 0.0425
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.29
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.280

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 90.23 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 74.92
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.02
AVERAGE FLOW DEPTH(FEET) = 1.20 TRAVEL TIME(MIN.) = 6.39
Tc(MIN.) = 25.43

SUBAREA AREA(ACRES) = 90.23 SUBAREA RUNOFF(CFS) = 79.57
EFFECTIVE AREA(ACRES) = 122.29 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 122.3 PEAK FLOW RATE(CFS) = 107.84
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.48 FLOW VELOCITY(FEET/SEC.) = 5.61
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13513.00 = 3857.73 FEET.

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FLOW PROCESS FROM NODE 13513.00 TO NODE 13514.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 872.45 DOWNSTREAM(FEET) = 813.12
CHANNEL LENGTH THRU SUBAREA(FEET) = 1895.66 CHANNEL SLOPE = 0.0313
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.06
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.161

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 135.65 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 160.51
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.70
AVERAGE FLOW DEPTH(FEET) = 2.01 TRAVEL TIME(MIN.) = 5.54
Tc(MIN.) = 30.98

SUBAREA AREA(ACRES) = 135.65 SUBAREA RUNOFF(CFS) = 105.17
EFFECTIVE AREA(ACRES) = 257.94 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 257.9 PEAK FLOW RATE(CFS) = 199.99
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.26 FLOW VELOCITY(FEET/SEC.) = 6.08
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13514.00 = 5753.39 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13514.00 TO NODE 13515.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 813.12 DOWNSTREAM(FEET) = 773.74
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.15 CHANNEL SLOPE = 0.0204
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.81
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.050

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 109.30 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 236.93
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.48
AVERAGE FLOW DEPTH(FEET) = 2.78 TRAVEL TIME(MIN.) = 5.86
Tc(MIN.) = 36.84

SUBAREA AREA(ACRES) = 109.30 SUBAREA RUNOFF(CFS) = 73.79
EFFECTIVE AREA(ACRES) = 367.24 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 367.2 PEAK FLOW RATE(CFS) = 247.92
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.84 FLOW VELOCITY(FEET/SEC.) = 5.56
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13515.00 = 7679.54 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 773.74 DOWNSTREAM(FEET) = 717.04
CHANNEL LENGTH THRU SUBAREA(FEET) = 2279.49 CHANNEL SLOPE = 0.0249
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.12
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.957

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 231.44 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 316.46  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 6.38  
 AVERAGE FLOW DEPTH( FEET) = 3.07 TRAVEL TIME( MIN.) = 5.95  
 Tc( MIN.) = 42.79  
 SUBAREA AREA( ACRES) = 231.44 SUBAREA RUNOFF( CFS) = 136.94  
 EFFECTIVE AREA( ACRES) = 598.68 AREA-AVERAGED Fm( INCH/HR) = 0.30  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA( ACRES) = 598.7 PEAK FLOW RATE( CFS) = 354.24  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 3.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 3.25 FLOW VELOCITY( FEET/SEC.) = 6.59  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13520.00 = 9959.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION( MIN.) = 42.79  
 RAINFALL INTENSITY( INCH/HR) = 0.96  
 AREA-AVERAGED Fm( INCH/HR) = 0.30  
 AREA-AVERAGED Fp( INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA( ACRES) = 598.68  
 TOTAL STREAM AREA( ACRES) = 598.68  
 PEAK FLOW RATE( CFS) AT CONFLUENCE = 354.24

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	198.81	52.53	0.850	0.30( 0.27)	0.89	379.5	13500.00
2	354.24	42.79	0.957	0.30( 0.30)	1.00	598.7	13510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	546.15	42.79	0.957	0.30( 0.29)	0.96	907.8	13510.00
2	495.01	52.53	0.850	0.30( 0.29)	0.96	978.1	13500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE( CFS) = 546.15 Tc( MIN.) = 42.79  
 EFFECTIVE AREA( ACRES) = 907.77 AREA-AVERAGED Fm( INCH/HR) = 0.29  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA( ACRES) = 978.1  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.00 TO NODE 13520.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM( FEET) = 717.04 DOWNSTREAM( FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 2019.22 CHANNEL SLOPE = 0.0084  
 GIVEN CHANNEL BASE( FEET) = 30.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 2.73  
 \* 10 YEAR RAINFALL INTENSITY( INCH/HR) = 0.889

SUBAREA LOSS RATE DATA( AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp( INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW( CFS) = 598.35  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 5.77  
 AVERAGE FLOW DEPTH( FEET) = 2.72 TRAVEL TIME( MIN.) = 5.84  
 Tc( MIN.) = 48.63  
 SUBAREA AREA( ACRES) = 193.31 SUBAREA RUNOFF( CFS) = 104.36  
 EFFECTIVE AREA( ACRES) = 1101.08 AREA-AVERAGED Fm( INCH/HR) = 0.29  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA( ACRES) = 1171.4 PEAK FLOW RATE( CFS) = 594.89  
 GIVEN CHANNEL BASE( FEET) = 30.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 2.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 2.71 FLOW VELOCITY( FEET/SEC.) = 5.75  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.50 = 14246.39 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	594.89	48.63	0.889	0.30( 0.29)	0.96	1101.1	13510.00
2	533.21	58.56	0.793	0.30( 0.29)	0.96	1171.4	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE( CFS) = 594.89 Tc( MIN.) = 48.63  
 AREA-AVERAGED Fm( INCH/HR) = 0.29 AREA-AVERAGED Fp( INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA( ACRES) = 1101.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.50 TO NODE 13521.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM( FEET) = 700.00 DOWNSTREAM( FEET) = 661.95  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 1622.36 CHANNEL SLOPE = 0.0235  
 GIVEN CHANNEL BASE( FEET) = 30.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 2.10  
 \* 10 YEAR RAINFALL INTENSITY( INCH/HR) = 0.856

SUBAREA LOSS RATE DATA( AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -        129.79      0.30        0.897       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 629.16  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.28  
 AVERAGE FLOW DEPTH(FEET) = 2.09    TRAVEL TIME(MIN.) = 3.26  
 Tc(MIN.) = 51.89  
 SUBAREA AREA(ACRES) = 129.79        SUBAREA RUNOFF(CFS) = 68.52  
 EFFECTIVE AREA(ACRES) = 1230.87    AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 1301.2        PEAK FLOW RATE(CFS) = 630.06  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.10

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.10    FLOW VELOCITY(FEET/SEC.) = 8.29  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13521.00 = 15868.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	630.06	51.89	0.856	0.30( 0.29)	0.96	1230.9	13510.00
2	567.14	61.95	0.770	0.30( 0.29)	0.95	1301.2	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 630.06    Tc(MIN.) = 51.89  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96    EFFECTIVE AREA(ACRES) = 1230.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 13521.00 TO NODE 13522.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 661.95    DOWNSTREAM(FEET) = 632.19  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2746.01    CHANNEL SLOPE = 0.0108  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.77  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 0.791  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	278.60	0.30	0.905	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 695.20  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.59  
 AVERAGE FLOW DEPTH(FEET) = 2.76    TRAVEL TIME(MIN.) = 6.95  
 Tc(MIN.) = 58.84  
 SUBAREA AREA(ACRES) = 278.60        SUBAREA RUNOFF(CFS) = 130.24  
 EFFECTIVE AREA(ACRES) = 1509.47    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.95  
 TOTAL AREA(ACRES) = 1579.8        PEAK FLOW RATE(CFS) = 688.52  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.74    FLOW VELOCITY(FEET/SEC.) = 6.57  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13522.00 = 18614.76 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	688.52	58.84	0.791	0.30( 0.28)	0.95	1509.5	13510.00
2	640.29	69.13	0.734	0.30( 0.28)	0.94	1579.8	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 688.52    Tc(MIN.) = 58.84  
 AREA-AVERAGED Fm(INCH/HR) = 0.28    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.95    EFFECTIVE AREA(ACRES) = 1509.47

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1579.8    TC(MIN.) = 58.84  
 EFFECTIVE AREA(ACRES) = 1509.47    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.947  
 PEAK FLOW RATE(CFS) = 688.52

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	688.52	58.84	0.791	0.30( 0.28)	0.95	1509.5	13510.00
2	640.29	69.13	0.734	0.30( 0.28)	0.94	1579.8	13500.00

=====

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 18.0 Release Date: 07/01/2011 License ID 1264

Analysis prepared by:

RBF Consulting

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 25-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P25EVAA.DAT  
TIME/DATE OF STUDY: 16:41 11/13/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.766
- 2) 10.00; 3.118
- 3) 15.00; 2.394
- 4) 20.00; 1.986
- 5) 25.00; 1.734
- 6) 30.00; 1.526
- 7) 40.00; 1.325
- 8) 50.00; 1.173
- 9) 60.00; 1.046
- 10) 90.00; 0.877
- 11) 120.00; 0.765
- 12) 180.00; 0.636
- 13) 360.00; 0.466
- 14) 1200.00; 0.203

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 571.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.305  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.006  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56	7.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 2.84  
TOTAL AREA (ACRES) = 0.80 PEAK FLOW RATE (CFS) = 2.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.006  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.170  
SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 11.75  
EFFECTIVE AREA (ACRES) = 4.10 AREA-AVERAGED Fm (INCH/HR) = 0.05  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
TOTAL AREA (ACRES) = 4.1 PEAK FLOW RATE (CFS) = 14.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.006  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 2.60 0.30 0.200 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 9.23  
EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.06  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19  
TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 23.82

\*\*\*\*\*

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 571.00 DOWNSTREAM ELEVATION(FEET) = 530.50  
STREET LENGTH(FEET) = 1215.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 28.68

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.46  
HALFSTREET FLOOD WIDTH(FEET) = 16.84  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.26  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.44  
STREET FLOW TRAVEL TIME(MIN.) = 3.85 Tc(MIN.) = 11.15

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.951

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.20	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	2.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.135  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 9.69  
EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 27.15

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.45  
FLOW VELOCITY(FEET/SEC.) = 5.20 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.37  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1542.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 11.15  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.951  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.119  
SUBAREA AREA(ACRES) = 22.60 SUBAREA RUNOFF(CFS) = 59.29  
EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.04  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.13  
TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 86.45

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 11.15  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.951  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198  
SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 16.39  
EFFECTIVE AREA(ACRES) = 39.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
TOTAL AREA(ACRES) = 39.3 PEAK FLOW RATE(CFS) = 102.84

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.50 DOWNSTREAM(FEET) = 522.00  
FLOW LENGTH(FEET) = 837.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.83  
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 102.84  
PIPE TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 12.33  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2379.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 12.33  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.780  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 15.30 0.30 0.100 56  
 PUBLIC PARK B 0.70 0.30 0.850 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.133  
 SUBAREA AREA(ACRES) = 16.00 SUBAREA RUNOFF(CFS) = 39.46  
 EFFECTIVE AREA(ACRES) = 55.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA(ACRES) = 55.3 PEAK FLOW RATE(CFS) = 136.26

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 522.00 DOWNSTREAM(FEET) = 473.00  
 FLOW LENGTH(FEET) = 568.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 28.16  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 136.26  
 PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 12.67  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2947.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 12.67  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.732  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	2.10	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
COMMERCIAL	B	0.50	0.30	0.100	56
PUBLIC PARK	B	13.00	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.820  
 SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 35.57  
 EFFECTIVE AREA(ACRES) = 71.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 71.2 PEAK FLOW RATE(CFS) = 169.41

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 127.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 435.00  
 FLOW LENGTH(FEET) = 588.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.95

ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 169.41  
 PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 13.03  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

=====

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 100.00 TO NODE 121.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 574.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.633  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56	8.44

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 1.93  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.93

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 574.00 DOWNSTREAM ELEVATION(FEET) = 557.00  
 STREET LENGTH(FEET) = 221.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.70  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.39  
 HALFSTREET FLOOD WIDTH(FEET) = 13.01  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.95  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.74

STREET FLOW TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 8.97  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.458  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 7.90 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.10 0.30 0.400 56  
 APARTMENTS B 2.20 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.257  
 SUBAREA AREA(ACRES) = 14.30 SUBAREA RUNOFF(CFS) = 43.51  
 EFFECTIVE AREA(ACRES) = 14.90 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.26  
 TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 45.35

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 17.07  
 FLOW VELOCITY(FEET/SEC.) = 8.11 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.79  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 551.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 557.00 DOWNSTREAM ELEVATION(FEET) = 527.00  
 STREET LENGTH(FEET) = 317.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 58.60  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.49  
 HALFSTREET FLOOD WIDTH(FEET) = 18.24  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.26  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.52  
 STREET FLOW TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 9.54  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.270  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.50 0.30 0.400 56  
 APARTMENTS B 0.70 0.30 0.200 56

COMMERCIAL B 0.40 0.30 0.100 56  
 CONDOMINIUMS B 3.50 0.30 0.350 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.352  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 26.49  
 EFFECTIVE AREA(ACRES) = 24.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 24.2 PEAK FLOW RATE(CFS) = 69.31

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.51 HALFSTREET FLOOD WIDTH(FEET) = 19.49  
 FLOW VELOCITY(FEET/SEC.) = 9.66 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.93  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 123.00 = 868.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 527.00 DOWNSTREAM ELEVATION(FEET) = 496.00  
 STREET LENGTH(FEET) = 315.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 84.68  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.54  
 HALFSTREET FLOOD WIDTH(FEET) = 20.90  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.34  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 5.54  
 STREET FLOW TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 10.05

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.111  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 2.90 0.30 0.400 56  
 CONDOMINIUMS B 1.40 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.00 0.30 0.400 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 CONDOMINIUMS B 2.70 0.30 0.350 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387  
 SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 30.73  
 EFFECTIVE AREA(ACRES) = 35.60 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32

TOTAL AREA (ACRES) = 35.6 PEAK FLOW RATE (CFS) = 96.58

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.56 HALFSTREET FLOOD WIDTH (FEET) = 22.07
FLOW VELOCITY (FEET/SEC.) = 10.62 DEPTH\*VELOCITY (FT\*FT/SEC.) = 5.92
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 124.00 = 1183.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 10.05

RAINFALL INTENSITY (INCH/HR) = 3.11

AREA-AVERAGED Fm (INCH/HR) = 0.10

AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.32

EFFECTIVE STREAM AREA (ACRES) = 35.60

TOTAL STREAM AREA (ACRES) = 35.60

PEAK FLOW RATE (CFS) AT CONFLUENCE = 96.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 317.00

ELEVATION DATA: UPSTREAM (FEET) = 699.00 DOWNSTREAM (FEET) = 610.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.111

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.411

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER

"OPEN BRUSH" B 1.50 0.30 1.000 66 9.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 4.20

TOTAL AREA (ACRES) = 1.50 PEAK FLOW RATE (CFS) = 4.20

\*\*\*\*\*

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 610.00 DOWNSTREAM (FEET) = 575.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 206.00 CHANNEL SLOPE = 0.1699

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.245

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 2.80 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.91

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.80

AVERAGE FLOW DEPTH (FEET) = 0.62 TRAVEL TIME (MIN.) = 0.50

Tc (MIN.) = 9.62

SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 7.42

EFFECTIVE AREA (ACRES) = 4.30 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 4.3 PEAK FLOW RATE (CFS) = 11.40

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.71 FLOW VELOCITY (FEET/SEC.) = 7.44

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 523.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 575.00 DOWNSTREAM (FEET) = 548.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.1350

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.109

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 3.30 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.57

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.42

AVERAGE FLOW DEPTH (FEET) = 0.84 TRAVEL TIME (MIN.) = 0.45

Tc (MIN.) = 10.07

SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 8.34

EFFECTIVE AREA (ACRES) = 7.60 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 7.6 PEAK FLOW RATE (CFS) = 19.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.91 FLOW VELOCITY (FEET/SEC.) = 7.82

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 723.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 548.00 DOWNSTREAM (FEET) = 524.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 318.00 CHANNEL SLOPE = 0.0755

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.990  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	2.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 22.00  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.46  
 AVERAGE FLOW DEPTH (FEET) = 1.07 TRAVEL TIME (MIN.) = 0.82  
 Tc (MIN.) = 10.89  
 SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 5.57  
 EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 23.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.10 FLOW VELOCITY (FEET/SEC.) = 6.58  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 1041.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	3.70	0.30	1.000	66

ELEVATION DATA: UPSTREAM (FEET) = 524.00 DOWNSTREAM (FEET) = 515.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 94.00 CHANNEL SLOPE = 0.0957  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.960  
 SUBAREA LOSS RATE DATA (AMC II):

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 28.39  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.56  
 AVERAGE FLOW DEPTH (FEET) = 1.12 TRAVEL TIME (MIN.) = 0.21  
 Tc (MIN.) = 11.09  
 SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 8.86  
 EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 32.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.18 FLOW VELOCITY (FEET/SEC.) = 7.80  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 1135.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	8.30	0.30	1.000	66

ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 507.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 207.00 CHANNEL SLOPE = 0.0386  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.876  
 SUBAREA LOSS RATE DATA (AMC II):

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 42.18  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.94  
 AVERAGE FLOW DEPTH (FEET) = 1.54 TRAVEL TIME (MIN.) = 0.58  
 Tc (MIN.) = 11.67  
 SUBAREA AREA (ACRES) = 8.30 SUBAREA RUNOFF (CFS) = 19.24  
 EFFECTIVE AREA (ACRES) = 21.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 21.9 PEAK FLOW RATE (CFS) = 50.77

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.65 FLOW VELOCITY (FEET/SEC.) = 6.21  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 1342.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	0.60	0.30	1.000	66
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
NATURAL FAIR COVER "OPEN BRUSH"	B	13.20	0.30	1.000	66

ELEVATION DATA: UPSTREAM (FEET) = 507.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 338.00 CHANNEL SLOPE = 0.0207  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.720  
 SUBAREA LOSS RATE DATA (AMC II):

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 66.15  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.25  
 AVERAGE FLOW DEPTH (FEET) = 2.05 TRAVEL TIME (MIN.) = 1.07  
 Tc (MIN.) = 12.75  
 SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 30.76  
 EFFECTIVE AREA (ACRES) = 36.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 36.0 PEAK FLOW RATE (CFS) = 78.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.18 FLOW VELOCITY(FEET/SEC.) = 5.48  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 1680.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 137.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 496.00  
FLOW LENGTH(FEET) = 726.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.75  
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 78.47  
PIPE TRAVEL TIME(MIN.) = 1.38 Tc(MIN.) = 14.13  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.13  
RAINFALL INTENSITY(INCH/HR) = 2.52  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 36.00  
TOTAL STREAM AREA(ACRES) = 36.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 78.47

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	96.58	10.05	3.111	0.30( 0.10)	0.32	35.6	100.00
2	78.47	14.13	2.520	0.30( 0.30)	1.00	36.0	130.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	167.22	10.05	3.111	0.30( 0.18)	0.60	61.2	100.00
2	156.11	14.13	2.520	0.30( 0.20)	0.66	71.6	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 167.22 Tc(MIN.) = 10.05  
EFFECTIVE AREA(ACRES) = 61.20 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 71.6  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 444.00  
FLOW LENGTH(FEET) = 888.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.79  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 167.22  
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 10.62  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 125.00 = 3294.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.62  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.028  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCs SOIL AREA Fp Ap SCs  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 7.50 0.30 0.400 56  
NATURAL FAIR COVER  
"OPEN BRUSH" B 0.10 0.30 1.000 66  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.407  
SUBAREA AREA(ACRES) = 8.60 SUBAREA RUNOFF(CFS) = 22.49  
EFFECTIVE AREA(ACRES) = 69.80 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 179.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 444.00 DOWNSTREAM(FEET) = 438.00  
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.07  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 179.30  
PIPE TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 11.46  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.46



\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.906  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	4.30	0.30	0.200	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.70	0.30	0.400	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.20	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 7.10 SUBAREA RUNOFF (CFS) = 18.14  
 EFFECTIVE AREA (ACRES) = 76.90 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 87.3 PEAK FLOW RATE (CFS) = 189.78

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.46  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.906  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.51  
 EFFECTIVE AREA (ACRES) = 77.10 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 87.5 PEAK FLOW RATE (CFS) = 190.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 11.46  
 RAINFALL INTENSITY (INCH/HR) = 2.91  
 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.55  
 EFFECTIVE STREAM AREA (ACRES) = 77.10  
 TOTAL STREAM AREA (ACRES) = 87.50  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 190.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====  
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 557.00 DOWNSTREAM (FEET) = 546.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.105  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.402  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.50	0.30	0.100	56	6.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 1.97  
 TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 1.97

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<<<<

=====

UPSTREAM ELEVATION (FEET) = 546.00 DOWNSTREAM ELEVATION (FEET) = 488.00  
 STREET LENGTH (FEET) = 671.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.86

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.32  
 HALfstREET FLOOD WIDTH (FEET) = 8.78  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.15  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.97  
 STREET FLOW TRAVEL TIME (MIN.) = 1.82 Tc (MIN.) = 7.92

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.803  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.50	0.30	0.200	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	3.90	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293  
 SUBAREA AREA (ACRES) = 5.30 SUBAREA RUNOFF (CFS) = 17.72  
 EFFECTIVE AREA (ACRES) = 5.80 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA (ACRES) = 5.8 PEAK FLOW RATE (CFS) = 19.42

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 11.60  
 FLOW VELOCITY (FEET/SEC.) = 6.96 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.57  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1001.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 7.92  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.803  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	14.60	0.30	0.200	56
COMMERCIAL	B	1.10	0.30	0.100	56
CONDOMINIUMS	B	4.30	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.227  
 SUBAREA AREA (ACRES) = 20.00 SUBAREA RUNOFF (CFS) = 67.22  
 EFFECTIVE AREA (ACRES) = 25.80 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 25.8 PEAK FLOW RATE (CFS) = 86.64

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

-----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

-----

UPSTREAM ELEVATION (FEET) = 488.00 DOWNSTREAM ELEVATION (FEET) = 460.00  
 STREET LENGTH (FEET) = 371.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 108.44  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.60  
 HALFSTREET FLOOD WIDTH (FEET) = 24.34  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 9.89  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 5.91  
 STREET FLOW TRAVEL TIME (MIN.) = 0.63 Tc (MIN.) = 8.55  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.597

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.50	0.30	0.200	56

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 10.00 0.30 0.200 56  
 APARTMENTS B 1.70 0.30 0.200 56  
 COMMERCIAL B 0.50 0.30 0.100 56  
 CONDOMINIUMS B 1.00 0.30 0.350 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.207  
 SUBAREA AREA (ACRES) = 13.70 SUBAREA RUNOFF (CFS) = 43.58  
 EFFECTIVE AREA (ACRES) = 39.50 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA (ACRES) = 39.5 PEAK FLOW RATE (CFS) = 125.44

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.62 HALFSTREET FLOOD WIDTH (FEET) = 25.74  
 FLOW VELOCITY (FEET/SEC.) = 10.26 DEPTH\*VELOCITY (FT\*FT/SEC.) = 6.39  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1372.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 113.00 TO NODE 126.00 IS CODE = 31

-----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----

ELEVATION DATA: UPSTREAM (FEET) = 460.00 DOWNSTREAM (FEET) = 438.00  
 FLOW LENGTH (FEET) = 500.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.9 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 21.36  
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 125.44  
 PIPE TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 8.94  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 1872.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

-----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 8.94  
 RAINFALL INTENSITY (INCH/HR) = 3.47  
 AREA-AVERAGED Fm (INCH/HR) = 0.07  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.23  
 EFFECTIVE STREAM AREA (ACRES) = 39.50  
 TOTAL STREAM AREA (ACRES) = 39.50  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 125.44

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	190.29	11.46	2.906	0.30 ( 0.16)	0.55	77.1	100.00
1	170.66	15.58	2.347	0.30 ( 0.18)	0.60	87.5	130.00
2	125.44	8.94	3.468	0.30 ( 0.07)	0.23	39.5	110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	304.22	8.94	3.468	0.30 ( 0.13)	0.42	99.6	110.00
2	295.00	11.46	2.906	0.30 ( 0.13)	0.44	116.6	100.00
3	254.73	15.58	2.347	0.30 ( 0.15)	0.48	127.0	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 304.22 Tc(MIN.) = 8.94  
EFFECTIVE AREA(ACRES) = 99.62 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 127.0  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 435.00  
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 66.0 INCH PIPE IS 51.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.36  
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 304.22  
PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 9.26  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.26  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.362  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	5.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.366  
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 22.83  
EFFECTIVE AREA(ACRES) = 107.42 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 134.8 PEAK FLOW RATE(CFS) = 312.99

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.26  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.362  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	1.50	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 14.14  
EFFECTIVE AREA(ACRES) = 112.32 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 139.7 PEAK FLOW RATE(CFS) = 327.13

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	327.13	9.26	3.362	0.30 ( 0.13)	0.42	112.3	110.00
2	317.52	11.78	2.860	0.30 ( 0.13)	0.44	129.3	100.00
3	273.61	15.91	2.320	0.30 ( 0.14)	0.48	139.7	130.00

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	169.41	13.03	2.679	0.30 ( 0.09)	0.29	71.2	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	479.23	9.26	3.362	0.30 ( 0.11)	0.38	162.9	110.00
2	481.39	11.78	2.860	0.30 ( 0.12)	0.39	193.7	100.00
3	473.65	13.03	2.679	0.30 ( 0.12)	0.39	203.6	100.00
4	419.54	15.91	2.320	0.30 ( 0.12)	0.42	210.9	130.00

TOTAL AREA(ACRES) = 210.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 481.39 Tc(MIN.) = 11.784  
EFFECTIVE AREA(ACRES) = 193.68 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
TOTAL AREA(ACRES) = 210.9  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

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FLOW PROCESS FROM NODE 127.00 TO NODE 127.10 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 500.20 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 44.56
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 481.39
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 11.97
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.10 = 4750.20 FEET.

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FLOW PROCESS FROM NODE 127.10 TO NODE 127.20 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 353.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 595.30 CHANNEL SLOPE = 0.0218
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.650
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL         B         3.50   0.30  0.100  56
COMMERCIAL         B         0.10   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 485.63
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.88
AVERAGE FLOW DEPTH(FEET) = 1.18 TRAVEL TIME(MIN.) = 1.26
Tc(MIN.) = 13.23
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 8.49
EFFECTIVE AREA(ACRES) = 197.28 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 214.5 PEAK FLOW RATE(CFS) = 481.39
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.17 FLOW VELOCITY(FEET/SEC.) = 7.85
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.20 = 5345.50 FEET.

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FLOW PROCESS FROM NODE 127.20 TO NODE 127.30 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 340.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 476.00 CHANNEL SLOPE = 0.0273
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.514
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS

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LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL         B         3.10   0.30  0.100  56
COMMERCIAL         B         0.10   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 484.97
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.43
AVERAGE FLOW DEPTH(FEET) = 1.10 TRAVEL TIME(MIN.) = 0.94
Tc(MIN.) = 14.17
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 7.15
EFFECTIVE AREA(ACRES) = 200.48 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 217.7 PEAK FLOW RATE(CFS) = 481.39
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.10 FLOW VELOCITY(FEET/SEC.) = 8.42
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.30 = 5821.50 FEET.

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FLOW PROCESS FROM NODE 127.30 TO NODE 13569.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 338.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 506.00 CHANNEL SLOPE = 0.0040
CHANNEL BASE(FEET) = 150.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.242
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL         B         2.80   0.30  0.100  56
COMMERCIAL         B         0.60   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 484.77
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.13
AVERAGE FLOW DEPTH(FEET) = 1.02 TRAVEL TIME(MIN.) = 2.70
Tc(MIN.) = 16.87
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 6.77
EFFECTIVE AREA(ACRES) = 203.88 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 221.1 PEAK FLOW RATE(CFS) = 481.39
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.02 FLOW VELOCITY(FEET/SEC.) = 3.11
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 13569.00 = 6327.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 12
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>>>>CLEAR MEMORY BANK # 1 <<<<
=====
END OF STUDY SUMMARY:

```

TOTAL AREA (ACRES) = 221.1 TC (MIN.) = 16.87  
 EFFECTIVE AREA (ACRES) = 203.88 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.375  
 PEAK FLOW RATE (CFS) = 481.39

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	479.23	14.36	2.487	0.30 ( 0.11)	0.36	173.1	110.00
2	481.39	16.87	2.242	0.30 ( 0.11)	0.37	203.9	100.00
3	473.65	18.15	2.137	0.30 ( 0.11)	0.38	213.8	100.00
4	419.54	21.27	1.922	0.30 ( 0.12)	0.40	221.1	130.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2012 Advanced Engineering Software (aes)  
Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 25-YR ULTIMATE EV DECEMBER 2013 MCHANDOO/TMULI \*  
\*\*\*\*\*

FILE NAME: 2P25EVBB.DAT  
TIME/DATE OF STUDY: 16:37 12/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.808
- 2) 10.00; 3.143
- 3) 15.00; 2.408
- 4) 20.00; 1.996
- 5) 25.00; 1.742
- 6) 30.00; 1.531
- 7) 40.00; 1.331
- 8) 50.00; 1.178
- 9) 60.00; 1.052
- 10) 90.00; 0.883
- 11) 120.00; 0.772
- 12) 180.00; 0.643
- 13) 360.00; 0.472
- 14) 1200.00; 0.207

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00  
ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 543.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.596  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.944  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.80	0.30	0.100	56	7.60

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 2.82  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 2.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 543.00 DOWNSTREAM ELEVATION(FEET) = 523.00  
STREET LENGTH(FEET) = 502.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.40  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.30  
HALFSTREET FLOOD WIDTH(FEET) = 6.95  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.01  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.19  
STREET FLOW TRAVEL TIME(MIN.) = 2.09 Tc(MIN.) = 9.68  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.249

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.20	0.30	0.200	56
COMMERCIAL	B	1.30	0.30	0.100	56

NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.261  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.14  
 EFFECTIVE AREA(ACRES) = 2.60 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 7.45

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 8.24  
 FLOW VELOCITY(FEET/SEC.) = 4.29 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.39  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 810.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.68  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.249  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 1.40 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 4.06  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 11.51

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 2 USED)<<<<

UPSTREAM ELEVATION(FEET) = 523.00 DOWNSTREAM ELEVATION(FEET) = 468.00  
 STREET LENGTH(FEET) = 987.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.52  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.38  
 HALFSTREET FLOOD WIDTH(FEET) = 11.11  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.80  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.21  
 STREET FLOW TRAVEL TIME(MIN.) = 2.84 Tc(MIN.) = 12.52  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.773  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56  
 COMMERCIAL B 2.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.426  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 10.00  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 19.79

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 12.05  
 FLOW VELOCITY(FEET/SEC.) = 6.03 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.41  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 1797.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 468.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.04  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.41  
 HALFSTREET FLOOD WIDTH(FEET) = 13.63  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.22  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.52  
 STREET FLOW TRAVEL TIME(MIN.) = 2.62 Tc(MIN.) = 15.14  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.397  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.10 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 COMMERCIAL B 1.90 0.30 0.100 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 6.49  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 23.51

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 13.71  
 FLOW VELOCITY(FEET/SEC.) = 6.28 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.56  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2774.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
 MAINLINE Tc(MIN.) = 15.14  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.397  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.30 0.30 1.000 66  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 2.45  
 EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
 TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 25.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 204.00 TO NODE 218.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

-----  
 UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 343.00  
 STREET LENGTH(FEET) = 1228.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.56  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.44  
 HALFSTREET FLOOD WIDTH(FEET) = 15.43  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.37  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.79  
 STREET FLOW TRAVEL TIME(MIN.) = 3.21 Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 COMMERCIAL B 0.50 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.40 0.30 1.000 66  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.70 0.30 0.500 56  
 COMMERCIAL B 1.50 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.80 0.30 1.000 66  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 7.19  
 EFFECTIVE AREA(ACRES) = 16.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 16.6 PEAK FLOW RATE(CFS) = 30.15

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 15.51  
 FLOW VELOCITY(FEET/SEC.) = 6.44 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.83  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
 MAINLINE Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 1.20 0.30 0.500 56  
 COMMERCIAL B 0.10 0.30 0.100 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
 COMMERCIAL B 0.10 0.30 0.100 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450  
 SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 2.88  
 EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 33.03

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

-----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 18.35  
 RAINFALL INTENSITY(INCH/HR) = 2.13  
 AREA-AVERAGED Fm(INCH/HR) = 0.12



AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.39  
EFFECTIVE STREAM AREA (ACRES) = 18.20  
TOTAL STREAM AREA (ACRES) = 18.20  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 33.03

\*\*\*\*\*  
FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----

INITIAL SUBAREA FLOW-LENGTH (FEET) = 268.00  
ELEVATION DATA: UPSTREAM (FEET) = 514.00 DOWNSTREAM (FEET) = 511.50

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.724  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.901

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	B	2.30	0.30	0.500	56	9.27
APARTMENTS	B	0.40	0.30	0.200	56	7.72

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456

SUBAREA RUNOFF (CFS) = 9.15

TOTAL AREA (ACRES) = 2.70 PEAK FLOW RATE (CFS) = 9.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 511.50 DOWNSTREAM ELEVATION (FEET) = 503.00  
STREET LENGTH (FEET) = 503.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 18.93  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.45  
HALFSTREET FLOOD WIDTH (FEET) = 16.29  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.69  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.67  
STREET FLOW TRAVEL TIME (MIN.) = 2.27 Tc (MIN.) = 9.99  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.145

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.20	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.475  
SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 19.46  
EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.14  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47  
TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 26.77

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.50 HALFSTREET FLOOD WIDTH (FEET) = 18.79  
FLOW VELOCITY (FEET/SEC.) = 4.00 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.99  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 771.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc (MIN.) = 9.99

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.145

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.281

SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 3.58

EFFECTIVE AREA (ACRES) = 11.20 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45

TOTAL AREA (ACRES) = 11.2 PEAK FLOW RATE (CFS) = 30.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 503.00 DOWNSTREAM ELEVATION (FEET) = 476.00  
STREET LENGTH (FEET) = 423.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.89  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.44  
HALFSTREET FLOOD WIDTH(FEET) = 15.35  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.94  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.03  
STREET FLOW TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 11.01  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.995

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 1.00 0.30 0.500 56  
COMMERCIAL B 0.10 0.30 0.100 56  
CONDOMINIUMS B 0.10 0.30 0.350 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.454  
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 3.09  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 31.92

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 15.35  
FLOW VELOCITY(FEET/SEC.) = 6.94 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.03  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 11.01  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.995  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.50 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
COMMERCIAL B 0.30 0.30 0.100 56  
CONDOMINIUMS B 3.30 0.30 0.350 56  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.332  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 12.77  
EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 44.69

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 11.01  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.995  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 3.40 0.30 0.100 56  
CONDOMINIUMS B 8.10 0.30 0.350 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.276  
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 30.14  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 74.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 476.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
STREET LENGTH(FEET) = 789.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 74.82  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.65  
HALFSTREET FLOOD WIDTH(FEET) = 27.23  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.49  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.56  
STREET FLOW TRAVEL TIME(MIN.) = 2.39 Tc(MIN.) = 13.40  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.642  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 74.82  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.65 HALFSTREET FLOOD WIDTH(FEET) = 27.23  
FLOW VELOCITY(FEET/SEC.) = 5.49 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.56  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1983.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.40  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.642  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	8.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.40	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 32.30  
 EFFECTIVE AREA(ACRES) = 43.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
 TOTAL AREA(ACRES) = 43.2 PEAK FLOW RATE(CFS) = 98.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 460.00 DOWNSTREAM ELEVATION(FEET) = 419.00  
STREET LENGTH(FEET) = 529.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 102.25  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.58  
 HALFSTREET FLOOD WIDTH(FEET) = 23.63  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.87  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 5.77  
 STREET FLOW TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 14.30  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.511  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.80	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 8.50  
 EFFECTIVE AREA(ACRES) = 47.20 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 47.2 PEAK FLOW RATE(CFS) = 101.39

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 23.55  
FLOW VELOCITY(FEET/SEC.) = 9.85 DEPTH\*VELOCITY(FT\*FT/SEC.) = 5.74  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 2512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.30  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.511  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.70	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 11.90  
 EFFECTIVE AREA(ACRES) = 52.80 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
 TOTAL AREA(ACRES) = 52.8 PEAK FLOW RATE(CFS) = 113.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.30  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.511  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.90	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.50	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 15.94  
 EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 129.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 419.00 DOWNSTREAM ELEVATION(FEET) = 405.00  
STREET LENGTH(FEET) = 174.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 129.23  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.62  
HALFSTREET FLOOD WIDTH(FEET) = 25.74  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.57  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.58  
STREET FLOW TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 14.57  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.471  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 129.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 25.74  
FLOW VELOCITY(FEET/SEC.) = 10.57 DEPTH\*VELOCITY(FT\*FT/SEC.) = 6.58  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 2686.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 372.00  
FLOW LENGTH(FEET) = 395.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.60  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 129.23  
PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 14.81  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 3081.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 14.81  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.436  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500					
SUBAREA AREA(ACRES) = 2.20		SUBAREA RUNOFF(CFS) = 4.53			
EFFECTIVE AREA(ACRES) = 62.50		AREA-AVERAGED Fm(INCH/HR) = 0.13			
AREA-AVERAGED Fp(INCH/HR) = 0.30		AREA-AVERAGED Ap = 0.44			
TOTAL AREA(ACRES) = 62.5		PEAK FLOW RATE(CFS) = 129.66			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 14.81  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.436  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 3.50 0.30 0.500 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 6.90 0.30 0.500 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 21.81  
EFFECTIVE AREA(ACRES) = 73.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 73.1 PEAK FLOW RATE(CFS) = 151.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 343.00  
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.30  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 151.47  
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 15.25  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 3688.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 15.25

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.388  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.443  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.42  
 EFFECTIVE AREA (ACRES) = 73.80 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 73.8 PEAK FLOW RATE (CFS) = 151.47  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
 -----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 15.25  
 RAINFALL INTENSITY (INCH/HR) = 2.39  
 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.44  
 EFFECTIVE STREAM AREA (ACRES) = 73.80  
 TOTAL STREAM AREA (ACRES) = 73.80  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 151.47

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	33.03	18.35	2.132	0.30 ( 0.12)	0.39	18.2	200.00
2	151.47	15.25	2.388	0.30 ( 0.13)	0.44	73.8	210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	182.39	15.25	2.388	0.30 ( 0.13)	0.43	88.9	210.00
2	167.32	18.35	2.132	0.30 ( 0.13)	0.43	92.0	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 182.39 Tc (MIN.) = 15.25  
 EFFECTIVE AREA (ACRES) = 88.92 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA (ACRES) = 92.0  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 343.00 DOWNSTREAM (FEET) = 326.50  
 FLOW LENGTH (FEET) = 734.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 35.4 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 18.38  
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 182.39  
 PIPE TRAVEL TIME (MIN.) = 0.67 Tc (MIN.) = 15.91  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 219.00 = 4736.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----

MAINLINE Tc (MIN.) = 15.91  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.333  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56  
 COMMERCIAL  
 B 0.60 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.70 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.90 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 5.66  
 EFFECTIVE AREA (ACRES) = 91.82 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 94.9 PEAK FLOW RATE (CFS) = 182.39  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----

MAINLINE Tc (MIN.) = 15.91  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.333  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL  
 B 0.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 1.19  
 EFFECTIVE AREA (ACRES) = 92.42 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA (ACRES) = 95.5 PEAK FLOW RATE (CFS) = 183.12

\*\*\*\*\*

FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 326.50 DOWNSTREAM (FEET) = 325.00  
FLOW LENGTH (FEET) = 161.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.5 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.24  
ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 183.12  
PIPE TRAVEL TIME (MIN.) = 0.20 Tc (MIN.) = 16.11  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 220.00 = 4897.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.11  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.316  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.90	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.60	0.30	0.400	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	18.40	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	4.30	0.30	0.400	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.50	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	6.90	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462  
SUBAREA AREA (ACRES) = 38.60 SUBAREA RUNOFF (CFS) = 75.66  
EFFECTIVE AREA (ACRES) = 131.02 AREA-AVERAGED Fm (INCH/HR) = 0.13  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA (ACRES) = 134.1 PEAK FLOW RATE (CFS) = 257.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 245.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 325.00 DOWNSTREAM (FEET) = 315.00  
FLOW LENGTH (FEET) = 1019.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 14.62  
ESTIMATED PIPE DIAMETER (INCH) = 63.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 257.39  
PIPE TRAVEL TIME (MIN.) = 1.16 Tc (MIN.) = 17.28  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.28  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.221  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.30	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.00	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379  
SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 5.50  
EFFECTIVE AREA (ACRES) = 133.92 AREA-AVERAGED Fm (INCH/HR) = 0.13  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA (ACRES) = 137.0 PEAK FLOW RATE (CFS) = 257.39  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.28  
\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.221  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.264  
SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.12  
EFFECTIVE AREA (ACRES) = 135.02 AREA-AVERAGED Fm (INCH/HR) = 0.13  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA (ACRES) = 138.1 PEAK FLOW RATE (CFS) = 257.39  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.28  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.221  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.40	0.30	0.400	56

  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.434  
 SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 6.02  
 EFFECTIVE AREA(ACRES) = 138.22 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA(ACRES) = 141.3 PEAK FLOW RATE(CFS) = 259.74

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3<<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 220.50 TO NODE 221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 251.00  
 ELEVATION DATA: UPSTREAM(FEET) = 551.00 DOWNSTREAM(FEET) = 547.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.785  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.215  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"1 DWELLING/ACRE"	B	3.10	0.30	0.800	56	9.79
RESIDENTIAL						
"1 DWELLING/ACRE"	B	3.10	0.30	0.800	56	9.79

  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA RUNOFF(CFS) = 16.60  
 TOTAL AREA(ACRES) = 6.20 PEAK FLOW RATE(CFS) = 16.60

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 542.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0130  
 CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.006  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56

  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.163  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.85  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.61  
 AVERAGE FLOW DEPTH(FEET) = 0.38 TRAVEL TIME(MIN.) = 1.15  
 Tc(MIN.) = 10.93  
 SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 12.51  
 EFFECTIVE AREA(ACRES) = 10.90 AREA-AVERAGED Fm(INCH/HR) = 0.16  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA(ACRES) = 10.9 PEAK FLOW RATE(CFS) = 27.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.43 FLOW VELOCITY(FEET/SEC.) = 5.98  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 222.00 = 637.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 542.00 DOWNSTREAM ELEVATION(FEET) = 531.00  
 STREET LENGTH(FEET) = 1146.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.78  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.63  
 HALFSTREET FLOOD WIDTH(FEET) = 25.98  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.68  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.31  
 STREET FLOW TRAVEL TIME(MIN.) = 5.19 Tc(MIN.) = 16.12  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.316

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					

"11+ DWELLINGS/ACRE" B 11.50 0.30 0.200 56  
 APARTMENTS B 2.90 0.30 0.200 56  
 COMMERCIAL B 0.70 0.30 0.100 56  
 PUBLIC PARK B 2.60 0.30 0.850 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.292  
 SUBAREA AREA(ACRES) = 17.70 SUBAREA RUNOFF(CFS) = 35.49  
 EFFECTIVE AREA(ACRES) = 28.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 28.6 PEAK FLOW RATE(CFS) = 56.66

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.67 HALFSTREET FLOOD WIDTH(FEET) = 28.26  
 FLOW VELOCITY(FEET/SEC.) = 3.87 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.58  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 223.00 = 1783.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 531.00 DOWNSTREAM ELEVATION(FEET) = 520.00  
 STREET LENGTH(FEET) = 702.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 67.82  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.65  
 HALFSTREET FLOOD WIDTH(FEET) = 27.54  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.87  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.19  
 STREET FLOW TRAVEL TIME(MIN.) = 2.40 Tc(MIN.) = 18.53

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.118

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 0.90 0.30 0.200 56  
 COMMERCIAL B 0.30 0.30 0.100 56  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 6.40 0.30 0.200 56  
 COMMERCIAL B 3.70 0.30 0.100 56  
 CONDOMINIUMS B 0.70 0.30 0.350 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175  
 SUBAREA AREA(ACRES) = 12.00 SUBAREA RUNOFF(CFS) = 22.30  
 EFFECTIVE AREA(ACRES) = 40.60 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32

TOTAL AREA(ACRES) = 40.6 PEAK FLOW RATE(CFS) = 73.87

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.67 HALFSTREET FLOOD WIDTH(FEET) = 28.70  
 FLOW VELOCITY(FEET/SEC.) = 4.97 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.33  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 224.00 = 2485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 463.00  
 FLOW LENGTH(FEET) = 1760.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.96  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 73.87  
 PIPE TRAVEL TIME(MIN.) = 1.73 Tc(MIN.) = 20.26  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 225.00 = 4245.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.26  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.983  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.20 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 CONDOMINIUMS B 0.30 0.30 0.350 56  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 6.80 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 CONDOMINIUMS B 2.00 0.30 0.350 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.235  
 SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 19.79  
 EFFECTIVE AREA(ACRES) = 52.10 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 52.1 PEAK FLOW RATE(CFS) = 88.75

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.26  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.983  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS



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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      6.40     0.30      0.500      56
CONDOMINIUMS          B      0.90     0.30      0.350      56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      5.20     0.30      0.500      56
CONDOMINIUMS          B      0.80     0.30      0.350      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.481
SUBAREA AREA(ACRES) = 13.30      SUBAREA RUNOFF(CFS) = 22.01
EFFECTIVE AREA(ACRES) = 65.40     AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 65.4         PEAK FLOW RATE(CFS) = 110.76

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*****
FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 425.00
FLOW LENGTH(FEET) = 639.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.33
ESTIMATED PIPE DIAMETER(INCH) = 33.00      NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 110.76
PIPE TRAVEL TIME(MIN.) = 0.46      Tc(MIN.) = 20.71
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 226.00 = 4884.00 FEET.

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*****
FLOW PROCESS FROM NODE 226.00 TO NODE 226.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN.) = 20.71
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.960
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B      2.90     0.30     0.200     56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      2.90     0.30     0.500     56
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B      6.30     0.30     0.200     56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      6.00     0.30     0.500     56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348
SUBAREA AREA(ACRES) = 18.10      SUBAREA RUNOFF(CFS) = 30.23
EFFECTIVE AREA(ACRES) = 83.50     AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 83.5         PEAK FLOW RATE(CFS) = 139.62

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*****
FLOW PROCESS FROM NODE 226.00 TO NODE 243.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

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>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 653.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 26.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.95
ESTIMATED PIPE DIAMETER(INCH) = 39.00      NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 139.62
PIPE TRAVEL TIME(MIN.) = 0.47      Tc(MIN.) = 21.19
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 243.00 = 5537.00 FEET.

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN.) = 21.19
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.936
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B      2.90     0.30     0.200     56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      1.60     0.30     0.500     56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307
SUBAREA AREA(ACRES) = 4.50      SUBAREA RUNOFF(CFS) = 7.47
EFFECTIVE AREA(ACRES) = 88.00     AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 88.0         PEAK FLOW RATE(CFS) = 145.28

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 21.19
RAINFALL INTENSITY(INCH/HR) = 1.94
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.34
EFFECTIVE STREAM AREA(ACRES) = 88.00
TOTAL STREAM AREA(ACRES) = 88.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 145.28

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*****
FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 547.50

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

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SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.751  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.559  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 APARTMENTS B 0.60 0.30 0.200 56 8.75  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 1.89  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.89

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 547.50 DOWNSTREAM(FEET) = 541.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 802.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 3.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.946  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 APARTMENTS B 0.20 0.30 0.200 56  
 COMMERCIAL B 5.90 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.93  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.16  
 AVERAGE FLOW DEPTH(FEET) = 0.98 TRAVEL TIME(MIN.) = 2.59  
 Tc(MIN.) = 11.34  
 SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 16.00  
 EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 17.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.22 FLOW VELOCITY(FEET/SEC.) = 5.94  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1132.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 541.00 DOWNSTREAM(FEET) = 533.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 849.00 CHANNEL SLOPE = 0.0094  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.667  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 14.90 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 35.26  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.47  
 AVERAGE FLOW DEPTH(FEET) = 1.54 TRAVEL TIME(MIN.) = 1.89  
 Tc(MIN.) = 13.24  
 SUBAREA AREA(ACRES) = 14.90 SUBAREA RUNOFF(CFS) = 35.36  
 EFFECTIVE AREA(ACRES) = 21.60 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 21.6 PEAK FLOW RATE(CFS) = 51.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.77 FLOW VELOCITY(FEET/SEC.) = 8.22  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1981.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 13.24  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.667  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 APARTMENTS B 0.20 0.30 0.200 56  
 COMMERCIAL B 1.80 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124  
 SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 4.97  
 EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 56.21

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.24  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.667  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.40 0.30 0.100 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 COMMERCIAL B 1.30 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.117  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.26  
 EFFECTIVE AREA(ACRES) = 25.50 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 25.5 PEAK FLOW RATE(CFS) = 60.48

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31

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=====
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 537.00 DOWNSTREAM(FEET) = 510.00
FLOW LENGTH(FEET) = 513.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.18
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 60.48
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 13.68
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2494.00 FEET.

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.68
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.601
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B        9.40    0.30    0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 20.99
EFFECTIVE AREA(ACRES) = 34.90 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 34.9 PEAK FLOW RATE(CFS) = 79.97

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.68
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.601
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        0.70    0.30    0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B        2.50    0.30    0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 7.18
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 87.15

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 478.00
FLOW LENGTH(FEET) = 474.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.17
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 87.15
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 14.02
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 2968.00 FEET.

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*****
FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.02
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.551
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        1.70    0.30    0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B        1.60    0.30    0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 7.31
EFFECTIVE AREA(ACRES) = 41.40 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21
TOTAL AREA(ACRES) = 41.4 PEAK FLOW RATE(CFS) = 92.74

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*****
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 478.00 DOWNSTREAM(FEET) = 471.00
FLOW LENGTH(FEET) = 473.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.09
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 92.74
PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 14.63
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 3441.00 FEET.

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*****
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.63
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.463
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        1.40    0.30    0.200    56

```

RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 7.10 0.30 0.400 56  
 APARTMENTS B 2.70 0.30 0.200 56  
 COMMERCIAL B 1.10 0.30 0.100 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.307  
 SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 26.25  
 EFFECTIVE AREA(ACRES) = 53.70 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA(ACRES) = 53.7 PEAK FLOW RATE(CFS) = 115.69

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.63  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.463  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.90 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 5.40 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
 COMMERCIAL B 0.60 0.30 0.100 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.378  
 SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 20.93  
 EFFECTIVE AREA(ACRES) = 63.60 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 63.6 PEAK FLOW RATE(CFS) = 136.62

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 471.00 DOWNSTREAM(FEET) = 468.00  
 FLOW LENGTH(FEET) = 283.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.72  
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 136.62  
 PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 15.00  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 237.00 = 3724.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.00  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.408  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 6.10 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.60 0.30 0.400 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.218  
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 14.13  
 EFFECTIVE AREA(ACRES) = 70.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 70.3 PEAK FLOW RATE(CFS) = 147.63

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 468.00 DOWNSTREAM(FEET) = 461.00  
 FLOW LENGTH(FEET) = 698.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.83  
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 147.63  
 PIPE TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 15.90  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 238.00 = 4422.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.90  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.333  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 8.40 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.220  
 SUBAREA AREA(ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 18.37  
 EFFECTIVE AREA(ACRES) = 79.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 79.3 PEAK FLOW RATE(CFS) = 161.26

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.90  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.333  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      2.10      0.30      0.200      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 2.10      SUBAREA RUNOFF (CFS) = 4.30
EFFECTIVE AREA (ACRES) = 81.40      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.25
TOTAL AREA (ACRES) = 81.4      PEAK FLOW RATE (CFS) = 165.56

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*****
FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 461.00 DOWNSTREAM(FEET) = 440.00
FLOW LENGTH( FEET) = 582.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 21.36
ESTIMATED PIPE DIAMETER (INCH) = 42.00      NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 165.56
PIPE TRAVEL TIME (MIN.) = 0.45      Tc (MIN.) = 16.36
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 5004.00 FEET.

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*****
FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.36
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.296
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      5.00      0.30      0.200      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 5.00      SUBAREA RUNOFF (CFS) = 10.06
EFFECTIVE AREA (ACRES) = 86.40      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 86.4      PEAK FLOW RATE (CFS) = 172.88

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*****
FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM( FEET) = 440.00 DOWNSTREAM( FEET) = 418.00
FLOW LENGTH( FEET) = 650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 20.80
ESTIMATED PIPE DIAMETER (INCH) = 42.00      NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 172.88
PIPE TRAVEL TIME (MIN.) = 0.52      Tc (MIN.) = 16.88
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 5654.00 FEET.

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*****
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.88
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.253
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      5.30      0.30      0.200      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 5.30      SUBAREA RUNOFF (CFS) = 10.46
EFFECTIVE AREA (ACRES) = 91.70      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 91.7      PEAK FLOW RATE (CFS) = 180.01

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*****
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc (MIN.) = 16.88
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.253
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      1.20      0.30      0.200      56
COMMERCIAL              B      0.20      0.30      0.100      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186
SUBAREA AREA (ACRES) = 1.40      SUBAREA RUNOFF (CFS) = 2.77
EFFECTIVE AREA (ACRES) = 93.10      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 93.1      PEAK FLOW RATE (CFS) = 182.78

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*****
FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.88
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.253
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      1.20      0.30      0.200      56
SCHOOL                  B      0.70      0.30      0.600      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA (ACRES) = 1.90      SUBAREA RUNOFF (CFS) = 3.67
EFFECTIVE AREA (ACRES) = 95.00      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24

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TOTAL AREA (ACRES) = 95.0 PEAK FLOW RATE (CFS) = 186.45

\*\*\*\*\*

FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 418.00 DOWNSTREAM(FEET) = 404.00
FLOW LENGTH(FEET) = 1279.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 42.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.97
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 186.45
PIPE TRAVEL TIME(MIN.) = 1.53 Tc(MIN.) = 18.41
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 241.00 = 6933.00 FEET.

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FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.41
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.127
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.10 0.30 0.200 56
COMMERCIAL B 1.20 0.30 0.100 56
PUBLIC PARK B 6.30 0.30 0.850 56
SCHOOL B 4.60 0.30 0.600 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.60 0.30 0.200 56
COMMERCIAL B 4.00 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 18.80 SUBAREA RUNOFF(CFS) = 33.52
EFFECTIVE AREA(ACRES) = 113.80 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 113.8 PEAK FLOW RATE(CFS) = 209.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.41
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.127
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK B 3.90 0.30 0.850 56
SCHOOL B 10.80 0.30 0.600 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.666
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 25.50
EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 234.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 403.00
FLOW LENGTH(FEET) = 66.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.90
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 234.72
PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 18.47
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 6999.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.47
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.122
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.40 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 16.40 0.30 0.200 56
COMMERCIAL B 1.30 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.193
SUBAREA AREA(ACRES) = 19.10 SUBAREA RUNOFF(CFS) = 35.48
EFFECTIVE AREA(ACRES) = 147.60 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 147.6 PEAK FLOW RATE(CFS) = 269.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 1270.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 50.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.14
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 269.58
PIPE TRAVEL TIME(MIN.) = 1.61 Tc(MIN.) = 20.08
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 20.08  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.992  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.00	0.30	0.200	56
PUBLIC PARK	B	2.00	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.80	0.30	0.200	56
COMMERCIAL	B	1.50	0.30	0.100	56
CONDOMINIUMS	B	0.10	0.30	0.350	56
PUBLIC PARK	B	1.10	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.421  
 SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 14.27  
 EFFECTIVE AREA(ACRES) = 156.10 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32  
 TOTAL AREA(ACRES) = 156.1 PEAK FLOW RATE(CFS) = 269.58  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

-----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 20.08  
 RAINFALL INTENSITY(INCH/HR) = 1.99  
 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.32  
 EFFECTIVE STREAM AREA(ACRES) = 156.10  
 TOTAL STREAM AREA(ACRES) = 156.10  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 269.58

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	145.28	21.19	1.936	0.30( 0.10)	0.34	88.0	220.50
2	269.58	20.08	1.992	0.30( 0.09)	0.32	156.1	230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	411.49	20.08	1.992	0.30( 0.10)	0.32	239.5	230.00
2	406.88	21.19	1.936	0.30( 0.10)	0.32	244.1	220.50

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 411.49 Tc(MIN.) = 20.08  
 EFFECTIVE AREA(ACRES) = 239.51 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32  
 TOTAL AREA(ACRES) = 244.1  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 244.00 IS CODE = 31

-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 394.00 DOWNSTREAM(FEET) = 340.00  
 FLOW LENGTH(FEET) = 849.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 33.35  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 411.49  
 PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 20.50  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 244.00 = 9118.00 FEET.

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FLOW PROCESS FROM NODE 244.00 TO NODE 244.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN.) = 20.50  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.970  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.70	0.30	0.500	56
PUBLIC PARK	B	0.30	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
PUBLIC PARK	B	0.10	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.537  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 4.89  
 EFFECTIVE AREA(ACRES) = 242.51 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33  
 TOTAL AREA(ACRES) = 247.1 PEAK FLOW RATE(CFS) = 411.49  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 244.00 TO NODE 245.00 IS CODE = 31

-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 315.00  
 FLOW LENGTH(FEET) = 777.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 60.0 INCH PIPE IS 45.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 25.63  
 ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 411.49  
 PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 21.01

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.01

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.945

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56

PUBLIC PARK B 0.20 0.30 0.850 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56

PUBLIC PARK B 0.10 0.30 0.850 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631

SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 1.26

EFFECTIVE AREA(ACRES) = 243.31 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33

TOTAL AREA(ACRES) = 247.9 PEAK FLOW RATE(CFS) = 411.49

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	411.49	21.01	1.945	0.30( 0.10)	0.33	243.3	230.00
2	406.88	22.12	1.888	0.30( 0.10)	0.33	247.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	259.74	17.28	2.221	0.30( 0.13)	0.44	138.2	210.00
2	234.15	20.44	1.973	0.30( 0.13)	0.44	141.3	200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	648.62	17.28	2.221	0.30( 0.11)	0.37	338.3	210.00
2	640.79	20.44	1.973	0.30( 0.11)	0.37	378.1	200.00
3	641.99	21.01	1.945	0.30( 0.11)	0.37	384.6	230.00
4	630.22	22.12	1.888	0.30( 0.11)	0.37	389.2	220.50

TOTAL AREA(ACRES) = 389.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 648.62 Tc(MIN.) = 17.275

EFFECTIVE AREA(ACRES) = 338.28 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 389.2

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 3 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 246.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 306.00

FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 81.0 INCH PIPE IS 64.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.12

ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 648.62

PIPE TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 17.76

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 246.00 = 10514.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.76

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.180

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.90 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.50 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56

CONDOMINIUMS B 9.10 0.30 0.350 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.80 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.410

SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 30.18

EFFECTIVE AREA(ACRES) = 354.58 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38

TOTAL AREA(ACRES) = 405.5 PEAK FLOW RATE(CFS) = 659.82

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<



MAINLINE Tc(MIN.) = 17.76  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.180  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.60	0.30	0.400	56
CONDOMINIUMS	B	7.40	0.30	0.350	56
PUBLIC PARK	B	0.30	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.375  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 17.31  
 EFFECTIVE AREA(ACRES) = 363.88 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 414.8 PEAK FLOW RATE(CFS) = 677.13

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 246.00 TO NODE 247.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 306.00 DOWNSTREAM(FEET) = 300.00  
 FLOW LENGTH(FEET) = 185.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 55.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 29.08  
 ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 677.13  
 PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 17.87  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 247.00 = 10699.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----  
 MAINLINE Tc(MIN.) = 17.87  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.172  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.30	0.30	0.400	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.413  
 SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 3.69  
 EFFECTIVE AREA(ACRES) = 365.88 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 416.8 PEAK FLOW RATE(CFS) = 677.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----  
 MAINLINE Tc(MIN.) = 17.87  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.172  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.40	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.80	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.365  
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 4.82  
 EFFECTIVE AREA(ACRES) = 368.48 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 419.4 PEAK FLOW RATE(CFS) = 682.78

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 248.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 271.00  
 FLOW LENGTH(FEET) = 859.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 29.64  
 ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 682.78  
 PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 18.35  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----  
 MAINLINE Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.60	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.60	0.30	0.400	56
COMMERCIAL	B	1.00	0.30	0.100	56

NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356  
 SUBAREA AREA(ACRES) = 4.80 SUBAREA RUNOFF(CFS) = 8.75  
 EFFECTIVE AREA(ACRES) = 373.28 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 424.2 PEAK FLOW RATE(CFS) = 682.78  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.50 0.30 0.400 56  
 COMMERCIAL B 0.30 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367  
 SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.64  
 EFFECTIVE AREA(ACRES) = 374.18 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 425.1 PEAK FLOW RATE(CFS) = 682.78  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 2.20 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.80 0.30 0.400 56  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 3.20 0.30 0.500 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.466  
 SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 14.70  
 EFFECTIVE AREA(ACRES) = 382.38 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 433.3 PEAK FLOW RATE(CFS) = 694.67

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 5.70 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 10.32  
 EFFECTIVE AREA(ACRES) = 388.08 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 439.0 PEAK FLOW RATE(CFS) = 704.99

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.35  
 \* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 6.40 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.40 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.60 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 8.40 SUBAREA RUNOFF(CFS) = 13.85  
 EFFECTIVE AREA(ACRES) = 396.48 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA(ACRES) = 447.4 PEAK FLOW RATE(CFS) = 718.84

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====  
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00

ELEVATION DATA: UPSTREAM(FEET) = 413.04 DOWNSTREAM(FEET) = 405.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.928

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.166

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
CONDOMINIUMS RESIDENTIAL	B	0.20	0.30	0.350	56	7.70
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56	6.93
CONDOMINIUMS	B	0.10	0.30	0.350	56	7.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.312

SUBAREA RUNOFF(CFS) = 1.47

TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 405.00 DOWNSTREAM ELEVATION(FEET) = 385.00

STREET LENGTH(FEET) = 587.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.40

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.30

HALFSTREET FLOOD WIDTH(FEET) = 7.78

AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.68

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.11

STREET FLOW TRAVEL TIME(MIN.) = 2.66 Tc(MIN.) = 9.59

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.281

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.20	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.224

SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 7.81

EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.07

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24

TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 8.96

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 10.04

FLOW VELOCITY(FEET/SEC.) = 4.09 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.40

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 917.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 385.00 DOWNSTREAM(FEET) = 378.50

FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.99

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 8.96

PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 9.83

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1079.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.83

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.199

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56
COMMERCIAL	B	1.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 6.84

EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.05

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18

TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 15.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 378.50 DOWNSTREAM(FEET) = 348.50

FLOW LENGTH(FEET) = 637.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 13.32

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 15.57

PIPE TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 10.63

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 1716.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.63

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.050

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.60	0.30	0.500	56
COMMERCIAL	B	1.70	0.30	0.100	56
CONDOMINIUMS	B	1.00	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
COMMERCIAL	B	0.70	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.240					
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 12.06					
EFFECTIVE AREA(ACRES) = 10.00 AREA-AVERAGED Fm(INCH/HR) = 0.06					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21					
TOTAL AREA(ACRES) = 10.0 PEAK FLOW RATE(CFS) = 26.90					

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 348.50 DOWNSTREAM(FEET) = 306.00  
 FLOW LENGTH(FEET) = 944.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.87  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 26.90  
 PIPE TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 11.69  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.69

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.895

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.20	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.50	0.30	0.500	56
RESIDENTIAL					

"8-10 DWELLINGS/ACRE" B 1.90 0.30 0.400 56  
 COMMERCIAL B 2.00 0.30 0.100 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.348  
 SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 18.33  
 EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.27  
 TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 43.83

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.69

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.895

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	4.40	0.30	0.200	56
COMMERCIAL	B	0.10	0.30	0.100	56
APARTMENTS	B	6.70	0.30	0.200	56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.199					
SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 28.58					
EFFECTIVE AREA(ACRES) = 28.50 AREA-AVERAGED Fm(INCH/HR) = 0.07					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24					
TOTAL AREA(ACRES) = 28.5 PEAK FLOW RATE(CFS) = 72.41					

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.69

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.895

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.10	0.30	1.000	66
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 7.24					
EFFECTIVE AREA(ACRES) = 31.60 AREA-AVERAGED Fm(INCH/HR) = 0.09					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31					
TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 79.65					

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 11.69  
 RAINFALL INTENSITY(INCH/HR) = 2.89  
 AREA-AVERAGED Fm(INCH/HR) = 0.09

AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.31  
 EFFECTIVE STREAM AREA (ACRES) = 31.60  
 TOTAL STREAM AREA (ACRES) = 31.60  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 79.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 400.00 TO NODE 420.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 300.40  
 ELEVATION DATA: UPSTREAM (FEET) = 312.80 DOWNSTREAM (FEET) = 310.80

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.115  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.771  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.50	0.30	0.100	56	8.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 1.68  
 TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 1.68

\*\*\*\*\*

FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STANDARD CURB SECTION USED)<<<<

UPSTREAM ELEVATION (FEET) = 310.80 DOWNSTREAM ELEVATION (FEET) = 307.00  
 STREET LENGTH (FEET) = 266.50 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 67.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 62.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.54  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.33  
 HALFSTREET FLOOD WIDTH (FEET) = 9.75  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.53  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.83  
 STREET FLOW TRAVEL TIME (MIN.) = 1.76 Tc (MIN.) = 9.87  
 \* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.185

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.60	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 1.70  
 EFFECTIVE AREA (ACRES) = 1.10 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 3.12

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.35 HALFSTREET FLOOD WIDTH (FEET) = 10.78  
 FLOW VELOCITY (FEET/SEC.) = 2.64 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.92  
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.00 = 566.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 307.00 DOWNSTREAM (FEET) = 305.50  
 FLOW LENGTH (FEET) = 105.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.68  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 3.12  
 PIPE TRAVEL TIME (MIN.) = 0.31 Tc (MIN.) = 10.18  
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.10 = 671.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 10.18  
 RAINFALL INTENSITY (INCH/HR) = 3.12  
 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.10  
 EFFECTIVE STREAM AREA (ACRES) = 1.10  
 TOTAL STREAM AREA (ACRES) = 1.10  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 3.12

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	79.65	11.69	2.895	0.30 ( 0.09)	0.31	31.6	300.00
2	3.12	10.18	3.116	0.30 ( 0.03)	0.10	1.1	400.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	77.99	10.18	3.116	0.30 ( 0.09)	0.31	28.6	400.00

2 82.55 11.69 2.895 0.30( 0.09) 0.31 32.7 300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 82.55 Tc(MIN.) = 11.69
EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.7
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 426.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 305.50 DOWNSTREAM(FEET) = 301.00
FLOW LENGTH(FEET) = 261.40 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 29.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.39
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 82.55
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 12.01
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.10 = 2921.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.01
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.847
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.49
EFFECTIVE AREA(ACRES) = 32.90 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.9 PEAK FLOW RATE(CFS) = 82.55
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.20 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 289.00
FLOW LENGTH(FEET) = 448.56 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.26
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 82.55
PIPE TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 12.47
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.20 = 3369.96 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.20 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.47
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.779
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.20
EFFECTIVE AREA(ACRES) = 33.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 33.4 PEAK FLOW RATE(CFS) = 82.55
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.30 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 289.00 DOWNSTREAM(FEET) = 282.00
FLOW LENGTH(FEET) = 260.45 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.29
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 82.55
PIPE TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 12.74
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.30 = 3630.41 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.30 TO NODE 426.30 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.74
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.740
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.80 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 2.59
EFFECTIVE AREA(ACRES) = 34.50 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 34.5 PEAK FLOW RATE(CFS) = 82.55

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 426.30 TO NODE 248.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 271.00
FLOW LENGTH(FEET) = 411.44 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.25
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 82.55
PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 13.16
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.
*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.16
RAINFALL INTENSITY(INCH/HR) = 2.68
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 34.50
TOTAL STREAM AREA(ACRES) = 34.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 82.55
*****
FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----
INITIAL SUBAREA FLOW-LENGTH(FEET) = 233.60
ELEVATION DATA: UPSTREAM(FEET) = 306.50 DOWNSTREAM(FEET) = 301.80

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.882
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.514
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.20 0.30 0.100 56 5.88
COMMERCIAL B 0.20 0.30 0.100 56 5.88
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 1.61
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.61
*****
FLOW PROCESS FROM NODE 426.00 TO NODE 427.00 IS CODE = 61
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 301.80 DOWNSTREAM ELEVATION(FEET) = 294.00
STREET LENGTH(FEET) = 478.70 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.73
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.33
HALFSTREET FLOOD WIDTH(FEET) = 9.73
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.73
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.90
STREET FLOW TRAVEL TIME(MIN.) = 2.93 Tc(MIN.) = 8.81
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.539
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.20 0.30 0.100 56
COMMERCIAL B 0.50 0.30 0.100 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 2.21
EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 3.47

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.93
FLOW VELOCITY(FEET/SEC.) = 2.87 DEPTH*VELOCITY(FT*FT/SEC.) = 1.00
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 427.00 = 712.30 FEET.
*****
FLOW PROCESS FROM NODE 427.00 TO NODE 428.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 294.00 DOWNSTREAM ELEVATION(FEET) = 286.00
STREET LENGTH(FEET) = 300.80 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
```

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.17
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.35
HALFSTREET FLOOD WIDTH(FEET) = 10.64
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.60
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.24
STREET FLOW TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 10.20
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.113

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN
COMMERCIAL B 0.10 0.30 0.100 56
COMMERCIAL B 0.40 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.39
EFFECTIVE AREA(ACRES) = 1.60 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 4.44

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.96
FLOW VELOCITY(FEET/SEC.) = 3.65 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.28
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 428.00 = 1013.10 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 428.00 TO NODE 429.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<

UPSTREAM ELEVATION(FEET) = 286.00 DOWNSTREAM ELEVATION(FEET) = 276.00
STREET LENGTH(FEET) = 242.40 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.97
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.34
HALFSTREET FLOOD WIDTH(FEET) = 10.42
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.44
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.52
STREET FLOW TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 11.11
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.980

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN
COMMERCIAL B 0.40 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.06
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 5.31

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.75
FLOW VELOCITY(FEET/SEC.) = 4.51 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.56
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 429.00 = 1255.50 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 429.00 TO NODE 429.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.11
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.980
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN

RESIDENTIAL "8-10 DWELLINGS/ACRE" B 0.50 0.30 0.400 56
RESIDENTIAL "8-10 DWELLINGS/ACRE" B 1.50 0.30 0.400 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 5.15
EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 10.46

\*\*\*\*\*
FLOW PROCESS FROM NODE 429.00 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 273.00
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.23
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.46
PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 11.27
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 248.00 = 1355.50 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 11.27



RAINFALL INTENSITY(INCH/HR) = 2.96  
 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.25  
 EFFECTIVE STREAM AREA(ACRES) = 4.00  
 TOTAL STREAM AREA(ACRES) = 4.00  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 10.46

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	78.44	11.69	2.894	0.30( 0.09)	0.31	30.4	400.00
1	82.55	13.16	2.678	0.30( 0.09)	0.31	34.5	300.00
2	10.46	11.27	2.956	0.30( 0.08)	0.25	4.0	425.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	87.75	11.27	2.956	0.30( 0.09)	0.30	33.3	425.00
2	88.67	11.69	2.894	0.30( 0.09)	0.30	34.4	400.00
3	92.00	13.16	2.678	0.30( 0.09)	0.31	38.5	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 92.00 Tc(MIN.) = 13.16  
 EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 38.5  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	87.75	11.27	2.956	0.30( 0.09)	0.30	33.3	425.00
2	88.67	11.69	2.894	0.30( 0.09)	0.30	34.4	400.00
3	92.00	13.16	2.678	0.30( 0.09)	0.31	38.5	300.00

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	718.84	18.35	2.132	0.30( 0.12)	0.39	396.5	210.00
2	707.92	21.52	1.919	0.30( 0.12)	0.39	436.3	200.00
3	707.21	22.09	1.890	0.30( 0.12)	0.38	442.8	230.00
4	691.92	23.20	1.834	0.30( 0.12)	0.38	447.4	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	709.95	11.27	2.956	0.30( 0.11)	0.38	276.9	425.00
2	720.02	11.69	2.894	0.30( 0.11)	0.38	287.1	400.00
3	747.36	13.16	2.678	0.30( 0.11)	0.38	322.8	300.00
4	791.40	18.35	2.132	0.30( 0.11)	0.38	435.0	210.00
5	772.91	21.52	1.919	0.30( 0.11)	0.38	474.8	200.00
6	771.17	22.09	1.890	0.30( 0.11)	0.38	481.3	230.00
7	753.88	23.20	1.834	0.30( 0.11)	0.38	485.9	220.50

TOTAL AREA(ACRES) = 485.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 791.40 Tc(MIN.) = 18.353  
 EFFECTIVE AREA(ACRES) = 434.98 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 485.9  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 249.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 261.00  
 FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 78.0 INCH PIPE IS 59.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 29.00  
 ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 791.40  
 PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 18.55  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 429.00 TO NODE 430.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 262.70

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.459

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.322

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
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COMMERCIAL B 0.20 0.30 0.100 56 6.46  
COMMERCIAL B 0.40 0.30 0.100 56 6.46  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 2.32  
TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 2.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 262.70 DOWNSTREAM ELEVATION(FEET) = 258.98  
STREET LENGTH(FEET) = 345.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.26

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 11.72  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.39  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.87  
STREET FLOW TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 8.87  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.521

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.89  
EFFECTIVE AREA(ACRES) = 1.20 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 3.77

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.52  
FLOW VELOCITY(FEET/SEC.) = 2.47 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.93  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.00 = 675.60 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.00 TO NODE 431.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 258.98 DOWNSTREAM(FEET) = 258.00

FLOW LENGTH(FEET) = 91.03 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.39  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 3.77  
PIPE TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 9.15  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.10 = 766.63 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 9.15  
RAINFALL INTENSITY(INCH/HR) = 3.43  
AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 1.20  
TOTAL STREAM AREA(ACRES) = 1.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 410.00 TO NODE 440.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 299.70  
ELEVATION DATA: UPSTREAM(FEET) = 312.69 DOWNSTREAM(FEET) = 310.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.196

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.744

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.40	0.30	0.100	56	8.20

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA RUNOFF(CFS) = 1.34

TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.34

\*\*\*\*\*  
FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 306.50  
STREET LENGTH(FEET) = 299.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017  
SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.89  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 8.38  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.38  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.73  
STREET FLOW TRAVEL TIME(MIN.) = 2.09 Tc(MIN.) = 10.29

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.101  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.10 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.11  
EFFECTIVE AREA(ACRES) = 0.80 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 2.21

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 9.03  
FLOW VELOCITY(FEET/SEC.) = 2.49 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.79  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 441.00 = 598.70 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 61  
-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 306.50 DOWNSTREAM ELEVATION(FEET) = 299.00  
STREET LENGTH(FEET) = 341.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.97  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 9.43  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.12  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.01  
STREET FLOW TRAVEL TIME(MIN.) = 1.83 Tc(MIN.) = 12.11

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.833  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.20 0.30 0.100 56  
COMMERCIAL B 0.40 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.51  
EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 3.53

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 10.33  
FLOW VELOCITY(FEET/SEC.) = 3.20 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.09  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 442.00 = 940.30 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 61  
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 299.00 DOWNSTREAM ELEVATION(FEET) = 288.50  
STREET LENGTH(FEET) = 390.10 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.22  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 10.63  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.65  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.26  
STREET FLOW TRAVEL TIME(MIN.) = 1.78 Tc(MIN.) = 13.89

\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.571  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.30 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.37  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 4.57

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 11.13  
FLOW VELOCITY(FEET/SEC.) = 3.67 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.30  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 443.00 = 1330.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 443.00 TO NODE 444.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 288.50 DOWNSTREAM ELEVATION(FEET) = 281.00  
STREET LENGTH(FEET) = 272.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.00

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 11.52  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.78  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.36  
STREET FLOW TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 15.10  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.400  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.85  
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 5.12

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.62  
FLOW VELOCITY(FEET/SEC.) = 3.81 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.38  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 444.00 = 1603.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 444.00 TO NODE 445.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 281.00 DOWNSTREAM ELEVATION(FEET) = 268.10  
STREET LENGTH(FEET) = 462.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.82

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 12.32  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.91  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.46  
STREET FLOW TRAVEL TIME(MIN.) = 1.97 Tc(MIN.) = 17.07  
\* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.238  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.70	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.39  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 6.16

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.62  
FLOW VELOCITY(FEET/SEC.) = 3.98 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.51  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 445.00 = 2065.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 445.00 TO NODE 446.00 IS CODE = 61

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 268.10 DOWNSTREAM ELEVATION(FEET) = 257.00  
STREET LENGTH(FEET) = 532.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.06

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.41  
HALFSTREET FLOOD WIDTH(FEET) = 14.29  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.66  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.49  
STREET FLOW TRAVEL TIME(MIN.) = 2.43 Tc(MIN.) = 19.50

\* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.038  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.10 0.30 0.100 56  
 COMMERCIAL B 0.60 0.30 0.100 56  
 COMMERCIAL B 0.30 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA (ACRES) = 1.00 SUBAREA RUNOFF (CFS) = 1.81  
 EFFECTIVE AREA (ACRES) = 4.10 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 4.1 PEAK FLOW RATE (CFS) = 7.41

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.41 HALFSTREET FLOOD WIDTH (FEET) = 14.51  
 FLOW VELOCITY (FEET/SEC.) = 3.73 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.53  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 446.00 = 2598.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 446.00 TO NODE 431.10 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 257.00 DOWNSTREAM (FEET) = 256.50  
 FLOW LENGTH (FEET) = 100.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.9 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.78  
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 7.41  
 PIPE TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 19.85  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 19.85  
 RAINFALL INTENSITY (INCH/HR) = 2.01  
 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.10  
 EFFECTIVE STREAM AREA (ACRES) = 4.10  
 TOTAL STREAM AREA (ACRES) = 4.10  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 7.41

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3.77	9.15	3.427	0.30 (0.03)	0.10	1.2	429.00
2	7.41	19.85	2.009	0.30 (0.03)	0.10	4.1	410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.63	9.15	3.427	0.30 (0.03)	0.10	3.1	429.00
2	9.60	19.85	2.009	0.30 (0.03)	0.10	5.3	410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 9.63 Tc (MIN.) = 9.15  
 EFFECTIVE AREA (ACRES) = 3.09 AREA-AVERAGED Fm (INCH/HR) = 0.03  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA (ACRES) = 5.3  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 431.10 TO NODE 249.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 258.00 DOWNSTREAM (FEET) = 257.00  
 FLOW LENGTH (FEET) = 230.42 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.69  
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 9.63  
 PIPE TRAVEL TIME (MIN.) = 0.82 Tc (MIN.) = 9.97  
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
 =====

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	9.63	9.97	3.155	0.30 (0.03)	0.10	3.1	429.00
2	9.60	20.66	1.962	0.30 (0.03)	0.10	5.3	410.00

LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	709.95	11.48	2.926	0.30 (0.11)	0.38	276.9	425.00
2	720.02	11.90	2.864	0.30 (0.11)	0.38	287.1	400.00
3	747.36	13.36	2.648	0.30 (0.11)	0.38	322.8	300.00
4	791.40	18.55	2.115	0.30 (0.11)	0.38	435.0	210.00
5	772.91	21.72	1.909	0.30 (0.11)	0.38	474.8	200.00
6	771.17	22.29	1.880	0.30 (0.11)	0.38	481.3	230.00
7	753.88	23.40	1.823	0.30 (0.11)	0.38	485.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	676.18	9.97	3.155	0.30	( 0.11)	0.38	243.5	429.00
2	719.57	11.48	2.926	0.30	( 0.11)	0.38	280.3	425.00
3	729.64	11.90	2.864	0.30	( 0.11)	0.38	290.5	400.00
4	756.99	13.36	2.648	0.30	( 0.11)	0.38	326.6	300.00
5	801.01	18.55	2.115	0.30	( 0.11)	0.38	439.8	210.00
6	788.68	20.66	1.962	0.30	( 0.11)	0.38	466.8	410.00
7	782.25	21.72	1.909	0.30	( 0.11)	0.38	480.1	200.00
8	780.36	22.29	1.880	0.30	( 0.11)	0.38	486.6	230.00
9	762.79	23.40	1.823	0.30	( 0.11)	0.37	491.2	220.50

TOTAL AREA (ACRES) = 491.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 801.01 Tc (MIN.) = 18.551  
EFFECTIVE AREA (ACRES) = 439.84 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA (ACRES) = 491.2  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 491.2 TC (MIN.) = 18.55  
EFFECTIVE AREA (ACRES) = 439.84 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.380  
PEAK FLOW RATE (CFS) = 801.01

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	676.18	9.97	3.155	0.30 ( 0.11)	0.38	243.5	429.00
2	719.57	11.48	2.926	0.30 ( 0.11)	0.38	280.3	425.00
3	729.64	11.90	2.864	0.30 ( 0.11)	0.38	290.5	400.00
4	756.99	13.36	2.648	0.30 ( 0.11)	0.38	326.6	300.00
5	801.01	18.55	2.115	0.30 ( 0.11)	0.38	439.8	210.00
6	788.68	20.66	1.962	0.30 ( 0.11)	0.38	466.8	410.00
7	782.25	21.72	1.909	0.30 ( 0.11)	0.38	480.1	200.00
8	780.36	22.29	1.880	0.30 ( 0.11)	0.38	486.6	230.00
9	762.79	23.40	1.823	0.30 ( 0.11)	0.37	491.2	220.50

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

FILE NAME: 0506101D.DAT  
TIME/DATE OF STUDY: 12:41 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.060
- 2) 6.00; 3.660
- 3) 7.00; 3.350
- 4) 8.00; 3.100
- 5) 9.00; 2.900
- 6) 10.00; 2.730
- 7) 11.00; 2.580
- 8) 12.00; 2.460
- 9) 13.00; 2.350
- 10) 14.00; 2.250
- 11) 15.00; 2.160
- 12) 20.00; 1.830
- 13) 25.00; 1.610
- 14) 30.00; 1.450
- 15) 40.00; 1.230
- 16) 50.00; 1.090
- 17) 60.00; 0.980
- 18) 90.00; 0.770
- 19) 120.00; 0.660
- 20) 180.00; 0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10100.00 TO NODE 10101.00 IS CODE = 21

-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 895.00 DOWNSTREAM(FEET) = 820.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.606  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.797  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.10	0.30	1.000	98	9.61
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.30	1.000	98	9.61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 0.90  
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 0.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 10101.00 TO NODE 10102.00 IS CODE = 51

-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 790.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 152.00 CHANNEL SLOPE = 0.1974  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.90  
FLOW VELOCITY(FEET/SEC.) = 4.11 FLOW DEPTH(FEET) = 0.27  
TRAVEL TIME(MIN.) = 0.62  $T_c$ (MIN.) = 10.22  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10102.00 = 479.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10102.00 TO NODE 10102.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN.) = 10.22  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.697  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED -      0.50     0.30      1.000     -
USER-DEFINED -      0.30     0.30      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.80 SUBAREA RUNOFF (CFS) = 1.73
EFFECTIVE AREA (ACRES) = 1.20 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.2 PEAK FLOW RATE (CFS) = 2.59

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*****
FLOW PROCESS FROM NODE 10102.00 TO NODE 10103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 762.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.1400
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.59
FLOW VELOCITY(FEET/SEC.) = 4.79 FLOW DEPTH(FEET) = 0.42
TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 10.92
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10103.00 = 679.00 FEET.

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 10.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.592
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED      -      0.40    0.30    1.000  -
USER-DEFINED      -      0.80    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 2.48
EFFECTIVE AREA (ACRES) = 2.40 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 2.4 PEAK FLOW RATE (CFS) = 4.95

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 762.00 DOWNSTREAM(FEET) = 754.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 124.00 CHANNEL SLOPE = 0.0645
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.95
FLOW VELOCITY(FEET/SEC.) = 4.18 FLOW DEPTH(FEET) = 0.63
TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 11.41
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10104.00 = 803.00 FEET.

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.41
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.531
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED      -      0.70    0.30    1.000  -
USER-DEFINED      -      1.10    0.30    1.000  -
USER-DEFINED      -      0.10    0.30    1.000  -
USER-DEFINED      -      0.40    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 4.62
EFFECTIVE AREA (ACRES) = 4.70 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.7 PEAK FLOW RATE (CFS) = 9.44

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 754.00 DOWNSTREAM(FEET) = 740.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00 CHANNEL SLOPE = 0.0255
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 9.44
FLOW VELOCITY(FEET/SEC.) = 3.48 FLOW DEPTH(FEET) = 0.95
TRAVEL TIME(MIN.) = 2.63 Tc(MIN.) = 14.05
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10105.00 = 1353.00 FEET.

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.05
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.246
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED      -      3.40    0.30    1.000  -
USER-DEFINED      -      0.60    0.30    1.000  -
USER-DEFINED      -      6.00    0.30    1.000  -
USER-DEFINED      -      0.60    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 10.60 SUBAREA RUNOFF (CFS) = 18.56
EFFECTIVE AREA (ACRES) = 15.30 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 15.3 PEAK FLOW RATE (CFS) = 26.79

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10106.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 740.00 DOWNSTREAM(FEET) = 623.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 929.00 CHANNEL SLOPE = 0.1259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 26.79
FLOW VELOCITY(FEET/SEC.) = 8.25 FLOW DEPTH(FEET) = 1.04
TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 15.92
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10106.00 = 2282.00 FEET.
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10106.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.099
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 10.40 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 4.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 25.10
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 49.87
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 592.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 417.00 CHANNEL SLOPE = 0.0743
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 49.87
FLOW VELOCITY(FEET/SEC.) = 7.88 FLOW DEPTH(FEET) = 1.45
TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 16.81
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10107.00 = 2699.00 FEET.
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10107.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.81

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* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.041
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 5.10 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 2.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 14.89
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 63.14
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 592.00 DOWNSTREAM(FEET) = 590.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0333
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.000
CHANNEL FLOW THRU SUBAREA(CFS) = 63.14
FLOW VELOCITY(FEET/SEC.) = 6.19 FLOW DEPTH(FEET) = 1.84
TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 16.97
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10108.00 = 2759.00 FEET.
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.97
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.030
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 7.00 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 7.50 0.30 1.000 -
USER-DEFINED - 1.80 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 28.19
EFFECTIVE AREA(ACRES) = 58.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.4 PEAK FLOW RATE(CFS) = 90.94
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.97
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.030
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.31
EFFECTIVE AREA(ACRES) = 58.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.6 PEAK FLOW RATE(CFS) = 91.26

\*\*\*\*\*
FLOW PROCESS FROM NODE 10108.00 TO NODE 10109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 526.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 973.00 CHANNEL SLOPE = 0.0658
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 91.26
FLOW VELOCITY(FEET/SEC.) = 8.75 FLOW DEPTH(FEET) = 1.86
TRAVEL TIME(MIN.) = 1.85 Tc(MIN.) = 18.82
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10109.00 = 3732.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10109.00 TO NODE 10109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.82
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.908
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 16.40 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 3.00 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 28.94
EFFECTIVE AREA(ACRES) = 78.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.6 PEAK FLOW RATE(CFS) = 113.75

\*\*\*\*\*
FLOW PROCESS FROM NODE 10109.00 TO NODE 10110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 526.00 DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1045.00 CHANNEL SLOPE = 0.0679

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 113.75
FLOW VELOCITY(FEET/SEC.) = 9.37 FLOW DEPTH(FEET) = 2.01
TRAVEL TIME(MIN.) = 1.86 Tc(MIN.) = 20.68
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10110.00 = 4777.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10110.00 TO NODE 10110.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.68
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.800
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.30 1.000 -
USER-DEFINED - 0.50 0.30 1.000 -
USER-DEFINED - 31.60 0.30 1.000 -
USER-DEFINED - 1.60 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.10 SUBAREA RUNOFF(CFS) = 47.39
EFFECTIVE AREA(ACRES) = 113.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.7 PEAK FLOW RATE(CFS) = 153.52

\*\*\*\*\*
FLOW PROCESS FROM NODE 10110.00 TO NODE 10111.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 675.00 CHANNEL SLOPE = 0.0667
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 153.52
FLOW VELOCITY(FEET/SEC.) = 10.06 FLOW DEPTH(FEET) = 2.26
TRAVEL TIME(MIN.) = 1.12 Tc(MIN.) = 21.80
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10111.00 = 5452.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10111.00 TO NODE 10111.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.80
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.751
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.40 0.30 1.000 -
USER-DEFINED - 6.00 0.30 1.000 -
USER-DEFINED - 24.80 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -

USER-DEFINED - 4.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 43.20 SUBAREA RUNOFF (CFS) = 56.42  
EFFECTIVE AREA (ACRES) = 156.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 156.9 PEAK FLOW RATE (CFS) = 204.90

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10111.00 TO NODE 10112.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	410.00	DOWNSTREAM (FEET) =	405.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	143.00	CHANNEL SLOPE =	0.0350
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	4.00
CHANNEL FLOW THRU SUBAREA (CFS) =	204.90		
FLOW VELOCITY (FEET/SEC.) =	8.46	FLOW DEPTH (FEET) =	2.84
TRAVEL TIME (MIN.) =	0.28	Tc (MIN.) =	22.08
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10112.00 =	5595.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 22.08

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.739

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	7.90	0.30	1.000	-
USER-DEFINED	-	25.90	0.30	1.000	-
USER-DEFINED	-	19.30	0.30	1.000	-
USER-DEFINED	-	2.10	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 56.20 SUBAREA RUNOFF (CFS) = 72.77

EFFECTIVE AREA (ACRES) = 213.10 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 213.1 PEAK FLOW RATE (CFS) = 275.92

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10113.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	405.00	DOWNSTREAM (FEET) =	363.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	1642.00	CHANNEL SLOPE =	0.0256
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	275.92		
FLOW VELOCITY (FEET/SEC.) =	8.11	FLOW DEPTH (FEET) =	3.37

TRAVEL TIME (MIN.) = 3.37 Tc (MIN.) = 25.45  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10113.00 = 7237.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 25.45

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.596

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	33.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 35.40 SUBAREA RUNOFF (CFS) = 41.28  
EFFECTIVE AREA (ACRES) = 248.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 248.5 PEAK FLOW RATE (CFS) = 289.76

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10114.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	363.00	DOWNSTREAM (FEET) =	340.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	918.00	CHANNEL SLOPE =	0.0251
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	289.76		
FLOW VELOCITY (FEET/SEC.) =	8.14	FLOW DEPTH (FEET) =	3.44
TRAVEL TIME (MIN.) =	1.88	Tc (MIN.) =	27.33
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10114.00 =	8155.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 27.33

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.535

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	10.10	0.30	1.000	-
USER-DEFINED	-	17.70	0.30	1.000	-
USER-DEFINED	-	52.90	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 83.10 SUBAREA RUNOFF (CFS) = 92.40

EFFECTIVE AREA(ACRES) = 331.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 331.6 PEAK FLOW RATE(CFS) = 368.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 27.33  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.535  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 1.67  
EFFECTIVE AREA(ACRES) = 333.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 333.1 PEAK FLOW RATE(CFS) = 370.39

\*\*\*\*\*

FLOW PROCESS FROM NODE 10114.00 TO NODE 10115.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 301.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1467.00 CHANNEL SLOPE = 0.0266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 370.39  
FLOW VELOCITY(FEET/SEC.) = 8.86 FLOW DEPTH(FEET) = 3.73  
TRAVEL TIME(MIN.) = 2.76 Tc(MIN.) = 30.09  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10115.00 = 9622.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10115.00 TO NODE 10115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 30.09  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.448  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.60 0.30 1.000 -  
USER-DEFINED - 24.30 0.30 1.000 -  
USER-DEFINED - 47.70 0.30 1.000 -  
USER-DEFINED - 9.80 0.30 1.000 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 94.00 SUBAREA RUNOFF(CFS) = 97.13  
EFFECTIVE AREA(ACRES) = 427.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 427.1 PEAK FLOW RATE(CFS) = 441.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 10115.00 TO NODE 10116.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 272.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1696.00 CHANNEL SLOPE = 0.0171  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 441.30  
FLOW VELOCITY(FEET/SEC.) = 7.85 FLOW DEPTH(FEET) = 4.33  
TRAVEL TIME(MIN.) = 3.60 Tc(MIN.) = 33.69  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10116.00 = 11318.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 33.69  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.369  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.90 0.30 1.000 -  
USER-DEFINED - 4.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 32.00 0.30 1.000 -  
USER-DEFINED - 3.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 45.60 SUBAREA RUNOFF(CFS) = 43.87  
EFFECTIVE AREA(ACRES) = 472.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 472.7 PEAK FLOW RATE(CFS) = 454.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 33.69  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.369  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 1.000 -  
USER-DEFINED - 7.70 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.70 SUBAREA RUNOFF(CFS) = 9.33  
EFFECTIVE AREA(ACRES) = 482.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 482.4 PEAK FLOW RATE(CFS) = 464.05

```

*****
FLOW PROCESS FROM NODE 10116.00 TO NODE 10117.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 272.00 DOWNSTREAM(FEET) = 252.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 878.00 CHANNEL SLOPE = 0.0228
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 464.05
FLOW VELOCITY(FEET/SEC.) = 8.86 FLOW DEPTH(FEET) = 4.18
TRAVEL TIME(MIN.) = 1.65 Tc(MIN.) = 35.34
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10117.00 = 12196.00 FEET.
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 35.34
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.332
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 8.20 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 11.45
EFFECTIVE AREA(ACRES) = 494.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 494.7 PEAK FLOW RATE(CFS) = 464.05
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 35.34
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.332
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 14.60 0.30 1.000 -
USER-DEFINED - 6.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 3.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996
SUBAREA AREA(ACRES) = 25.00 SUBAREA RUNOFF(CFS) = 23.26
EFFECTIVE AREA(ACRES) = 519.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

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AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 519.7 PEAK FLOW RATE(CFS) = 482.99
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10118.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 252.00 DOWNSTREAM(FEET) = 249.00
FLOW LENGTH(FEET) = 280.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 78.0 INCH PIPE IS 60.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.64
ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 482.99
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 35.61
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10118.00 = 12476.00 FEET.
*****
FLOW PROCESS FROM NODE 10118.00 TO NODE 10119.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 249.00 DOWNSTREAM(FEET) = 240.00
FLOW LENGTH(FEET) = 892.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 78.0 INCH PIPE IS 61.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.15
ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 482.99
PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 36.47
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10119.00 = 13368.00 FEET.
*****
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 36.47
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.308
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.100 -
USER-DEFINED - 1.00 0.30 0.600 -
USER-DEFINED - 0.80 0.30 0.850 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.706
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 3.55
EFFECTIVE AREA(ACRES) = 523.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 523.3 PEAK FLOW RATE(CFS) = 482.99
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****

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FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.47  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.308  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	9.60	0.30	0.600	-
USER-DEFINED	-	1.00	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.627  
 SUBAREA AREA (ACRES) = 13.60 SUBAREA RUNOFF (CFS) = 13.70  
 EFFECTIVE AREA (ACRES) = 536.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 536.9 PEAK FLOW RATE (CFS) = 488.60

FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.47  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.308  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.09  
 EFFECTIVE AREA (ACRES) = 537.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 537.0 PEAK FLOW RATE (CFS) = 488.69

FLOW PROCESS FROM NODE 10119.00 TO NODE 10120.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 240.00 DOWNSTREAM(FEET) = 239.00  
 FLOW LENGTH(FEET) = 120.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 81.0 INCH PIPE IS 64.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.99  
 ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 488.69  
 PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 36.60  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10120.00 = 13488.00 FEET.

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.60  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.305  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.657  
 SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 5.58  
 EFFECTIVE AREA (ACRES) = 542.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA (ACRES) = 542.6 PEAK FLOW RATE (CFS) = 492.94

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.60  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.305  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.717  
 SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 5.00  
 EFFECTIVE AREA (ACRES) = 547.70 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA (ACRES) = 547.7 PEAK FLOW RATE (CFS) = 497.95

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.60  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.305  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	2.70	0.30	1.000	-
USER-DEFINED	-	11.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 14.29  
EFFECTIVE AREA(ACRES) = 563.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 563.5 PEAK FLOW RATE(CFS) = 512.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10121.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	239.00	DOWNSTREAM(FEET) =	213.00
FLOW LENGTH(FEET) =	194.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	51.0 INCH PIPE IS	36.9 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) =	46.59		
ESTIMATED PIPE DIAMETER(INCH) =	51.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	512.23		
PIPE TRAVEL TIME(MIN.) =	0.07	Tc(MIN.) =	36.67
LONGEST FLOWPATH FROM NODE	10100.00 TO NODE	10121.00 =	13682.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10121.00 TO NODE 10122.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	213.00	DOWNSTREAM(FEET) =	176.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	995.00	CHANNEL SLOPE =	0.0372
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	6.00
CHANNEL FLOW THRU SUBAREA(CFS) =	512.23		
FLOW VELOCITY(FEET/SEC.) =	10.91	FLOW DEPTH(FEET) =	3.96
TRAVEL TIME(MIN.) =	1.52	Tc(MIN.) =	38.19
LONGEST FLOWPATH FROM NODE	10100.00 TO NODE	10122.00 =	14677.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	38.19				
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	1.270				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	4.80	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	1.000				
SUBAREA AREA(ACRES) =	7.30	SUBAREA RUNOFF(CFS) =	6.37		
EFFECTIVE AREA(ACRES) =	570.80	AREA-AVERAGED Fm(INCH/HR) =	0.29		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.98		

TOTAL AREA(ACRES) = 570.8 PEAK FLOW RATE(CFS) = 512.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	38.19				
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	1.270				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	3.00	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	1.000				
SUBAREA AREA(ACRES) =	10.50	SUBAREA RUNOFF(CFS) =	9.17		
EFFECTIVE AREA(ACRES) =	581.30	AREA-AVERAGED Fm(INCH/HR) =	0.29		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.98		
TOTAL AREA(ACRES) =	581.3	PEAK FLOW RATE(CFS) =	512.23		
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE					

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	38.19				
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	1.270				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	1.000				
SUBAREA AREA(ACRES) =	7.90	SUBAREA RUNOFF(CFS) =	6.90		
EFFECTIVE AREA(ACRES) =	589.20	AREA-AVERAGED Fm(INCH/HR) =	0.30		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.98		
TOTAL AREA(ACRES) =	589.2	PEAK FLOW RATE(CFS) =	516.93		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	38.19				
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	1.270				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN

USER-DEFINED - 1.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$  (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 1.57  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.98  
TOTAL AREA (ACRES) = 591.0 PEAK FLOW RATE (CFS) = 518.50

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 591.0 TC (MIN.) = 38.19  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.984  
PEAK FLOW RATE (CFS) = 518.50

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

-----  
FILE NAME: 0506102D.DAT  
TIME/DATE OF STUDY: 13:56 01/08/2009  
=====

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:  
=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.080
- 2) 10.00; 2.729
- 3) 15.00; 2.163
- 4) 20.00; 1.834
- 5) 25.00; 1.614
- 6) 30.00; 1.440
- 7) 40.00; 1.233
- 8) 50.00; 1.085
- 9) 60.00; 0.950
- 10) 90.00; 0.775
- 11) 120.00; 0.657
- 12) 180.00; 0.530
- 13) 360.00; 0.367
- 14) 1440.00; 0.153

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10200.00 TO NODE 10201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 293.00  
ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 617.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.991

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.732

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
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RESIDENTIAL

"3-4 DWELLINGS/ACRE" - 0.73 0.30 0.600 0 9.99

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600

SUBAREA RUNOFF(CFS) = 1.68

TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 1.68

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10201.00 TO NODE 10202.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 617.00 DOWNSTREAM ELEVATION(FEET) = 613.00  
STREET LENGTH(FEET) = 323.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.60

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.34

HALFSTREET FLOOD WIDTH(FEET) = 9.19

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.51

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.86

STREET FLOW TRAVEL TIME(MIN.) = 2.14 Tc(MIN.) = 12.13

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.488

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED - 0.88 0.30 0.600 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 1.84  
EFFECTIVE AREA(ACRES) = 1.62 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 3.36

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.39  
FLOW VELOCITY(FEET/SEC.) = 2.64 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.97  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10202.00 = 616.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10202.00 TO NODE 10203.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 613.00 DOWNSTREAM ELEVATION(FEET) = 594.00  
STREET LENGTH(FEET) = 613.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.02  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 10.12  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.13  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.49  
STREET FLOW TRAVEL TIME(MIN.) = 2.47 Tc(MIN.) = 14.60  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.208

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.82 0.30 0.614 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.614  
SUBAREA AREA(ACRES) = 1.82 SUBAREA RUNOFF(CFS) = 3.32  
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 6.27

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 11.21  
FLOW VELOCITY(FEET/SEC.) = 4.33 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.66  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10203.00 = 1229.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10203.00 TO NODE 10204.00 IS CODE = 63  
-----

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 594.00 DOWNSTREAM ELEVATION(FEET) = 578.00  
STREET LENGTH(FEET) = 433.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.30  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.54  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.79  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.87  
STREET FLOW TRAVEL TIME(MIN.) = 1.51 Tc(MIN.) = 16.11  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.090

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.21 0.30 0.655 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.655  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 2.06  
EFFECTIVE AREA(ACRES) = 4.64 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 7.96

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 11.98  
FLOW VELOCITY(FEET/SEC.) = 4.90 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.95  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10204.00 = 1662.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 578.00 DOWNSTREAM(FEET) = 575.00  
FLOW LENGTH(FEET) = 147.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.28  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 7.96  
PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 16.41  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10205.00 = 1809.00 FEET.

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*****
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.41
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.071
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.61    0.30    0.917    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917
SUBAREA AREA(ACRES) = 3.61      SUBAREA RUNOFF(CFS) = 5.83
EFFECTIVE AREA(ACRES) = 8.25    AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75
TOTAL AREA(ACRES) = 8.3        PEAK FLOW RATE(CFS) = 13.71
*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 563.00
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.35
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.71
PIPE TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 17.41
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10206.00 = 2374.00 FEET.
*****
FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.41
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.004
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         4.75    0.30    0.669    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.669
SUBAREA AREA(ACRES) = 4.75      SUBAREA RUNOFF(CFS) = 7.71
EFFECTIVE AREA(ACRES) = 13.00    AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 13.0        PEAK FLOW RATE(CFS) = 20.92
*****
FLOW PROCESS FROM NODE 10206.00 TO NODE 10207.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 563.00 DOWNSTREAM(FEET) = 547.00

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FLOW LENGTH(FEET) = 599.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.47
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.92
PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 18.28
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10207.00 = 2973.00 FEET.
*****
FLOW PROCESS FROM NODE 10206.10 TO NODE 10207.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.28
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.947
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         4.59    0.30    0.664    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.664
SUBAREA AREA(ACRES) = 4.59      SUBAREA RUNOFF(CFS) = 7.21
EFFECTIVE AREA(ACRES) = 17.58    AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 17.6        PEAK FLOW RATE(CFS) = 27.46
*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 516.00
FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.79
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 27.46
PIPE TRAVEL TIME(MIN.) = 0.63 Tc(MIN.) = 18.92
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10208.00 = 3573.00 FEET.
*****
FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.92
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.905
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp      Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.60    0.30    0.697    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.697
SUBAREA AREA(ACRES) = 3.60      SUBAREA RUNOFF(CFS) = 5.50
EFFECTIVE AREA(ACRES) = 21.18    AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70
TOTAL AREA(ACRES) = 21.2        PEAK FLOW RATE(CFS) = 32.30

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*****
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 516.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 604.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.21
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 32.30
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 19.50
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10209.00 = 4177.00 FEET.

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*****
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.50
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.867
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 8.21 0.30 0.645 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645
SUBAREA AREA(ACRES) = 8.21 SUBAREA RUNOFF(CFS) = 12.37
EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 43.93

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*****
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 678.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.98
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 43.93
PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 20.10
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10210.00 = 4855.00 FEET.

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*****
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.10
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.830
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 10.49 0.30 0.986 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 10.49 SUBAREA RUNOFF(CFS) = 14.49
EFFECTIVE AREA(ACRES) = 39.89 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 39.9 PEAK FLOW RATE(CFS) = 57.44

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*****
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 280.00
FLOW LENGTH(FEET) = 2662.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.01
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 57.44
PIPE TRAVEL TIME(MIN.) = 2.22 Tc(MIN.) = 22.31
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10211.00 = 7517.00 FEET.

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*****
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.31
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.732
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 10.00 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 12.89
EFFECTIVE AREA(ACRES) = 49.89 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 49.9 PEAK FLOW RATE(CFS) = 66.83

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*****
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 280.00 DOWNSTREAM(FEET) = 176.00
FLOW LENGTH(FEET) = 935.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.89
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 66.83
PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 22.92
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10212.00 = 8452.00 FEET.

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FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.92
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.706
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 18.37 0.30 0.926 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.926
SUBAREA AREA(ACRES) = 18.37 SUBAREA RUNOFF(CFS) = 23.61
EFFECTIVE AREA(ACRES) = 68.26 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 68.3 PEAK FLOW RATE(CFS) = 89.25

\*\*\*\*\*
FLOW PROCESS FROM NODE 10212.00 TO NODE 10242.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 176.00 DOWNSTREAM(FEET) = 169.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00 CHANNEL SLOPE = 0.0211
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.663
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.97 0.30 0.970 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 90.47
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.70
AVERAGE FLOW DEPTH(FEET) = 2.30 TRAVEL TIME(MIN.) = 0.97
Tc(MIN.) = 23.89
SUBAREA AREA(ACRES) = 1.97 SUBAREA RUNOFF(CFS) = 2.43
EFFECTIVE AREA(ACRES) = 70.23 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 89.25
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.29 FLOW VELOCITY(FEET/SEC.) = 5.69
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<

\*\*\*\*\*
FLOW PROCESS FROM NODE 10220.00 TO NODE 10221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 308.00 DOWNSTREAM(FEET) = 300.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.111
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.156
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"GRASS" - 1.03 0.30 1.000 0 15.11
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.72
TOTAL AREA(ACRES) = 1.03 PEAK FLOW RATE(CFS) = 1.72

\*\*\*\*\*
FLOW PROCESS FROM NODE 10221.10 TO NODE 10222.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 300.00 DOWNSTREAM ELEVATION(FEET) = 261.00
STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.03

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.21
HALFSTREET FLOOD WIDTH(FEET) = 2.43
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.10
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.26
STREET FLOW TRAVEL TIME(MIN.) = 1.19 Tc(MIN.) = 16.30
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.078

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.64 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 2.62
EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 4.27

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.25 HALFSTREET FLOOD WIDTH(FEET) = 4.36  
FLOW VELOCITY(FEET/SEC.) = 5.62 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.38  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10222.00 = 764.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10221.20 TO NODE 10222.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.30  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.078  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.12 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.12 SUBAREA RUNOFF(CFS) = 4.98  
EFFECTIVE AREA(ACRES) = 5.78 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 9.25

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.10 TO NODE 10223.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 261.00 DOWNSTREAM ELEVATION(FEET) = 208.00  
STREET LENGTH(FEET) = 622.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.57

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 8.12  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.23  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.00  
STREET FLOW TRAVEL TIME(MIN.) = 1.66 Tc(MIN.) = 17.96  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.968

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.75 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 2.63  
EFFECTIVE AREA(ACRES) = 7.54 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.5 PEAK FLOW RATE(CFS) = 11.32

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.42  
FLOW VELOCITY(FEET/SEC.) = 6.29 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.06  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10223.00 = 1386.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.20 TO NODE 10223.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.96  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.968  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.91 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.91 SUBAREA RUNOFF(CFS) = 11.88  
EFFECTIVE AREA(ACRES) = 15.45 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 23.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 10223.10 TO NODE 10224.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 208.00 DOWNSTREAM ELEVATION(FEET) = 204.00  
STREET LENGTH(FEET) = 758.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.18

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.60  
HALFSTREET FLOOD WIDTH(FEET) = 21.88  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.63  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.57  
STREET FLOW TRAVEL TIME(MIN.) = 4.80 Tc(MIN.) = 22.77  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.712

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.70 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 5.97  
EFFECTIVE AREA(ACRES) = 20.15 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.1 PEAK FLOW RATE(CFS) = 25.61

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 21.71  
FLOW VELOCITY(FEET/SEC.) = 2.61 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.55  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10224.00 = 2144.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.20 TO NODE 10224.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 22.77  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.712  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.21	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 1.54  
EFFECTIVE AREA(ACRES) = 21.35 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 27.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 204.00 DOWNSTREAM(FEET) = 201.00  
FLOW LENGTH(FEET) = 422.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.47  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 27.14  
PIPE TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 23.71  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10225.00 = 2566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 23.71  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.671  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.81	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 4.81 SUBAREA RUNOFF(CFS) = 5.94  
EFFECTIVE AREA(ACRES) = 26.17 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 26.2 PEAK FLOW RATE(CFS) = 32.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 201.00 DOWNSTREAM(FEET) = 197.00  
FLOW LENGTH(FEET) = 799.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.77  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 32.29  
PIPE TRAVEL TIME(MIN.) = 1.97 Tc(MIN.) = 25.68  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10238.00 = 3365.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 25.68  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.590  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.24	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.24 SUBAREA RUNOFF(CFS) = 4.92  
EFFECTIVE AREA(ACRES) = 30.41 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 30.4 PEAK FLOW RATE(CFS) = 35.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 25.68  
RAINFALL INTENSITY(INCH/HR) = 1.59  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 30.41  
TOTAL STREAM AREA(ACRES) = 30.41  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 35.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10230.00 TO NODE 10231.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 276.00  
ELEVATION DATA: UPSTREAM (FEET) = 503.00 DOWNSTREAM (FEET) = 390.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM  $T_c$  (MIN.) = 5.944

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.825

SUBAREA  $T_c$  AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
AGRICULTURAL POOR COVER "FALLOW"	-	0.95	0.30	1.000	0	5.94

AGRICULTURAL POOR COVER

"FALLOW"

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 3.02

TOTAL AREA (ACRES) = 0.95 PEAK FLOW RATE (CFS) = 3.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10231.10 TO NODE 10232.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 390.00 DOWNSTREAM (FEET) = 301.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 394.00 CHANNEL SLOPE = 0.2259

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.619

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.68	0.30	1.000	-

USER-DEFINED

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.53

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.62

AVERAGE FLOW DEPTH (FEET) = 0.46 TRAVEL TIME (MIN.) = 0.76

$T_c$  (MIN.) = 6.71

SUBAREA AREA (ACRES) = 1.68 SUBAREA RUNOFF (CFS) = 5.03

EFFECTIVE AREA (ACRES) = 2.63 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 2.6 PEAK FLOW RATE (CFS) = 7.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.53 FLOW VELOCITY (FEET/SEC.) = 9.37

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10232.00 = 670.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10231.20 TO NODE 10232.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE  $T_c$  (MIN.) = 6.71

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.619

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED - 6.38 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 6.38 SUBAREA RUNOFF (CFS) = 19.05  
 EFFECTIVE AREA (ACRES) = 9.01 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.0 PEAK FLOW RATE (CFS) = 26.92

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10232.00 TO NODE 10233.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION (FEET) = 301.00 DOWNSTREAM ELEVATION (FEET) = 277.00

STREET LENGTH (FEET) = 341.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.61

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.83

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.44

HALFSTREET FLOOD WIDTH (FEET) = 14.01

AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.39

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.24

STREET FLOW TRAVEL TIME (MIN.) = 0.77  $T_c$  (MIN.) = 7.47

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.411

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.30	1.000	-

USER-DEFINED

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 3.50 SUBAREA RUNOFF (CFS) = 9.81

EFFECTIVE AREA (ACRES) = 12.52 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 12.5 PEAK FLOW RATE (CFS) = 35.05

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.45 HALFSTREET FLOOD WIDTH (FEET) = 14.62

FLOW VELOCITY (FEET/SEC.) = 7.53 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.39

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10233.00 = 1011.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10233.10 TO NODE 10234.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<



UPSTREAM ELEVATION(FEET) = 277.00 DOWNSTREAM ELEVATION(FEET) = 226.00  
STREET LENGTH(FEET) = 682.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 40.29

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.46  
HALFSTREET FLOOD WIDTH(FEET) = 15.26  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.00  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.71

STREET FLOW TRAVEL TIME(MIN.) = 1.42 Tc(MIN.) = 8.90

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.027

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.27	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.27 SUBAREA RUNOFF(CFS) = 10.48  
EFFECTIVE AREA(ACRES) = 16.78 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 41.20

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 15.44  
FLOW VELOCITY(FEET/SEC.) = 8.01 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.74  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10234.00 = 1693.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10233.20 TO NODE 10234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.90

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.027

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	15.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 38.29  
EFFECTIVE AREA(ACRES) = 32.38 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 79.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.10 TO NODE 10235.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 3 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 226.00 DOWNSTREAM ELEVATION(FEET) = 205.00  
STREET LENGTH(FEET) = 759.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 84.48

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.66  
HALFSTREET FLOOD WIDTH(FEET) = 25.04  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.54  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.31

STREET FLOW TRAVEL TIME(MIN.) = 1.93 Tc(MIN.) = 10.83

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.635

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.74	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 9.97  
EFFECTIVE AREA(ACRES) = 37.13 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 79.49

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.65 HALFSTREET FLOOD WIDTH(FEET) = 24.41  
FLOW VELOCITY(FEET/SEC.) = 6.46 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.18  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10235.00 = 2452.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.20 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.83

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.635

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.02 SUBAREA RUNOFF(CFS) = 16.85  
EFFECTIVE AREA(ACRES) = 45.15 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.1 PEAK FLOW RATE (CFS) = 94.88

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.30 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.83  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.635  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.62 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.62 SUBAREA RUNOFF (CFS) = 5.50  
EFFECTIVE AREA (ACRES) = 47.76 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 100.37

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.00 TO NODE 10236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 205.00 DOWNSTREAM (FEET) = 201.00  
FLOW LENGTH (FEET) = 489.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.6 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.70  
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 100.37  
PIPE TRAVEL TIME (MIN.) = 0.76 Tc (MIN.) = 11.59  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10236.00 = 2941.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.10 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.59  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.549  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.89 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.89 SUBAREA RUNOFF (CFS) = 5.85  
EFFECTIVE AREA (ACRES) = 50.65 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 50.7 PEAK FLOW RATE (CFS) = 102.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.20 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 11.59  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.549  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.84 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.84 SUBAREA RUNOFF (CFS) = 9.79  
EFFECTIVE AREA (ACRES) = 55.49 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 112.31

\*\*\*\*\*

FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 201.00 DOWNSTREAM (FEET) = 199.00  
FLOW LENGTH (FEET) = 278.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.48  
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 112.31  
PIPE TRAVEL TIME (MIN.) = 0.44 Tc (MIN.) = 12.03  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10237.00 = 3219.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 12.03  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.499  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.62 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.62 SUBAREA RUNOFF (CFS) = 3.21  
EFFECTIVE AREA (ACRES) = 57.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 57.1 PEAK FLOW RATE (CFS) = 113.02

\*\*\*\*\*

FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 199.00 DOWNSTREAM (FEET) = 197.00  
FLOW LENGTH (FEET) = 345.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.76  
ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 113.02  
 PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 12.62  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 12.62  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.432  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.38 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.38 SUBAREA RUNOFF(CFS) = 2.65  
 EFFECTIVE AREA(ACRES) = 58.49 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 58.5 PEAK FLOW RATE(CFS) = 113.02  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 12.62  
 RAINFALL INTENSITY(INCH/HR) = 2.43  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 58.49  
 TOTAL STREAM AREA(ACRES) = 58.49  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 113.02

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	35.32	25.68	1.590	0.30( 0.30)	1.00	30.4	10220.00
2	113.02	12.62	2.432	0.30( 0.30)	1.00	58.5	10230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	141.71	12.62	2.432	0.30( 0.30)	1.00	73.4	10230.00
2	103.73	25.68	1.590	0.30( 0.30)	1.00	88.9	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 141.71 Tc(MIN.) = 12.62  
 EFFECTIVE AREA(ACRES) = 73.44 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 88.9  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.00 TO NODE 10239.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 197.00 DOWNSTREAM(FEET) = 193.00  
 FLOW LENGTH(FEET) = 753.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 42.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.03  
 ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 141.71  
 PIPE TRAVEL TIME(MIN.) = 1.25 Tc(MIN.) = 13.87  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10239.00 = 4317.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.10 TO NODE 10239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 13.87  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.290  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.72 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.72 SUBAREA RUNOFF(CFS) = 4.87  
 EFFECTIVE AREA(ACRES) = 76.16 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 91.6 PEAK FLOW RATE(CFS) = 141.71  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.20 TO NODE 10239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 13.87  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.290  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 34.37 0.30 0.991 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991  
 SUBAREA AREA(ACRES) = 34.37 SUBAREA RUNOFF(CFS) = 61.65  
 EFFECTIVE AREA(ACRES) = 110.53 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 126.0 PEAK FLOW RATE(CFS) = 198.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 193.00 DOWNSTREAM(FEET) = 191.00
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 48.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.69
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 198.09
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 14.30
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10240.00 = 4618.00 FEET.

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*****
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.30
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.242
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.22   0.30  0.916 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.916
SUBAREA AREA(ACRES) = 2.22 SUBAREA RUNOFF(CFS) = 3.94
EFFECTIVE AREA(ACRES) = 112.75 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 128.2 PEAK FLOW RATE(CFS) = 198.09
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

*****
FLOW PROCESS FROM NODE 10240.00 TO NODE 10241.00 IS CODE = 31
-----

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 191.00 DOWNSTREAM(FEET) = 180.00
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.05
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 198.09
PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 14.39
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10241.00 = 4768.00 FEET.

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*****
FLOW PROCESS FROM NODE 10241.00 TO NODE 10242.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 169.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 267.00 CHANNEL SLOPE = 0.0412
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.187

```

```

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.16   0.30  0.958 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.958
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 199.94
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.09
AVERAGE FLOW DEPTH(FEET) = 2.45 TRAVEL TIME(MIN.) = 0.40
Tc(MIN.) = 14.79
SUBAREA AREA(ACRES) = 2.16 SUBAREA RUNOFF(CFS) = 3.69
EFFECTIVE AREA(ACRES) = 114.91 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 130.4 PEAK FLOW RATE(CFS) = 198.09
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.44 FLOW VELOCITY(FEET/SEC.) = 11.10
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

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*****
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 11
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>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<
=====

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** MAIN STREAM CONFLUENCE DATA **
STREAM   Q   Tc Intensity   Fp(Fm)   Ap   Ae   HEADWATER
NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1       198.09 14.79 2.187 0.30( 0.30) 0.99 114.9 10230.00
2       142.03 28.02 1.509 0.30( 0.30) 1.00 130.4 10220.00
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

```

```

** MEMORY BANK # 1 CONFLUENCE DATA **
STREAM   Q   Tc Intensity   Fp(Fm)   Ap   Ae   HEADWATER
NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1       89.25 23.89 1.663 0.30( 0.25) 0.85 70.2 10200.00
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

```

```

** PEAK FLOW RATE TABLE **
STREAM   Q   Tc Intensity   Fp(Fm)   Ap   Ae   HEADWATER
NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1       273.90 14.79 2.187 0.30( 0.29) 0.95 158.4 10230.00
2       248.79 23.89 1.663 0.30( 0.28) 0.94 195.8 10200.00
3       221.53 28.02 1.509 0.30( 0.28) 0.94 200.6 10220.00
TOTAL AREA(ACRES) = 200.6

```

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 273.90 Tc(MIN.) = 14.791
EFFECTIVE AREA(ACRES) = 158.40 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 200.6
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 12
-----

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>>>>CLEAR MEMORY BANK # 1 <<<<

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*****
FLOW PROCESS FROM NODE 10242.00 TO NODE 10256.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 169.00 DOWNSTREAM(FEET) = 163.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 315.00 CHANNEL SLOPE = 0.0190
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.139
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 9.10 0.30 0.995 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 281.44
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.07
AVERAGE FLOW DEPTH(FEET) = 3.22 TRAVEL TIME(MIN.) = 0.58
Tc(MIN.) = 15.37
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 15.08
EFFECTIVE AREA(ACRES) = 167.51 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 209.7 PEAK FLOW RATE(CFS) = 279.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 3.21 FLOW VELOCITY(FEET/SEC.) = 9.05
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

*****
FLOW PROCESS FROM NODE 10243.00 TO NODE 10256.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 15.37
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.139
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.01 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.01 SUBAREA RUNOFF(CFS) = 11.59
EFFECTIVE AREA(ACRES) = 174.51 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 216.7 PEAK FLOW RATE(CFS) = 290.76

*****
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 15.37

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RAINFALL INTENSITY(INCH/HR) = 2.14
AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.96
EFFECTIVE STREAM AREA(ACRES) = 174.51
TOTAL STREAM AREA(ACRES) = 216.71
PEAK FLOW RATE(CFS) AT CONFLUENCE = 290.76

*****
FLOW PROCESS FROM NODE 10250.00 TO NODE 10251.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----
INITIAL SUBAREA FLOW-LENGTH(FEET) = 284.00
ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 243.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.802
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.044
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"WOODLAND,GRASS" - 1.04 0.30 1.000 0 16.80
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.63
TOTAL AREA(ACRES) = 1.04 PEAK FLOW RATE(CFS) = 1.63

*****
FLOW PROCESS FROM NODE 10251.00 TO NODE 10252.00 IS CODE = 63
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 243.00 DOWNSTREAM ELEVATION(FEET) = 240.00
STREET LENGTH(FEET) = 301.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.68
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.30
HALFSTREET FLOOD WIDTH(FEET) = 6.91
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.01
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.60
STREET FLOW TRAVEL TIME(MIN.) = 2.49 Tc(MIN.) = 19.30
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.880

```

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.47	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 2.09  
EFFECTIVE AREA(ACRES) = 2.51 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 3.57

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 8.09  
FLOW VELOCITY(FEET/SEC.) = 2.11 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.68  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10252.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10252.00 TO NODE 10253.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 240.00 DOWNSTREAM ELEVATION(FEET) = 234.00  
STREET LENGTH(FEET) = 544.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.49

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 10.51  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.51  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.92  
STREET FLOW TRAVEL TIME(MIN.) = 3.61 Tc(MIN.) = 22.91  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.706

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.60 SUBAREA RUNOFF(CFS) = 5.83  
EFFECTIVE AREA(ACRES) = 7.12 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 9.00

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 12.15  
FLOW VELOCITY(FEET/SEC.) = 2.70 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.08

LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10253.00 = 1129.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 234.00 DOWNSTREAM(FEET) = 219.00  
FLOW LENGTH(FEET) = 362.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.14  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 9.00  
PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 23.45  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10254.00 = 1491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.45  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.682  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.55	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 10.63  
EFFECTIVE AREA(ACRES) = 15.66 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.7 PEAK FLOW RATE(CFS) = 19.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10254.00 TO NODE 10255.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 219.00 DOWNSTREAM(FEET) = 182.00  
FLOW LENGTH(FEET) = 716.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.42  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 19.48  
PIPE TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 24.28  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10255.00 = 2207.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10255.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 182.00 DOWNSTREAM(FEET) = 163.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 228.00 CHANNEL SLOPE = 0.0833  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.627  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	13.88	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.77  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.81  
 AVERAGE FLOW DEPTH (FEET) = 1.03 TRAVEL TIME (MIN.) = 0.43  
 Tc (MIN.) = 24.71  
 SUBAREA AREA (ACRES) = 13.88 SUBAREA RUNOFF (CFS) = 16.57  
 EFFECTIVE AREA (ACRES) = 29.54 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 29.5 PEAK FLOW RATE (CFS) = 35.28

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.12 FLOW VELOCITY (FEET/SEC.) = 9.40  
 LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10256.00 = 2435.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 24.71  
 RAINFALL INTENSITY (INCH/HR) = 1.63  
 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 29.54  
 TOTAL STREAM AREA (ACRES) = 29.54  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 35.28

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	290.76	15.37	2.139	0.30 ( 0.29)	0.96	174.5	10230.00
1	258.03	24.48	1.637	0.30 ( 0.28)	0.95	211.9	10200.00
1	234.75	28.63	1.488	0.30 ( 0.28)	0.95	216.7	10220.00
2	35.28	24.71	1.627	0.30 ( 0.30)	1.00	29.5	10250.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	321.17	15.37	2.139	0.30 ( 0.29)	0.96	192.9	10230.00
2	293.25	24.48	1.637	0.30 ( 0.29)	0.95	241.2	10200.00
3	292.00	24.71	1.627	0.30 ( 0.29)	0.95	241.7	10250.00
4	266.33	28.63	1.488	0.30 ( 0.29)	0.95	246.3	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 321.17 Tc (MIN.) = 15.37  
 EFFECTIVE AREA (ACRES) = 192.89 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 246.3  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 246.3 TC (MIN.) = 15.37  
 EFFECTIVE AREA (ACRES) = 192.89 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 PEAK FLOW RATE (CFS) = 321.17

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	321.17	15.37	2.139	0.30 ( 0.29)	0.96	192.9	10230.00
2	293.25	24.48	1.637	0.30 ( 0.29)	0.95	241.2	10200.00
3	292.00	24.71	1.627	0.30 ( 0.29)	0.95	241.7	10250.00
4	266.33	28.63	1.488	0.30 ( 0.29)	0.95	246.3	10220.00

=====

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

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FILE NAME: 0506103D.DAT  
TIME/DATE OF STUDY: 12:44 04/15/2013  
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--\*TIME-OF-CONCENTRATION MODEL\*--  
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USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.060
- 2) 6.00; 3.660
- 3) 7.00; 3.350
- 4) 8.00; 3.100
- 5) 9.00; 2.900
- 6) 10.00; 2.730
- 7) 11.00; 2.580
- 8) 12.00; 2.460
- 9) 13.00; 2.350
- 10) 14.00; 2.250
- 11) 15.00; 2.160
- 12) 20.00; 1.830
- 13) 25.00; 1.610
- 14) 30.00; 1.450
- 15) 40.00; 1.230
- 16) 50.00; 1.090
- 17) 60.00; 0.980
- 18) 90.00; 0.770
- 19) 120.00; 0.660
- 20) 180.00; 0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH	LIP	HIKE	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

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FLOW PROCESS FROM NODE 10300.00 TO NODE 10301.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 627.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 5.147  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.001  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "5-7 DWELLINGS/ACRE"	-	1.20	0.30	0.500	95	5.15

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.500  
 SUBAREA RUNOFF(CFS) = 4.16  
 TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 4.16

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FLOW PROCESS FROM NODE 10301.00 TO NODE 10302.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 510.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.2609  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.16  
 FLOW VELOCITY(FEET/SEC.) = 6.76 FLOW DEPTH(FEET) = 0.45  
 TRAVEL TIME(MIN.) = 0.28  $T_c$ (MIN.) = 5.43  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10302.00 = 443.00 FEET.

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FLOW PROCESS FROM NODE 10302.00 TO NODE 10302.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
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MAINLINE  $T_c$ (MIN.) = 5.43  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.888  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 5.05  
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 9.08

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FLOW PROCESS FROM NODE 10302.00 TO NODE 10303.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 467.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.2575  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.08  
FLOW VELOCITY(FEET/SEC.) = 8.20 FLOW DEPTH(FEET) = 0.61  
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 5.77  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10303.00 = 610.00 FEET.

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FLOW PROCESS FROM NODE 10303.00 TO NODE 10303.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.77  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.752  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 7.13  
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 15.88

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FLOW PROCESS FROM NODE 10303.00 TO NODE 10304.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 467.00 DOWNSTREAM(FEET) = 446.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 15.88  
FLOW VELOCITY(FEET/SEC.) = 8.31 FLOW DEPTH(FEET) = 0.80  
TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 6.00  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10304.00 = 725.00 FEET.

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FLOW PROCESS FROM NODE 10304.00 TO NODE 10304.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.660  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.500 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 7.53  
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 23.01

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FLOW PROCESS FROM NODE 10304.00 TO NODE 10305.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 446.00 DOWNSTREAM(FEET) = 366.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 423.00 CHANNEL SLOPE = 0.1891  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 23.01  
FLOW VELOCITY(FEET/SEC.) = 9.24 FLOW DEPTH(FEET) = 0.91  
TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 6.76  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10305.00 = 1148.00 FEET.

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FLOW PROCESS FROM NODE 10305.00 TO NODE 10305.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.76  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.423  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.912  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 9.64  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.65  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 31.09

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FLOW PROCESS FROM NODE 10305.00 TO NODE 10306.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 300.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 574.00 CHANNEL SLOPE = 0.1150  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.09  
FLOW VELOCITY (FEET/SEC.) = 8.28 FLOW DEPTH (FEET) = 1.12  
TRAVEL TIME (MIN.) = 1.16 Tc (MIN.) = 7.92  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10306.00 = 1722.00 FEET.

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FLOW PROCESS FROM NODE 10306.00 TO NODE 10306.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc (MIN.) = 7.92  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.120  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 9.15  
EFFECTIVE AREA (ACRES) = 14.30 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA (ACRES) = 14.3 PEAK FLOW RATE (CFS) = 37.32

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FLOW PROCESS FROM NODE 10306.00 TO NODE 10307.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 300.00 DOWNSTREAM (FEET) = 293.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0350  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 37.32  
FLOW VELOCITY (FEET/SEC.) = 5.54 FLOW DEPTH (FEET) = 1.50  
TRAVEL TIME (MIN.) = 0.60 Tc (MIN.) = 8.52  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10307.00 = 1922.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10307.00 TO NODE 10307.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc (MIN.) = 8.52  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.996  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.70  
EFFECTIVE AREA (ACRES) = 15.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 15.0 PEAK FLOW RATE (CFS) = 37.42

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10307.00 TO NODE 10308.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 293.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0850  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 37.42  
FLOW VELOCITY (FEET/SEC.) = 9.57 FLOW DEPTH (FEET) = 1.14  
TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 8.87  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10308.00 = 2122.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10308.00 TO NODE 10308.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc (MIN.) = 8.87  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.926  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	8.50	0.30	0.500	-
USER-DEFINED	-	3.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.696  
SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 34.24  
EFFECTIVE AREA (ACRES) = 29.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA (ACRES) = 29.0 PEAK FLOW RATE (CFS) = 70.72

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10308.00 TO NODE 10309.00 IS CODE = 51  
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 250.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 600.00 CHANNEL SLOPE = 0.0433  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 70.72  
FLOW VELOCITY (FEET/SEC.) = 8.73 FLOW DEPTH (FEET) = 1.64  
TRAVEL TIME (MIN.) = 1.15 Tc (MIN.) = 10.01  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10309.00 = 2722.00 FEET.

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FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.01  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.728  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.00	0.30	0.600	-
USER-DEFINED	-	1.80	0.30	0.850	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	0.500	-
USER-DEFINED	-	2.10	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.662  
 SUBAREA AREA (ACRES) = 15.40 SUBAREA RUNOFF (CFS) = 35.06  
 EFFECTIVE AREA (ACRES) = 44.40 AREA-AVERAGED Fm (INCH/HR) = 0.21  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
 TOTAL AREA (ACRES) = 44.4 PEAK FLOW RATE (CFS) = 100.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.01  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.728  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.30	0.850	-
USER-DEFINED	-	8.80	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.967  
 SUBAREA AREA (ACRES) = 15.80 SUBAREA RUNOFF (CFS) = 34.67  
 EFFECTIVE AREA (ACRES) = 60.20 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA (ACRES) = 60.2 PEAK FLOW RATE (CFS) = 135.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10309.00 TO NODE 10310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 250.00 DOWNSTREAM (FEET) = 208.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1021.00 CHANNEL SLOPE = 0.0411  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 135.27  
 FLOW VELOCITY (FEET/SEC.) = 10.07 FLOW DEPTH (FEET) = 2.12  
 TRAVEL TIME (MIN.) = 1.69 Tc (MIN.) = 11.70  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10310.00 = 3743.00 FEET.

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.70  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.496  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	1.80	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.668  
 SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 13.63  
 EFFECTIVE AREA (ACRES) = 66.80 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA (ACRES) = 66.8 PEAK FLOW RATE (CFS) = 136.31

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.70  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.496  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	8.00	0.30	0.600	-
USER-DEFINED	-	7.10	0.30	0.850	-
USER-DEFINED	-	8.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814  
 SUBAREA AREA (ACRES) = 23.50 SUBAREA RUNOFF (CFS) = 47.62  
 EFFECTIVE AREA (ACRES) = 90.30 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA (ACRES) = 90.3 PEAK FLOW RATE (CFS) = 183.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10310.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 208.00 DOWNSTREAM (FEET) = 189.00  
 FLOW LENGTH (FEET) = 1595.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.2 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.49  
 ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 183.93  
 PIPE TRAVEL TIME (MIN.) = 1.83 Tc (MIN.) = 13.54  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10335.00 = 5338.00 FEET.

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*****
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.54
RAINFALL INTENSITY(INCH/HR) = 2.30
AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.77
EFFECTIVE STREAM AREA(ACRES) = 90.30
TOTAL STREAM AREA(ACRES) = 90.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 183.93

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*****
FLOW PROCESS FROM NODE 10320.00 TO NODE 10321.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 671.00 DOWNSTREAM(FEET) = 622.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.795
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.742
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.00 0.30 0.500 95 5.79
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 3.23
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 3.23

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*****
FLOW PROCESS FROM NODE 10321.00 TO NODE 10322.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 622.00 DOWNSTREAM(FEET) = 599.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 227.00 CHANNEL SLOPE = 0.1013
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.23
FLOW VELOCITY(FEET/SEC.) = 5.58 FLOW DEPTH(FEET) = 0.44
TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 6.47
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10322.00 = 557.00 FEET.

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*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10322.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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MAINLINE Tc(MIN.) = 6.47
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.513
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.30 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 4.24
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 7.26

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*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10323.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 599.00 DOWNSTREAM(FEET) = 539.00
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.13
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.26
PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 6.59
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10323.00 = 719.00 FEET.

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*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10323.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 6.59
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.477
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.30 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.50
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 8.68

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*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10324.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 539.00 DOWNSTREAM(FEET) = 530.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 97.00 CHANNEL SLOPE = 0.0928
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 8.68

```

FLOW VELOCITY(FEET/SEC.) = 5.55 FLOW DEPTH(FEET) = 0.72  
TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 6.88  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10324.00 = 816.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10324.00 TO NODE 10324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.88  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.387

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.24  
EFFECTIVE AREA(ACRES) = 4.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.7 PEAK FLOW RATE(CFS) = 13.69

\*\*\*\*\*

FLOW PROCESS FROM NODE 10324.00 TO NODE 10325.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 210.00 CHANNEL SLOPE = 0.1429  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 13.69  
FLOW VELOCITY(FEET/SEC.) = 7.30 FLOW DEPTH(FEET) = 0.79  
TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 7.36  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10325.00 = 1026.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.36  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 4.76  
EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 17.91

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10326.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 460.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 345.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 17.91  
FLOW VELOCITY(FEET/SEC.) = 7.20 FLOW DEPTH(FEET) = 0.91  
TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 8.16  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10326.00 = 1371.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10326.00 TO NODE 10326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.16  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.068

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 4.99  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 21.80

\*\*\*\*\*

FLOW PROCESS FROM NODE 10326.00 TO NODE 10327.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 430.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 263.00 CHANNEL SLOPE = 0.1141  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 21.80  
FLOW VELOCITY(FEET/SEC.) = 7.55 FLOW DEPTH(FEET) = 0.98  
TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 8.74  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10327.00 = 1634.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10327.00 TO NODE 10327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.74  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.952

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.10	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500

SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 10.34  
EFFECTIVE AREA (ACRES) = 12.40 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 12.4 PEAK FLOW RATE (CFS) = 31.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10327.00 TO NODE 10328.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 430.00 DOWNSTREAM (FEET) = 375.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 437.00 CHANNEL SLOPE = 0.1259  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.27  
FLOW VELOCITY (FEET/SEC.) = 10.66 FLOW DEPTH (FEET) = 0.99  
TRAVEL TIME (MIN.) = 0.68 Tc (MIN.) = 9.42  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10328.00 = 2071.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10328.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 9.42  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.828  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.500 -  
USER-DEFINED - 1.20 0.30 0.850 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.772  
SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 7.48  
EFFECTIVE AREA (ACRES) = 15.60 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 15.6 PEAK FLOW RATE (CFS) = 37.37

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10328.00 TO NODE 10329.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 375.00 DOWNSTREAM (FEET) = 372.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 224.00 CHANNEL SLOPE = 0.0134  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 37.37  
FLOW VELOCITY (FEET/SEC.) = 4.79 FLOW DEPTH (FEET) = 1.61  
TRAVEL TIME (MIN.) = 0.78 Tc (MIN.) = 10.20  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10329.00 = 2295.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10329.00 TO NODE 10329.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 10.20  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.700  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.20 0.30 0.500 -  
USER-DEFINED - 1.40 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.571  
SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 25.49  
EFFECTIVE AREA (ACRES) = 26.80 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 26.8 PEAK FLOW RATE (CFS) = 61.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10329.00 TO NODE 10330.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 372.00 DOWNSTREAM (FEET) = 300.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 452.00 CHANNEL SLOPE = 0.1593  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 61.05  
FLOW VELOCITY (FEET/SEC.) = 13.72 FLOW DEPTH (FEET) = 1.22  
TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 10.75  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10330.00 = 2747.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10330.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 10.75  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.617  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 4.20 0.30 0.500 -  
USER-DEFINED - 2.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.673  
SUBAREA AREA (ACRES) = 7.80 SUBAREA RUNOFF (CFS) = 16.96  
EFFECTIVE AREA (ACRES) = 34.60 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 34.6 PEAK FLOW RATE (CFS) = 76.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10330.00 TO NODE 10331.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 295.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 182.00 CHANNEL SLOPE = 0.0275  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 76.02  
FLOW VELOCITY(FEET/SEC.) = 7.47 FLOW DEPTH(FEET) = 1.84  
TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 11.16  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10331.00 = 2929.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10331.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 11.16  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.561  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 11.30 0.30 0.500 -  
USER-DEFINED - 0.20 0.30 0.600 -  
USER-DEFINED - 4.20 0.30 0.850 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.652  
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 40.45  
EFFECTIVE AREA(ACRES) = 53.60 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 53.6 PEAK FLOW RATE(CFS) = 114.72

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10332.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 295.00 DOWNSTREAM(FEET) = 245.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.00 CHANNEL SLOPE = 0.0542  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 114.72  
FLOW VELOCITY(FEET/SEC.) = 10.71 FLOW DEPTH(FEET) = 1.89  
TRAVEL TIME(MIN.) = 1.43 Tc(MIN.) = 12.59  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10332.00 = 3851.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10332.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 12.59  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.395  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.850 -

USER-DEFINED - 1.40 0.30 0.500 -  
USER-DEFINED - 15.40 0.30 0.850 -  
USER-DEFINED - 8.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.881  
SUBAREA AREA(ACRES) = 25.60 SUBAREA RUNOFF(CFS) = 49.09  
EFFECTIVE AREA(ACRES) = 79.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 79.2 PEAK FLOW RATE(CFS) = 155.79

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10333.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 199.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 564.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 155.79  
FLOW VELOCITY(FEET/SEC.) = 13.47 FLOW DEPTH(FEET) = 1.96  
TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 13.29  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10333.00 = 4415.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10333.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 13.29  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.321  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 0.500 -  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 5.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.761  
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 15.63  
EFFECTIVE AREA(ACRES) = 87.50 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 87.5 PEAK FLOW RATE(CFS) = 166.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10334.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 195.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 454.00 CHANNEL SLOPE = 0.0088  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 166.16  
FLOW VELOCITY(FEET/SEC.) = 5.96 FLOW DEPTH(FEET) = 3.05



TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 14.56  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10334.00 = 4869.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10334.00 TO NODE 10334.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.56  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.200  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.800 -  
USER-DEFINED - 2.60 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 6.49  
EFFECTIVE AREA(ACRES) = 91.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71  
TOTAL AREA(ACRES) = 91.2 PEAK FLOW RATE(CFS) = 166.16  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10334.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 195.00 DOWNSTREAM(FEET) = 189.00  
FLOW LENGTH(FEET) = 1291.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 60.0 INCH PIPE IS 48.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.78  
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 166.16  
PIPE TRAVEL TIME(MIN.) = 2.20 Tc(MIN.) = 16.76  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 16.76  
RAINFALL INTENSITY(INCH/HR) = 2.04  
AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.71  
EFFECTIVE STREAM AREA(ACRES) = 91.20  
TOTAL STREAM AREA(ACRES) = 91.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 166.16

\*\* CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE

1 183.93 13.54 2.296 0.30( 0.23) 0.77 90.3 10300.00  
2 166.16 16.76 2.044 0.30( 0.21) 0.71 91.2 10320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	336.64	13.54	2.296	0.30( 0.22)	0.75	164.0	10300.00
2	327.59	16.76	2.044	0.30( 0.22)	0.74	181.5	10320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 336.64 Tc(MIN.) = 13.54  
EFFECTIVE AREA(ACRES) = 163.96 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA(ACRES) = 181.5  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10335.00 TO NODE 10336.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 189.00 DOWNSTREAM(FEET) = 188.00  
FLOW LENGTH(FEET) = 103.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 69.0 INCH PIPE IS 53.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.49  
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 336.64  
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 13.65  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10336.00 = 6263.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10336.00 TO NODE 10337.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 54.0 INCH PIPE IS 41.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.88  
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 336.64  
PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 13.78  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10337.00 = 6475.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10337.00 TO NODE 10338.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 161.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0218  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 336.64  
FLOW VELOCITY(FEET/SEC.) = 9.97 FLOW DEPTH(FEET) = 3.35  
TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 15.24  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10338.00 = 7347.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.24  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.144  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.850 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.943  
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 7.04  
EFFECTIVE AREA(ACRES) = 168.16 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA(ACRES) = 185.7 PEAK FLOW RATE(CFS) = 336.64  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.24  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.144  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 8.30  
EFFECTIVE AREA(ACRES) = 173.16 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 190.7 PEAK FLOW RATE(CFS) = 336.64  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10339.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 161.00 DOWNSTREAM(FEET) = 159.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 328.00 CHANNEL SLOPE = 0.0061

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 336.64  
FLOW VELOCITY(FEET/SEC.) = 6.18 FLOW DEPTH(FEET) = 4.26  
TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 16.13  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10339.00 = 7675.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.13  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.086  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 2.30 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.767  
SUBAREA AREA(ACRES) = 6.90 SUBAREA RUNOFF(CFS) = 11.52  
EFFECTIVE AREA(ACRES) = 180.06 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 197.6 PEAK FLOW RATE(CFS) = 336.64  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.13  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.086  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 6.30 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 2.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.876  
SUBAREA AREA(ACRES) = 9.20 SUBAREA RUNOFF(CFS) = 15.10  
EFFECTIVE AREA(ACRES) = 189.26 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 206.8 PEAK FLOW RATE(CFS) = 336.64  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10390.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

```
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 159.00 DOWNSTREAM(FEET) = 155.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 782.00 CHANNEL SLOPE = 0.0051
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 336.64
FLOW VELOCITY(FEET/SEC.) = 5.78 FLOW DEPTH(FEET) = 4.41
TRAVEL TIME(MIN.) = 2.25 Tc(MIN.) = 18.38
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
```

```
MAINLINE Tc(MIN.) = 18.38
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.937
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 0.800 -
USER-DEFINED - 3.70 0.30 0.850 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 2.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.901
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 9.30
EFFECTIVE AREA(ACRES) = 195.46 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 213.0 PEAK FLOW RATE(CFS) = 336.64
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

```
*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10
-----
```

```
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====
```

```
*****
FLOW PROCESS FROM NODE 10340.00 TO NODE 10341.00 IS CODE = 21
-----
```

```
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
```

```
INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 585.00
```

```
Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.581
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.643
```

```
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE" - 0.10 0.30 0.800 95 10.58
PUBLIC PARK - 0.50 0.30 0.850 95 10.90
AGRICULTURAL GOOD COVER
```

```
"ROW CROPS, STRAIGHT ROW" - 0.40 0.30 1.000 95 21.09
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA RUNOFF(CFS) = 2.13
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.13
```

```
*****
FLOW PROCESS FROM NODE 10341.00 TO NODE 10342.00 IS CODE = 63
-----
```

```
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====
```

```
UPSTREAM ELEVATION(FEET) = 585.00 DOWNSTREAM ELEVATION(FEET) = 570.00
STREET LENGTH(FEET) = 250.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00
```

```
DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020
```

```
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64
```

```
**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.25
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.26
HALFSTREET FLOOD WIDTH(FEET) = 5.17
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.65
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.22
STREET FLOW TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 11.48
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.523
```

```
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.70 0.30 0.800 -
USER-DEFINED - 1.40 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 4.24
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 6.27
```

```
END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 6.70
FLOW VELOCITY(FEET/SEC.) = 4.91 DEPTH*VELOCITY(FT*FT/SEC.) = 1.43
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10342.00 = 558.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
-----
```

```
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====
```

```
UPSTREAM ELEVATION(FEET) = 570.00 DOWNSTREAM ELEVATION(FEET) = 560.00
```

STREET LENGTH(FEET) = 415.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.49  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.36  
 HALfstREET FLOOD WIDTH(FEET) = 9.95  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.60  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.29  
 STREET FLOW TRAVEL TIME(MIN.) = 1.92 Tc(MIN.) = 13.40  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.310  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.800	-
USER-DEFINED	-	1.20	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.825  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.46  
 EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
 TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 10.13

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.37 HALfstREET FLOOD WIDTH(FEET) = 10.76  
 FLOW VELOCITY(FEET/SEC.) = 3.76 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.40  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10343.00 = 973.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10343.00 TO NODE 10344.00 IS CODE = 63  
 -----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 4 USED)<<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 560.00 DOWNSTREAM ELEVATION(FEET) = 550.00  
 STREET LENGTH(FEET) = 616.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.51  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.42  
 HALfstREET FLOOD WIDTH(FEET) = 12.89  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.38  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.41  
 STREET FLOW TRAVEL TIME(MIN.) = 3.04 Tc(MIN.) = 16.44  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.065  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.30	0.800	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814  
 SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 4.75  
 EFFECTIVE AREA(ACRES) = 8.40 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 13.67

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.43 HALfstREET FLOOD WIDTH(FEET) = 13.40  
 FLOW VELOCITY(FEET/SEC.) = 3.44 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.47  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10344.00 = 1589.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10344.00 TO NODE 10345.00 IS CODE = 63  
 -----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 4 USED)<<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 550.00 DOWNSTREAM ELEVATION(FEET) = 510.00  
 STREET LENGTH(FEET) = 474.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.03  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.36  
 HALfstREET FLOOD WIDTH(FEET) = 9.95  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.80  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.43  
 STREET FLOW TRAVEL TIME(MIN.) = 1.16 Tc(MIN.) = 17.60  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.989  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.80	0.30	0.800	-
USER-DEFINED	-	0.20	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 4.72  
EFFECTIVE AREA(ACRES) = 11.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 11.4 PEAK FLOW RATE(CFS) = 17.81

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.46  
FLOW VELOCITY(FEET/SEC.) = 6.94 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.55  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10345.00 = 2063.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10345.00 TO NODE 10346.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 510.00 DOWNSTREAM ELEVATION(FEET) = 484.00  
STREET LENGTH(FEET) = 231.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.54

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.66  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 10.25  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.92  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.88  
STREET FLOW TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 18.08  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.956

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.40 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 3.71  
EFFECTIVE AREA(ACRES) = 13.80 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 13.8 PEAK FLOW RATE(CFS) = 21.19

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.61  
FLOW VELOCITY(FEET/SEC.) = 8.06 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.98  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10346.00 = 2294.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10346.00 TO NODE 10347.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 484.00 DOWNSTREAM ELEVATION(FEET) = 378.00  
STREET LENGTH(FEET) = 995.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.55

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.11  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.37  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.13  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.14  
STREET FLOW TRAVEL TIME(MIN.) = 2.04 Tc(MIN.) = 20.12  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.825

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 5.85  
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 25.39

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.62  
FLOW VELOCITY(FEET/SEC.) = 8.24 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.22  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10347.00 = 3289.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10347.00 TO NODE 10348.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 378.00 DOWNSTREAM ELEVATION(FEET) = 303.00  
STREET LENGTH(FEET) = 751.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.56

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.00  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.42  
HALFSTREET FLOOD WIDTH(FEET) = 12.89  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.37  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.48  
STREET FLOW TRAVEL TIME(MIN.) = 1.50 Tc(MIN.) = 21.62  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.759

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.20 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 11.21  
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 35.54

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 13.65  
FLOW VELOCITY(FEET/SEC.) = 8.65 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.73  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10348.00 = 4040.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10348.00 TO NODE 10349.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 303.00 DOWNSTREAM ELEVATION(FEET) = 252.00  
STREET LENGTH(FEET) = 607.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.32  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.46  
HALFSTREET FLOOD WIDTH(FEET) = 15.21  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.46  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.91  
STREET FLOW TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 22.81  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.706  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.30 0.30 0.800 -  
USER-DEFINED - 3.00 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.815  
SUBAREA AREA(ACRES) = 10.30 SUBAREA RUNOFF(CFS) = 13.55  
EFFECTIVE AREA(ACRES) = 36.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 36.4 PEAK FLOW RATE(CFS) = 47.86

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 16.03  
FLOW VELOCITY(FEET/SEC.) = 8.68 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.15  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10349.00 = 4647.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10349.00 TO NODE 10350.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 252.00 DOWNSTREAM ELEVATION(FEET) = 246.00  
STREET LENGTH(FEET) = 224.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 56.33  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.59  
HALFSTREET FLOOD WIDTH(FEET) = 21.47  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.87  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.45  
STREET FLOW TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 23.45  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.678  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 12.60 0.30 0.800 -  
USER-DEFINED - 0.50 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.802  
SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 16.95  
EFFECTIVE AREA(ACRES) = 49.50 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 49.5 PEAK FLOW RATE(CFS) = 63.89

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.61 HALFSTREET FLOOD WIDTH(FEET) = 22.59  
FLOW VELOCITY(FEET/SEC.) = 6.04 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.68

LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10350.00 = 4871.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10350.00 TO NODE 10351.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 237.00
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.67
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 63.89
PIPE TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 24.13
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10351.00 = 5390.00 FEET.

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FLOW PROCESS FROM NODE 10351.00 TO NODE 10351.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.13
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.648
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 0.100 -
USER-DEFINED - 5.60 0.30 0.800 -
USER-DEFINED - 0.70 0.30 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.784
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 8.27
EFFECTIVE AREA(ACRES) = 56.00 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 56.0 PEAK FLOW RATE(CFS) = 70.82

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10352.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 237.00 DOWNSTREAM(FEET) = 230.00
FLOW LENGTH(FEET) = 675.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.86
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 70.82
PIPE TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 25.17
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10352.00 = 6065.00 FEET.

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FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 25.17

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.605

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.30 0.100 -
USER-DEFINED - 0.40 0.30 0.800 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.300
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.91
EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 70.82
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 25.17
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.605
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.80 0.30 0.100 -
USER-DEFINED - 9.40 0.30 0.800 -
USER-DEFINED - 1.10 0.30 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 14.01
EFFECTIVE AREA(ACRES) = 68.70 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79
TOTAL AREA(ACRES) = 68.7 PEAK FLOW RATE(CFS) = 84.55

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10353.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 230.00 DOWNSTREAM(FEET) = 180.00
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 19.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 31.72
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 84.55
PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 25.33
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10353.00 = 6366.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10353.00 TO NODE 10353.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 25.33
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.600
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            0.10       0.30       0.100       -  
 USER-DEFINED       -            6.00       0.30       0.800       -  
 USER-DEFINED       -            1.30       0.30       0.850       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.799  
 SUBAREA AREA(ACRES) = 7.40       SUBAREA RUNOFF(CFS) = 9.06  
 EFFECTIVE AREA(ACRES) = 76.10    AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 76.1        PEAK FLOW RATE(CFS) = 93.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10353.00 TO NODE 10354.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 180.00    DOWNSTREAM(FEET) = 172.00  
 FLOW LENGTH(FEET) = 458.00    MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.12  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00    NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 93.29  
 PIPE TRAVEL TIME(MIN.) = 0.54    Tc(MIN.) = 25.87  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10354.00 = 6824.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10354.00 TO NODE 10390.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 172.00    DOWNSTREAM(FEET) = 155.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00    CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030    MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 93.29  
 FLOW VELOCITY(FEET/SEC.) = 9.17    FLOW DEPTH(FEET) = 1.84  
 TRAVEL TIME(MIN.) = 0.75    Tc(MIN.) = 26.62  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----  
 MAINLINE Tc(MIN.) = 26.62  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.558  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS  
                           LAND USE    GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            0.60       0.30       0.100       -  
 USER-DEFINED       -            0.10       0.30       0.850       -  
 USER-DEFINED       -            0.10       0.30       1.000       -  
 USER-DEFINED       -            0.30       0.30       0.100       -  
 USER-DEFINED       -            0.90       0.30       0.850       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.520

SUBAREA AREA(ACRES) = 2.00        SUBAREA RUNOFF(CFS) = 2.52  
 EFFECTIVE AREA(ACRES) = 78.10    AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.78  
 TOTAL AREA(ACRES) = 78.1        PEAK FLOW RATE(CFS) = 93.29  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----  
 MAINLINE Tc(MIN.) = 26.62  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.558  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS  
                           LAND USE    GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            0.60       0.30       1.000       -  
 USER-DEFINED       -            0.60       0.30       1.000       -  
 USER-DEFINED       -            0.30       0.30       0.850       -  
 USER-DEFINED       -            0.10       0.30       1.000       -  
 USER-DEFINED       -            0.10       0.30       0.100       -  
 USER-DEFINED       -            2.10       0.30       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.964  
 SUBAREA AREA(ACRES) = 3.80        SUBAREA RUNOFF(CFS) = 4.34  
 EFFECTIVE AREA(ACRES) = 81.90    AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 81.9        PEAK FLOW RATE(CFS) = 97.32

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----  
 MAINLINE Tc(MIN.) = 26.62  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.558  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS  
                           LAND USE    GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            2.50       0.30       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.50        SUBAREA RUNOFF(CFS) = 2.83  
 EFFECTIVE AREA(ACRES) = 84.40    AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 84.4        PEAK FLOW RATE(CFS) = 100.15

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
 -----  
 \*\* MAIN STREAM CONFLUENCE DATA \*\*  
 STREAM            Q        Tc    Intensity    Fp(Fm)    Ap    Ae    HEADWATER  
 NUMBER            (CFS)    (MIN.)    (INCH/HR)    (INCH/HR)    (ACRES)    NODE  
 1            100.15    26.62    1.558    0.30( 0.24)    0.80    84.4    10340.00  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.



\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	336.64	18.38	1.937	0.30 ( 0.23)	0.77	195.5	10300.00
2	327.59	21.63	1.758	0.30 ( 0.23)	0.76	213.0	10320.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	425.65	18.38	1.937	0.30 ( 0.23)	0.77	253.7	10300.00
2	421.33	21.63	1.758	0.30 ( 0.23)	0.77	281.6	10320.00
3	384.92	26.62	1.558	0.30 ( 0.23)	0.77	297.4	10340.00

TOTAL AREA (ACRES) = 297.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 425.65 Tc (MIN.) = 18.380  
EFFECTIVE AREA (ACRES) = 253.74 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
TOTAL AREA (ACRES) = 297.4  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10360.00 TO NODE 10361.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
ELEVATION DATA: UPSTREAM (FEET) = 337.00 DOWNSTREAM (FEET) = 292.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.697

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.625

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.30	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"GRASS"	-	0.50	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.10	0.30	1.000	95	10.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 1.88  
TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 1.88

\*\*\*\*\*

FLOW PROCESS FROM NODE 10361.00 TO NODE 10362.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 292.00 DOWNSTREAM (FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 199.00 CHANNEL SLOPE = 0.0101  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 1.88  
FLOW VELOCITY (FEET/SEC.) = 2.05 FLOW DEPTH (FEET) = 0.55  
TRAVEL TIME (MIN.) = 1.62 Tc (MIN.) = 12.32  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10362.00 = 529.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.32

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.425

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.11  
EFFECTIVE AREA (ACRES) = 2.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 3.83

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10363.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 290.00 DOWNSTREAM (FEET) = 288.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 3.83  
FLOW VELOCITY (FEET/SEC.) = 2.73 FLOW DEPTH (FEET) = 0.68  
TRAVEL TIME (MIN.) = 0.90 Tc (MIN.) = 13.22  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10363.00 = 676.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10363.00 TO NODE 10363.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.22  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.328  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.40 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 0.850 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.39  
 EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 8.04

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10363.00 TO NODE 10364.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 288.00 DOWNSTREAM(FEET) = 286.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.04  
 FLOW VELOCITY(FEET/SEC.) = 3.29 FLOW DEPTH(FEET) = 0.90  
 TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 13.96  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10364.00 = 823.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10364.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.96  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.254  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.40 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
 SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 3.35  
 EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 11.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10365.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 286.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 11.10  
 FLOW VELOCITY(FEET/SEC.) = 2.93 FLOW DEPTH(FEET) = 1.12  
 TRAVEL TIME(MIN.) = 1.41 Tc(MIN.) = 15.37  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10365.00 = 1071.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10365.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.37  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.135  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.90 0.30 1.000 -  
 USER-DEFINED - 1.80 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.850 -  
 USER-DEFINED - 0.50 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 5.79  
 EFFECTIVE AREA(ACRES) = 9.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 16.22

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10366.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 16.22  
 FLOW VELOCITY(FEET/SEC.) = 3.23 FLOW DEPTH(FEET) = 1.29  
 TRAVEL TIME(MIN.) = 1.28 Tc(MIN.) = 16.65  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10366.00 = 1319.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10366.00 TO NODE 10366.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.65  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.051  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.20 0.30 1.000 -  
 USER-DEFINED - 2.30 0.30 1.000 -

USER-DEFINED - 0.20 0.30 0.850 -  
 USER-DEFINED - 2.70 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995  
 SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 13.41  
 EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 28.88

\*\*\*\*\*

FLOW PROCESS FROM NODE 10366.00 TO NODE 10367.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 279.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 292.00 CHANNEL SLOPE = 0.0103  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 28.88  
 FLOW VELOCITY (FEET/SEC.) = 4.07 FLOW DEPTH (FEET) = 1.54  
 TRAVEL TIME (MIN.) = 1.20 Tc (MIN.) = 17.85  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10367.00 = 1611.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10367.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.85  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.972  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972  
 SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 2.42  
 EFFECTIVE AREA (ACRES) = 19.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 19.9 PEAK FLOW RATE (CFS) = 30.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10368.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 279.00 DOWNSTREAM (FEET) = 276.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 378.00 CHANNEL SLOPE = 0.0079  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 30.00  
 FLOW VELOCITY (FEET/SEC.) = 3.73 FLOW DEPTH (FEET) = 1.64

TRAVEL TIME (MIN.) = 1.69 Tc (MIN.) = 19.54  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10368.00 = 1989.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10368.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 19.54  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.860  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.973  
 SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 3.11  
 EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 31.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10369.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 247.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 229.00 CHANNEL SLOPE = 0.1266  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 31.11  
 FLOW VELOCITY (FEET/SEC.) = 10.64 FLOW DEPTH (FEET) = 0.99  
 TRAVEL TIME (MIN.) = 0.36 Tc (MIN.) = 19.90  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10369.00 = 2218.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10369.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 19.90  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.837  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	9.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996  
 SUBAREA AREA (ACRES) = 11.60 SUBAREA RUNOFF (CFS) = 16.06  
 EFFECTIVE AREA (ACRES) = 33.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 33.7 PEAK FLOW RATE (CFS) = 46.70

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10370.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 247.00 DOWNSTREAM(FEET) = 226.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 179.00 CHANNEL SLOPE = 0.1173
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 46.70
FLOW VELOCITY(FEET/SEC.) = 11.48 FLOW DEPTH(FEET) = 1.16
TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 20.16
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10370.00 = 2397.00 FEET.

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FLOW PROCESS FROM NODE 10370.00 TO NODE 10370.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.16
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.823
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 0.850 -
USER-DEFINED - 3.60 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 5.60 0.30 1.000 -
USER-DEFINED - 1.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 15.22
EFFECTIVE AREA(ACRES) = 44.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 44.8 PEAK FLOW RATE(CFS) = 61.50

\*\*\*\*\*

FLOW PROCESS FROM NODE 10370.00 TO NODE 10371.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 226.00 DOWNSTREAM(FEET) = 188.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 434.00 CHANNEL SLOPE = 0.0876
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 61.50
FLOW VELOCITY(FEET/SEC.) = 10.95 FLOW DEPTH(FEET) = 1.37
TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 20.82
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10371.00 = 2831.00 FEET.

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FLOW PROCESS FROM NODE 10371.00 TO NODE 10371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.82

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.794

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 0.100 -
USER-DEFINED - 1.20 0.30 0.850 -
USER-DEFINED - 1.60 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 0.20 0.30 0.100 -
USER-DEFINED - 7.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958
SUBAREA AREA(ACRES) = 10.70 SUBAREA RUNOFF(CFS) = 14.51
EFFECTIVE AREA(ACRES) = 55.50 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 55.5 PEAK FLOW RATE(CFS) = 74.84

\*\*\*\*\*

FLOW PROCESS FROM NODE 10371.00 TO NODE 10389.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 157.00
FLOW LENGTH(FEET) = 1918.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.93
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 74.84
PIPE TRAVEL TIME(MIN.) = 2.47 Tc(MIN.) = 23.29
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 23.29
RAINFALL INTENSITY(INCH/HR) = 1.69
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.99
EFFECTIVE STREAM AREA(ACRES) = 55.50
TOTAL STREAM AREA(ACRES) = 55.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 74.84

\*\*\*\*\*

FLOW PROCESS FROM NODE 10380.00 TO NODE 10381.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 241.00
ELEVATION DATA: UPSTREAM(FEET) = 275.00 DOWNSTREAM(FEET) = 273.00

Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.110  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.322  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.30	0.100	95	7.11
PUBLIC PARK	-	1.10	0.30	0.850	95	11.30

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.735  
 SUBAREA RUNOFF(CFS) = 3.63  
 TOTAL AREA(ACRES) = 1.30 PEAK FLOW RATE(CFS) = 3.63

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10381.00 TO NODE 10382.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 273.00 DOWNSTREAM ELEVATION(FEET) = 271.00  
 STREET LENGTH(FEET) = 238.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.70  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.37  
 HALfstREET FLOOD WIDTH(FEET) = 10.51  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.20  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.81  
 STREET FLOW TRAVEL TIME(MIN.) = 1.80 Tc(MIN.) = 8.91

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.918  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	1.40	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.718  
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 4.13  
 EFFECTIVE AREA(ACRES) = 3.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 7.29

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.39 HALfstREET FLOOD WIDTH(FEET) = 11.76  
 FLOW VELOCITY(FEET/SEC.) = 2.32 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.91  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10382.00 = 479.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10382.00 TO NODE 10383.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 271.00 DOWNSTREAM ELEVATION(FEET) = 268.00  
 STREET LENGTH(FEET) = 357.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.55  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.43  
 HALfstREET FLOOD WIDTH(FEET) = 13.79  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.52  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.09  
 STREET FLOW TRAVEL TIME(MIN.) = 2.36 Tc(MIN.) = 11.27

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.548  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	1.30	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.452  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 6.51  
 EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 12.80

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.46 HALfstREET FLOOD WIDTH(FEET) = 14.96  
 FLOW VELOCITY(FEET/SEC.) = 2.64 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.21  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10383.00 = 836.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10383.00 TO NODE 10384.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 268.00 DOWNSTREAM ELEVATION(FEET) = 264.00  
 STREET LENGTH(FEET) = 473.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.83  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.49  
 HALFSTREET FLOOD WIDTH(FEET) = 16.68  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.83  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.39  
 STREET FLOW TRAVEL TIME(MIN.) = 2.78 Tc(MIN.) = 14.05  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.245

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.60	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 8.05  
 EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.57  
 TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 19.22

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.51 HALFSTREET FLOOD WIDTH(FEET) = 17.62  
 FLOW VELOCITY(FEET/SEC.) = 2.92 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.49  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10384.00 = 1309.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10384.00 TO NODE 10385.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 264.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
 STREET LENGTH(FEET) = 463.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.55  
 \*\*\*STREET FLOWING FULL\*\*\*

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.57  
 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.82  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.60  
 STREET FLOW TRAVEL TIME(MIN.) = 2.73 Tc(MIN.) = 16.79  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.042

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.600	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.650  
 SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 10.64  
 EFFECTIVE AREA(ACRES) = 16.70 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.7 PEAK FLOW RATE(CFS) = 27.98

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
 FLOW VELOCITY(FEET/SEC.) = 2.98 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.74  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10385.00 = 1772.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10385.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 16.79  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.042  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.34  
 EFFECTIVE AREA(ACRES) = 16.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.9 PEAK FLOW RATE(CFS) = 28.32

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10386.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 261.00 DOWNSTREAM(FEET) = 200.00  
 FLOW LENGTH(FEET) = 712.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 18.81  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 28.32

PIPE TRAVEL TIME(MIN.) = 0.63 Tc(MIN.) = 17.42  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10386.00 = 2484.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 0.100 -  
USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 0.100 -  
USER-DEFINED - 0.30 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.561  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.31  
EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 30.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 0.100 -  
USER-DEFINED - 0.10 0.30 0.600 -  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.30 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.544  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 6.78  
EFFECTIVE AREA(ACRES) = 22.40 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 22.4 PEAK FLOW RATE(CFS) = 36.78

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.100 -  
USER-DEFINED - 0.20 0.30 0.500 -  
USER-DEFINED - 0.10 0.30 0.600 -  
USER-DEFINED - 0.30 0.30 0.850 -  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 0.10 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 6.09  
EFFECTIVE AREA(ACRES) = 25.90 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54  
TOTAL AREA(ACRES) = 25.9 PEAK FLOW RATE(CFS) = 42.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.70 0.30 0.100 -  
USER-DEFINED - 0.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.228  
SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 3.48  
EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52  
TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 46.34

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 2.10 0.30 0.100 -  
USER-DEFINED - 0.20 0.30 0.100 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.225  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.22  
EFFECTIVE AREA(ACRES) = 30.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49  
TOTAL AREA(ACRES) = 30.9 PEAK FLOW RATE(CFS) = 51.56

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.42  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.100 -  
USER-DEFINED - 1.50 0.30 0.600 -  
USER-DEFINED - 1.70 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.204  
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 12.57  
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 64.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10387.00 IS CODE = 31  
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 200.00 DOWNSTREAM(FEET) = 163.00  
FLOW LENGTH(FEET) = 1145.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.16  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 64.13  
PIPE TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 18.60  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10387.00 = 3629.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.60  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.922  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.100 -  
USER-DEFINED - 23.80 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 0.100 -  
USER-DEFINED - 6.90 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.830  
SUBAREA AREA(ACRES) = 32.90 SUBAREA RUNOFF(CFS) = 49.55  
EFFECTIVE AREA(ACRES) = 71.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 71.0 PEAK FLOW RATE(CFS) = 111.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81  
=====

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.60  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.922  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 1.20 0.30 0.100 -  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.641  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 5.92  
EFFECTIVE AREA(ACRES) = 74.80 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 74.8 PEAK FLOW RATE(CFS) = 116.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10388.00 IS CODE = 31  
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 163.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 26.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.23  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 116.93  
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 18.73  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10388.00 = 3779.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.73  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.914  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.80 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.400 -  
USER-DEFINED - 0.60 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 10.14  
EFFECTIVE AREA(ACRES) = 80.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 80.9 PEAK FLOW RATE(CFS) = 126.49



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*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.73
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.914
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -      0.10    0.30    0.100  -
USER-DEFINED         -     10.70    0.30    0.400  -
USER-DEFINED         -      2.30    0.30    0.850  -
USER-DEFINED         -      0.50    0.30    1.000  -
USER-DEFINED         -      0.30    0.30    1.000  -
USER-DEFINED         -      0.70    0.30    0.400  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.502
SUBAREA AREA(ACRES) = 14.60    SUBAREA RUNOFF(CFS) = 23.17
EFFECTIVE AREA(ACRES) = 95.50    AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 95.5    PEAK FLOW RATE(CFS) = 149.66

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.73
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.914
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -      0.70    0.30    0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.70    SUBAREA RUNOFF(CFS) = 1.05
EFFECTIVE AREA(ACRES) = 96.20    AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 96.2    PEAK FLOW RATE(CFS) = 150.71

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10389.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 158.00    DOWNSTREAM(FEET) = 157.00
FLOW LENGTH(FEET) = 51.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.53
ESTIMATED PIPE DIAMETER(INCH) = 45.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 150.71
PIPE TRAVEL TIME(MIN.) = 0.05    Tc(MIN.) = 18.78
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10389.00 = 3830.00 FEET.

*****

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FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 18.78
RAINFALL INTENSITY(INCH/HR) = 1.91
AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.58
EFFECTIVE STREAM AREA(ACRES) = 96.20
TOTAL STREAM AREA(ACRES) = 96.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 150.71

** CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1          74.84 23.29  1.685  0.30( 0.30) 0.99 55.5 10360.00
2         150.71 18.78  1.911  0.30( 0.17) 0.58 96.2 10380.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1          220.84 18.78  1.911  0.30( 0.21) 0.71 140.9 10380.00
2          206.00 23.29  1.685  0.30( 0.22) 0.73 151.7 10360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 220.84    Tc(MIN.) = 18.78
EFFECTIVE AREA(ACRES) = 140.95    AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 151.7
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

*****
FLOW PROCESS FROM NODE 10389.00 TO NODE 10390.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 157.00    DOWNSTREAM(FEET) = 155.00
FLOW LENGTH(FEET) = 312.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 50.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.86
ESTIMATED PIPE DIAMETER(INCH) = 63.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 220.84
PIPE TRAVEL TIME(MIN.) = 0.44    Tc(MIN.) = 19.22
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

MAINLINE Tc(MIN.) = 19.22  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.882  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 5.70 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 13.53  
 EFFECTIVE AREA(ACRES) = 150.45 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 161.2 PEAK FLOW RATE(CFS) = 225.31

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.22  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.882  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 3.13  
 EFFECTIVE AREA(ACRES) = 152.65 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 163.4 PEAK FLOW RATE(CFS) = 228.45

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	228.45	19.22	1.882	0.30( 0.22)	0.73	152.6	10380.00
2	212.05	23.73	1.666	0.30( 0.22)	0.75	163.4	10360.00

LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	425.65	18.38	1.937	0.30( 0.23)	0.77	253.7	10300.00
2	421.33	21.63	1.758	0.30( 0.23)	0.77	281.6	10320.00
3	384.92	26.62	1.558	0.30( 0.23)	0.77	297.4	10340.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	651.40	18.38	1.937	0.30( 0.23)	0.76	399.7	10300.00
2	652.99	19.22	1.882	0.30( 0.23)	0.76	413.6	10380.00
3	641.00	21.63	1.758	0.30( 0.23)	0.76	440.0	10320.00
4	618.06	23.73	1.666	0.30( 0.23)	0.76	451.6	10360.00
5	581.15	26.62	1.558	0.30( 0.23)	0.76	460.8	10340.00

TOTAL AREA(ACRES) = 460.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 652.99 Tc(MIN.) = 19.219  
 EFFECTIVE AREA(ACRES) = 413.56 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA(ACRES) = 460.8  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12  
 -----

>>>>CLEAR MEMORY BANK # 1 <<<<<

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 460.8 TC(MIN.) = 19.22  
 EFFECTIVE AREA(ACRES) = 413.56 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.758  
 PEAK FLOW RATE(CFS) = 652.99

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	651.40	18.38	1.937	0.30( 0.23)	0.76	399.7	10300.00
2	652.99	19.22	1.882	0.30( 0.23)	0.76	413.6	10380.00
3	641.00	21.63	1.758	0.30( 0.23)	0.76	440.0	10320.00
4	618.06	23.73	1.666	0.30( 0.23)	0.76	451.6	10360.00
5	581.15	26.62	1.558	0.30( 0.23)	0.76	460.8	10340.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506104D.DAT  
TIME/DATE OF STUDY: 12:47 04/15/2013  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.060
- 2) 6.00; 3.660
- 3) 7.00; 3.350
- 4) 8.00; 3.100
- 5) 9.00; 2.900
- 6) 10.00; 2.730
- 7) 11.00; 2.580
- 8) 12.00; 2.460
- 9) 13.00; 2.350
- 10) 14.00; 2.250
- 11) 15.00; 2.160
- 12) 20.00; 1.830
- 13) 25.00; 1.610
- 14) 30.00; 1.450
- 15) 40.00; 1.230
- 16) 50.00; 1.090
- 17) 60.00; 0.980
- 18) 90.00; 0.770
- 19) 120.00; 0.660
- 20) 180.00; 0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH	LIP	HIKE	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10400.00 TO NODE 10401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00  
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 540.00  
=====

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.434  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.526  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
PUBLIC PARK	-	0.50	0.30	0.850	95	6.43

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.850  
 SUBAREA RUNOFF(CFS) = 1.47  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 10401.00 TO NODE 10402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.3419  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.47  
 FLOW VELOCITY(FEET/SEC.) = 5.72 FLOW DEPTH(FEET) = 0.29  
 TRAVEL TIME(MIN.) = 0.34  $T_c$ (MIN.) = 6.77  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10402.00 = 424.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 6.77  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.420  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.940  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.41  
EFFECTIVE AREA(ACRES) = 1.00 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 2.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10402.00 TO NODE 10403.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.2439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 2.84  
FLOW VELOCITY(FEET/SEC.) = 6.09 FLOW DEPTH(FEET) = 0.39  
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 7.11  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10403.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10403.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.11  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.322  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 2.47  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 5.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10404.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 420.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 266.00 CHANNEL SLOPE = 0.1880  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 5.22  
FLOW VELOCITY(FEET/SEC.) = 6.34 FLOW DEPTH(FEET) = 0.52  
TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 7.81  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10404.00 = 813.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.81  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.148  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.863  
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 5.98  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 10.90

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10405.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 370.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 289.00 CHANNEL SLOPE = 0.1730  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.90  
FLOW VELOCITY(FEET/SEC.) = 7.43 FLOW DEPTH(FEET) = 0.70  
TRAVEL TIME(MIN.) = 0.65 Tc(MIN.) = 8.46  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10405.00 = 1102.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.46  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.008  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 9.91  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 20.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10406.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 367.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 23.00 CHANNEL SLOPE = 0.1304

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 20.28  
 FLOW VELOCITY (FEET/SEC.) = 7.76 FLOW DEPTH (FEET) = 0.93  
 TRAVEL TIME (MIN.) = 0.05 Tc (MIN.) = 8.51  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10406.00 = 1125.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10406.00 TO NODE 10406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.51  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.999  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 5.19  
 EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 25.40

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10406.00 TO NODE 10407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 367.00 DOWNSTREAM (FEET) = 344.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 214.00 CHANNEL SLOPE = 0.1075  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 25.40  
 FLOW VELOCITY (FEET/SEC.) = 7.68 FLOW DEPTH (FEET) = 1.05  
 TRAVEL TIME (MIN.) = 0.46 Tc (MIN.) = 8.97  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10407.00 = 1339.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10407.00 TO NODE 10407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.97  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.906  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.00	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
 SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 4.77  
 EFFECTIVE AREA (ACRES) = 12.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 29.31

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10407.00 TO NODE 10408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 344.00 DOWNSTREAM (FEET) = 327.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 919.00 CHANNEL SLOPE = 0.0185  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 29.31  
 FLOW VELOCITY (FEET/SEC.) = 5.09 FLOW DEPTH (FEET) = 1.39  
 TRAVEL TIME (MIN.) = 3.01 Tc (MIN.) = 11.98  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10408.00 = 2258.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10408.00 TO NODE 10408.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.98  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.462  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.800	-
USER-DEFINED	-	7.90	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.849  
 SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 15.89  
 EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 40.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10408.00 TO NODE 10409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 327.00 DOWNSTREAM (FEET) = 314.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 807.00 CHANNEL SLOPE = 0.0161  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 40.29  
 FLOW VELOCITY (FEET/SEC.) = 5.25 FLOW DEPTH (FEET) = 1.60  
 TRAVEL TIME (MIN.) = 2.56 Tc (MIN.) = 14.54  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10409.00 = 3065.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10409.00 TO NODE 10409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 14.54  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.201  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.800	-
USER-DEFINED	-	7.90	0.30	0.850	-

```

LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -       6.90     0.30      0.800     -
USER-DEFINED  -       5.70     0.30      0.850     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.823
SUBAREA AREA (ACRES) = 12.60  SUBAREA RUNOFF (CFS) = 22.16
EFFECTIVE AREA (ACRES) = 32.90  AREA-AVERAGED Fm (INCH/HR) = 0.25
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.84
TOTAL AREA (ACRES) = 32.9  PEAK FLOW RATE (CFS) = 57.68

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*****
FLOW PROCESS FROM NODE 10409.00 TO NODE 10410.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 314.00  DOWNSTREAM(FEET) = 266.00
FLOW LENGTH(FEET) = 213.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 33.02
ESTIMATED PIPE DIAMETER(INCH) = 21.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 57.68
PIPE TRAVEL TIME(MIN.) = 0.11  Tc(MIN.) = 14.65
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10410.00 = 3278.00 FEET.

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*****
FLOW PROCESS FROM NODE 10410.00 TO NODE 10411.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

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```

ELEVATION DATA: UPSTREAM(FEET) = 266.00  DOWNSTREAM(FEET) = 170.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1470.00  CHANNEL SLOPE = 0.0653
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 57.68
FLOW VELOCITY(FEET/SEC.) = 9.69  FLOW DEPTH(FEET) = 1.41
TRAVEL TIME(MIN.) = 2.53  Tc(MIN.) = 17.18
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10411.00 = 4748.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10411.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

```

MAINLINE Tc(MIN.) = 17.18
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.016
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -       0.60     0.30     0.100  -
USER-DEFINED  -       0.10     0.30     0.850  -
USER-DEFINED  -       0.40     0.30     0.100  -
USER-DEFINED  -       6.60     0.30     0.800  -
USER-DEFINED  -       0.80     0.30     0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.723
SUBAREA AREA (ACRES) = 8.50  SUBAREA RUNOFF (CFS) = 13.76

```

```

EFFECTIVE AREA (ACRES) = 41.40  AREA-AVERAGED Fm (INCH/HR) = 0.25
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.82
TOTAL AREA (ACRES) = 41.4  PEAK FLOW RATE (CFS) = 65.97

```

```

*****
FLOW PROCESS FROM NODE 10411.00 TO NODE 10412.00 IS CODE = 31
-----

```

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

```

```

ELEVATION DATA: UPSTREAM(FEET) = 170.00  DOWNSTREAM(FEET) = 161.00
FLOW LENGTH(FEET) = 1129.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 30.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.59
ESTIMATED PIPE DIAMETER(INCH) = 39.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 65.97
PIPE TRAVEL TIME(MIN.) = 1.96  Tc(MIN.) = 19.14
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10412.00 = 5877.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10412.00 TO NODE 10413.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

```

```

ELEVATION DATA: UPSTREAM(FEET) = 161.00  DOWNSTREAM(FEET) = 141.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 360.00  CHANNEL SLOPE = 0.0556
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 65.97
FLOW VELOCITY(FEET/SEC.) = 9.41  FLOW DEPTH(FEET) = 1.53
TRAVEL TIME(MIN.) = 0.64  Tc(MIN.) = 19.78
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10413.00 = 6237.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10413.00 TO NODE 10413.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

```

MAINLINE Tc(MIN.) = 19.78
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.845
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE  GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -       1.20     0.30     0.100  -
USER-DEFINED  -       0.40     0.30     0.850  -
USER-DEFINED  -       0.30     0.30     0.100  -
USER-DEFINED  -       0.10     0.30     0.850  -
USER-DEFINED  -       0.90     0.30     1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.509
SUBAREA AREA (ACRES) = 2.90  SUBAREA RUNOFF (CFS) = 4.42
EFFECTIVE AREA (ACRES) = 44.30  AREA-AVERAGED Fm (INCH/HR) = 0.24
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.80
TOTAL AREA (ACRES) = 44.3  PEAK FLOW RATE (CFS) = 65.97
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

```

=====
END OF STUDY SUMMARY:

```

TOTAL AREA (ACRES) = 44.3 TC (MIN.) = 19.78  
EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.798  
PEAK FLOW RATE (CFS) = 65.97

=====  
=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506105K.DAT  
TIME/DATE OF STUDY: 12:50 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.060
- 2) 6.00; 3.660
- 3) 7.00; 3.350
- 4) 8.00; 3.100
- 5) 9.00; 2.900
- 6) 10.00; 2.730
- 7) 11.00; 2.580
- 8) 12.00; 2.460
- 9) 13.00; 2.350
- 10) 14.00; 2.250
- 11) 15.00; 2.160
- 12) 20.00; 1.830
- 13) 25.00; 1.610
- 14) 30.00; 1.450
- 15) 40.00; 1.230
- 16) 50.00; 1.090
- 17) 60.00; 0.980
- 18) 90.00; 0.770
- 19) 120.00; 0.660
- 20) 180.00; 0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10500.00 TO NODE 10501.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 1123.00 DOWNSTREAM(FEET) = 1085.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.984  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.582  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.20	0.30	1.000	95	10.98
NATURAL FAIR COVER "GRASS"	-	0.30	0.30	1.000	95	10.98

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
 SUBAREA RUNOFF(CFS) = 1.03  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.03

\*\*\*\*\*

FLOW PROCESS FROM NODE 10501.00 TO NODE 10502.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 1085.00 DOWNSTREAM(FEET) = 1050.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 181.00 CHANNEL SLOPE = 0.1934  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.03  
 FLOW VELOCITY(FEET/SEC.) = 4.21 FLOW DEPTH(FEET) = 0.29  
 TRAVEL TIME(MIN.) = 0.72  $T_c$ (MIN.) = 11.70  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10502.00 = 507.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10502.00 TO NODE 10502.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 11.70  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.496  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL	AREA	Fp	Ap	SCS
-------------------------------	------	----	----	-----

```

LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.10     0.30      1.000     -
USER-DEFINED  -        0.80     0.30      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 1.78
EFFECTIVE AREA (ACRES) = 1.40  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.4    PEAK FLOW RATE (CFS) = 2.77

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*****
FLOW PROCESS FROM NODE 10502.00 TO NODE 10503.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1025.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 193.00  CHANNEL SLOPE = 0.1295
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.77
FLOW VELOCITY(FEET/SEC.) = 4.77  FLOW DEPTH(FEET) = 0.44
TRAVEL TIME(MIN.) = 0.67  Tc(MIN.) = 12.38
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10503.00 = 700.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10503.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN.) = 12.38
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.419
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.50   0.30  1.000  -
USER-DEFINED      -        1.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 4.39
EFFECTIVE AREA (ACRES) = 3.70  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 3.7    PEAK FLOW RATE (CFS) = 7.06

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```

*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10504.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 1025.00  DOWNSTREAM(FEET) = 1020.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00  CHANNEL SLOPE = 0.0151
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.06
FLOW VELOCITY(FEET/SEC.) = 3.30  FLOW DEPTH(FEET) = 0.84
TRAVEL TIME(MIN.) = 1.68  Tc(MIN.) = 14.05
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10504.00 = 1032.00 FEET.

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10504.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN.) = 14.05
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.245
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.10   0.30  1.000  -
USER-DEFINED      -        0.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 1.58
EFFECTIVE AREA (ACRES) = 4.60  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.6    PEAK FLOW RATE (CFS) = 8.05

```

```

*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10505.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 1020.00  DOWNSTREAM(FEET) = 975.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 397.00  CHANNEL SLOPE = 0.1134
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 8.05
FLOW VELOCITY(FEET/SEC.) = 7.27  FLOW DEPTH(FEET) = 0.61
TRAVEL TIME(MIN.) = 0.91  Tc(MIN.) = 14.96
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10505.00 = 1429.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10505.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----

```

```

MAINLINE Tc(MIN.) = 14.96
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.164
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.20   0.30  1.000  -
USER-DEFINED      -        1.20   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.40  SUBAREA RUNOFF (CFS) = 2.35
EFFECTIVE AREA (ACRES) = 6.00  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.0    PEAK FLOW RATE (CFS) = 10.06

```

```

*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10506.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

```

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 905.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 334.00 CHANNEL SLOPE = 0.2096  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 10.06  
 FLOW VELOCITY(FEET/SEC.) = 9.63 FLOW DEPTH(FEET) = 0.59  
 TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 15.54  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10506.00 = 1763.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10506.00 TO NODE 10506.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc(MIN.) = 15.54  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.124  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.10	0.30	1.000	-
USER-DEFINED	-	3.70	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 16.09  
 EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 25.94

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10506.00 TO NODE 10507.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 875.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 790.00 CHANNEL SLOPE = 0.0380  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 25.94  
 FLOW VELOCITY(FEET/SEC.) = 5.23 FLOW DEPTH(FEET) = 1.29  
 TRAVEL TIME(MIN.) = 2.52 Tc(MIN.) = 18.06  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10507.00 = 2553.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10507.00 TO NODE 10507.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc(MIN.) = 18.06  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.958  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.70	0.30	1.000	-
USER-DEFINED	-	6.30	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 13.88  
 EFFECTIVE AREA(ACRES) = 25.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 37.46

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10507.00 TO NODE 10508.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 755.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1071  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 37.46  
 FLOW VELOCITY(FEET/SEC.) = 8.42 FLOW DEPTH(FEET) = 1.22  
 TRAVEL TIME(MIN.) = 2.22 Tc(MIN.) = 20.28  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10508.00 = 3673.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10508.00 TO NODE 10508.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc(MIN.) = 20.28  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.818  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	11.10	0.30	1.000	-
USER-DEFINED	-	3.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 20.49  
 EFFECTIVE AREA(ACRES) = 40.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 54.78

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10508.00 TO NODE 10509.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 755.00 DOWNSTREAM(FEET) = 533.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1578.00 CHANNEL SLOPE = 0.1407  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 54.78  
 FLOW VELOCITY(FEET/SEC.) = 10.29 FLOW DEPTH(FEET) = 1.33  
 TRAVEL TIME(MIN.) = 2.56 Tc(MIN.) = 22.83  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10509.00 = 5251.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10509.00 TO NODE 10509.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.83

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.705

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.80	0.30	1.000	-
USER-DEFINED	-	11.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	8.30	0.30	1.000	-
USER-DEFINED	-	38.10	0.30	1.000	-
USER-DEFINED	-	8.70	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 77.40 SUBAREA RUNOFF (CFS) = 97.90

EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 148.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 10509.00 TO NODE 10510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 415.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1236.00 CHANNEL SLOPE = 0.0955  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 148.63  
FLOW VELOCITY (FEET/SEC.) = 11.39 FLOW DEPTH (FEET) = 2.09  
TRAVEL TIME (MIN.) = 1.81 Tc (MIN.) = 24.64  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10510.00 = 6487.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 24.64

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.626

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	30.10	0.30	1.000	-
USER-DEFINED	-	15.30	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	11.30	0.30	1.000	-
USER-DEFINED	-	5.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 64.90 SUBAREA RUNOFF (CFS) = 77.44

EFFECTIVE AREA (ACRES) = 182.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 182.4 PEAK FLOW RATE (CFS) = 217.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10511.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 302.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1161.00 CHANNEL SLOPE = 0.0973  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 217.65  
FLOW VELOCITY (FEET/SEC.) = 12.61 FLOW DEPTH (FEET) = 2.40  
TRAVEL TIME (MIN.) = 1.53 Tc (MIN.) = 26.18  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10511.00 = 7648.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10511.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 26.18

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.572

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.50	0.30	1.000	-
USER-DEFINED	-	10.80	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	22.10	0.30	1.000	-
USER-DEFINED	-	4.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 54.80 SUBAREA RUNOFF (CFS) = 62.76

EFFECTIVE AREA (ACRES) = 237.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 237.2 PEAK FLOW RATE (CFS) = 271.64

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 302.00 DOWNSTREAM (FEET) = 190.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1644.00 CHANNEL SLOPE = 0.0681  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 271.64  
FLOW VELOCITY (FEET/SEC.) = 11.65 FLOW DEPTH (FEET) = 2.79  
TRAVEL TIME (MIN.) = 2.35 Tc (MIN.) = 28.53  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10512.00 = 9292.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10512.00 TO NODE 10512.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 28.53
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.497
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.50     0.30     1.000     -
USER-DEFINED            -        0.20     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     1.000     -
USER-DEFINED            -        0.10     0.30     1.000     -
USER-DEFINED            -       14.20     0.30     1.000     -
USER-DEFINED            -        2.80     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 19.50      SUBAREA RUNOFF(CFS) = 21.01
EFFECTIVE AREA(ACRES) = 256.70   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 256.7        PEAK FLOW RATE(CFS) = 276.59

*****
FLOW PROCESS FROM NODE 10512.00 TO NODE 10513.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 190.00 DOWNSTREAM(FEET) = 183.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 86.00 CHANNEL SLOPE = 0.0814
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00
CHANNEL FLOW THRU SUBAREA(CFS) = 276.59
FLOW VELOCITY(FEET/SEC.) = 12.54 FLOW DEPTH(FEET) = 2.71
TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 28.64
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10513.00 = 9378.00 FEET.

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 28.64
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.493
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.10     0.30     0.100     -
USER-DEFINED            -        1.30     0.30     1.000     -
USER-DEFINED            -       29.90     0.30     1.000     -
USER-DEFINED            -       11.90     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     1.000     -
USER-DEFINED            -        0.60     0.30     0.100     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 45.50      SUBAREA RUNOFF(CFS) = 49.05
EFFECTIVE AREA(ACRES) = 302.20   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 302.2        PEAK FLOW RATE(CFS) = 324.79

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FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 28.64
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.493
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        9.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30      SUBAREA RUNOFF(CFS) = 9.99
EFFECTIVE AREA(ACRES) = 311.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 311.5        PEAK FLOW RATE(CFS) = 334.78

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10514.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 171.00
FLOW LENGTH(FEET) = 1209.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 53.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.64
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 334.78
PIPE TRAVEL TIME(MIN.) = 1.29 Tc(MIN.) = 29.93
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10514.00 = 10587.00 FEET.

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10514.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 29.93
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.452
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.20     0.30     0.100     -
USER-DEFINED            -        0.40     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     0.100     -
USER-DEFINED            -       31.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 33.60      SUBAREA RUNOFF(CFS) = 35.31
EFFECTIVE AREA(ACRES) = 345.10   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 345.1        PEAK FLOW RATE(CFS) = 358.53

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10515.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

ELEVATION DATA: UPSTREAM(FEET) = 171.00 DOWNSTREAM(FEET) = 165.00  
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.22  
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 358.53  
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 30.51  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10515.00 = 11152.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10515.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 30.51  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.439  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 1.30 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 15.30 0.30 0.100 -  
USER-DEFINED - 1.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.202  
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 23.81  
EFFECTIVE AREA(ACRES) = 364.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 364.3 PEAK FLOW RATE(CFS) = 378.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10525.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 709.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 72.0 INCH PIPE IS 55.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.06  
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 378.16  
PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 31.25  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 31.25  
RAINFALL INTENSITY(INCH/HR) = 1.42  
AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.95  
EFFECTIVE STREAM AREA(ACRES) = 364.30  
TOTAL STREAM AREA(ACRES) = 364.30  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 378.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10520.00 TO NODE 10521.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 289.00  
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 180.00  
-----

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.311  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.272  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL - 0.30 0.30 0.100 95 7.31  
PUBLIC PARK - 1.20 0.30 0.850 95 11.62  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.700  
SUBAREA RUNOFF(CFS) = 4.13  
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 4.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10521.00 TO NODE 10522.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

\*\*\*\*\*  
UPSTREAM ELEVATION(FEET) = 180.00 DOWNSTREAM ELEVATION(FEET) = 176.00  
STREET LENGTH(FEET) = 408.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00  
-----

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.02  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 11.21  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.43  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.93  
STREET FLOW TRAVEL TIME(MIN.) = 2.80 Tc(MIN.) = 10.11

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.713  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.60	0.30	0.100	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520  
 SUBAREA AREA (ACRES) = 2.50 SUBAREA RUNOFF (CFS) = 5.75  
 EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 9.13

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.41 HALFSTREET FLOOD WIDTH (FEET) = 12.54  
 FLOW VELOCITY (FEET/SEC.) = 2.59 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.06  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10522.00 = 697.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10522.00 TO NODE 10523.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 176.00 DOWNSTREAM ELEVATION (FEET) = 173.00  
 STREET LENGTH (FEET) = 333.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.01  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.47  
 HALFSTREET FLOOD WIDTH (FEET) = 15.74  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.81  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.33  
 STREET FLOW TRAVEL TIME (MIN.) = 1.97 Tc (MIN.) = 12.09  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.451

SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	4.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.109  
 SUBAREA AREA (ACRES) = 5.40 SUBAREA RUNOFF (CFS) = 11.75  
 EFFECTIVE AREA (ACRES) = 9.40 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA (ACRES) = 9.4 PEAK FLOW RATE (CFS) = 19.94

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.51 HALFSTREET FLOOD WIDTH (FEET) = 17.62  
 FLOW VELOCITY (FEET/SEC.) = 3.03 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.55  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10523.00 = 1030.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10523.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.09  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.451  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.90	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	0.100	-
USER-DEFINED	-	4.80	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	4.90	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.785  
 SUBAREA AREA (ACRES) = 12.70 SUBAREA RUNOFF (CFS) = 25.32  
 EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 45.26

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10524.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 173.00 DOWNSTREAM (FEET) = 165.00  
 FLOW LENGTH (FEET) = 736.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.91  
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 45.26  
 PIPE TRAVEL TIME (MIN.) = 1.24 Tc (MIN.) = 13.32  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10524.00 = 1766.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10524.00 TO NODE 10524.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.32  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.318  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.308  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 3.60  
EFFECTIVE AREA(ACRES) = 23.90 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 23.9 PEAK FLOW RATE(CFS) = 46.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10524.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 623.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.08  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 46.22  
PIPE TRAVEL TIME(MIN.) = 1.03 Tc(MIN.) = 14.35  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10525.00 = 2389.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.35  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.218  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	6.80	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 16.07  
EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64  
TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 60.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.35  
RAINFALL INTENSITY(INCH/HR) = 2.22  
AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.64  
EFFECTIVE STREAM AREA(ACRES) = 33.00

TOTAL STREAM AREA(ACRES) = 33.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 60.15

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	378.16	31.25	1.423	0.30( 0.29)	0.95	364.3	10500.00
2	60.15	14.35	2.218	0.30( 0.19)	0.64	33.0	10520.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	355.40	14.35	2.218	0.30( 0.27)	0.90	200.4	10520.00
2	414.68	31.25	1.423	0.30( 0.28)	0.93	397.3	10500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 414.68 Tc(MIN.) = 31.25  
EFFECTIVE AREA(ACRES) = 397.30 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
TOTAL AREA(ACRES) = 397.3  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10526.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 158.00 DOWNSTREAM(FEET) = 148.00  
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 61.83  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 414.68  
PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 31.25  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10526.00 = 11891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10526.00 TO NODE 10527.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 148.00 DOWNSTREAM(FEET) = 135.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 296.00 CHANNEL SLOPE = 0.0439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 414.68  
FLOW VELOCITY(FEET/SEC.) = 13.68 FLOW DEPTH(FEET) = 3.18  
TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 31.61  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10527.00 = 12187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81



>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 31.61  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.414  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.40  
 EFFECTIVE AREA(ACRES) = 398.70 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 398.7 PEAK FLOW RATE(CFS) = 414.68  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 31.61  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.414  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
 SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 4.94  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 403.6 PEAK FLOW RATE(CFS) = 414.68  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 403.6 TC(MIN.) = 31.61  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.927  
 PEAK FLOW RATE(CFS) = 414.68

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	355.73	14.74	2.184	0.30( 0.27)	0.90	206.7	10520.00
2	414.68	31.61	1.414	0.30( 0.28)	0.93	403.6	10500.00

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506106D.DAT  
TIME/DATE OF STUDY: 12:51 04/15/2013  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.060
- 2) 6.00; 3.660
- 3) 7.00; 3.350
- 4) 8.00; 3.100
- 5) 9.00; 2.900
- 6) 10.00; 2.730
- 7) 11.00; 2.580
- 8) 12.00; 2.460
- 9) 13.00; 2.350
- 10) 14.00; 2.250
- 11) 15.00; 2.160
- 12) 20.00; 1.830
- 13) 25.00; 1.610
- 14) 30.00; 1.450
- 15) 40.00; 1.230
- 16) 50.00; 1.090
- 17) 60.00; 0.980
- 18) 90.00; 0.770
- 19) 120.00; 0.660
- 20) 180.00; 0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10600.00 TO NODE 10601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 311.00  
ELEVATION DATA: UPSTREAM(FEET) = 166.00 DOWNSTREAM(FEET) = 164.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.602  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.640  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	-	0.50	0.30	0.500	95	10.60
PUBLIC PARK	-	0.60	0.30	0.850	95	13.16

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 0.691  
 SUBAREA RUNOFF(CFS) = 2.41  
 TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 2.41

\*\*\*\*\*

FLOW PROCESS FROM NODE 10601.00 TO NODE 10602.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 164.00 DOWNSTREAM ELEVATION(FEET) = 162.00  
STREET LENGTH(FEET) = 220.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.56  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 9.34  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.14

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.74  
STREET FLOW TRAVEL TIME (MIN.) = 1.71 Tc (MIN.) = 12.31  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.426  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.517  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 4.29  
EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 6.49

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.38 HALFSTREET FLOOD WIDTH (FEET) = 10.98  
FLOW VELOCITY (FEET/SEC.) = 2.33 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.88  
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10602.00 = 531.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10602.00 TO NODE 10603.00 IS CODE = 63  
-----  
>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
>>>> (STREET TABLE SECTION # 5 USED) <<<<<  
-----  
UPSTREAM ELEVATION (FEET) = 162.00 DOWNSTREAM ELEVATION (FEET) = 159.00  
STREET LENGTH (FEET) = 328.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.09  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.42  
HALFSTREET FLOOD WIDTH (FEET) = 13.32  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.57  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.09  
STREET FLOW TRAVEL TIME (MIN.) = 2.13 Tc (MIN.) = 14.44  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.210  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.500	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	2.40	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527  
SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 7.20

EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.16  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 13.07

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.45 HALFSTREET FLOOD WIDTH (FEET) = 14.80  
FLOW VELOCITY (FEET/SEC.) = 2.74 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.25  
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10603.00 = 859.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10603.00 TO NODE 10604.00 IS CODE = 63  
-----  
>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
>>>> (STREET TABLE SECTION # 5 USED) <<<<<  
-----  
UPSTREAM ELEVATION (FEET) = 159.00 DOWNSTREAM ELEVATION (FEET) = 155.00  
STREET LENGTH (FEET) = 465.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 19.38  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.51  
HALFSTREET FLOOD WIDTH (FEET) = 17.62  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.94  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.50  
STREET FLOW TRAVEL TIME (MIN.) = 2.63 Tc (MIN.) = 17.07  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.023  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.30	0.500	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.513  
SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 12.62  
EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.16  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 24.49

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.54 HALFSTREET FLOOD WIDTH (FEET) = 19.34  
FLOW VELOCITY (FEET/SEC.) = 3.12 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.70  
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10604.00 = 1324.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10604.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.07
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.023
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.30     0.850   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.10   SUBAREA RUNOFF(CFS) = 0.16
EFFECTIVE AREA(ACRES) = 14.70  AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 14.7     PEAK FLOW RATE(CFS) = 24.65

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10605.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 155.00  DOWNSTREAM(FEET) = 140.00
FLOW LENGTH(FEET) = 214.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.96
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 24.65
PIPE TRAVEL TIME(MIN.) = 0.21  Tc(MIN.) = 17.28
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10605.00 = 1538.00 FEET.

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10605.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.28
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.009
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20     0.30     0.100   -
USER-DEFINED        -         1.70     0.30     0.100   -
USER-DEFINED        -        10.20     0.30     0.800   -
USER-DEFINED        -         2.90     0.30     0.850   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.682
SUBAREA AREA(ACRES) = 16.00  SUBAREA RUNOFF(CFS) = 25.99
EFFECTIVE AREA(ACRES) = 30.70  AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 30.7     PEAK FLOW RATE(CFS) = 50.46

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10606.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

```

```

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 140.00  DOWNSTREAM(FEET) = 133.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00  CHANNEL SLOPE = 0.0400
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 50.46
FLOW VELOCITY(FEET/SEC.) = 7.79  FLOW DEPTH(FEET) = 1.47
TRAVEL TIME(MIN.) = 0.37  Tc(MIN.) = 17.66
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10606.00 = 1713.00 FEET.

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.66
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.985
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     0.500   -
USER-DEFINED        -         0.30     0.30     0.850   -
USER-DEFINED        -         0.10     0.30     1.000   -
USER-DEFINED        -         1.10     0.30     1.000   -
USER-DEFINED        -         0.10     0.30     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 1.80   SUBAREA RUNOFF(CFS) = 2.77
EFFECTIVE AREA(ACRES) = 32.50  AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 32.5     PEAK FLOW RATE(CFS) = 52.54

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.66
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.985
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40     0.30     0.850   -
USER-DEFINED        -         1.20     0.30     1.000   -
USER-DEFINED        -         0.10     0.30     1.000   -
USER-DEFINED        -         1.80     0.30     1.000   -
USER-DEFINED        -         0.10     0.30     0.850   -
USER-DEFINED        -         0.20     0.30     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980
SUBAREA AREA(ACRES) = 3.80   SUBAREA RUNOFF(CFS) = 5.78
EFFECTIVE AREA(ACRES) = 36.30  AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.66
TOTAL AREA(ACRES) = 36.3     PEAK FLOW RATE(CFS) = 58.32

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81

```

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.66  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.985  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.91  
EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.67  
TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 59.23  
=====

END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 36.9 TC(MIN.) = 17.66  
EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR)= 0.20  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.670  
PEAK FLOW RATE(CFS) = 59.23  
=====

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 2 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 25-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P201XX25.DAT  
TIME/DATE OF STUDY: 10:20 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.000; 4.060  
2) 6.000; 3.660  
3) 7.000; 3.350  
4) 8.000; 3.100  
5) 9.000; 2.900  
6) 10.000; 2.730  
7) 11.000; 2.580  
8) 12.000; 2.460  
9) 13.000; 2.350  
10) 14.000; 2.250  
11) 15.000; 2.160  
12) 20.000; 1.830  
13) 25.000; 1.610  
14) 30.000; 1.450  
15) 40.000; 1.230  
16) 50.000; 1.090  
17) 60.000; 0.980  
18) 90.000; 0.770  
19) 120.000; 0.660  
20) 180.000; 0.520  
\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20100.00 TO NODE 20101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 830.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.230  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.861  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.30	1.000	95	9.23
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.23

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.38  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20101.00 TO NODE 20102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 276.00 CHANNEL SLOPE = 0.2899  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.38  
FLOW VELOCITY(FEET/SEC.) = 5.38 FLOW DEPTH(FEET) = 0.29  
TRAVEL TIME(MIN.) = 0.86  $T_c$ (MIN.) = 10.09  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20102.00 = 595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20102.00 TO NODE 20102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN) = 10.09
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.717
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
    LAND USE         GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.80    0.30    1.000    -
USER-DEFINED         -         0.20    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.00    SUBAREA RUNOFF(CFS) = 2.18
EFFECTIVE AREA(ACRES) = 1.60    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6    PEAK FLOW RATE(CFS) = 3.48

```

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*****
FLOW PROCESS FROM NODE 20102.00 TO NODE 20103.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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```

=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.1863
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.48
FLOW VELOCITY(FEET/SEC.) = 5.80 FLOW DEPTH(FEET) = 0.45
TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 10.55
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20103.00 = 756.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20103.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 10.55
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.648
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
    LAND USE         GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.50    0.30    1.000    -
USER-DEFINED         -         0.10    0.30    1.000    -
USER-DEFINED         -         0.30    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90    SUBAREA RUNOFF(CFS) = 1.90
EFFECTIVE AREA(ACRES) = 2.50    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.5    PEAK FLOW RATE(CFS) = 5.28

```

```

*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20104.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 690.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 64.00 CHANNEL SLOPE = 0.4688

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```

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.28
FLOW VELOCITY(FEET/SEC.) = 8.88 FLOW DEPTH(FEET) = 0.45
TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 10.67
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20104.00 = 820.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20104.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 10.67
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.630
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
    LAND USE         GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.40    0.30    1.000    -
USER-DEFINED         -         3.30    0.30    1.000    -
USER-DEFINED         -         0.10    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 7.97
EFFECTIVE AREA(ACRES) = 6.30    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.3    PEAK FLOW RATE(CFS) = 13.21

```

```

*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20105.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 690.00 DOWNSTREAM(FEET) = 670.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 159.00 CHANNEL SLOPE = 0.1258
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 13.21
FLOW VELOCITY(FEET/SEC.) = 6.91 FLOW DEPTH(FEET) = 0.80
TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 11.05
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20105.00 = 979.00 FEET.

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*****
FLOW PROCESS FROM NODE 20105.00 TO NODE 20105.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

```

=====
MAINLINE Tc(MIN) = 11.05
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.574
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
    LAND USE         GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.20    0.30    1.000    -
USER-DEFINED         -         1.50    0.30    1.000    -
USER-DEFINED         -         2.20    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90    SUBAREA RUNOFF(CFS) = 7.98

```

EFFECTIVE AREA(ACRES) = 10.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 10.2 PEAK FLOW RATE(CFS) = 20.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 20105.00 TO NODE 20106.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 670.00 DOWNSTREAM(FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 192.00 CHANNEL SLOPE = 0.1042  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 20.87  
FLOW VELOCITY(FEET/SEC.) = 7.23 FLOW DEPTH(FEET) = 0.98  
TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 11.49  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20106.00 = 1171.00 FEET.

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FLOW PROCESS FROM NODE 20106.00 TO NODE 20106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 11.49  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.521  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.10 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 7.59  
EFFECTIVE AREA(ACRES) = 14.00 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 27.98

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FLOW PROCESS FROM NODE 20106.00 TO NODE 20107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 650.00 DOWNSTREAM(FEET) = 640.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 156.00 CHANNEL SLOPE = 0.0641  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 27.98  
FLOW VELOCITY(FEET/SEC.) = 6.47 FLOW DEPTH(FEET) = 1.20  
TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 11.90  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20107.00 = 1327.00 FEET.

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FLOW PROCESS FROM NODE 20107.00 TO NODE 20107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN) = 11.90  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.472

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.20 0.30 1.000 -  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 7.82  
EFFECTIVE AREA(ACRES) = 18.00 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 18.0 PEAK FLOW RATE(CFS) = 35.19

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FLOW PROCESS FROM NODE 20107.00 TO NODE 20108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 640.00 DOWNSTREAM(FEET) = 609.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 512.00 CHANNEL SLOPE = 0.0605  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 35.19  
FLOW VELOCITY(FEET/SEC.) = 6.71 FLOW DEPTH(FEET) = 1.32  
TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 13.17  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20108.00 = 1839.00 FEET.

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 13.17  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.333  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.200 -  
USER-DEFINED - 1.50 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 4.96  
EFFECTIVE AREA(ACRES) = 20.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.7 PEAK FLOW RATE(CFS) = 37.90

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<



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ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 600.00
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.42
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 37.90
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 13.37
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20109.00 = 2033.00 FEET.

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FLOW PROCESS FROM NODE 20109.00 TO NODE 20109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 13.37
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.313
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -      0.70    0.30    0.200  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.42
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 38.95

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FLOW PROCESS FROM NODE 20109.00 TO NODE 20110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 594.00
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.30
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 38.95
PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 13.90
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20110.00 = 2393.00 FEET.

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FLOW PROCESS FROM NODE 20110.00 TO NODE 20110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 13.90
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.260
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	3.50	0.30	0.200	-
USER-DEFINED	-	2.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-

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USER-DEFINED         -      0.30    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 15.30
EFFECTIVE AREA(ACRES) = 29.60 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 29.6 PEAK FLOW RATE(CFS) = 53.23

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FLOW PROCESS FROM NODE 20110.00 TO NODE 20111.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 594.00 DOWNSTREAM(FEET) = 590.00
FLOW LENGTH(FEET) = 246.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.05
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 53.23
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 14.24
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20111.00 = 2639.00 FEET.

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FLOW PROCESS FROM NODE 20111.00 TO NODE 20111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 14.24
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.229
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	2.10	0.30	0.200	-
USER-DEFINED	-	2.10	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	4.70	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.792
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 19.89
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 72.28

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FLOW PROCESS FROM NODE 20111.00 TO NODE 20112.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 580.00
FLOW LENGTH(FEET) = 628.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.79
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 72.28

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PIPE TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 15.06  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20112.00 = 3267.00 FEET.

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FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN) = 15.06  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.156  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.200	-
USER-DEFINED	-	4.40	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	7.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.797  
SUBAREA AREA(ACRES) = 15.20 SUBAREA RUNOFF(CFS) = 26.23  
EFFECTIVE AREA(ACRES) = 55.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 55.9 PEAK FLOW RATE(CFS) = 95.86

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FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN) = 15.06  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.156  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.04  
EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 99.90

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FLOW PROCESS FROM NODE 20112.00 TO NODE 20113.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 580.00 DOWNSTREAM(FEET) = 570.00  
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.87  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 99.90  
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 15.64  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20113.00 = 3786.00 FEET.

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FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN) = 15.64  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.118  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.100	-
USER-DEFINED	-	4.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.877  
SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 21.03  
EFFECTIVE AREA(ACRES) = 70.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 118.92

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FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 15.64  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.118  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	1.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.787  
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 6.10  
EFFECTIVE AREA(ACRES) = 74.50 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 74.5 PEAK FLOW RATE(CFS) = 125.01

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FLOW PROCESS FROM NODE 20113.00 TO NODE 20114.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00  
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 36.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.52

ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 125.01  
PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 16.51  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20114.00 = 4393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.51

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.060

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	4.00	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.747

SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 13.05

EFFECTIVE AREA(ACRES) = 82.40 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 82.4 PEAK FLOW RATE(CFS) = 134.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.51

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.060

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	1.000	-
USER-DEFINED	-	8.20	0.30	1.000	-
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	3.70	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.932

SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 28.04

EFFECTIVE AREA(ACRES) = 99.90 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 99.9 PEAK FLOW RATE(CFS) = 162.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20115.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 560.00  
FLOW LENGTH(FEET) = 461.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.40  
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 162.22  
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 17.09  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20115.00 = 4854.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.09

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.022

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.60	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	0.100	-
USER-DEFINED	-	6.20	0.30	0.850	-
USER-DEFINED	-	2.20	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798

SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 20.54

EFFECTIVE AREA(ACRES) = 112.70 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 112.7 PEAK FLOW RATE(CFS) = 179.36

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 17.09

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.022

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.09

EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 180.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20116.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 560.00 DOWNSTREAM(FEET) = 528.00  
FLOW LENGTH(FEET) = 219.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 36.71

ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 180.44  
 PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 17.19  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20116.00 = 5073.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20116.00 TO NODE 20117.00 IS CODE = 51

=====  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====  
 ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 489.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 174.00 CHANNEL SLOPE = 0.2241  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 180.44  
 FLOW VELOCITY(FEET/SEC.) = 20.48 FLOW DEPTH(FEET) = 1.71  
 TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 17.33  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20117.00 = 5247.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

=====  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====  
 MAINLINE Tc(MIN) = 17.33  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.006  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.910  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 3.90  
 EFFECTIVE AREA(ACRES) = 115.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 115.9 PEAK FLOW RATE(CFS) = 182.72

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

=====  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====  
 MAINLINE Tc(MIN) = 17.33  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.006  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.200	-
USER-DEFINED	-	3.30	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	6.50	0.30	1.000	-

USER-DEFINED - 0.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.855  
 SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 20.16  
 EFFECTIVE AREA(ACRES) = 128.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 128.7 PEAK FLOW RATE(CFS) = 202.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

=====  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====  
 MAINLINE Tc(MIN) = 17.33  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.006  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 7.86  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 133.8 PEAK FLOW RATE(CFS) = 210.74

=====  
 END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 133.8 TC(MIN.) = 17.33  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.854  
 PEAK FLOW RATE(CFS) = 210.74

=====  
 END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 25-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P501XX25.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.000; 4.060  
2) 6.000; 3.660  
3) 7.000; 3.350  
4) 8.000; 3.100  
5) 9.000; 2.900  
6) 10.000; 2.730  
7) 11.000; 2.580  
8) 12.000; 2.460  
9) 13.000; 2.350  
10) 14.000; 2.250  
11) 15.000; 2.160  
12) 20.000; 1.830  
13) 25.000; 1.610  
14) 30.000; 1.450  
15) 40.000; 1.230  
16) 50.000; 1.090  
17) 60.000; 0.980  
18) 90.000; 0.770  
19) 120.000; 0.660  
20) 180.000; 0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50100.00 TO NODE 50101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 424.00

$T_c = K * [(LENGTH^{**} 3.00) / (ELEVATION CHANGE)]^{**} 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.479  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.004  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"8-10 DWELLINGS/ACRE"	-	0.10	0.30	0.400	95	8.48
RESIDENTIAL						
"8-10 DWELLINGS/ACRE"	-	0.90	0.30	0.400	95	8.48

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.400  
SUBAREA RUNOFF(CFS) = 2.60  
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50101.00 TO NODE 50102.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 424.00 DOWNSTREAM ELEVATION(FEET) = 420.00  
STREET LENGTH(FEET) = 115.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.75  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.27  
HALFSTREET FLOOD WIDTH(FEET) = 5.78  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.58  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.98  
STREET FLOW TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 9.01  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.897  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.400	-
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.178  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 2.30  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.09  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 4.80

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 6.72  
FLOW VELOCITY(FEET/SEC.) = 3.75 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.10  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50102.00 = 445.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50102.00 TO NODE 50103.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 420.00 DOWNSTREAM ELEVATION(FEET) = 418.00  
STREET LENGTH(FEET) = 84.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.26  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.33  
HALFSTREET FLOOD WIDTH(FEET) = 8.59  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.37  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.11  
STREET FLOW TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 9.43  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.827  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	0.500	-
USER-DEFINED	-	0.50	0.30	0.500	-

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.433  
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 2.91  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.10  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 7.60

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 9.47  
FLOW VELOCITY(FEET/SEC.) = 3.50 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.22  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50103.00 = 529.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50103.00 TO NODE 50104.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 418.00 DOWNSTREAM ELEVATION(FEET) = 416.00  
STREET LENGTH(FEET) = 84.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.24  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 10.35  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.66  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.34  
STREET FLOW TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 9.81  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.762  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	0.500	-
USER-DEFINED	-	0.50	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 3.29  
EFFECTIVE AREA(ACRES) = 4.50 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40  
TOTAL AREA(ACRES) = 4.5 PEAK FLOW RATE(CFS) = 10.71

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 11.05  
FLOW VELOCITY(FEET/SEC.) = 3.79 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.44  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50104.00 = 613.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50104.00 TO NODE 50105.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 416.00 DOWNSTREAM ELEVATION(FEET) = 400.00  
STREET LENGTH(FEET) = 513.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.29

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.84  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.49  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.77  
STREET FLOW TRAVEL TIME(MIN.) = 1.90 Tc(MIN.) = 11.72  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.494

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	0.500	-
USER-DEFINED	-	0.40	0.30	0.600	-
USER-DEFINED	-	2.40	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.512  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 7.16  
EFFECTIVE AREA(ACRES) = 7.90 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 7.9 PEAK FLOW RATE(CFS) = 16.78

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 12.70  
FLOW VELOCITY(FEET/SEC.) = 4.66 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.92  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50105.00 = 1126.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 11.72

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.494

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	2.50	0.30	0.600	-
USER-DEFINED	-	1.00	0.30	0.500	-
USER-DEFINED	-	3.00	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 6.60 SUBAREA RUNOFF(CFS) = 13.78  
EFFECTIVE AREA(ACRES) = 14.50 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.51  
TOTAL AREA(ACRES) = 14.5 PEAK FLOW RATE(CFS) = 30.56

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50106.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 400.00 DOWNSTREAM ELEVATION(FEET) = 390.00  
STREET LENGTH(FEET) = 562.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 40.12

\*\*\*STREET FLOWING FULL\*\*\*

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.56  
HALFSTREET FLOOD WIDTH(FEET) = 20.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.67  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.63  
STREET FLOW TRAVEL TIME(MIN.) = 2.01 Tc(MIN.) = 13.72  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.278

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	3.70	0.30	0.600	-
USER-DEFINED	-	1.10	0.30	0.500	-
USER-DEFINED	-	5.20	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.588  
SUBAREA AREA(ACRES) = 10.10 SUBAREA RUNOFF(CFS) = 19.10  
EFFECTIVE AREA(ACRES) = 24.60 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54  
TOTAL AREA(ACRES) = 24.6 PEAK FLOW RATE(CFS) = 46.84

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 20.00



FLOW VELOCITY(FEET/SEC.) = 4.94 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.89  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50106.00 = 1688.00 FEET.

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FLOW PROCESS FROM NODE 50106.00 TO NODE 50107.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 390.00 DOWNSTREAM ELEVATION(FEET) = 381.00  
STREET LENGTH(FEET) = 252.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 53.16

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.55  
HALFSTREET FLOOD WIDTH(FEET) = 19.80  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.46  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.58  
STREET FLOW TRAVEL TIME(MIN.) = 0.65 Tc(MIN.) = 14.37  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.216

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	6.80	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 6.90 SUBAREA RUNOFF(CFS) = 12.65  
EFFECTIVE AREA(ACRES) = 31.50 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
TOTAL AREA(ACRES) = 31.5 PEAK FLOW RATE(CFS) = 58.13

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.57 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
FLOW VELOCITY(FEET/SEC.) = 6.65 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.77  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50107.00 = 1940.00 FEET.

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FLOW PROCESS FROM NODE 50107.00 TO NODE 50108.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 381.00 DOWNSTREAM(FEET) = 345.00  
FLOW LENGTH(FEET) = 109.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 38.53

ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 58.13

PIPE TRAVEL TIME(MIN.) = 0.05 Tc(MIN.) = 14.42

LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50108.00 = 2049.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50108.00 TO NODE 50109.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 220.00 CHANNEL SLOPE = 0.1364  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 58.13  
FLOW VELOCITY(FEET/SEC.) = 10.32 FLOW DEPTH(FEET) = 1.37  
TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 14.78  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50109.00 = 2269.00 FEET.

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FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN) = 14.78

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.180

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.667  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.07  
EFFECTIVE AREA(ACRES) = 32.10 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 32.1 PEAK FLOW RATE(CFS) = 58.17

\*\*\*\*\*

FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 14.78

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.180

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	2.30	0.30	0.600	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	8.30	0.30	1.000	-
USER-DEFINED	-	6.90	0.30	1.000	-
USER-DEFINED	-	13.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.965

SUBAREA AREA (ACRES) = 31.60 SUBAREA RUNOFF (CFS) = 53.77  
EFFECTIVE AREA (ACRES) = 63.70 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 63.7 PEAK FLOW RATE (CFS) = 111.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 14.78

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.180

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.600	-
USER-DEFINED	-	4.30	0.30	1.000	-
USER-DEFINED	-	4.10	0.30	1.000	-
USER-DEFINED	-	37.30	0.30	1.000	-
USER-DEFINED	-	37.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990

SUBAREA AREA (ACRES) = 84.90 SUBAREA RUNOFF (CFS) = 143.90

EFFECTIVE AREA (ACRES) = 148.60 AREA-AVERAGED Fm (INCH/HR) = 0.27

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89

TOTAL AREA (ACRES) = 148.6 PEAK FLOW RATE (CFS) = 255.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 14.78

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.180

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	1.20	0.30	1.000	-
USER-DEFINED	-	4.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.985

SUBAREA AREA (ACRES) = 5.50 SUBAREA RUNOFF (CFS) = 9.33

EFFECTIVE AREA (ACRES) = 154.10 AREA-AVERAGED Fm (INCH/HR) = 0.27

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89

TOTAL AREA (ACRES) = 154.1 PEAK FLOW RATE (CFS) = 265.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50119.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 315.00 DOWNSTREAM (FEET) = 284.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 893.00 CHANNEL SLOPE = 0.0347

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00

CHANNEL FLOW THRU SUBAREA (CFS) = 265.18  
FLOW VELOCITY (FEET/SEC.) = 9.02 FLOW DEPTH (FEET) = 3.13  
TRAVEL TIME (MIN.) = 1.65 Tc (MIN.) = 16.43  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50119.00 = 3162.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 16.43

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.066

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	5.30	0.30	1.000	-
USER-DEFINED	-	2.70	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.904

SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 22.62

EFFECTIVE AREA (ACRES) = 168.10 AREA-AVERAGED Fm (INCH/HR) = 0.27

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90

TOTAL AREA (ACRES) = 168.1 PEAK FLOW RATE (CFS) = 271.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 16.43

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.066

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	0.850	-
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980

SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 13.40

EFFECTIVE AREA (ACRES) = 176.50 AREA-AVERAGED Fm (INCH/HR) = 0.27

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90

TOTAL AREA (ACRES) = 176.5 PEAK FLOW RATE (CFS) = 285.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 16.43  
 RAINFALL INTENSITY(INCH/HR) = 2.07  
 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.90  
 EFFECTIVE STREAM AREA(ACRES) = 176.50  
 TOTAL STREAM AREA(ACRES) = 176.50  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 285.33

\*\*\*\*\*

FLOW PROCESS FROM NODE 50110.00 TO NODE 50111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 420.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 7.342  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.264  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	-	1.20	0.30	0.500	95	7.34
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	-	0.20	0.30	0.600	95	7.78
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	-	0.10	0.30	0.500	95	7.34

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.513  
 SUBAREA RUNOFF(CFS) = 4.20  
 TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 4.20

\*\*\*\*\*

FLOW PROCESS FROM NODE 50111.00 TO NODE 50112.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 420.00 DOWNSTREAM ELEVATION(FEET) = 415.00  
 STREET LENGTH(FEET) = 122.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.07  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.31

HALFSTREET FLOOD WIDTH(FEET) = 7.34  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.16  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.27  
 STREET FLOW TRAVEL TIME(MIN.) = 0.49  $T_c$ (MIN.) = 7.83  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.142

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.500	-
USER-DEFINED	-	0.50	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.500	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.571  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 3.74  
 EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.16  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54  
 TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 7.78

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.34  
 FLOW VELOCITY(FEET/SEC.) = 4.39 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.43  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50112.00 = 452.00 FEET.

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FLOW PROCESS FROM NODE 50112.00 TO NODE 50113.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 415.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 122.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.85

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.35  
 HALFSTREET FLOOD WIDTH(FEET) = 9.41  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.58  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.59  
 STREET FLOW TRAVEL TIME(MIN.) = 0.44  $T_c$ (MIN.) = 8.27  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.045

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	1.00	0.30	0.600	-

USER-DEFINED - 0.20 0.30 0.500 -  
 USER-DEFINED - 0.10 0.30 0.600 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.581  
 SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 4.13  
 EFFECTIVE AREA(ACRES) = 4.50 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
 TOTAL AREA(ACRES) = 4.5 PEAK FLOW RATE(CFS) = 11.66

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 10.20  
 FLOW VELOCITY(FEET/SEC.) = 4.74 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.72  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50113.00 = 574.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50113.00 TO NODE 50113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 8.27  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.045  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.500	-
USER-DEFINED	-	1.90	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.600	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.575  
 SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 7.24  
 EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
 TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 18.90

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50113.00 TO NODE 50114.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 400.00  
 STREET LENGTH(FEET) = 238.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.57  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.43

HALFSTREET FLOOD WIDTH(FEET) = 13.55  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.57  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.39  
 STREET FLOW TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 8.99  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.903

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.600	-
USER-DEFINED	-	1.90	0.30	0.600	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 7.35  
 EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.57  
 TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 25.31

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 14.18  
 FLOW VELOCITY(FEET/SEC.) = 5.75 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.54  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50114.00 = 812.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50114.00 TO NODE 50115.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 400.00 DOWNSTREAM ELEVATION(FEET) = 390.00  
 STREET LENGTH(FEET) = 241.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.88

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.47  
 HALFSTREET FLOOD WIDTH(FEET) = 15.66  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.03  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.84  
 STREET FLOW TRAVEL TIME(MIN.) = 0.67 Tc(MIN.) = 9.65  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.789

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	1.50	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.607

SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 13.14  
EFFECTIVE AREA (ACRES) = 15.90 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 15.9 PEAK FLOW RATE (CFS) = 37.40

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.49 HALFSTREET FLOOD WIDTH (FEET) = 16.68  
FLOW VELOCITY (FEET/SEC.) = 6.29 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.09  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50115.00 = 1053.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50115.00 TO NODE 50116.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 390.00 DOWNSTREAM ELEVATION (FEET) = 380.00  
STREET LENGTH (FEET) = 268.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 42.22

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.52  
HALFSTREET FLOOD WIDTH (FEET) = 17.93  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.20  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.21  
STREET FLOW TRAVEL TIME (MIN.) = 0.72 Tc (MIN.) = 10.37  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.674

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	0.600	-
USER-DEFINED	-	3.50	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA (ACRES) = 4.30 SUBAREA RUNOFF (CFS) = 9.65  
EFFECTIVE AREA (ACRES) = 20.20 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 20.2 PEAK FLOW RATE (CFS) = 45.40

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.53 HALFSTREET FLOOD WIDTH (FEET) = 18.48  
FLOW VELOCITY (FEET/SEC.) = 6.30 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.33  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50116.00 = 1321.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50116.00 TO NODE 50117.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 380.00 DOWNSTREAM ELEVATION (FEET) = 355.00  
STREET LENGTH (FEET) = 507.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.64

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 60.59

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.55  
HALFSTREET FLOOD WIDTH (FEET) = 19.57  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.54  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 4.14  
STREET FLOW TRAVEL TIME (MIN.) = 1.12 Tc (MIN.) = 11.49  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.521

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.80	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	6.10	0.30	0.600	-
USER-DEFINED	-	1.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.644

SUBAREA AREA (ACRES) = 14.50 SUBAREA RUNOFF (CFS) = 30.37  
EFFECTIVE AREA (ACRES) = 34.70 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA (ACRES) = 34.7 PEAK FLOW RATE (CFS) = 72.99

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.58 HALFSTREET FLOOD WIDTH (FEET) = 20.00  
FLOW VELOCITY (FEET/SEC.) = 8.03 DEPTH\*VELOCITY (FT\*FT/SEC.) = 4.63  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50117.00 = 1828.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50117.00 TO NODE 50118.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 355.00 DOWNSTREAM (FEET) = 315.00  
FLOW LENGTH (FEET) = 171.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 14.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 35.78  
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 72.99

PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 11.57  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50118.00 = 1999.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50118.00 TO NODE 50119.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 284.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 180.00 CHANNEL SLOPE = 0.1722  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 72.99  
FLOW VELOCITY(FEET/SEC.) = 11.91 FLOW DEPTH(FEET) = 1.43  
TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 11.83  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50119.00 = 2179.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 11.83  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.481  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	2.30	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.688  
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 6.55  
EFFECTIVE AREA(ACRES) = 37.90 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 37.9 PEAK FLOW RATE(CFS) = 78.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 11.83  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.481  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.18  
EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62

TOTAL AREA(ACRES) = 38.5 PEAK FLOW RATE(CFS) = 79.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 11.83  
RAINFALL INTENSITY(INCH/HR) = 2.48  
AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.62  
EFFECTIVE STREAM AREA(ACRES) = 38.50  
TOTAL STREAM AREA(ACRES) = 38.50  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 79.48

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	285.33	16.43	2.066	0.30( 0.27)	0.90	176.5	50100.00
2	79.48	11.83	2.481	0.30( 0.19)	0.62	38.5	50110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	332.36	11.83	2.481	0.30( 0.25)	0.84	165.6	50110.00
2	350.43	16.43	2.066	0.30( 0.25)	0.85	215.0	50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 350.43 Tc(MIN.) = 16.43  
EFFECTIVE AREA(ACRES) = 215.00 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 215.0  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50119.00 = 3162.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50120.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 240.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00 CHANNEL SLOPE = 0.0437  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 350.43  
FLOW VELOCITY(FEET/SEC.) = 10.53 FLOW DEPTH(FEET) = 3.33  
TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 18.02  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50120.00 = 4170.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50120.00 TO NODE 50120.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 18.02

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.961

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.640

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 3.18

EFFECTIVE AREA(ACRES) = 217.00 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 217.0 PEAK FLOW RATE(CFS) = 350.43

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50120.00 TO NODE 50120.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 18.02

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.961

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	1.70	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	2.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.929

SUBAREA AREA(ACRES) = 5.30 SUBAREA RUNOFF(CFS) = 8.02

EFFECTIVE AREA(ACRES) = 222.30 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 222.3 PEAK FLOW RATE(CFS) = 350.43

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50120.00 TO NODE 50120.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 18.02

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.961

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.35

EFFECTIVE AREA(ACRES) = 223.20 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 223.2 PEAK FLOW RATE(CFS) = 350.43

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====  
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 223.2 TC(MIN.) = 18.02

EFFECTIVE AREA(ACRES) = 223.20 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.851

PEAK FLOW RATE(CFS) = 350.43

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	332.36	13.44	2.306	0.30( 0.25)	0.84	173.8	50110.00
2	350.43	18.02	1.961	0.30( 0.26)	0.85	223.2	50100.00

=====  
END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PA3 & PA4 ROMP \*  
\* REGIONAL WATERSHED S29 - FREE DRAINING - ULTIMATE CONDITION \*  
\* 25-YR RM EV JULY 2018 ROKAMOTO \*  
\*\*\*\*\*

FILE NAME: P503XX25.DAT  
TIME/DATE OF STUDY: 15:12 03/27/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.00;	4.060
2)	6.00;	3.660
3)	7.00;	3.350
4)	8.00;	3.100
5)	9.00;	2.900
6)	10.00;	2.730
7)	11.00;	2.580
8)	12.00;	2.460
9)	13.00;	2.350
10)	14.00;	2.250
11)	15.00;	2.160
12)	20.00;	1.830
13)	25.00;	1.610
14)	30.00;	1.450
15)	40.00;	1.230
16)	50.00;	1.090
17)	60.00;	0.980
18)	90.00;	0.770
19)	120.00;	0.660
20)	180.00;	0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50300.00 TO NODE 50301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 660.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.792  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.765  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.70	0.30	1.000	0	9.79
NATURAL FAIR COVER						
"GRASS"	-	0.40	0.30	1.000	0	9.79
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.20	0.30	1.000	0	9.79
NATURAL FAIR COVER						
"GRASS"	-	0.10	0.30	1.000	0	9.79

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 3.11  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 3.11

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50301.00 TO NODE 50302.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 660.00 DOWNSTREAM ELEVATION(FEET) = 650.00  
STREET LENGTH(FEET) = 259.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.97  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.29  
HALFSTREET FLOOD WIDTH(FEET) = 6.66  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.93  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.15  
STREET FLOW TRAVEL TIME(MIN.) = 1.10 Tc(MIN.) = 10.89  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.596

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 0.50 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.700 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.967  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 3.74  
EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 6.63

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 7.84  
FLOW VELOCITY(FEET/SEC.) = 4.12 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.30  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50302.00 = 589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50302.00 TO NODE 50303.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 650.00 DOWNSTREAM ELEVATION(FEET) = 630.00  
STREET LENGTH(FEET) = 298.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.06  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.47

AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.39  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.66  
STREET FLOW TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 11.81  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.483  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.30 0.30 0.700 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.721  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.86  
EFFECTIVE AREA(ACRES) = 4.60 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 9.16

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 8.03  
FLOW VELOCITY(FEET/SEC.) = 5.49 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.75  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50303.00 = 887.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50303.00 TO NODE 50304.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 630.00 DOWNSTREAM ELEVATION(FEET) = 590.00  
STREET LENGTH(FEET) = 724.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.62

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.65  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 10.51  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.66  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.09  
STREET FLOW TRAVEL TIME(MIN.) = 2.13 Tc(MIN.) = 13.94  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.256

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.40 0.30 0.700 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 0.700 -  
USER-DEFINED - 0.50 0.30 1.000 -  
USER-DEFINED - 1.00 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.848  
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 10.99  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 19.21

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 11.91  
FLOW VELOCITY(FEET/SEC.) = 5.97 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.37  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50304.00 = 1611.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50304.00 TO NODE 50304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 13.94  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.256  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.18  
EFFECTIVE AREA(ACRES) = 10.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 10.8 PEAK FLOW RATE(CFS) = 19.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50304.00 TO NODE 50305.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 590.00 DOWNSTREAM ELEVATION(FEET) = 550.00  
STREET LENGTH(FEET) = 788.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.63

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.26  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.45  
HALFSTREET FLOOD WIDTH(FEET) = 14.49  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.39  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.86  
STREET FLOW TRAVEL TIME(MIN.) = 2.06 Tc(MIN.) = 16.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.094

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.60	0.30	0.600	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.30	0.30	0.600	-
USER-DEFINED	-	2.20	0.30	1.000	-
USER-DEFINED	-	4.00	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835  
SUBAREA AREA(ACRES) = 11.90 SUBAREA RUNOFF(CFS) = 19.75  
EFFECTIVE AREA(ACRES) = 22.70 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 22.7 PEAK FLOW RATE(CFS) = 37.56

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 16.05  
FLOW VELOCITY(FEET/SEC.) = 6.79 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.25  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50305.00 = 2399.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 16.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.094  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.700	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.98  
EFFECTIVE AREA(ACRES) = 23.30 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA(ACRES) = 23.3 PEAK FLOW RATE(CFS) = 38.53

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 16.00  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.094  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.30	0.600	-
USER-DEFINED	-	1.20	0.30	0.700	-
USER-DEFINED	-	2.50	0.30	0.600	-
USER-DEFINED	-	7.60	0.30	0.700	-
USER-DEFINED	-	0.50	0.30	0.600	-
USER-DEFINED	-	1.30	0.30	0.700	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.666  
 SUBAREA AREA (ACRES) = 15.20 SUBAREA RUNOFF (CFS) = 25.91  
 EFFECTIVE AREA (ACRES) = 38.50 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
 TOTAL AREA (ACRES) = 38.5 PEAK FLOW RATE (CFS) = 64.45

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50305.00 TO NODE 50306.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 510.00  
 FLOW LENGTH (FEET) = 813.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.9 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 18.69  
 ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 64.45  
 PIPE TRAVEL TIME (MIN.) = 0.73 Tc (MIN.) = 16.72  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50306.00 = 3212.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.72  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.046  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	2.80	0.30	0.600	-
USER-DEFINED	-	2.00	0.30	0.100	-
USER-DEFINED	-	10.00	0.30	0.600	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.536  
 SUBAREA AREA (ACRES) = 15.90 SUBAREA RUNOFF (CFS) = 26.98  
 EFFECTIVE AREA (ACRES) = 54.40 AREA-AVERAGED Fm (INCH/HR) = 0.21  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71  
 TOTAL AREA (ACRES) = 54.4 PEAK FLOW RATE (CFS) = 89.77

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.72  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.046  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 2.83

EFFECTIVE AREA (ACRES) = 56.20 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 56.2 PEAK FLOW RATE (CFS) = 92.60

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50306.00 TO NODE 50307.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 510.00 DOWNSTREAM (FEET) = 470.00  
 FLOW LENGTH (FEET) = 919.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.1 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 19.90  
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 92.60  
 PIPE TRAVEL TIME (MIN.) = 0.77 Tc (MIN.) = 17.49  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50307.00 = 4131.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.49  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.995  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.30	0.600	-
USER-DEFINED	-	2.20	0.30	0.100	-
USER-DEFINED	-	1.50	0.30	0.400	-
USER-DEFINED	-	10.50	0.30	0.600	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.533  
 SUBAREA AREA (ACRES) = 17.90 SUBAREA RUNOFF (CFS) = 29.57  
 EFFECTIVE AREA (ACRES) = 74.10 AREA-AVERAGED Fm (INCH/HR) = 0.20  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.67  
 TOTAL AREA (ACRES) = 74.1 PEAK FLOW RATE (CFS) = 119.60

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.49  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.995  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 4.58  
 EFFECTIVE AREA (ACRES) = 77.10 AREA-AVERAGED Fm (INCH/HR) = 0.21

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA (ACRES) = 77.1 PEAK FLOW RATE (CFS) = 124.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50307.00 TO NODE 50308.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 425.00  
FLOW LENGTH (FEET) = 1006.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 21.50  
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 124.18  
PIPE TRAVEL TIME (MIN.) = 0.78 Tc (MIN.) = 18.27  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50308.00 = 5137.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 18.27  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.944  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.100	-
USER-DEFINED	-	2.10	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	0.100	-
USER-DEFINED	-	2.50	0.30	0.400	-
USER-DEFINED	-	6.30	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.495  
SUBAREA AREA (ACRES) = 12.90 SUBAREA RUNOFF (CFS) = 20.85  
EFFECTIVE AREA (ACRES) = 90.00 AREA-AVERAGED Fm (INCH/HR) = 0.20  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.66  
TOTAL AREA (ACRES) = 90.0 PEAK FLOW RATE (CFS) = 141.45

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 18.27  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.944  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.893  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.06  
EFFECTIVE AREA (ACRES) = 90.70 AREA-AVERAGED Fm (INCH/HR) = 0.20  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.66

TOTAL AREA (ACRES) = 90.7 PEAK FLOW RATE (CFS) = 142.51

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 18.27  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.944  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	0.400	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	5.20	0.30	0.100	-
USER-DEFINED	-	11.00	0.30	0.400	-
USER-DEFINED	-	8.80	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.419  
SUBAREA AREA (ACRES) = 26.80 SUBAREA RUNOFF (CFS) = 43.86  
EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 186.37

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 18.27  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.944  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.60	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	2.80	0.30	0.400	-
USER-DEFINED	-	0.20	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.749  
SUBAREA AREA (ACRES) = 13.70 SUBAREA RUNOFF (CFS) = 21.20  
EFFECTIVE AREA (ACRES) = 131.20 AREA-AVERAGED Fm (INCH/HR) = 0.19  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA (ACRES) = 131.2 PEAK FLOW RATE (CFS) = 207.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50309.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 425.00 DOWNSTREAM (FEET) = 410.00  
FLOW LENGTH (FEET) = 296.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 25.44  
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 207.57

PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 18.47  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 5433.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 10

-----  
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 15.1

-----  
>>>>DEFINE MEMORY BANK # 2 <<<<<

PEAK FLOWRATE TABLE FILE NAME: P502XX25.DNA

MEMORY BANK # 2 DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	860.59	13.31	0.30 ( 0.23)	0.76	452.6	50240.00
2	893.10	17.27	0.30 ( 0.23)	0.76	554.9	50280.00
3	882.60	19.76	0.30 ( 0.23)	0.76	600.4	50220.00
4	823.52	23.87	0.30 ( 0.23)	0.76	638.9	50260.00
5	770.46	26.68	0.30 ( 0.23)	0.76	645.2	50200.00
TOTAL AREA (ACRES) =						645.2

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 14.0

-----  
>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<<

-----  
MAIN-STREAM MEMORY DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	860.59	13.31	0.30 ( 0.23)	0.76	452.6	50240.00
2	893.10	17.27	0.30 ( 0.23)	0.76	554.9	50280.00
3	882.60	19.76	0.30 ( 0.23)	0.76	600.4	50220.00
4	823.52	23.87	0.30 ( 0.23)	0.76	638.9	50260.00
5	770.46	26.68	0.30 ( 0.23)	0.76	645.2	50200.00
TOTAL AREA (ACRES) =						645.2

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 12

-----  
>>>>CLEAR MEMORY BANK # 2 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 11

-----  
>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\*\*\*\*  
\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	860.59	13.31	2.319	0.30 ( 0.23)	0.76	452.6	50240.00
2	893.10	17.27	2.010	0.30 ( 0.23)	0.76	554.9	50280.00

3 882.60 19.76 1.846 0.30 ( 0.23) 0.76 600.4 50220.00  
4 823.52 23.87 1.660 0.30 ( 0.23) 0.76 638.9 50260.00  
5 770.46 26.68 1.556 0.30 ( 0.23) 0.76 645.2 50200.00  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50309.00 = 11241.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	207.57	18.47	1.931	0.30 ( 0.19)	0.62	131.2	50300.00

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 5433.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1043.43	13.31	2.319	0.30 ( 0.22)	0.74	547.2	50240.00
2	1095.99	17.27	2.010	0.30 ( 0.22)	0.74	677.6	50280.00
3	1095.62	18.47	1.931	0.30 ( 0.22)	0.74	708.0	50300.00
4	1080.00	19.76	1.846	0.30 ( 0.22)	0.74	731.6	50220.00
5	998.77	23.87	1.660	0.30 ( 0.22)	0.74	770.1	50260.00
6	933.41	26.68	1.556	0.30 ( 0.22)	0.74	776.4	50200.00
TOTAL AREA (ACRES) =						776.4	

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1095.99 Tc (MIN.) = 17.267  
EFFECTIVE AREA (ACRES) = 677.61 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
TOTAL AREA (ACRES) = 776.4  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50309.00 = 11241.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 12

-----  
>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50310.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 410.00 DOWNSTREAM (FEET) = 407.00  
FLOW LENGTH (FEET) = 898.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 132.0 INCH PIPE IS 101.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.98  
ESTIMATED PIPE DIAMETER (INCH) = 132.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 1095.99  
PIPE TRAVEL TIME (MIN.) = 1.07 Tc (MIN.) = 18.34  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50310.00 = 12139.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 18.34  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.940  
SUBAREA LOSS RATE DATA (AMC II):

```

DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.30   0.100  -
USER-DEFINED        -         4.60   0.30   0.400  -
USER-DEFINED        -         2.60   0.30   0.850  -
USER-DEFINED        -         1.00   0.30   0.100  -
USER-DEFINED        -         9.60   0.30   0.400  -
USER-DEFINED        -         0.50   0.30   0.500  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.446
SUBAREA AREA (ACRES) = 18.50   SUBAREA RUNOFF (CFS) = 30.07
EFFECTIVE AREA (ACRES) = 696.11   AREA-AVERAGED Fm (INCH/HR) = 0.22
AREA-AVERAGED Fp (INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.73
TOTAL AREA (ACRES) = 794.9   PEAK FLOW RATE (CFS) = 1095.99
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 18.34
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.940
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.30   0.600  -
USER-DEFINED        -        10.70   0.30   0.850  -
USER-DEFINED        -         3.20   0.30   0.400  -
USER-DEFINED        -         0.50   0.30   0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.749
SUBAREA AREA (ACRES) = 14.50   SUBAREA RUNOFF (CFS) = 22.38
EFFECTIVE AREA (ACRES) = 710.61   AREA-AVERAGED Fm (INCH/HR) = 0.22
AREA-AVERAGED Fp (INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.73
TOTAL AREA (ACRES) = 809.4   PEAK FLOW RATE (CFS) = 1100.32

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*****
FLOW PROCESS FROM NODE 50310.00 TO NODE 50345.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM (FEET) = 407.00   DOWNSTREAM (FEET) = 403.00
FLOW LENGTH (FEET) = 1487.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 138.0 INCH PIPE IS 105.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 12.92
ESTIMATED PIPE DIAMETER (INCH) = 138.00   NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 1100.32
PIPE TRAVEL TIME (MIN.) = 1.92   Tc (MIN.) = 20.26
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50345.00 = 13626.00 FEET.

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*****
FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
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*****
FLOW PROCESS FROM NODE 50320.00 TO NODE 50321.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

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INITIAL SUBAREA FLOW-LENGTH (FEET) = 322.00
ELEVATION DATA: UPSTREAM (FEET) = 1110.00   DOWNSTREAM (FEET) = 1035.00

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Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.517
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.812
SUBAREA Tc AND LOSS RATE DATA (AMC II):

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DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"GRASS"              -         0.60   0.30   1.000  0   9.52
NATURAL FAIR COVER
"WOODLAND, GRASS"   -         0.30   0.30   1.000  0   9.52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 2.03
TOTAL AREA (ACRES) = 0.90   PEAK FLOW RATE (CFS) = 2.03

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*****
FLOW PROCESS FROM NODE 50321.00 TO NODE 50322.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

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ELEVATION DATA: UPSTREAM (FEET) = 1035.00   DOWNSTREAM (FEET) = 960.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 225.00   CHANNEL SLOPE = 0.3333
CHANNEL BASE (FEET) = 0.00   "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040   MAXIMUM DEPTH (FEET) = 1.00
CHANNEL FLOW THRU SUBAREA (CFS) = 2.03
FLOW VELOCITY (FEET/SEC.) = 6.19   FLOW DEPTH (FEET) = 0.33
TRAVEL TIME (MIN.) = 0.61   Tc (MIN.) = 10.12
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50322.00 = 547.00 FEET.

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*****
FLOW PROCESS FROM NODE 50322.00 TO NODE 50322.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 10.12
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.712
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.30   1.000  -
USER-DEFINED        -         1.00   0.30   1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.10   SUBAREA RUNOFF (CFS) = 2.39
EFFECTIVE AREA (ACRES) = 2.00   AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 2.0   PEAK FLOW RATE (CFS) = 4.34

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*****
FLOW PROCESS FROM NODE 50322.00 TO NODE 50323.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 955.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 33.00 CHANNEL SLOPE = 0.1515
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.34
FLOW VELOCITY(FEET/SEC.) = 5.60 FLOW DEPTH(FEET) = 0.51
TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 10.22
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50323.00 = 580.00 FEET.

*****
FLOW PROCESS FROM NODE 50323.00 TO NODE 50323.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.22
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.697
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.70 0.30 1.000 -
USER-DEFINED - 1.50 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 6.90
EFFECTIVE AREA(ACRES) = 5.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 5.2 PEAK FLOW RATE(CFS) = 11.22

*****
FLOW PROCESS FROM NODE 50323.00 TO NODE 50324.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 955.00 DOWNSTREAM(FEET) = 915.00
FLOW LENGTH(FEET) = 254.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.26
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 11.22
PIPE TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 10.44
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50324.00 = 834.00 FEET.

*****
FLOW PROCESS FROM NODE 50324.00 TO NODE 50324.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.44
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.664
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.90 0.30 0.800 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

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```

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.00 0.30 0.800 -
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.818
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 4.79
EFFECTIVE AREA(ACRES) = 7.40 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 7.4 PEAK FLOW RATE(CFS) = 15.85

*****
FLOW PROCESS FROM NODE 50324.00 TO NODE 50324.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.44
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.664
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.80 0.30 0.800 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 2.00 0.30 0.800 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.804
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 10.68
EFFECTIVE AREA(ACRES) = 12.30 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89
TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 26.54

*****
FLOW PROCESS FROM NODE 50324.00 TO NODE 50325.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 880.00
FLOW LENGTH(FEET) = 548.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.08
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 26.54
PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 10.98
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50325.00 = 1382.00 FEET.

*****
FLOW PROCESS FROM NODE 50325.00 TO NODE 50325.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.98
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.584
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.90 0.30 0.800 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

```



SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 8.23  
EFFECTIVE AREA (ACRES) = 16.20 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA (ACRES) = 16.2 PEAK FLOW RATE (CFS) = 33.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50325.00 TO NODE 50326.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 880.00 DOWNSTREAM (FEET) = 850.00  
FLOW LENGTH (FEET) = 441.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.1 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 18.34  
ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 33.88  
PIPE TRAVEL TIME (MIN.) = 0.40 Tc (MIN.) = 11.38  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50326.00 = 1823.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50326.00 TO NODE 50326.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 11.38  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.535  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.30 0.30 0.800 -  
USER-DEFINED - 1.20 0.30 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 4.50 SUBAREA RUNOFF (CFS) = 9.29  
EFFECTIVE AREA (ACRES) = 20.70 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA (ACRES) = 20.7 PEAK FLOW RATE (CFS) = 42.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50326.00 TO NODE 50327.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 850.00 DOWNSTREAM (FEET) = 810.00  
FLOW LENGTH (FEET) = 616.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.9 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 19.23  
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 42.46  
PIPE TRAVEL TIME (MIN.) = 0.53 Tc (MIN.) = 11.91  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50327.00 = 2439.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50327.00 TO NODE 50327.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 11.91  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.471  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.30 0.800 -  
USER-DEFINED - 5.00 0.30 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 14.46  
EFFECTIVE AREA (ACRES) = 27.90 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA (ACRES) = 27.9 PEAK FLOW RATE (CFS) = 55.72

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50327.00 TO NODE 50328.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 810.00 DOWNSTREAM (FEET) = 760.00  
FLOW LENGTH (FEET) = 724.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 19.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 20.47  
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 55.72  
PIPE TRAVEL TIME (MIN.) = 0.59 Tc (MIN.) = 12.50  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50328.00 = 3163.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50328.00 TO NODE 50328.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 12.50  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.405  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.90 0.30 0.800 -  
USER-DEFINED - 6.30 0.30 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 17.93  
EFFECTIVE AREA (ACRES) = 37.10 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA (ACRES) = 37.1 PEAK FLOW RATE (CFS) = 72.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50328.00 TO NODE 50328.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 12.50  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.405  
SUBAREA LOSS RATE DATA (AMC II):

```

DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        2.90    0.30    0.800  -
USER-DEFINED        -        3.10    0.30    0.800  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 6.00    SUBAREA RUNOFF(CFS) = 11.69
EFFECTIVE AREA(ACRES) = 43.10  AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.83
TOTAL AREA(ACRES) = 43.1    PEAK FLOW RATE(CFS) = 83.69

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*****
FLOW PROCESS FROM NODE 50328.00 TO NODE 50329.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 760.00  DOWNSTREAM(FEET) = 700.00
FLOW LENGTH(FEET) = 769.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.42
ESTIMATED PIPE DIAMETER(INCH) = 30.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 83.69
PIPE TRAVEL TIME(MIN.) = 0.52  Tc(MIN.) = 13.02
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50329.00 = 3932.00 FEET.

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*****
FLOW PROCESS FROM NODE 50329.00 TO NODE 50329.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.02
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.348
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        7.10    0.30    0.800  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 7.10    SUBAREA RUNOFF(CFS) = 13.47
EFFECTIVE AREA(ACRES) = 50.20  AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.82
TOTAL AREA(ACRES) = 50.2    PEAK FLOW RATE(CFS) = 94.93

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*****
FLOW PROCESS FROM NODE 50329.00 TO NODE 50340.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 700.00  DOWNSTREAM(FEET) = 660.00
FLOW LENGTH(FEET) = 478.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.71
ESTIMATED PIPE DIAMETER(INCH) = 30.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 94.93
PIPE TRAVEL TIME(MIN.) = 0.31  Tc(MIN.) = 13.33
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50340.00 = 4410.00 FEET.

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*****
FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.33
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.317
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        8.70    0.30    0.800  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 8.70    SUBAREA RUNOFF(CFS) = 16.26
EFFECTIVE AREA(ACRES) = 58.90  AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.82
TOTAL AREA(ACRES) = 58.9    PEAK FLOW RATE(CFS) = 109.79

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*****
FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.33
RAINFALL INTENSITY(INCH/HR) = 2.32
AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.82
EFFECTIVE STREAM AREA(ACRES) = 58.90
TOTAL STREAM AREA(ACRES) = 58.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 109.79

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*****
FLOW PROCESS FROM NODE 50330.00 TO NODE 50331.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 294.00
ELEVATION DATA: UPSTREAM(FEET) = 990.00  DOWNSTREAM(FEET) = 965.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.457
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.236
SUBAREA Tc AND LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS  Tc
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE"  -        1.60    0.30    0.800  0  7.46
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800
SUBAREA RUNOFF(CFS) = 4.31
TOTAL AREA(ACRES) = 1.60  PEAK FLOW RATE(CFS) = 4.31

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FLOW PROCESS FROM NODE 50331.00 TO NODE 50332.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 965.00 DOWNSTREAM ELEVATION(FEET) = 960.00
STREET LENGTH(FEET) = 285.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.43

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.36
HALFSTREET FLOOD WIDTH(FEET) = 10.04
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.10
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.11
STREET FLOW TRAVEL TIME(MIN.) = 1.53 Tc(MIN.) = 8.99
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.902

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.60 0.30 0.800 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 6.23
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 10.06

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.52
FLOW VELOCITY(FEET/SEC.) = 3.32 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.29
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50332.00 = 579.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 50332.00 TO NODE 50333.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 960.00 DOWNSTREAM ELEVATION(FEET) = 940.00
STREET LENGTH(FEET) = 364.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.62

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.52

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 10.51
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.61
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.07
STREET FLOW TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 10.07
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.720

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.90 0.30 0.800 -
USER-DEFINED - 0.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.805
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 8.92
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 18.30

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.68
FLOW VELOCITY(FEET/SEC.) = 5.89 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.31
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50333.00 = 943.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 50333.00 TO NODE 50334.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 940.00 DOWNSTREAM ELEVATION(FEET) = 920.00
STREET LENGTH(FEET) = 405.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 25.05

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.43
HALFSTREET FLOOD WIDTH(FEET) = 13.63
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.12
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.64
STREET FLOW TRAVEL TIME(MIN.) = 1.10 Tc(MIN.) = 11.17
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.559

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.50	0.30	0.800	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.831  
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 13.51  
EFFECTIVE AREA(ACRES) = 14.70 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 14.7 PEAK FLOW RATE(CFS) = 30.63

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 14.88  
FLOW VELOCITY(FEET/SEC.) = 6.37 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.90  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50334.00 = 1348.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50334.00 TO NODE 50335.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 920.00 DOWNSTREAM ELEVATION(FEET) = 905.00  
STREET LENGTH(FEET) = 270.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.62

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 53.33  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.52  
HALFSTREET FLOOD WIDTH(FEET) = 18.16  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.64  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.99  
STREET FLOW TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 11.76  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.489

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	12.90	0.30	0.800	-
USER-DEFINED	-	4.00	0.30	1.000	-
USER-DEFINED	-	5.40	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.886  
SUBAREA AREA(ACRES) = 22.70 SUBAREA RUNOFF(CFS) = 45.41  
EFFECTIVE AREA(ACRES) = 37.40 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86

TOTAL AREA(ACRES) = 37.4 PEAK FLOW RATE(CFS) = 75.10

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.57 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
FLOW VELOCITY(FEET/SEC.) = 8.40 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.81  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50335.00 = 1618.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50335.00 TO NODE 50336.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 870.00  
FLOW LENGTH(FEET) = 898.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.84  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 75.10  
PIPE TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 12.60  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50336.00 = 2516.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50336.00 TO NODE 50336.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.60  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.394  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.40	0.30	0.800	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 12.41  
EFFECTIVE AREA(ACRES) = 43.80 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 43.8 PEAK FLOW RATE(CFS) = 84.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50336.00 TO NODE 50337.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 820.00  
FLOW LENGTH(FEET) = 799.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.32  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 84.32  
PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 13.20  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50337.00 = 3315.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50337.00 TO NODE 50337.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 13.20  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.330  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.00	0.30	0.800	-
USER-DEFINED	-	7.20	0.30	0.800	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.839  
 SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 21.33  
 EFFECTIVE AREA(ACRES) = 55.20 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 55.2 PEAK FLOW RATE(CFS) = 103.14

\*\*\*\*\*

FLOW PROCESS FROM NODE 50337.00 TO NODE 50338.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 750.00  
 FLOW LENGTH(FEET) = 1063.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 24.09  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 103.14  
 PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 13.93  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50338.00 = 4378.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50338.00 TO NODE 50338.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN.) = 13.93  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.257  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.70	0.30	0.800	-
USER-DEFINED	-	4.20	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 16.16  
 EFFECTIVE AREA(ACRES) = 64.10 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA(ACRES) = 64.1 PEAK FLOW RATE(CFS) = 115.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 50338.00 TO NODE 50339.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 685.00  
 FLOW LENGTH(FEET) = 1107.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 23.29  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 115.65  
 PIPE TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 14.72  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50339.00 = 5485.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50339.00 TO NODE 50339.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN.) = 14.72  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.185  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.10	0.30	0.800	-
USER-DEFINED	-	1.20	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 12.78  
 EFFECTIVE AREA(ACRES) = 71.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA(ACRES) = 71.4 PEAK FLOW RATE(CFS) = 124.27

\*\*\*\*\*

FLOW PROCESS FROM NODE 50339.00 TO NODE 50340.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 685.00 DOWNSTREAM(FEET) = 660.00  
 FLOW LENGTH(FEET) = 592.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.94  
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 124.27  
 PIPE TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 15.20  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50340.00 = 6077.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN.) = 15.20  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.00	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 8.58  
 EFFECTIVE AREA(ACRES) = 76.40 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA (ACRES) = 76.4 PEAK FLOW RATE (CFS) = 130.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION (MIN.) = 15.20

RAINFALL INTENSITY (INCH/HR) = 2.15

AREA-AVERAGED Fm (INCH/HR) = 0.25

AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.83

EFFECTIVE STREAM AREA (ACRES) = 76.40

TOTAL STREAM AREA (ACRES) = 76.40

PEAK FLOW RATE (CFS) AT CONFLUENCE = 130.43

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	109.79	13.33	2.317	0.30 (0.25)	0.82	58.9	50320.00
2	130.43	15.20	2.147	0.30 (0.25)	0.83	76.4	50330.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	234.47	13.33	2.317	0.30 (0.25)	0.83	125.9	50320.00
2	231.23	15.20	2.147	0.30 (0.25)	0.83	135.3	50330.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 234.47 Tc (MIN.) = 13.33

EFFECTIVE AREA (ACRES) = 125.94 AREA-AVERAGED Fm (INCH/HR) = 0.25

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83

TOTAL AREA (ACRES) = 135.3

LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50340.00 = 6077.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50340.00 TO NODE 50341.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 660.00 DOWNSTREAM (FEET) = 575.00

FLOW LENGTH (FEET) = 1133.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.1 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 30.74

ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 234.47

PIPE TRAVEL TIME (MIN.) = 0.61 Tc (MIN.) = 13.95

LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50341.00 = 7210.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50341.00 TO NODE 50341.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.95

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.255

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.30	0.30	0.600	-
USER-DEFINED	-	3.10	0.30	0.800	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.684

SUBAREA AREA (ACRES) = 7.40 SUBAREA RUNOFF (CFS) = 13.65

EFFECTIVE AREA (ACRES) = 133.34 AREA-AVERAGED Fm (INCH/HR) = 0.25

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82

TOTAL AREA (ACRES) = 142.7 PEAK FLOW RATE (CFS) = 241.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 50341.00 TO NODE 50342.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 575.00 DOWNSTREAM (FEET) = 540.00

FLOW LENGTH (FEET) = 495.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.7 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 30.02

ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 241.16

PIPE TRAVEL TIME (MIN.) = 0.27 Tc (MIN.) = 14.22

LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50342.00 = 7705.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50342.00 TO NODE 50342.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.22

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.230

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600

SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 3.87

EFFECTIVE AREA (ACRES) = 135.44 AREA-AVERAGED Fm (INCH/HR) = 0.24

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82

TOTAL AREA (ACRES) = 144.8 PEAK FLOW RATE (CFS) = 242.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 50342.00 TO NODE 50342.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.22

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.230  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.10 0.30 0.600 -  
USER-DEFINED - 17.00 0.30 0.800 -  
USER-DEFINED - 0.90 0.30 0.600 -  
USER-DEFINED - 0.90 0.30 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.738  
SUBAREA AREA (ACRES) = 25.90 SUBAREA RUNOFF (CFS) = 46.82  
EFFECTIVE AREA (ACRES) = 161.34 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA (ACRES) = 170.7 PEAK FLOW RATE (CFS) = 288.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50342.00 TO NODE 50343.00 IS CODE = 31  
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
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ELEVATION DATA: UPSTREAM (FEET) = 540.00 DOWNSTREAM (FEET) = 470.00  
FLOW LENGTH (FEET) = 894.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 32.89  
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 288.82  
PIPE TRAVEL TIME (MIN.) = 0.45 Tc (MIN.) = 14.68  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50343.00 = 8599.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50343.00 TO NODE 50343.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
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MAINLINE Tc (MIN.) = 14.68  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.189  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 6.60 0.30 0.600 -  
USER-DEFINED - 0.10 0.30 0.800 -  
USER-DEFINED - 0.20 0.30 0.600 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.603  
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 12.47  
EFFECTIVE AREA (ACRES) = 168.24 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA (ACRES) = 177.6 PEAK FLOW RATE (CFS) = 295.37

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50343.00 TO NODE 50343.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 14.68  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.189  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 0.500 -  
USER-DEFINED - 1.80 0.30 0.600 -  
USER-DEFINED - 17.90 0.30 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.777  
SUBAREA AREA (ACRES) = 20.00 SUBAREA RUNOFF (CFS) = 35.21  
EFFECTIVE AREA (ACRES) = 188.24 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 330.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50343.00 TO NODE 50344.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 416.00  
FLOW LENGTH (FEET) = 780.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.3 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 32.38  
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 330.58  
PIPE TRAVEL TIME (MIN.) = 0.40 Tc (MIN.) = 15.08  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50344.00 = 9379.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50344.00 TO NODE 50344.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 15.08  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.155  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.60 0.30 0.500 -  
USER-DEFINED - 0.20 0.30 0.600 -  
USER-DEFINED - 1.90 0.30 0.100 -  
USER-DEFINED - 0.10 0.30 0.400 -  
USER-DEFINED - 14.70 0.30 0.500 -  
USER-DEFINED - 33.20 0.30 0.600 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.548  
SUBAREA AREA (ACRES) = 53.70 SUBAREA RUNOFF (CFS) = 96.20  
EFFECTIVE AREA (ACRES) = 241.94 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
TOTAL AREA (ACRES) = 251.3 PEAK FLOW RATE (CFS) = 420.98

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50344.00 TO NODE 50344.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc (MIN.) = 15.08  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.155  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.30	0.800	-
USER-DEFINED	-	0.40	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.773  
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 8.83  
EFFECTIVE AREA(ACRES) = 247.04 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
TOTAL AREA(ACRES) = 256.4 PEAK FLOW RATE(CFS) = 429.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50344.00 TO NODE 50345.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 416.00 DOWNSTREAM(FEET) = 403.00  
FLOW LENGTH(FEET) = 526.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 63.0 INCH PIPE IS 50.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.29  
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 429.80  
PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 15.45  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50345.00 = 9905.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	429.80	15.45	2.130	0.30( 0.22)	0.74	247.0	50320.00
2	417.45	17.32	2.007	0.30( 0.22)	0.74	256.4	50330.00

LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50345.00 = 9905.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1043.43	16.35	2.071	0.30( 0.22)	0.73	580.2	50240.00
2	1100.32	20.26	1.819	0.30( 0.22)	0.73	710.6	50280.00
3	1095.62	21.46	1.766	0.30( 0.22)	0.73	741.0	50300.00
4	1082.92	22.76	1.709	0.30( 0.22)	0.73	764.6	50220.00
5	1005.66	26.95	1.548	0.30( 0.22)	0.73	803.1	50260.00
6	947.44	29.77	1.457	0.30( 0.22)	0.73	809.4	50200.00

LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50345.00 = 13626.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1447.44	15.45	2.130	0.30( 0.22)	0.73	795.3	50320.00
2	1467.28	16.35	2.071	0.30( 0.22)	0.73	831.7	50240.00
3	1474.95	17.32	2.007	0.30( 0.22)	0.73	868.8	50330.00
4	1473.73	20.26	1.819	0.30( 0.22)	0.73	967.0	50280.00

5	1456.68	21.46	1.766	0.30( 0.22)	0.73	997.4	50300.00
6	1430.61	22.76	1.709	0.30( 0.22)	0.73	1021.0	50220.00
7	1315.67	26.95	1.548	0.30( 0.22)	0.74	1059.5	50260.00
8	1236.27	29.77	1.457	0.30( 0.22)	0.74	1065.8	50200.00

TOTAL AREA(ACRES) = 1065.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1474.95 Tc(MIN.) = 17.319  
EFFECTIVE AREA(ACRES) = 868.84 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1065.8  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50345.00 = 13626.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 12  
-----

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.32  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.007  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.40	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	6.30	0.30	0.100	-
USER-DEFINED	-	8.70	0.30	0.400	-
USER-DEFINED	-	10.80	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.376  
SUBAREA AREA(ACRES) = 27.40 SUBAREA RUNOFF(CFS) = 46.71  
EFFECTIVE AREA(ACRES) = 896.24 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA(ACRES) = 1093.2 PEAK FLOW RATE(CFS) = 1474.95  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.32  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.007  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.600	-
USER-DEFINED	-	1.60	0.30	0.850	-
USER-DEFINED	-	1.80	0.30	0.100	-
USER-DEFINED	-	6.20	0.30	0.400	-
USER-DEFINED	-	2.80	0.30	0.500	-



USER-DEFINED - 0.20 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.456  
SUBAREA AREA (ACRES) = 13.70 SUBAREA RUNOFF (CFS) = 23.06  
EFFECTIVE AREA (ACRES) = 909.94 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA (ACRES) = 1106.9 PEAK FLOW RATE (CFS) = 1474.95  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50345.00 TO NODE 50346.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 403.00 DOWNSTREAM (FEET) = 350.00  
FLOW LENGTH (FEET) = 1031.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 87.0 INCH PIPE IS 69.6 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 41.66  
ESTIMATED PIPE DIAMETER (INCH) = 87.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 1474.95  
PIPE TRAVEL TIME (MIN.) = 0.41 Tc (MIN.) = 17.73  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50346.00 = 14657.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50346.00 TO NODE 50346.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.73

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.980

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	1.40	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	0.500	-
USER-DEFINED	-	2.40	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.423  
SUBAREA AREA (ACRES) = 6.00 SUBAREA RUNOFF (CFS) = 10.00  
EFFECTIVE AREA (ACRES) = 915.94 AREA-AVERAGED Fm (INCH/HR) = 0.21  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA (ACRES) = 1112.9 PEAK FLOW RATE (CFS) = 1474.95  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50346.00 TO NODE 50347.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 350.00 DOWNSTREAM (FEET) = 313.00  
FLOW LENGTH (FEET) = 240.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 72.0 INCH PIPE IS 55.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 63.40

ESTIMATED PIPE DIAMETER (INCH) = 72.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 1474.95  
PIPE TRAVEL TIME (MIN.) = 0.06 Tc (MIN.) = 17.79  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50347.00 = 14897.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50347.00 TO NODE 50347.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.79

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.976

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	0.500	-
USER-DEFINED	-	1.90	0.30	0.800	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.749  
SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 8.04  
EFFECTIVE AREA (ACRES) = 921.04 AREA-AVERAGED Fm (INCH/HR) = 0.21  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA (ACRES) = 1118.0 PEAK FLOW RATE (CFS) = 1474.95  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50347.00 TO NODE 50347.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 17.79

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.976

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.500	-
USER-DEFINED	-	1.00	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA (ACRES) = 2.40 SUBAREA RUNOFF (CFS) = 3.94  
EFFECTIVE AREA (ACRES) = 923.44 AREA-AVERAGED Fm (INCH/HR) = 0.21  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA (ACRES) = 1120.4 PEAK FLOW RATE (CFS) = 1474.95  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50347.00 TO NODE 50348.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 313.00 DOWNSTREAM (FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1690.00 CHANNEL SLOPE = 0.0473  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 7.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 1474.95  
 FLOW VELOCITY (FEET/SEC.) = 15.53 FLOW DEPTH (FEET) = 5.63  
 TRAVEL TIME (MIN.) = 1.81 Tc (MIN.) = 19.61  
 LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50348.00 = 16587.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 19.61  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.856  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	5.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949  
 SUBAREA AREA (ACRES) = 7.30 SUBAREA RUNOFF (CFS) = 10.32  
 EFFECTIVE AREA (ACRES) = 930.74 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 1127.7 PEAK FLOW RATE (CFS) = 1474.95  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 19.61  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.856  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.600	-
USER-DEFINED	-	42.40	0.30	0.800	-
USER-DEFINED	-	3.00	0.30	1.000	-
USER-DEFINED	-	4.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.827  
 SUBAREA AREA (ACRES) = 54.60 SUBAREA RUNOFF (CFS) = 79.01  
 EFFECTIVE AREA (ACRES) = 985.34 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 1182.3 PEAK FLOW RATE (CFS) = 1474.95  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 19.61  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.856  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.90	0.30	1.000	-
USER-DEFINED	-	3.70	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	4.10	0.30	0.800	-
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.948  
 SUBAREA AREA (ACRES) = 21.10 SUBAREA RUNOFF (CFS) = 29.84  
 EFFECTIVE AREA (ACRES) = 1006.44 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 1203.4 PEAK FLOW RATE (CFS) = 1483.06

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1478.05	17.75	1.979	0.30 ( 0.22)	0.73	932.9	50320.00
2	1484.13	18.64	1.920	0.30 ( 0.22)	0.73	969.3	50240.00
3	1483.06	19.61	1.856	0.30 ( 0.22)	0.73	1006.4	50330.00
4	1490.46	22.54	1.718	0.30 ( 0.22)	0.73	1104.6	50280.00
5	1477.23	23.75	1.665	0.30 ( 0.22)	0.73	1135.0	50300.00
6	1448.40	25.06	1.608	0.30 ( 0.22)	0.73	1158.6	50220.00
7	1350.30	29.29	1.473	0.30 ( 0.22)	0.73	1197.1	50260.00
8	1281.10	32.17	1.402	0.30 ( 0.22)	0.73	1203.4	50200.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 1490.46 Tc (MIN.) = 22.54  
 AREA-AVERAGED Fm (INCH/HR) = 0.22 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.73 EFFECTIVE AREA (ACRES) = 1104.61

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 22.54  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.718  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.26  
 EFFECTIVE AREA (ACRES) = 1104.81 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 1203.6 PEAK FLOW RATE (CFS) = 1490.72

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.54  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.718  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	1.70	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	4.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.944  
 SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 11.49  
 EFFECTIVE AREA(ACRES) = 1113.71 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 1212.5 PEAK FLOW RATE(CFS) = 1502.21

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.54  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.718  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 0.89  
 EFFECTIVE AREA(ACRES) = 1114.41 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 1213.2 PEAK FLOW RATE(CFS) = 1503.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.54  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.718  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	3.50	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.556  
 SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 6.28  
 EFFECTIVE AREA(ACRES) = 1118.91 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 1217.7 PEAK FLOW RATE(CFS) = 1509.39

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.54  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.718  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.80	0.30	0.600	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.732  
 SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 18.34  
 EFFECTIVE AREA(ACRES) = 1132.51 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 1231.3 PEAK FLOW RATE(CFS) = 1527.73

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.54  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.718  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 2.17  
 EFFECTIVE AREA(ACRES) = 1134.21 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 1233.0 PEAK FLOW RATE(CFS) = 1529.90

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50349.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 233.00 DOWNSTREAM(FEET) = 214.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1010.00 CHANNEL SLOPE = 0.0188  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 8.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1529.90  
 FLOW VELOCITY(FEET/SEC.) = 13.77 FLOW DEPTH(FEET) = 6.09  
 TRAVEL TIME(MIN.) = 1.22 Tc(MIN.) = 23.76  
 LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50349.00 = 17597.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.76

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.664

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	2.30	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.817

SUBAREA AREA(ACRES) = 6.90 SUBAREA RUNOFF(CFS) = 8.81

EFFECTIVE AREA(ACRES) = 1141.11 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73

TOTAL AREA(ACRES) = 1239.9 PEAK FLOW RATE(CFS) = 1529.90

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.76

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.664

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	5.10	0.30	0.850	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	7.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958

SUBAREA AREA(ACRES) = 18.40 SUBAREA RUNOFF(CFS) = 22.80

EFFECTIVE AREA(ACRES) = 1159.51 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74

TOTAL AREA(ACRES) = 1258.3 PEAK FLOW RATE(CFS) = 1529.90

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.76

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.664

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.25  
EFFECTIVE AREA(ACRES) = 1159.71 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
TOTAL AREA(ACRES) = 1258.5 PEAK FLOW RATE(CFS) = 1529.90  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.76

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.664

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.70	0.30	0.100	-
USER-DEFINED	-	3.50	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	3.00	0.30	1.000	-
USER-DEFINED	-	11.70	0.30	1.000	-
USER-DEFINED	-	12.40	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.874

SUBAREA AREA(ACRES) = 34.10 SUBAREA RUNOFF(CFS) = 43.03

EFFECTIVE AREA(ACRES) = 1193.81 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74

TOTAL AREA(ACRES) = 1292.6 PEAK FLOW RATE(CFS) = 1549.89

\*\*\*\*\*

FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.76

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.664

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.00 SUBAREA RUNOFF(CFS) = 7.37  
EFFECTIVE AREA(ACRES) = 1199.81 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
TOTAL AREA(ACRES) = 1298.6 PEAK FLOW RATE(CFS) = 1557.26

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1550.55	18.97	1.898	0.30( 0.22)	0.74	1028.1	50320.00
2	1548.96	19.87	1.839	0.30( 0.22)	0.74	1064.5	50240.00
3	1557.87	20.83	1.793	0.30( 0.22)	0.74	1101.6	50330.00
4	1557.26	23.76	1.664	0.30( 0.22)	0.74	1199.8	50280.00
5	1537.88	24.97	1.611	0.30( 0.22)	0.74	1230.2	50300.00

6	1519.40	26.29	1.569	0.30 ( 0.22)	0.74	1253.8	50220.00
7	1413.89	30.55	1.438	0.30 ( 0.22)	0.74	1292.3	50260.00
8	1346.29	33.44	1.374	0.30 ( 0.22)	0.74	1298.6	50200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1557.87 Tc (MIN.) = 20.83  
 AREA-AVERAGED Fm (INCH/HR) = 0.22 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.74 EFFECTIVE AREA (ACRES) = 1101.64

=====  
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1298.6 TC (MIN.) = 20.83  
 EFFECTIVE AREA (ACRES) = 1101.64 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.741  
 PEAK FLOW RATE (CFS) = 1557.87

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1550.55	18.97	1.898	0.30 ( 0.22)	0.74	1028.1	50320.00
2	1548.96	19.87	1.839	0.30 ( 0.22)	0.74	1064.5	50240.00
3	1557.87	20.83	1.793	0.30 ( 0.22)	0.74	1101.6	50330.00
4	1557.26	23.76	1.664	0.30 ( 0.22)	0.74	1199.8	50280.00
5	1537.88	24.97	1.611	0.30 ( 0.22)	0.74	1230.2	50300.00
6	1519.40	26.29	1.569	0.30 ( 0.22)	0.74	1253.8	50220.00
7	1413.89	30.55	1.438	0.30 ( 0.22)	0.74	1292.3	50260.00
8	1346.29	33.44	1.374	0.30 ( 0.22)	0.74	1298.6	50200.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2013 Advanced Engineering Software (aes)  
Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PA3 7 PA4 ROMP \*  
\* REGIONAL WATERSHED S29 - FREE DRAINING - ULTIMATE CONDITION \*  
\* 25-YR RM EV JUNE 2018 ROKAMOTO \*  
\*\*\*\*\*

FILE NAME: P504XX25.DAT  
TIME/DATE OF STUDY: 15:13 03/27/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.00;	4.060
2)	6.00;	3.660
3)	7.00;	3.350
4)	8.00;	3.100
5)	9.00;	2.900
6)	10.00;	2.730
7)	11.00;	2.580
8)	12.00;	2.460
9)	13.00;	2.350
10)	14.00;	2.250
11)	15.00;	2.160
12)	20.00;	1.830
13)	25.00;	1.610
14)	30.00;	1.450
15)	40.00;	1.230
16)	50.00;	1.090
17)	60.00;	0.980
18)	90.00;	0.770
19)	120.00;	0.660
20)	180.00;	0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.963  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.361  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "1 DWELLING/ACRE"	-	0.50	0.30	0.800	0	6.96

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.800  
SUBAREA RUNOFF(CFS) = 1.40  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.40

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.40  
FLOW VELOCITY(FEET/SEC.) = 5.12 FLOW DEPTH(FEET) = 0.30  
TRAVEL TIME(MIN.) = 0.85  $T_c$ (MIN.) = 7.82  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN.) = 7.82

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.146  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.30 0.800 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 1.05  
 EFFECTIVE AREA (ACRES) = 0.90 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 2.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 239.00 CHANNEL SLOPE = 0.4184  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 2.35  
 FLOW VELOCITY (FEET/SEC.) = 7.08 FLOW DEPTH (FEET) = 0.33  
 TRAVEL TIME (MIN.) = 0.56 Tc (MIN.) = 8.38  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50403.00 IS CODE = 81  
 -----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 8.38  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.024  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.30 0.800 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 1.00  
 EFFECTIVE AREA (ACRES) = 1.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 1.3 PEAK FLOW RATE (CFS) = 3.25

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00 CHANNEL SLOPE = 0.7042  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 3.25  
 FLOW VELOCITY (FEET/SEC.) = 9.35 FLOW DEPTH (FEET) = 0.34

TRAVEL TIME (MIN.) = 0.13 Tc (MIN.) = 8.50  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50404.00 IS CODE = 81  
 -----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 8.50  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.999  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.90 0.30 0.800 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.862  
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 3.21  
 EFFECTIVE AREA (ACRES) = 2.60 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA (ACRES) = 2.6 PEAK FLOW RATE (CFS) = 6.43

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 145.00 CHANNEL SLOPE = 0.3448  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 6.43  
 FLOW VELOCITY (FEET/SEC.) = 8.36 FLOW DEPTH (FEET) = 0.51  
 TRAVEL TIME (MIN.) = 0.29 Tc (MIN.) = 8.79  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50405.00 TO NODE 50405.00 IS CODE = 81  
 -----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 8.79  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.941  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.20 0.30 0.800 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.964  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.63  
 EFFECTIVE AREA (ACRES) = 3.70 AREA-AVERAGED Fm (INCH/HR) = 0.26  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
 TOTAL AREA (ACRES) = 3.7 PEAK FLOW RATE (CFS) = 8.92

```

*****
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 8.92
FLOW VELOCITY(FEET/SEC.) = 8.76 FLOW DEPTH(FEET) = 0.58
TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 9.09
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50406.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.09
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.884
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.80 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 2.79
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 11.52

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.2193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 11.52
FLOW VELOCITY(FEET/SEC.) = 8.21 FLOW DEPTH(FEET) = 0.68
TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 9.56
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50407.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.56
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.805
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.70 0.30 0.800 -
USER-DEFINED - 1.00 0.30 1.000 -
USER-DEFINED - 1.60 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.883
SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 14.41
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 25.58

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 325.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 490.00 CHANNEL SLOPE = 0.1531
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 25.58
FLOW VELOCITY(FEET/SEC.) = 8.75 FLOW DEPTH(FEET) = 0.99
TRAVEL TIME(MIN.) = 0.93 Tc(MIN.) = 10.49
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.49
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.656
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 1.40 0.30 1.000 -
USER-DEFINED - 0.50 0.30 1.000 -
USER-DEFINED - 1.20 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90 SUBAREA RUNOFF(CFS) = 8.27
EFFECTIVE AREA(ACRES) = 15.10 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 15.1 PEAK FLOW RATE(CFS) = 32.35

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.49
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.656
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.91  
EFFECTIVE AREA(ACRES) = 16.00 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
TOTAL AREA(ACRES) = 16.0 PEAK FLOW RATE(CFS) = 34.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 34.26  
FLOW VELOCITY(FEET/SEC.) = 6.98 FLOW DEPTH(FEET) = 1.28  
TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 10.66  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.66  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.630  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	4.30	0.30	0.800	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	3.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.910  
SUBAREA AREA(ACRES) = 9.60 SUBAREA RUNOFF(CFS) = 20.37  
EFFECTIVE AREA(ACRES) = 25.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
TOTAL AREA(ACRES) = 25.6 PEAK FLOW RATE(CFS) = 54.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.66  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.630  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.30	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 5.90 SUBAREA RUNOFF(CFS) = 12.37  
EFFECTIVE AREA(ACRES) = 31.50 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
TOTAL AREA(ACRES) = 31.5 PEAK FLOW RATE(CFS) = 66.62

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 66.62  
FLOW VELOCITY(FEET/SEC.) = 8.68 FLOW DEPTH(FEET) = 1.60  
TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 10.86  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.86  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.601  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 13.25  
EFFECTIVE AREA(ACRES) = 37.90 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 37.9 PEAK FLOW RATE(CFS) = 79.04

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.86  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.601  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA (ACRES) =		0.60	SUBAREA RUNOFF (CFS) =		1.24
EFFECTIVE AREA (ACRES) =		38.50	AREA-AVERAGED Fm (INCH/HR) =		0.28
AREA-AVERAGED Fp (INCH/HR) =		0.30	AREA-AVERAGED Ap =		0.95
TOTAL AREA (ACRES) =		38.5	PEAK FLOW RATE (CFS) =		80.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 312.00 DOWNSTREAM (FEET) = 282.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 566.00 CHANNEL SLOPE = 0.0530  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 80.29  
FLOW VELOCITY (FEET/SEC.) = 7.83 FLOW DEPTH (FEET) = 1.85  
TRAVEL TIME (MIN.) = 1.21 Tc (MIN.) = 12.07  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 12.07  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.453  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658					
SUBAREA AREA (ACRES) =		5.00	SUBAREA RUNOFF (CFS) =		10.15
EFFECTIVE AREA (ACRES) =		43.50	AREA-AVERAGED Fm (INCH/HR) =		0.27
AREA-AVERAGED Fp (INCH/HR) =		0.30	AREA-AVERAGED Ap =		0.91
TOTAL AREA (ACRES) =		43.5	PEAK FLOW RATE (CFS) =		85.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 12.07  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.453  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	5.80	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA (ACRES) =		10.50	SUBAREA RUNOFF (CFS) =		20.34
EFFECTIVE AREA (ACRES) =		54.00	AREA-AVERAGED Fm (INCH/HR) =		0.28
AREA-AVERAGED Fp (INCH/HR) =		0.30	AREA-AVERAGED Ap =		0.93
TOTAL AREA (ACRES) =		54.0	PEAK FLOW RATE (CFS) =		105.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 216.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 954.00 CHANNEL SLOPE = 0.0692  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 105.65  
FLOW VELOCITY (FEET/SEC.) = 11.50 FLOW DEPTH (FEET) = 1.75  
TRAVEL TIME (MIN.) = 1.38 Tc (MIN.) = 13.45  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 13.45  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.305  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875					
SUBAREA AREA (ACRES) =		3.60	SUBAREA RUNOFF (CFS) =		6.62
EFFECTIVE AREA (ACRES) =		57.60	AREA-AVERAGED Fm (INCH/HR) =		0.28
AREA-AVERAGED Fp (INCH/HR) =		0.30	AREA-AVERAGED Ap =		0.93
TOTAL AREA (ACRES) =		57.6	PEAK FLOW RATE (CFS) =		105.65

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 13.45  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.305  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	9.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 SUBAREA AREA (ACRES) = 10.60      SUBAREA RUNOFF (CFS) = 19.13  
 EFFECTIVE AREA (ACRES) = 68.20      AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.94  
 TOTAL AREA (ACRES) = 68.2      PEAK FLOW RATE (CFS) = 124.23

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 13.45  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.305  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.934  
 SUBAREA AREA (ACRES) = 2.50      SUBAREA RUNOFF (CFS) = 4.56  
 EFFECTIVE AREA (ACRES) = 70.70      AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.94  
 TOTAL AREA (ACRES) = 70.7      PEAK FLOW RATE (CFS) = 128.78

END OF STUDY SUMMARY:  
 TOTAL AREA (ACRES) = 70.7      TC (MIN.) = 13.45  
 EFFECTIVE AREA (ACRES) = 70.70      AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.938  
 PEAK FLOW RATE (CFS) = 128.78

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2006 Advanced Engineering Software (aes)  
Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 5 \*  
\* HYDROLOGIC ANALYSIS - 25-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P505XX25.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.060
2)	6.000;	3.660
3)	7.000;	3.350
4)	8.000;	3.100
5)	9.000;	2.900
6)	10.000;	2.730
7)	11.000;	2.580
8)	12.000;	2.460
9)	13.000;	2.350
10)	14.000;	2.250
11)	15.000;	2.160
12)	20.000;	1.830
13)	25.000;	1.610
14)	30.000;	1.450
15)	40.000;	1.230
16)	50.000;	1.090
17)	60.000;	0.980
18)	90.000;	0.770
19)	120.000;	0.660
20)	180.000;	0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50500.00 TO NODE 50501.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 254.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 779.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.543  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.492  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "1 DWELLING/ACRE"	-	2.00	0.30	0.800	95	6.54

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.800  
SUBAREA RUNOFF(CFS) = 5.85  
TOTAL AREA(ACRES) = 2.00 PEAK FLOW RATE(CFS) = 5.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50501.00 TO NODE 50502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 779.00 DOWNSTREAM(FEET) = 765.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 382.00 CHANNEL SLOPE = 0.0366  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 5.85  
FLOW VELOCITY(FEET/SEC.) = 3.53 FLOW DEPTH(FEET) = 0.74  
TRAVEL TIME(MIN.) = 1.80  $T_c$ (MIN.) = 8.34  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50502.00 = 636.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50502.00 TO NODE 50502.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 8.34

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.031  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.60 0.30 0.800 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.840  
 SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 5.00  
 EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 10.03

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50502.00 TO NODE 50503.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 765.00 DOWNSTREAM (FEET) = 750.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 355.00 CHANNEL SLOPE = 0.0423  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 10.03  
 FLOW VELOCITY (FEET/SEC.) = 4.29 FLOW DEPTH (FEET) = 0.88  
 TRAVEL TIME (MIN.) = 1.38 Tc (MIN.) = 9.72  
 LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50503.00 = 991.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50503.00 TO NODE 50503.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----  
 MAINLINE Tc (MIN) = 9.72  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.777  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.70 0.30 0.800 -  
 USER-DEFINED - 1.30 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.890  
 SUBAREA AREA (ACRES) = 3.10 SUBAREA RUNOFF (CFS) = 7.00  
 EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.26  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 16.12

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50503.00 TO NODE 50504.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 750.00 DOWNSTREAM (FEET) = 712.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 261.00 CHANNEL SLOPE = 0.1456  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 16.12  
 FLOW VELOCITY (FEET/SEC.) = 7.68 FLOW DEPTH (FEET) = 0.84  
 TRAVEL TIME (MIN.) = 0.57 Tc (MIN.) = 10.29  
 LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50504.00 = 1252.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50504.00 TO NODE 50504.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----  
 MAINLINE Tc (MIN) = 10.29  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.687  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.90 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 13.53  
 EFFECTIVE AREA (ACRES) = 13.40 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
 TOTAL AREA (ACRES) = 13.4 PEAK FLOW RATE (CFS) = 29.07

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50504.00 TO NODE 50505.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 464.00 CHANNEL SLOPE = 0.2414  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 29.07  
 FLOW VELOCITY (FEET/SEC.) = 10.72 FLOW DEPTH (FEET) = 0.95  
 TRAVEL TIME (MIN.) = 0.72 Tc (MIN.) = 11.01  
 LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50505.00 = 1716.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50505.00 TO NODE 50505.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----  
 MAINLINE Tc (MIN) = 11.01  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.579  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.50 0.30 1.000 -  
 USER-DEFINED - 0.70 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.60 SUBAREA RUNOFF (CFS) = 5.33  
 EFFECTIVE AREA (ACRES) = 16.00 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93

TOTAL AREA (ACRES) = 16.0 PEAK FLOW RATE (CFS) = 33.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 50505.00 TO NODE 50506.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 535.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 310.00 CHANNEL SLOPE = 0.2097
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 33.10
FLOW VELOCITY (FEET/SEC.) = 10.50 FLOW DEPTH (FEET) = 1.03
TRAVEL TIME (MIN.) = 0.49 Tc (MIN.) = 11.50
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50506.00 = 2026.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50506.00 TO NODE 50506.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 11.50
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.520
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCs SOIL AREA Fp Ap SCs
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.80 0.30 0.800 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.70 0.30 1.000 -
USER-DEFINED - 2.70 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.941
SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 12.28
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.28
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 44.54

\*\*\*\*\*

FLOW PROCESS FROM NODE 50506.00 TO NODE 50507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 405.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.2658
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 44.54
FLOW VELOCITY (FEET/SEC.) = 12.36 FLOW DEPTH (FEET) = 1.10
TRAVEL TIME (MIN.) = 0.66 Tc (MIN.) = 12.16
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50507.00 = 2515.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50507.00 TO NODE 50507.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 12.16
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.442
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCs SOIL AREA Fp Ap SCs
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.800 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 1.30 0.30 1.000 -
USER-DEFINED - 2.80 0.30 1.000 -
USER-DEFINED - 5.20 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.988
SUBAREA AREA (ACRES) = 10.00 SUBAREA RUNOFF (CFS) = 19.31
EFFECTIVE AREA (ACRES) = 32.10 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 62.31

\*\*\*\*\*

FLOW PROCESS FROM NODE 50507.00 TO NODE 50508.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 285.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 706.00 CHANNEL SLOPE = 0.1700
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 62.31
FLOW VELOCITY (FEET/SEC.) = 11.34 FLOW DEPTH (FEET) = 1.35
TRAVEL TIME (MIN.) = 1.04 Tc (MIN.) = 13.20
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50508.00 = 3221.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50508.00 TO NODE 50508.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 13.20
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.330
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCs SOIL AREA Fp Ap SCs
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.40 0.30 0.100 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 5.10 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.945
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 12.16
EFFECTIVE AREA (ACRES) = 38.70 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA (ACRES) = 38.7 PEAK FLOW RATE (CFS) = 71.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 50508.00 TO NODE 50509.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 238.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1169.00 CHANNEL SLOPE = 0.0402
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 71.22
FLOW VELOCITY(FEET/SEC.) = 8.53 FLOW DEPTH(FEET) = 1.67
TRAVEL TIME(MIN.) = 2.28 Tc(MIN.) = 15.48
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50509.00 = 4390.00 FEET.

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*****
FLOW PROCESS FROM NODE 50509.00 TO NODE 50509.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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```

MAINLINE Tc(MIN) = 15.48
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.128
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED           -         0.10     0.30     1.000     -
USER-DEFINED           -         1.30     0.30     1.000     -
USER-DEFINED           -         6.90     0.30     1.000     -
USER-DEFINED           -         1.10     0.30     0.100     -
USER-DEFINED           -         0.80     0.30     1.000     -
USER-DEFINED           -         2.10     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.920
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 20.51
EFFECTIVE AREA(ACRES) = 51.00 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 51.0 PEAK FLOW RATE(CFS) = 84.70

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```

*****
FLOW PROCESS FROM NODE 50509.00 TO NODE 50509.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

```

MAINLINE Tc(MIN) = 15.48
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.128
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED           -         9.40     0.30     1.000     -
USER-DEFINED           -         0.70     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.10 SUBAREA RUNOFF(CFS) = 16.62
EFFECTIVE AREA(ACRES) = 61.10 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 61.1 PEAK FLOW RATE(CFS) = 101.32

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*****
FLOW PROCESS FROM NODE 50509.00 TO NODE 50510.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

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```

ELEVATION DATA: UPSTREAM(FEET) = 238.00 DOWNSTREAM(FEET) = 209.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1026.00 CHANNEL SLOPE = 0.0283
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 101.32
FLOW VELOCITY(FEET/SEC.) = 8.16 FLOW DEPTH(FEET) = 2.03
TRAVEL TIME(MIN.) = 2.10 Tc(MIN.) = 17.58
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50510.00 = 5416.00 FEET.

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 17.58
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.990
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED           -         0.10     0.30     1.000     -
USER-DEFINED           -         1.40     0.30     1.000     -
USER-DEFINED           -         4.40     0.30     1.000     -
USER-DEFINED           -         0.20     0.30     1.000     -
USER-DEFINED           -         1.50     0.30     1.000     -
USER-DEFINED           -        10.00     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 17.60 SUBAREA RUNOFF(CFS) = 26.77
EFFECTIVE AREA(ACRES) = 78.70 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 78.7 PEAK FLOW RATE(CFS) = 120.48

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN) = 17.58
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.990
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED           -         1.70     0.30     0.100     -
USER-DEFINED           -        13.10     0.30     1.000     -
USER-DEFINED           -         1.60     0.30     1.000     -
USER-DEFINED           -        12.70     0.30     1.000     -
USER-DEFINED           -         0.60     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.948
SUBAREA AREA(ACRES) = 29.70 SUBAREA RUNOFF(CFS) = 45.59
EFFECTIVE AREA(ACRES) = 108.40 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 108.4 PEAK FLOW RATE(CFS) = 166.07

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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=====
MAINLINE Tc(MIN) = 17.58
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.990
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
  LAND USE          GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         1.90     0.30     1.000     -
USER-DEFINED        -         1.70     0.30     1.000     -
USER-DEFINED        -         0.40     0.30     0.850     -
USER-DEFINED        -         3.40     0.30     1.000     -
USER-DEFINED        -         2.10     0.30     1.000     -
USER-DEFINED        -         1.10     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.994
SUBAREA AREA(ACRES) = 10.60      SUBAREA RUNOFF(CFS) = 16.14
EFFECTIVE AREA(ACRES) = 119.00   AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 119.0       PEAK FLOW RATE(CFS) = 182.21

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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=====
MAINLINE Tc(MIN) = 17.58
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.990
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
  LAND USE          GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.50     0.30     0.100     -
USER-DEFINED        -         0.30     0.30     1.000     -
USER-DEFINED        -         4.80     0.30     1.000     -
USER-DEFINED        -         2.60     0.30     1.000     -
USER-DEFINED        -         0.90     0.30     1.000     -
USER-DEFINED        -         7.50     0.30     0.850     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA AREA(ACRES) = 16.60      SUBAREA RUNOFF(CFS) = 25.67
EFFECTIVE AREA(ACRES) = 135.60   AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 135.6       PEAK FLOW RATE(CFS) = 207.88

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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=====
MAINLINE Tc(MIN) = 17.58
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.990
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
  LAND USE          GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         8.00     0.30     1.000     -
USER-DEFINED        -         2.80     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.80      SUBAREA RUNOFF(CFS) = 16.43
EFFECTIVE AREA(ACRES) = 146.40   AREA-AVERAGED Fm(INCH/HR) = 0.29

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=====
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 146.4       PEAK FLOW RATE(CFS) = 224.31
=====

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END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 146.4 TC(MIN.) = 17.58
EFFECTIVE AREA(ACRES) = 146.40 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.959
PEAK FLOW RATE(CFS) = 224.31
=====

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END OF RATIONAL METHOD ANALYSIS

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\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2006 Advanced Engineering Software (aes)  
Ver. 13.1 Release Date: 06/15/2006 License ID 1202

Analysis prepared by:

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 6 \*  
\* HYDROLOGIC ANALYSIS - 25-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P506XX25.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.000; 4.060
- 2) 6.000; 3.660
- 3) 7.000; 3.350
- 4) 8.000; 3.100
- 5) 9.000; 2.900
- 6) 10.000; 2.730
- 7) 11.000; 2.580
- 8) 12.000; 2.460
- 9) 13.000; 2.350
- 10) 14.000; 2.250
- 11) 15.000; 2.160
- 12) 20.000; 1.830
- 13) 25.000; 1.610
- 14) 30.000; 1.450
- 15) 40.000; 1.230
- 16) 50.000; 1.090
- 17) 60.000; 0.980
- 18) 90.000; 0.770
- 19) 120.000; 0.660
- 20) 180.000; 0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50600.00 TO NODE 50601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00  
ELEVATION DATA: UPSTREAM(FEET) = 780.00 DOWNSTREAM(FEET) = 730.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.166  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.705  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	1.40	0.30	1.000	95	10.17

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 3.03  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 3.03

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50601.00 TO NODE 50602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.1541  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.03  
FLOW VELOCITY(FEET/SEC.) = 5.09 FLOW DEPTH(FEET) = 0.45  
TRAVEL TIME(MIN.) = 1.17  $T_c$ (MIN.) = 11.33  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50602.00 = 671.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50602.00 TO NODE 50602.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.33

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.540  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.30 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 2.62  
 EFFECTIVE AREA (ACRES) = 2.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.7 PEAK FLOW RATE (CFS) = 5.44

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50602.00 TO NODE 50603.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 258.00 CHANNEL SLOPE = 0.2907  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 5.44  
 FLOW VELOCITY (FEET/SEC.) = 7.52 FLOW DEPTH (FEET) = 0.49  
 TRAVEL TIME (MIN.) = 0.57 Tc (MIN.) = 11.91  
 LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50603.00 = 929.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50603.00 TO NODE 50603.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 11.91  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.471  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.30 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 2.54  
 EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 7.82

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50603.00 TO NODE 50604.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 585.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 116.00 CHANNEL SLOPE = 0.1293  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 7.82  
 FLOW VELOCITY (FEET/SEC.) = 6.11 FLOW DEPTH (FEET) = 0.65  
 TRAVEL TIME (MIN.) = 0.32 Tc (MIN.) = 12.22

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50604.00 = 1045.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50604.00 TO NODE 50604.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.22  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.435  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.60 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 3.08  
 EFFECTIVE AREA (ACRES) = 5.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.6 PEAK FLOW RATE (CFS) = 10.76

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50604.00 TO NODE 50605.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 585.00 DOWNSTREAM (FEET) = 584.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 16.00 CHANNEL SLOPE = 0.0625  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 10.76  
 FLOW VELOCITY (FEET/SEC.) = 5.04 FLOW DEPTH (FEET) = 0.84  
 TRAVEL TIME (MIN.) = 0.05 Tc (MIN.) = 12.28  
 LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50605.00 = 1061.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50605.00 TO NODE 50605.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.28  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.430  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.00 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 9.58  
 EFFECTIVE AREA (ACRES) = 10.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 10.6 PEAK FLOW RATE (CFS) = 20.32

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50605.00 TO NODE 50606.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 584.00 DOWNSTREAM(FEET) = 579.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 122.00 CHANNEL SLOPE = 0.0410
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 20.32
FLOW VELOCITY(FEET/SEC.) = 5.06 FLOW DEPTH(FEET) = 1.16
TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 12.68
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50606.00 = 1183.00 FEET.

*****
FLOW PROCESS FROM NODE 50606.00 TO NODE 50606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.68
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.385
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 5.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 9.76
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 29.66

*****
FLOW PROCESS FROM NODE 50606.00 TO NODE 50607.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 579.00 DOWNSTREAM(FEET) = 528.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 637.00 CHANNEL SLOPE = 0.0801
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 29.66
FLOW VELOCITY(FEET/SEC.) = 7.13 FLOW DEPTH(FEET) = 1.18
TRAVEL TIME(MIN.) = 1.49 Tc(MIN.) = 14.17
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50607.00 = 1820.00 FEET.

*****
FLOW PROCESS FROM NODE 50607.00 TO NODE 50607.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.17
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.235
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 12.71
EFFECTIVE AREA(ACRES) = 23.10 AREA-AVERAGED Fm(INCH/HR) = 0.30

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AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 23.1 PEAK FLOW RATE(CFS) = 40.23

*****
FLOW PROCESS FROM NODE 50607.00 TO NODE 50608.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 422.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 529.00 CHANNEL SLOPE = 0.2004
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 40.23
FLOW VELOCITY(FEET/SEC.) = 10.86 FLOW DEPTH(FEET) = 1.11
TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 14.98
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50608.00 = 2349.00 FEET.

*****
FLOW PROCESS FROM NODE 50608.00 TO NODE 50608.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.98
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.162
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.30 0.30 1.000 -
USER-DEFINED - 0.70 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.03
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 43.74

*****
FLOW PROCESS FROM NODE 50608.00 TO NODE 50609.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 422.00 DOWNSTREAM(FEET) = 297.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 708.00 CHANNEL SLOPE = 0.1766
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 43.74
FLOW VELOCITY(FEET/SEC.) = 10.61 FLOW DEPTH(FEET) = 1.17
TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 16.09
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50609.00 = 3057.00 FEET.

*****
FLOW PROCESS FROM NODE 50609.00 TO NODE 50609.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 16.09

```

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.088  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.60	0.30	0.100	-
USER-DEFINED	-	7.90	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.880  
 SUBAREA AREA (ACRES) = 12.00 SUBAREA RUNOFF (CFS) = 19.70  
 EFFECTIVE AREA (ACRES) = 38.10 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 38.1 PEAK FLOW RATE (CFS) = 61.70

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50609.00 TO NODE 50610.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 297.00 DOWNSTREAM (FEET) = 207.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1321.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 61.70  
 FLOW VELOCITY (FEET/SEC.) = 10.04 FLOW DEPTH (FEET) = 1.43  
 TRAVEL TIME (MIN.) = 2.19 Tc (MIN.) = 18.28  
 LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50610.00 = 4378.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81  
 -----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN) = 18.28  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.943  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	4.40	0.30	1.000	-
USER-DEFINED	-	3.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.974  
 SUBAREA AREA (ACRES) = 10.20 SUBAREA RUNOFF (CFS) = 15.16  
 EFFECTIVE AREA (ACRES) = 48.30 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 48.3 PEAK FLOW RATE (CFS) = 71.89

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81  
 -----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN) = 18.28

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.943  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.15  
 EFFECTIVE AREA (ACRES) = 48.40 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 72.04

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81  
 -----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN) = 18.28  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.943  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 1.63  
 EFFECTIVE AREA (ACRES) = 49.50 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 49.5 PEAK FLOW RATE (CFS) = 73.67

END OF STUDY SUMMARY:  
 TOTAL AREA (ACRES) = 49.5 TC (MIN.) = 18.28  
 EFFECTIVE AREA (ACRES) = 49.50 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.965  
 PEAK FLOW RATE (CFS) = 73.67  
 =====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 7 \*  
\* HYDROLOGIC ANALYSIS - 25-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P507XX25.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.060
2)	6.000;	3.660
3)	7.000;	3.350
4)	8.000;	3.100
5)	9.000;	2.900
6)	10.000;	2.730
7)	11.000;	2.580
8)	12.000;	2.460
9)	13.000;	2.350
10)	14.000;	2.250
11)	15.000;	2.160
12)	20.000;	1.830
13)	25.000;	1.610
14)	30.000;	1.450
15)	40.000;	1.230
16)	50.000;	1.090
17)	60.000;	0.980
18)	90.000;	0.770
19)	120.000;	0.660
20)	180.000;	0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50700.00 TO NODE 50701.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 925.00 DOWNSTREAM(FEET) = 815.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.946  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.911  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"OPEN BRUSH"	-	0.20	0.30	1.000	95	8.95
NATURAL FAIR COVER						
"GRASS"	-	0.20	0.30	1.000	95	8.95
NATURAL FAIR COVER						
"OPEN BRUSH"	-	0.20	0.30	1.000	95	8.95

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.41  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.41

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50701.00 TO NODE 50702.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 815.00 DOWNSTREAM(FEET) = 800.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 169.00 CHANNEL SLOPE = 0.0888  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.41  
FLOW VELOCITY(FEET/SEC.) = 3.45 FLOW DEPTH(FEET) = 0.37  
TRAVEL TIME(MIN.) = 0.82  $T_c$ (MIN.) = 9.76  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50702.00 = 499.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50702.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.76  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.770  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 2.22  
EFFECTIVE AREA(ACRES) = 1.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 3.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50703.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====  
ELEVATION DATA: UPSTREAM(FEET) = 800.00 DOWNSTREAM(FEET) = 785.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 128.00 CHANNEL SLOPE = 0.1172  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.56  
FLOW VELOCITY(FEET/SEC.) = 4.88 FLOW DEPTH(FEET) = 0.49  
TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 10.20  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50703.00 = 627.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50703.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.20  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.700  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 3.46  
EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 6.91

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50704.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 775.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 6.91  
FLOW VELOCITY(FEET/SEC.) = 4.42 FLOW DEPTH(FEET) = 0.72  
TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 10.84  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50704.00 = 797.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50704.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.84  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.604  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 1.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 6.43  
EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 13.06

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50705.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====  
ELEVATION DATA: UPSTREAM(FEET) = 775.00 DOWNSTREAM(FEET) = 772.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 162.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 13.06  
FLOW VELOCITY(FEET/SEC.) = 3.35 FLOW DEPTH(FEET) = 1.14  
TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 11.65  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50705.00 = 959.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50705.00 TO NODE 50705.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 11.65  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.502  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -



USER-DEFINED - 2.50 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 8.52  
 EFFECTIVE AREA(ACRES) = 10.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 10.6 PEAK FLOW RATE(CFS) = 21.01

\*\*\*\*\*

FLOW PROCESS FROM NODE 50705.00 TO NODE 50706.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 772.00 DOWNSTREAM(FEET) = 745.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.0756  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 21.01  
 FLOW VELOCITY(FEET/SEC.) = 6.38 FLOW DEPTH(FEET) = 1.05  
 TRAVEL TIME(MIN.) = 0.93 Tc(MIN.) = 12.58  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50706.00 = 1316.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50706.00 TO NODE 50706.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 12.58  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.396

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 6.60  
 EFFECTIVE AREA(ACRES) = 14.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 14.1 PEAK FLOW RATE(CFS) = 26.60

\*\*\*\*\*

FLOW PROCESS FROM NODE 50706.00 TO NODE 50707.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 733.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 444.00 CHANNEL SLOPE = 0.0270  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 26.60  
 FLOW VELOCITY(FEET/SEC.) = 4.62 FLOW DEPTH(FEET) = 1.39  
 TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 14.18

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50707.00 = 1760.00 FEET.

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FLOW PROCESS FROM NODE 50707.00 TO NODE 50707.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 14.18  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.234

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.40	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 5.50 SUBAREA RUNOFF(CFS) = 9.57  
 EFFECTIVE AREA(ACRES) = 19.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 19.6 PEAK FLOW RATE(CFS) = 34.11

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FLOW PROCESS FROM NODE 50707.00 TO NODE 50708.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 733.00 DOWNSTREAM(FEET) = 675.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 467.00 CHANNEL SLOPE = 0.1242  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 34.11  
 FLOW VELOCITY(FEET/SEC.) = 8.73 FLOW DEPTH(FEET) = 1.14  
 TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 15.07  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50708.00 = 2227.00 FEET.

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FLOW PROCESS FROM NODE 50708.00 TO NODE 50708.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 15.07  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.155

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 7.01  
 EFFECTIVE AREA(ACRES) = 23.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 23.8 PEAK FLOW RATE(CFS) = 39.74

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FLOW PROCESS FROM NODE 50708.00 TO NODE 50709.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 619.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 516.00 CHANNEL SLOPE = 0.1085
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 39.74
FLOW VELOCITY(FEET/SEC.) = 8.60 FLOW DEPTH(FEET) = 1.24
TRAVEL TIME(MIN.) = 1.00 Tc(MIN.) = 16.07
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50709.00 = 2743.00 FEET.

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FLOW PROCESS FROM NODE 50709.00 TO NODE 50709.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 16.07
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.089
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 17.70 0.30 1.000 -
USER-DEFINED - 2.00 0.30 1.000 -
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.20 SUBAREA RUNOFF(CFS) = 32.53
EFFECTIVE AREA(ACRES) = 44.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 44.0 PEAK FLOW RATE(CFS) = 70.85

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FLOW PROCESS FROM NODE 50709.00 TO NODE 50710.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 619.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 650.00 CHANNEL SLOPE = 0.0292
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 70.85
FLOW VELOCITY(FEET/SEC.) = 7.51 FLOW DEPTH(FEET) = 1.77
TRAVEL TIME(MIN.) = 1.44 Tc(MIN.) = 17.51
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50710.00 = 3393.00 FEET.

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FLOW PROCESS FROM NODE 50710.00 TO NODE 50710.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 17.51
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.994
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.60 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 11.44
EFFECTIVE AREA(ACRES) = 51.50 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 51.5 PEAK FLOW RATE(CFS) = 78.52

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FLOW PROCESS FROM NODE 50710.00 TO NODE 50711.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 528.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 794.00 CHANNEL SLOPE = 0.0907
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 78.52
FLOW VELOCITY(FEET/SEC.) = 11.78 FLOW DEPTH(FEET) = 1.49
TRAVEL TIME(MIN.) = 1.12 Tc(MIN.) = 18.64
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50711.00 = 4187.00 FEET.

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FLOW PROCESS FROM NODE 50711.00 TO NODE 50711.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 18.64
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.920
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 33.10 0.30 1.000 -
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 1.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 34.90 SUBAREA RUNOFF(CFS) = 50.88
EFFECTIVE AREA(ACRES) = 86.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 86.4 PEAK FLOW RATE(CFS) = 125.97

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FLOW PROCESS FROM NODE 50711.00 TO NODE 50712.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 423.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1215.00 CHANNEL SLOPE = 0.0864
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 125.97
FLOW VELOCITY(FEET/SEC.) = 13.10 FLOW DEPTH(FEET) = 1.79
TRAVEL TIME(MIN.) = 1.55 Tc(MIN.) = 20.18

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LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50712.00 = 5402.00 FEET.

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FLOW PROCESS FROM NODE 50712.00 TO NODE 50712.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 20.18

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.822

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.900	-
USER-DEFINED	-	18.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.998

SUBAREA AREA(ACRES) = 18.60 SUBAREA RUNOFF(CFS) = 25.49

EFFECTIVE AREA(ACRES) = 105.00 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 105.0 PEAK FLOW RATE(CFS) = 143.84

\*\*\*\*\*

FLOW PROCESS FROM NODE 50712.00 TO NODE 50713.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 319.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 768.00 CHANNEL SLOPE = 0.1354

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00

CHANNEL FLOW THRU SUBAREA(CFS) = 143.84

FLOW VELOCITY(FEET/SEC.) = 16.04 FLOW DEPTH(FEET) = 1.73

TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 20.98

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50713.00 = 6170.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50713.00 TO NODE 50713.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 20.98

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.787

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	4.60	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.966

SUBAREA AREA(ACRES) = 5.30 SUBAREA RUNOFF(CFS) = 7.14

EFFECTIVE AREA(ACRES) = 110.30 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 110.3 PEAK FLOW RATE(CFS) = 147.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 50713.00 TO NODE 50714.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 319.00 DOWNSTREAM(FEET) = 182.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 1513.00 CHANNEL SLOPE = 0.0905

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00

CHANNEL FLOW THRU SUBAREA(CFS) = 147.66

FLOW VELOCITY(FEET/SEC.) = 13.82 FLOW DEPTH(FEET) = 1.89

TRAVEL TIME(MIN.) = 1.82 Tc(MIN.) = 22.81

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50714.00 = 7683.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.81

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.707

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	5.20	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	7.70	0.30	1.000	-
USER-DEFINED	-	2.60	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867

SUBAREA AREA(ACRES) = 17.60 SUBAREA RUNOFF(CFS) = 22.91

EFFECTIVE AREA(ACRES) = 127.90 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98

TOTAL AREA(ACRES) = 127.9 PEAK FLOW RATE(CFS) = 162.60

\*\*\*\*\*

FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.81

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.707

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	0.900	-
USER-DEFINED	-	52.70	0.30	1.000	-
USER-DEFINED	-	7.00	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999

SUBAREA AREA(ACRES) = 61.30 SUBAREA RUNOFF(CFS) = 77.62

EFFECTIVE AREA(ACRES) = 189.20 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 189.2 PEAK FLOW RATE(CFS) = 240.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.81

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.707

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	6.20	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 20.63

EFFECTIVE AREA(ACRES) = 205.50 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 205.5 PEAK FLOW RATE(CFS) = 260.85

\*\*\*\*\*

FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.81

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.707

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	7.60	0.30	1.000	-
USER-DEFINED	-	10.40	0.30	1.000	-
USER-DEFINED	-	7.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997

SUBAREA AREA(ACRES) = 25.90 SUBAREA RUNOFF(CFS) = 32.81

EFFECTIVE AREA(ACRES) = 231.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 231.4 PEAK FLOW RATE(CFS) = 293.66

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 231.4 TC(MIN.) = 22.81

EFFECTIVE AREA(ACRES) = 231.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.988

PEAK FLOW RATE(CFS) = 293.66

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 8 \*  
\* HYDROLOGIC ANALYSIS - 25-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P508XX25.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.060
2)	6.000;	3.660
3)	7.000;	3.350
4)	8.000;	3.100
5)	9.000;	2.900
6)	10.000;	2.730
7)	11.000;	2.580
8)	12.000;	2.460
9)	13.000;	2.350
10)	14.000;	2.250
11)	15.000;	2.160
12)	20.000;	1.830
13)	25.000;	1.610
14)	30.000;	1.450
15)	40.000;	1.230
16)	50.000;	1.090
17)	60.000;	0.980
18)	90.000;	0.770
19)	120.000;	0.660
20)	180.000;	0.520

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50800.00 TO NODE 50801.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00  
ELEVATION DATA: UPSTREAM(FEET) = 795.00 DOWNSTREAM(FEET) = 745.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.302  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.685  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.60	0.30	1.000	95	10.30

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.29  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50801.00 TO NODE 50802.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 725.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 245.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.29  
FLOW VELOCITY(FEET/SEC.) = 3.29 FLOW DEPTH(FEET) = 0.36  
TRAVEL TIME(MIN.) = 1.24  $T_c$ (MIN.) = 11.54  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50802.00 = 566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50802.00 TO NODE 50802.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.54

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.515  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 6.58  
 EFFECTIVE AREA (ACRES) = 3.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.9 PEAK FLOW RATE (CFS) = 7.77

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50802.00 TO NODE 50803.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 725.00 DOWNSTREAM (FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 325.00 CHANNEL SLOPE = 0.0769  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 7.77  
 FLOW VELOCITY (FEET/SEC.) = 5.00 FLOW DEPTH (FEET) = 0.72  
 TRAVEL TIME (MIN.) = 1.08 Tc (MIN.) = 12.63  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50803.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50803.00 TO NODE 50803.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----  
 MAINLINE Tc (MIN) = 12.63  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.391  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.50 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.50 SUBAREA RUNOFF (CFS) = 2.82  
 EFFECTIVE AREA (ACRES) = 5.40 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.4 PEAK FLOW RATE (CFS) = 10.16

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50803.00 TO NODE 50804.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 652.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 594.00 CHANNEL SLOPE = 0.0808  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 10.16  
 FLOW VELOCITY (FEET/SEC.) = 5.45 FLOW DEPTH (FEET) = 0.79

TRAVEL TIME (MIN.) = 1.82 Tc (MIN.) = 14.45  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50804.00 = 1485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50804.00 TO NODE 50804.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----  
 MAINLINE Tc (MIN) = 14.45  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.210  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 10.49  
 EFFECTIVE AREA (ACRES) = 11.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 11.5 PEAK FLOW RATE (CFS) = 19.77

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50804.00 TO NODE 50805.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 652.00 DOWNSTREAM (FEET) = 542.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 499.00 CHANNEL SLOPE = 0.2204  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 19.77  
 FLOW VELOCITY (FEET/SEC.) = 9.42 FLOW DEPTH (FEET) = 0.84  
 TRAVEL TIME (MIN.) = 0.88 Tc (MIN.) = 15.33  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50805.00 = 1984.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50805.00 TO NODE 50805.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----  
 MAINLINE Tc (MIN) = 15.33  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.138  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.70 0.30 1.000 -  
 USER-DEFINED - 1.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 5.20 SUBAREA RUNOFF (CFS) = 8.60  
 EFFECTIVE AREA (ACRES) = 16.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 16.7 PEAK FLOW RATE (CFS) = 27.63

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50805.00 TO NODE 50806.00 IS CODE = 51

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-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 542.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 650.00 CHANNEL SLOPE = 0.1415
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 27.63
FLOW VELOCITY(FEET/SEC.) = 8.63 FLOW DEPTH(FEET) = 1.03
TRAVEL TIME(MIN.) = 1.25 Tc(MIN.) = 16.58
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50806.00 = 2634.00 FEET.

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*****
FLOW PROCESS FROM NODE 50806.00 TO NODE 50806.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 16.58
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.055
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.20     0.30     1.000   -
USER-DEFINED        -         1.50     0.30     1.000   -
USER-DEFINED        -         0.50     0.30     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 8.22
EFFECTIVE AREA(ACRES) = 21.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 21.9 PEAK FLOW RATE(CFS) = 34.60

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*****
FLOW PROCESS FROM NODE 50806.00 TO NODE 50807.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 639.00 CHANNEL SLOPE = 0.0782
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 34.60
FLOW VELOCITY(FEET/SEC.) = 7.33 FLOW DEPTH(FEET) = 1.25
TRAVEL TIME(MIN.) = 1.45 Tc(MIN.) = 18.04
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50807.00 = 3273.00 FEET.

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*****
FLOW PROCESS FROM NODE 50807.00 TO NODE 50807.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 18.04
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.960
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN

```

```

USER-DEFINED        -         15.50     0.30     1.000   -
USER-DEFINED        -         0.10     0.30     1.000   -
USER-DEFINED        -         0.30     0.30     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 23.75
EFFECTIVE AREA(ACRES) = 37.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 56.46

```

```

*****
FLOW PROCESS FROM NODE 50807.00 TO NODE 50808.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 350.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 448.00 CHANNEL SLOPE = 0.1116
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 56.46
FLOW VELOCITY(FEET/SEC.) = 9.49 FLOW DEPTH(FEET) = 1.41
TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 18.82
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50808.00 = 3721.00 FEET.

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*****
FLOW PROCESS FROM NODE 50808.00 TO NODE 50808.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 18.82
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.908
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap   SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         6.90     0.30     1.000   -
USER-DEFINED        -         0.60     0.30     1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 10.85
EFFECTIVE AREA(ACRES) = 45.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 45.3 PEAK FLOW RATE(CFS) = 65.55

```

```

*****
FLOW PROCESS FROM NODE 50808.00 TO NODE 50809.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 283.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 438.00 CHANNEL SLOPE = 0.1530
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 65.55
FLOW VELOCITY(FEET/SEC.) = 11.04 FLOW DEPTH(FEET) = 1.41
TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 19.48
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50809.00 = 4159.00 FEET.

```

```
*****
FLOW PROCESS FROM NODE 50809.00 TO NODE 50809.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 19.48
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.864
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     0.100    -
USER-DEFINED        -         5.70     0.30     1.000    -
USER-DEFINED        -         1.30     0.30     1.000    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.975
SUBAREA AREA(ACRES) = 7.20     SUBAREA RUNOFF(CFS) = 10.18
EFFECTIVE AREA(ACRES) = 52.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 52.5     PEAK FLOW RATE(CFS) = 73.95
```

```
*****
FLOW PROCESS FROM NODE 50809.00 TO NODE 50810.00 IS CODE = 51
-----
```

```
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 283.00 DOWNSTREAM(FEET) = 243.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.00 CHANNEL SLOPE = 0.0602
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 73.95
FLOW VELOCITY(FEET/SEC.) = 10.02 FLOW DEPTH(FEET) = 1.57
TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 20.59
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50810.00 = 4824.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 50810.00 TO NODE 50810.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 20.59
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.804
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20     0.30     0.100    -
USER-DEFINED        -        41.90     0.30     1.000    -
USER-DEFINED        -         4.90     0.30     1.000    -
USER-DEFINED        -         4.40     0.30     1.000    -
USER-DEFINED        -         9.90     0.30     1.000    -
USER-DEFINED        -         1.20     0.30     1.000    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.983
SUBAREA AREA(ACRES) = 63.50     SUBAREA RUNOFF(CFS) = 86.25
EFFECTIVE AREA(ACRES) = 116.00   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 116.0     PEAK FLOW RATE(CFS) = 157.37
```

```
*****
FLOW PROCESS FROM NODE 50810.00 TO NODE 50811.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 243.00 DOWNSTREAM(FEET) = 173.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1122.00 CHANNEL SLOPE = 0.0624
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 157.37
FLOW VELOCITY(FEET/SEC.) = 9.86 FLOW DEPTH(FEET) = 2.31
TRAVEL TIME(MIN.) = 1.90 Tc(MIN.) = 22.49
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50811.00 = 5946.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81
-----
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```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 22.49
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.721
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         4.00     0.30     1.000    -
USER-DEFINED        -         0.40     0.30     1.000    -
USER-DEFINED        -         2.70     0.30     1.000    -
USER-DEFINED        -         0.30     0.30     0.100    -
USER-DEFINED        -         3.00     0.30     1.000    -
USER-DEFINED        -         1.10     0.30     1.000    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.977
SUBAREA AREA(ACRES) = 11.50     SUBAREA RUNOFF(CFS) = 14.78
EFFECTIVE AREA(ACRES) = 127.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 127.5     PEAK FLOW RATE(CFS) = 163.43
```

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*****
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81
-----
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```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 22.49
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.721
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     1.000    -
USER-DEFINED        -         1.90     0.30     1.000    -
USER-DEFINED        -         0.20     0.30     1.000    -
USER-DEFINED        -         0.80     0.30     1.000    -
USER-DEFINED        -         0.20     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     1.000    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.40     SUBAREA RUNOFF(CFS) = 4.35
```



EFFECTIVE AREA(ACRES) = 130.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 130.9 PEAK FLOW RATE(CFS) = 167.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 22.49  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.721

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.51

EFFECTIVE AREA(ACRES) = 131.30 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 131.3 PEAK FLOW RATE(CFS) = 168.28

-----

END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 131.3 TC(MIN.) = 22.49

EFFECTIVE AREA(ACRES) = 131.30 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.988

PEAK FLOW RATE(CFS) = 168.28

-----  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S31 \*  
\* Rational Method Hydrology Analysis - 25-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S31.DAT  
TIME/DATE OF STUDY: 16:09 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.080
- 2) 10.00; 2.729
- 3) 15.00; 2.163
- 4) 20.00; 1.834
- 5) 25.00; 1.614
- 6) 30.00; 1.440
- 7) 40.00; 1.233
- 8) 50.00; 1.085
- 9) 60.00; 0.950
- 10) 90.00; 0.775
- 11) 120.00; 0.657
- 12) 180.00; 0.530
- 13) 360.00; 0.367
- 14) 1440.00; 0.153

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13100.00 TO NODE 13101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.58  
ELEVATION DATA: UPSTREAM(FEET) = 1069.66 DOWNSTREAM(FEET) = 969.92

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.312  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.185  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.94	0.30	1.000	0	8.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.44  
TOTAL AREA(ACRES) = 0.94 PEAK FLOW RATE(CFS) = 2.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13101.00 TO NODE 13102.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 969.92 DOWNSTREAM(FEET) = 807.20  
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.89 CHANNEL SLOPE = 0.2444  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.25  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.639  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.67	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.57  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.47  
AVERAGE FLOW DEPTH(FEET) = 0.23 TRAVEL TIME(MIN.) = 2.48  
Tc(MIN.) = 10.79  
SUBAREA AREA(ACRES) = 7.67 SUBAREA RUNOFF(CFS) = 16.15  
EFFECTIVE AREA(ACRES) = 8.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 18.13  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.32

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.32 FLOW VELOCITY(FEET/SEC.) = 5.40  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13102.00 = 948.47 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13102.00 TO NODE 13103.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	807.20	DOWNSTREAM(FEET) =	769.94
CHANNEL LENGTH THRU SUBAREA(FEET) =	691.01	CHANNEL SLOPE =	0.0539
GIVEN CHANNEL BASE(FEET) =	10.00	CHANNEL FREEBOARD(FEET) =	0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.78  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.336

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	20.65	0.30	0.999	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.12  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.30  
AVERAGE FLOW DEPTH(FEET) = 0.75 TRAVEL TIME(MIN.) = 2.68  
Tc(MIN.) = 13.47

SUBAREA AREA(ACRES) = 20.65 SUBAREA RUNOFF(CFS) = 37.85  
EFFECTIVE AREA(ACRES) = 29.26 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 29.3 PEAK FLOW RATE(CFS) = 53.63  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.93 FLOW VELOCITY(FEET/SEC.) = 4.87  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13103.00 = 1639.48 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	769.94	DOWNSTREAM(FEET) =	693.88
FLOW LENGTH(FEET) =	1563.10	MANNING'S N =	0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO	36.000		
DEPTH OF FLOW IN 36.0 INCH PIPE IS	15.5 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	18.45		
ESTIMATED PIPE DIAMETER(INCH) =	36.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	53.63		
PIPE TRAVEL TIME(MIN.) =	1.41	Tc(MIN.) =	14.88
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13104.00 =	3202.58 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.88  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.176

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	28.00	0.30	0.750	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750  
SUBAREA AREA(ACRES) = 28.00 SUBAREA RUNOFF(CFS) = 49.18  
EFFECTIVE AREA(ACRES) = 57.26 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 57.3 PEAK FLOW RATE(CFS) = 98.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	693.88	DOWNSTREAM(FEET) =	645.69
FLOW LENGTH(FEET) =	1068.98	MANNING'S N =	0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO	36.000		
DEPTH OF FLOW IN 36.0 INCH PIPE IS	22.9 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	20.77		
ESTIMATED PIPE DIAMETER(INCH) =	36.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	98.59		
PIPE TRAVEL TIME(MIN.) =	0.86	Tc(MIN.) =	15.74
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13105.00 =	4271.56 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.74  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.114

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	35.28	0.30	0.867	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867  
SUBAREA AREA(ACRES) = 35.28 SUBAREA RUNOFF(CFS) = 58.88  
EFFECTIVE AREA(ACRES) = 92.54 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 154.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	645.69	DOWNSTREAM(FEET) =	608.48
FLOW LENGTH(FEET) =	1127.55	MANNING'S N =	0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS	30.9 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	20.36		
ESTIMATED PIPE DIAMETER(INCH) =	42.00	NUMBER OF PIPES =	1

PIPE-FLOW(CFS) = 154.28  
PIPE TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 16.66  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.66  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.054  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 37.68 0.30 0.889 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.889  
SUBAREA AREA(ACRES) = 37.68 SUBAREA RUNOFF(CFS) = 60.60  
EFFECTIVE AREA(ACRES) = 130.22 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 130.2 PEAK FLOW RATE(CFS) = 209.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 15.1

>>>>DEFINE MEMORY BANK # 2 <<<<<

PEAK FLOWRATE TABLE FILE NAME: S30.DNA  
MEMORY BANK # 2 DEFINED AS FOLLOWS:  
STREAM Q Tc Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (ACRES) NODE  
1 1841.40 38.39 0.30( 0.24) 0.81 1996.2 13000.00  
2 1786.54 40.48 0.30( 0.24) 0.81 2016.1 13010.00  
TOTAL AREA(ACRES) = 2016.1

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 14.0

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<<

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1841.40	38.39	0.30( 0.24)	0.81	1996.2	13000.00
2	1786.54	40.48	0.30( 0.24)	0.81	2016.1	13010.00
TOTAL AREA(ACRES) =						2016.1

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13026.00 TO NODE 13106.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 662.66 DOWNSTREAM(FEET) = 608.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 3098.88 CHANNEL SLOPE = 0.0175  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.76  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.191

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	75.28	0.30	0.755	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1874.09  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.67  
AVERAGE FLOW DEPTH(FEET) = 2.76 TRAVEL TIME(MIN.) = 4.43  
Tc(MIN.) = 42.81  
SUBAREA AREA(ACRES) = 75.28 SUBAREA RUNOFF(CFS) = 65.38  
EFFECTIVE AREA(ACRES) = 2071.52 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 2091.4 PEAK FLOW RATE(CFS) = 1841.40

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.73 FLOW VELOCITY(FEET/SEC.) = 11.61  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1841.40	42.81	1.191	0.30( 0.24)	0.80	2071.5	13000.00
2	1786.54	44.94	1.160	0.30( 0.24)	0.80	2091.4	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1841.40 Tc(MIN.) = 42.81  
AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA(ACRES) = 2071.52

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1841.40	42.81	1.191	0.30( 0.24)	0.80	2071.5	13000.00
2	1786.54	44.94	1.160	0.30( 0.24)	0.80	2091.4	13010.00

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	209.83	16.66	2.054	0.30( 0.26)	0.88	130.2	13100.00

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1576.75	16.66	2.054	0.30 ( 0.24)	0.81	936.5	13100.00
2	1950.17	42.81	1.191	0.30 ( 0.24)	0.81	2201.7	13000.00
3	1891.62	44.94	1.160	0.30 ( 0.24)	0.81	2221.6	13010.00
TOTAL AREA (ACRES) =							2221.6

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1950.17 Tc (MIN.) = 42.814  
 EFFECTIVE AREA (ACRES) = 2201.74 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 2221.6  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13106.00 TO NODE 13107.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 608.48 DOWNSTREAM (FEET) = 584.29  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1650.20 CHANNEL SLOPE = 0.0147  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.04  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.156

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	190.45	0.30	0.755	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2029.80  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.32  
 AVERAGE FLOW DEPTH (FEET) = 3.03 TRAVEL TIME (MIN.) = 2.43  
 Tc (MIN.) = 45.24  
 SUBAREA AREA (ACRES) = 190.45 SUBAREA RUNOFF (CFS) = 159.25  
 EFFECTIVE AREA (ACRES) = 2392.19 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA (ACRES) = 2412.1 PEAK FLOW RATE (CFS) = 1968.75  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.98 FLOW VELOCITY (FEET/SEC.) = 11.21  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13107.00 = 20924.84 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1667.01	19.23	1.885	0.30 ( 0.24)	0.80	1126.9	13100.00
2	1968.75	45.24	1.156	0.30 ( 0.24)	0.80	2392.2	13000.00
3	1916.07	47.40	1.124	0.30 ( 0.24)	0.80	2412.1	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1968.75 Tc (MIN.) = 45.24  
 AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA (ACRES) = 2392.19

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13107.00 TO NODE 13108.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 584.29 DOWNSTREAM (FEET) = 563.78  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1061.67 CHANNEL SLOPE = 0.0193  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.86  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.135

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	314.12	0.30	0.939	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.939  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2089.32  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.52  
 AVERAGE FLOW DEPTH (FEET) = 2.85 TRAVEL TIME (MIN.) = 1.41  
 Tc (MIN.) = 46.66  
 SUBAREA AREA (ACRES) = 314.12 SUBAREA RUNOFF (CFS) = 241.14  
 EFFECTIVE AREA (ACRES) = 2706.31 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 2726.2 PEAK FLOW RATE (CFS) = 2164.85  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.91 FLOW VELOCITY (FEET/SEC.) = 12.67  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13108.00 = 21986.51 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2015.05	20.70	1.804	0.30 ( 0.25)	0.83	1441.1	13100.00
2	2164.85	46.66	1.135	0.30 ( 0.25)	0.82	2706.3	13000.00
3	2102.29	48.83	1.102	0.30 ( 0.25)	0.82	2726.2	13010.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 2164.85 Tc (MIN.) = 46.66  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2706.31

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13108.00 TO NODE 13109.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 563.78 DOWNSTREAM (FEET) = 541.61  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1657.28 CHANNEL SLOPE = 0.0134  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.30  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.099  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 203.63 0.30 0.785 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2243.94  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.35  
 AVERAGE FLOW DEPTH (FEET) = 3.30 TRAVEL TIME (MIN.) = 2.43  
 Tc (MIN.) = 49.09  
 SUBAREA AREA (ACRES) = 203.63 SUBAREA RUNOFF (CFS) = 158.18  
 EFFECTIVE AREA (ACRES) = 2909.94 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 2929.8 PEAK FLOW RATE (CFS) = 2235.30  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.29 FLOW VELOCITY (FEET/SEC.) = 11.34  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13109.00 = 23643.79 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2141.68	23.16	1.695	0.30 (0.25)	0.83	1644.7	13100.00
2	2235.30	49.09	1.099	0.30 (0.25)	0.82	2909.9	13000.00
3	2169.63	51.28	1.068	0.30 (0.24)	0.82	2929.8	13010.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 2235.30 Tc (MIN.) = 49.09  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2909.94

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13109.00 TO NODE 13110.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 541.61 DOWNSTREAM (FEET) = 509.94  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 2016.96 CHANNEL SLOPE = 0.0157  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.23  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.060  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 283.06 0.30 0.791 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.791  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2340.10  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.14  
 AVERAGE FLOW DEPTH (FEET) = 3.23 TRAVEL TIME (MIN.) = 2.77  
 Tc (MIN.) = 51.86

SUBAREA AREA (ACRES) = 283.06 SUBAREA RUNOFF (CFS) = 209.59  
 EFFECTIVE AREA (ACRES) = 3193.00 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3212.9 PEAK FLOW RATE (CFS) = 2343.81  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.23 FLOW VELOCITY (FEET/SEC.) = 12.15  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13110.00 = 25660.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2315.78	25.94	1.581	0.30 (0.25)	0.82	1927.8	13100.00
2	2343.81	51.86	1.060	0.30 (0.24)	0.81	3193.0	13000.00
3	2272.06	54.08	1.030	0.30 (0.24)	0.81	3212.9	13010.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 2343.81 Tc (MIN.) = 51.86  
 AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA (ACRES) = 3193.00

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13110.00 TO NODE 13111.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 509.94 DOWNSTREAM (FEET) = 461.07  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 3058.95 CHANNEL SLOPE = 0.0160  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.29  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.004  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 248.05 0.30 0.783 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2429.71  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.36  
 AVERAGE FLOW DEPTH (FEET) = 3.28 TRAVEL TIME (MIN.) = 4.12  
 Tc (MIN.) = 55.98  
 SUBAREA AREA (ACRES) = 248.05 SUBAREA RUNOFF (CFS) = 171.77  
 EFFECTIVE AREA (ACRES) = 3441.05 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3460.9 PEAK FLOW RATE (CFS) = 2355.48  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.22 FLOW VELOCITY (FEET/SEC.) = 12.24  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13111.00 = 28719.70 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2337.39	30.06	1.439	0.30( 0.25)	0.82	2175.8	13100.00
2	2355.48	55.98	1.004	0.30( 0.24)	0.81	3441.0	13000.00
3	2274.25	58.24	0.974	0.30( 0.24)	0.81	3460.9	13010.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 2355.48 Tc(MIN.) = 55.98  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3441.05

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13111.00 TO NODE 13112.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 461.07 DOWNSTREAM(FEET) = 452.77  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1781.78 CHANNEL SLOPE = 0.0047  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.64  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 0.955  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	179.91	0.30	0.694	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.694  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2415.95  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.14  
 AVERAGE FLOW DEPTH(FEET) = 4.64 TRAVEL TIME(MIN.) = 3.65  
 Tc(MIN.) = 59.63

SUBAREA AREA(ACRES) = 179.91 SUBAREA RUNOFF(CFS) = 120.93  
 EFFECTIVE AREA(ACRES) = 3620.96 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3640.9 PEAK FLOW RATE(CFS) = 2355.48  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 4.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 4.57 FLOW VELOCITY(FEET/SEC.) = 8.08  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13112.00 = 30501.48 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2377.04	33.69	1.364	0.30( 0.24)	0.81	2355.7	13100.00
2	2355.48	59.63	0.955	0.30( 0.24)	0.81	3621.0	13000.00
3	2283.49	61.93	0.939	0.30( 0.24)	0.81	3640.9	13010.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 2377.04 Tc(MIN.) = 33.69  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 2355.71

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13112.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 452.77 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1625.01 CHANNEL SLOPE = 0.0155  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.33  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.318

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	155.96	0.30	0.836	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.836  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2451.94  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.30  
 AVERAGE FLOW DEPTH(FEET) = 3.32 TRAVEL TIME(MIN.) = 2.20  
 Tc(MIN.) = 35.90

SUBAREA AREA(ACRES) = 155.96 SUBAREA RUNOFF(CFS) = 149.81  
 EFFECTIVE AREA(ACRES) = 2511.67 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3796.8 PEAK FLOW RATE(CFS) = 2430.28

GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.31 FLOW VELOCITY(FEET/SEC.) = 12.26  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13222.00 = 32126.49 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2430.28	35.90	1.318	0.30( 0.24)	0.81	2511.7	13100.00
2	2369.04	61.85	0.939	0.30( 0.24)	0.81	3776.9	13000.00
3	2335.36	64.17	0.926	0.30( 0.24)	0.81	3796.8	13010.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 2430.28 Tc(MIN.) = 35.90  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 2511.67

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 3796.8 TC(MIN.) = 35.90  
 EFFECTIVE AREA(ACRES) = 2511.67 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.810  
 PEAK FLOW RATE(CFS) = 2430.28

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2430.28	35.90	1.318	0.30( 0.24)	0.81	2511.7	13100.00
2	2369.04	61.85	0.939	0.30( 0.24)	0.81	3776.9	13000.00
3	2335.36	64.17	0.926	0.30( 0.24)	0.81	3796.8	13010.00

END OF RATIONAL METHOD ANALYSIS





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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S32 \*  
\* Rational Method Hydrology Analysis - 25-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S32.DAT  
TIME/DATE OF STUDY: 16:09 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.080
- 2) 10.00; 2.729
- 3) 15.00; 2.163
- 4) 20.00; 1.834
- 5) 25.00; 1.614
- 6) 30.00; 1.440
- 7) 40.00; 1.233
- 8) 50.00; 1.085
- 9) 60.00; 0.950
- 10) 90.00; 0.775
- 11) 120.00; 0.657
- 12) 180.00; 0.530
- 13) 360.00; 0.367
- 14) 1440.00; 0.153

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13200.00 TO NODE 13201.00 IS CODE = 21  
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 298.57  
ELEVATION DATA: UPSTREAM(FEET) = 1069.04 DOWNSTREAM(FEET) = 1005.76

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.888  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.67	0.30	1.000	0	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.56  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 1.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13201.00 TO NODE 13202.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.76 DOWNSTREAM(FEET) = 896.98  
CHANNEL LENGTH THRU SUBAREA(FEET) = 747.55 CHANNEL SLOPE = 0.1455  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.26  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.396  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.62  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.52  
AVERAGE FLOW DEPTH(FEET) = 0.23 TRAVEL TIME(MIN.) = 3.53  
Tc(MIN.) = 12.94  
SUBAREA AREA(ACRES) = 7.42 SUBAREA RUNOFF(CFS) = 14.00  
EFFECTIVE AREA(ACRES) = 8.09 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.1 PEAK FLOW RATE(CFS) = 15.26  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.33 FLOW VELOCITY(FEET/SEC.) = 4.30  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13202.00 = 1046.12 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	896.98	DOWNSTREAM(FEET) =	840.27
FLOW LENGTH(FEET) =	1789.59	MANNING'S N =	0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO	36.000		
DEPTH OF FLOW IN 36.0 INCH PIPE IS	9.0 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	11.13		
ESTIMATED PIPE DIAMETER(INCH) =	36.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	15.26		
PIPE TRAVEL TIME(MIN.) =	2.68	Tc(MIN.) =	15.62
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13203.00 =	2835.71 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	15.62				
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	2.122				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	38.89	0.30	0.731	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.731				
SUBAREA AREA(ACRES) =	38.89	SUBAREA RUNOFF(CFS) =	66.60		
EFFECTIVE AREA(ACRES) =	46.98	AREA-AVERAGED Fm(INCH/HR) =	0.23		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.78		
TOTAL AREA(ACRES) =	47.0	PEAK FLOW RATE(CFS) =	79.87		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	840.27	DOWNSTREAM(FEET) =	782.97
FLOW LENGTH(FEET) =	992.54	MANNING'S N =	0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO	36.000		
DEPTH OF FLOW IN 36.0 INCH PIPE IS	18.5 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	21.77		
ESTIMATED PIPE DIAMETER(INCH) =	36.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	79.87		
PIPE TRAVEL TIME(MIN.) =	0.76	Tc(MIN.) =	16.38
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13204.00 =	3828.25 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.38  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.072  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	83.09	0.30	0.645	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.645				
SUBAREA AREA(ACRES) =	83.09	SUBAREA RUNOFF(CFS) =	140.49		
EFFECTIVE AREA(ACRES) =	130.07	AREA-AVERAGED Fm(INCH/HR) =	0.21		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.69		
TOTAL AREA(ACRES) =	130.1	PEAK FLOW RATE(CFS) =	218.24		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	782.97	DOWNSTREAM(FEET) =	692.52
FLOW LENGTH(FEET) =	2046.57	MANNING'S N =	0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS	33.5 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	24.73		
ESTIMATED PIPE DIAMETER(INCH) =	45.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	218.24		
PIPE TRAVEL TIME(MIN.) =	1.38	Tc(MIN.) =	17.76
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13205.00 =	5874.82 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	17.76				
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	1.981				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	88.51	0.30	0.679	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.679				
SUBAREA AREA(ACRES) =	88.51	SUBAREA RUNOFF(CFS) =	141.62		
EFFECTIVE AREA(ACRES) =	218.58	AREA-AVERAGED Fm(INCH/HR) =	0.21		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.69		
TOTAL AREA(ACRES) =	218.6	PEAK FLOW RATE(CFS) =	349.24		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13205.00 TO NODE 13206.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	692.52	DOWNSTREAM(FEET) =	605.24
CHANNEL LENGTH THRU SUBAREA(FEET) =	2704.69	CHANNEL SLOPE =	0.0323
GIVEN CHANNEL BASE(FEET) =	10.00	CHANNEL FREEBOARD(FEET) =	0.0
"Z" FACTOR =	2.000	MANNING'S FACTOR =	0.040
*ESTIMATED CHANNEL HEIGHT(FEET) =	2.89		
* 25 YEAR RAINFALL INTENSITY(INCH/HR) =	1.742		

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	163.73	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 458.82  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.41  
AVERAGE FLOW DEPTH(FEET) = 2.82 TRAVEL TIME(MIN.) = 4.33  
Tc(MIN.) = 22.09  
SUBAREA AREA(ACRES) = 163.73 SUBAREA RUNOFF(CFS) = 218.81  
EFFECTIVE AREA(ACRES) = 382.31 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 382.3 PEAK FLOW RATE(CFS) = 521.00  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.01 FLOW VELOCITY(FEET/SEC.) = 10.80  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13206.00 = 8579.51 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13206.00 TO NODE 13207.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 604.78  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.47  
AVERAGE FLOW DEPTH(FEET) = 3.68 TRAVEL TIME(MIN.) = 4.37  
Tc(MIN.) = 26.46  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 167.41  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 626.89  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.74

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 604.78  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.47  
AVERAGE FLOW DEPTH(FEET) = 3.68 TRAVEL TIME(MIN.) = 4.37  
Tc(MIN.) = 26.46  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 167.41  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 626.89  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.74 FLOW VELOCITY(FEET/SEC.) = 9.58  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13207.00 = 11058.66 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 694.52  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.20  
AVERAGE FLOW DEPTH(FEET) = 3.60 TRAVEL TIME(MIN.) = 2.58  
Tc(MIN.) = 29.04  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 135.24  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 719.57  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.67

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 694.52  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.20  
AVERAGE FLOW DEPTH(FEET) = 3.60 TRAVEL TIME(MIN.) = 2.58  
Tc(MIN.) = 29.04  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 135.24  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 719.57  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.67

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.67 FLOW VELOCITY(FEET/SEC.) = 11.32  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 29.04  
RAINFALL INTENSITY(INCH/HR) = 1.47  
AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.81  
EFFECTIVE STREAM AREA(ACRES) = 649.28  
TOTAL STREAM AREA(ACRES) = 649.28  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 719.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13210.00 TO NODE 13211.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.51  
ELEVATION DATA: UPSTREAM(FEET) = 949.80 DOWNSTREAM(FEET) = 828.64

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.525  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.127  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 NATURAL FAIR COVER  
 "OPEN BRUSH" - 1.96 0.30 1.000 0 8.53  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 4.99  
 TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 4.99

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13211.00 TO NODE 13212.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 828.64 DOWNSTREAM(FEET) = 767.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 652.49 CHANNEL SLOPE = 0.0930  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.45

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.582

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 11.95 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.35  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.92  
 AVERAGE FLOW DEPTH(FEET) = 0.41 TRAVEL TIME(MIN.) = 2.77  
 Tc(MIN.) = 11.30

SUBAREA AREA(ACRES) = 11.95 SUBAREA RUNOFF(CFS) = 24.54  
 EFFECTIVE AREA(ACRES) = 13.91 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 28.57  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.55 FLOW VELOCITY(FEET/SEC.) = 4.71  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13212.00 = 967.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13212.00 TO NODE 13213.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 767.94 DOWNSTREAM(FEET) = 706.43  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 967.91 CHANNEL SLOPE = 0.0635  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.91

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.223

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 27.07 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 52.11  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.08  
 AVERAGE FLOW DEPTH(FEET) = 0.87 TRAVEL TIME(MIN.) = 3.17  
 Tc(MIN.) = 14.47  
 SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 46.85  
 EFFECTIVE AREA(ACRES) = 40.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 41.0 PEAK FLOW RATE(CFS) = 70.92  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.04 FLOW VELOCITY(FEET/SEC.) = 5.64  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13213.00 = 1934.91 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13213.00 TO NODE 13214.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 706.43 DOWNSTREAM(FEET) = 659.31  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 948.11 CHANNEL SLOPE = 0.0497  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.25

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.009

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 18.09 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 84.84  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.49  
 AVERAGE FLOW DEPTH(FEET) = 1.24 TRAVEL TIME(MIN.) = 2.88  
 Tc(MIN.) = 17.35

SUBAREA AREA(ACRES) = 18.09 SUBAREA RUNOFF(CFS) = 27.82  
 EFFECTIVE AREA(ACRES) = 59.07 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 90.83  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.29 FLOW VELOCITY(FEET/SEC.) = 5.62  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13214.00 = 2883.02 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13214.00 TO NODE 13215.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 659.31 DOWNSTREAM(FEET) = 628.91  
CHANNEL LENGTH THRU SUBAREA(FEET) = 970.24 CHANNEL SLOPE = 0.0313  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.90

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.821

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	71.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 139.77

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.46

AVERAGE FLOW DEPTH(FEET) = 1.86 TRAVEL TIME(MIN.) = 2.96

Tc(MIN.) = 20.31

SUBAREA AREA(ACRES) = 71.42 SUBAREA RUNOFF(CFS) = 97.75

EFFECTIVE AREA(ACRES) = 130.49 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 130.5 PEAK FLOW RATE(CFS) = 178.59

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.13 FLOW VELOCITY(FEET/SEC.) = 5.87

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13215.00 = 3853.26 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13215.00 TO NODE 13216.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 628.91 DOWNSTREAM(FEET) = 598.39  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.63 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.25

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.712

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	36.33	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 201.67

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.22

AVERAGE FLOW DEPTH(FEET) = 2.24 TRAVEL TIME(MIN.) = 2.47

Tc(MIN.) = 22.79

SUBAREA AREA(ACRES) = 36.33 SUBAREA RUNOFF(CFS) = 46.16

EFFECTIVE AREA(ACRES) = 166.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 166.8 PEAK FLOW RATE(CFS) = 211.96

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.30 FLOW VELOCITY(FEET/SEC.) = 6.31

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13216.00 = 4775.89 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13216.00 TO NODE 13217.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 598.39 DOWNSTREAM(FEET) = 568.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.40 CHANNEL SLOPE = 0.0470  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.23

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.649

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	42.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 237.76

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.40

AVERAGE FLOW DEPTH(FEET) = 2.22 TRAVEL TIME(MIN.) = 1.43

Tc(MIN.) = 24.22

SUBAREA AREA(ACRES) = 42.51 SUBAREA RUNOFF(CFS) = 51.60

EFFECTIVE AREA(ACRES) = 209.33 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 209.3 PEAK FLOW RATE(CFS) = 254.07

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.31 FLOW VELOCITY(FEET/SEC.) = 7.53

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13217.00 = 5412.29 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 568.48 DOWNSTREAM(FEET) = 505.65  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1896.50 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.76

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.483

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	73.24	0.30	0.951	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.951  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 293.55  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 6.93  
 AVERAGE FLOW DEPTH( FEET) = 2.74 TRAVEL TIME( MIN.) = 4.56  
 Tc( MIN.) = 28.78  
 SUBAREA AREA( ACRES) = 73.24 SUBAREA RUNOFF( CFS) = 78.92  
 EFFECTIVE AREA( ACRES) = 282.57 AREA-AVERAGED Fm( INCH/HR) = 0.30  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA( ACRES) = 282.6 PEAK FLOW RATE( CFS) = 301.72  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 2.78

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 2.78 FLOW VELOCITY( FEET/SEC.) = 6.98  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13220.00 = 7308.79 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION( MIN.) = 28.78  
 RAINFALL INTENSITY( INCH/HR) = 1.48  
 AREA-AVERAGED Fm( INCH/HR) = 0.30  
 AREA-AVERAGED Fp( INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.99  
 EFFECTIVE STREAM AREA( ACRES) = 282.57  
 TOTAL STREAM AREA( ACRES) = 282.57  
 PEAK FLOW RATE( CFS) AT CONFLUENCE = 301.72

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	719.57	29.04	1.473	0.30( 0.24)	0.81	649.3	13200.00
2	301.72	28.78	1.483	0.30( 0.30)	0.99	282.6	13210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1020.09	28.78	1.483	0.30( 0.26)	0.86	926.0	13210.00
2	1018.98	29.04	1.473	0.30( 0.26)	0.86	931.8	13200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE( CFS) = 1020.09 Tc( MIN.) = 28.78  
 EFFECTIVE AREA( ACRES) = 926.04 AREA-AVERAGED Fm( INCH/HR) = 0.26  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA( ACRES) = 931.8  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13220.00 TO NODE 13221.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM( FEET) = 505.65 DOWNSTREAM( FEET) = 478.94  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 1949.14 CHANNEL SLOPE = 0.0137  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 4.69  
 \* 25 YEAR RAINFALL INTENSITY( INCH/HR) = 1.409

SUBAREA LOSS RATE DATA( AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 108.50 0.30 0.637 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.637  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1079.54  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 11.88  
 AVERAGE FLOW DEPTH( FEET) = 4.69 TRAVEL TIME( MIN.) = 2.73  
 Tc( MIN.) = 31.51

SUBAREA AREA( ACRES) = 108.50 SUBAREA RUNOFF( CFS) = 118.90  
 EFFECTIVE AREA( ACRES) = 1034.54 AREA-AVERAGED Fm( INCH/HR) = 0.25  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA( ACRES) = 1040.3 PEAK FLOW RATE( CFS) = 1077.44  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 4.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 4.68 FLOW VELOCITY( FEET/SEC.) = 11.89  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13221.00 = 14742.35 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1077.44	31.51	1.409	0.30( 0.25)	0.84	1034.5	13210.00
2	1078.47	31.78	1.403	0.30( 0.25)	0.84	1040.3	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE( CFS) = 1078.47 Tc( MIN.) = 31.78  
 AREA-AVERAGED Fm( INCH/HR) = 0.25 AREA-AVERAGED Fp( INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.84 EFFECTIVE AREA( ACRES) = 1040.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13221.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM( FEET) = 478.94 DOWNSTREAM( FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 2078.70 CHANNEL SLOPE = 0.0247  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 4.13  
 \* 25 YEAR RAINFALL INTENSITY( INCH/HR) = 1.355

SUBAREA LOSS RATE DATA( AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 87.26 0.30 0.699 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.699  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1123.45  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 14.93  
 AVERAGE FLOW DEPTH (FEET) = 4.12 TRAVEL TIME (MIN.) = 2.32  
 Tc (MIN.) = 34.10  
 SUBAREA AREA (ACRES) = 87.26 SUBAREA RUNOFF (CFS) = 89.97  
 EFFECTIVE AREA (ACRES) = 1127.61 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA (ACRES) = 1127.6 PEAK FLOW RATE (CFS) = 1123.47  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 4.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 4.12 FLOW VELOCITY (FEET/SEC.) = 14.93  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13222.00 = 16821.05 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1123.08	33.84	1.361	0.30 (0.25)	0.83	1121.8	13210.00
2	1123.47	34.10	1.355	0.30 (0.25)	0.83	1127.6	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1123.47 Tc (MIN.) = 34.10  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.83 EFFECTIVE AREA (ACRES) = 1127.61

=====  
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1127.6 TC (MIN.) = 34.10  
 EFFECTIVE AREA (ACRES) = 1127.61 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.828  
 PEAK FLOW RATE (CFS) = 1123.47

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1123.08	33.84	1.361	0.30 (0.25)	0.83	1121.8	13210.00
2	1123.47	34.10	1.355	0.30 (0.25)	0.83	1127.6	13200.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S35 \*  
\* Rational Method Hydrology Analysis - 25-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S35.DAT  
TIME/DATE OF STUDY: 16:10 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.080
- 2) 10.00; 2.729
- 3) 15.00; 2.163
- 4) 20.00; 1.834
- 5) 25.00; 1.614
- 6) 30.00; 1.440
- 7) 40.00; 1.233
- 8) 50.00; 1.085
- 9) 60.00; 0.950
- 10) 90.00; 0.775
- 11) 120.00; 0.657
- 12) 180.00; 0.530
- 13) 360.00; 0.367
- 14) 1440.00; 0.153

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.00 TO NODE 13500.50 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 548.43  
ELEVATION DATA: UPSTREAM(FEET) = 1183.47 DOWNSTREAM(FEET) = 1065.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.508  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	5.11	0.30	1.000	0	11.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 10.15  
TOTAL AREA(ACRES) = 5.11 PEAK FLOW RATE(CFS) = 10.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.50 TO NODE 13501.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1033.15  
CHANNEL LENGTH THRU SUBAREA(FEET) = 431.71 CHANNEL SLOPE = 0.0738  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.46  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.288  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.87	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.10  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.71  
AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 1.94  
Tc(MIN.) = 13.89  
SUBAREA AREA(ACRES) = 8.87 SUBAREA RUNOFF(CFS) = 15.87  
EFFECTIVE AREA(ACRES) = 13.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 25.02  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:



DEPTH(FEET) = 0.54 FLOW VELOCITY(FEET/SEC.) = 4.14  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13501.00 = 980.14 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13501.00 TO NODE 13502.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1033.15 DOWNSTREAM(FEET) = 990.26  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.63 CHANNEL SLOPE = 0.0452  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.83

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.981

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.82	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.78

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.08

AVERAGE FLOW DEPTH(FEET) = 0.80 TRAVEL TIME(MIN.) = 3.87

Tc(MIN.) = 17.77

SUBAREA AREA(ACRES) = 16.82 SUBAREA RUNOFF(CFS) = 25.45

EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 46.61

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.90 FLOW VELOCITY(FEET/SEC.) = 4.37

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13502.00 = 1928.77 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13502.00 TO NODE 13503.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.26 DOWNSTREAM(FEET) = 956.06

CHANNEL LENGTH THRU SUBAREA(FEET) = 940.98 CHANNEL SLOPE = 0.0363

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.32

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.789

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	46.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 77.48

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.80

AVERAGE FLOW DEPTH(FEET) = 1.28 TRAVEL TIME(MIN.) = 3.27

Tc(MIN.) = 21.03

SUBAREA AREA(ACRES) = 46.02 SUBAREA RUNOFF(CFS) = 61.67

EFFECTIVE AREA(ACRES) = 76.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 76.8 PEAK FLOW RATE(CFS) = 102.94

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.51 FLOW VELOCITY(FEET/SEC.) = 5.25

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13503.00 = 2869.75 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13503.00 TO NODE 13504.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 956.06 DOWNSTREAM(FEET) = 889.48

CHANNEL LENGTH THRU SUBAREA(FEET) = 2131.31 CHANNEL SLOPE = 0.0312

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.88

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.524

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	58.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 135.23

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.42

AVERAGE FLOW DEPTH(FEET) = 1.83 TRAVEL TIME(MIN.) = 6.56

Tc(MIN.) = 27.59

SUBAREA AREA(ACRES) = 58.46 SUBAREA RUNOFF(CFS) = 64.40

EFFECTIVE AREA(ACRES) = 135.28 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 135.3 PEAK FLOW RATE(CFS) = 149.02

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.93 FLOW VELOCITY(FEET/SEC.) = 5.58

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13504.00 = 5001.06 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13504.00 TO NODE 13505.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 889.48 DOWNSTREAM(FEET) = 848.10

CHANNEL LENGTH THRU SUBAREA(FEET) = 1661.97 CHANNEL SLOPE = 0.0249

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.25

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.383  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	49.30	0.30	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 173.07  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.38  
 AVERAGE FLOW DEPTH (FEET) = 2.22 TRAVEL TIME (MIN.) = 5.15  
 Tc (MIN.) = 32.74  
 SUBAREA AREA (ACRES) = 49.30 SUBAREA RUNOFF (CFS) = 48.07  
 EFFECTIVE AREA (ACRES) = 184.58 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 184.6 PEAK FLOW RATE (CFS) = 179.98  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.28  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.28 FLOW VELOCITY (FEET/SEC.) = 5.43  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.00 = 6663.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13505.00 TO NODE 13505.50 IS CODE = 56

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 848.10 DOWNSTREAM (FEET) = 811.10  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1234.61 CHANNEL SLOPE = 0.0300  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.29  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.312  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.35	0.30	0.811	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.811  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 198.91  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.98  
 AVERAGE FLOW DEPTH (FEET) = 2.28 TRAVEL TIME (MIN.) = 3.44  
 Tc (MIN.) = 36.18  
 SUBAREA AREA (ACRES) = 39.35 SUBAREA RUNOFF (CFS) = 37.86  
 EFFECTIVE AREA (ACRES) = 223.93 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 223.9 PEAK FLOW RATE (CFS) = 206.01  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.33  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.33 FLOW VELOCITY (FEET/SEC.) = 6.03  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.50 = 7897.64 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13505.50 TO NODE 13506.00 IS CODE = 56

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 811.10 DOWNSTREAM (FEET) = 781.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1415.98 CHANNEL SLOPE = 0.0213  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.71  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.226  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	54.33	0.30	0.738	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.738  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 230.58  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.51  
 AVERAGE FLOW DEPTH (FEET) = 2.71 TRAVEL TIME (MIN.) = 4.28  
 Tc (MIN.) = 40.46  
 SUBAREA AREA (ACRES) = 54.33 SUBAREA RUNOFF (CFS) = 49.14  
 EFFECTIVE AREA (ACRES) = 278.26 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
 TOTAL AREA (ACRES) = 278.3 PEAK FLOW RATE (CFS) = 237.85  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.76  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.76 FLOW VELOCITY (FEET/SEC.) = 5.56  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.00 = 9313.62 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13506.50 IS CODE = 56

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 781.00 DOWNSTREAM (FEET) = 743.17  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1542.62 CHANNEL SLOPE = 0.0245  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.80  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.163  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	61.33	0.30	0.783	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 263.47  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.02  
 AVERAGE FLOW DEPTH (FEET) = 2.80 TRAVEL TIME (MIN.) = 4.27  
 Tc (MIN.) = 44.73  
 SUBAREA AREA (ACRES) = 61.33 SUBAREA RUNOFF (CFS) = 51.24  
 EFFECTIVE AREA (ACRES) = 339.59 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90

TOTAL AREA (ACRES) = 339.6 PEAK FLOW RATE (CFS) = 273.26  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.86  
  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.86 FLOW VELOCITY (FEET/SEC.) = 6.09  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.50 = 10856.24 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.50 TO NODE 13520.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 743.17 DOWNSTREAM (FEET) = 717.04  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1370.93 CHANNEL SLOPE = 0.0191  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.14  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.103  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.86	0.30	0.848	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.848  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 288.49  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.65  
 AVERAGE FLOW DEPTH (FEET) = 3.14 TRAVEL TIME (MIN.) = 4.05  
 Tc (MIN.) = 48.77  
 SUBAREA AREA (ACRES) = 39.86 SUBAREA RUNOFF (CFS) = 30.45  
 EFFECTIVE AREA (ACRES) = 379.45 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
 TOTAL AREA (ACRES) = 379.5 PEAK FLOW RATE (CFS) = 285.42  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.12 FLOW VELOCITY (FEET/SEC.) = 5.64  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 48.77  
 RAINFALL INTENSITY (INCH/HR) = 1.10  
 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.89  
 EFFECTIVE STREAM AREA (ACRES) = 379.45  
 TOTAL STREAM AREA (ACRES) = 379.45  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 285.42

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13510.00 TO NODE 13511.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

ELEVATION DATA: UPSTREAM (FEET) = 1216.90 DOWNSTREAM (FEET) = 1022.78

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.615  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.207  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	6.66	0.30	1.000	0	14.62

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 11.43  
 TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 11.43

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13511.00 TO NODE 13512.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1022.78 DOWNSTREAM (FEET) = 954.27  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1027.63 CHANNEL SLOPE = 0.0667  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.66  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 1.927  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.30	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 30.12  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.30  
 AVERAGE FLOW DEPTH (FEET) = 0.62 TRAVEL TIME (MIN.) = 3.98  
 Tc (MIN.) = 18.60  
 SUBAREA AREA (ACRES) = 25.40 SUBAREA RUNOFF (CFS) = 37.19  
 EFFECTIVE AREA (ACRES) = 32.06 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 46.94  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.81

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.81 FLOW VELOCITY (FEET/SEC.) = 4.98  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13512.00 = 1931.31 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13512.00 TO NODE 13513.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 954.27 DOWNSTREAM(FEET) = 872.45
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.42 CHANNEL SLOPE = 0.0425
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.52
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.640

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 90.23 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 101.67
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.52
AVERAGE FLOW DEPTH(FEET) = 1.43 TRAVEL TIME(MIN.) = 5.81
Tc(MIN.) = 24.41

SUBAREA AREA(ACRES) = 90.23 SUBAREA RUNOFF(CFS) = 108.83
EFFECTIVE AREA(ACRES) = 122.29 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 122.3 PEAK FLOW RATE(CFS) = 147.50
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.77

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.77 FLOW VELOCITY(FEET/SEC.) = 6.18
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13513.00 = 3857.73 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13513.00 TO NODE 13514.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 872.45 DOWNSTREAM(FEET) = 813.12
CHANNEL LENGTH THRU SUBAREA(FEET) = 1895.66 CHANNEL SLOPE = 0.0313
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.44
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.458

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 135.65 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 218.36
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.23
AVERAGE FLOW DEPTH(FEET) = 2.38 TRAVEL TIME(MIN.) = 5.07
Tc(MIN.) = 29.48

SUBAREA AREA(ACRES) = 135.65 SUBAREA RUNOFF(CFS) = 141.38
EFFECTIVE AREA(ACRES) = 257.94 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 257.9 PEAK FLOW RATE(CFS) = 268.84
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.65

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.65 FLOW VELOCITY(FEET/SEC.) = 6.62
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13514.00 = 5753.39 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13514.00 TO NODE 13515.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 813.12 DOWNSTREAM(FEET) = 773.74
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.15 CHANNEL SLOPE = 0.0204
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.28
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.339

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 109.30 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 319.99
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.96
AVERAGE FLOW DEPTH(FEET) = 3.25 TRAVEL TIME(MIN.) = 5.39
Tc(MIN.) = 34.87

SUBAREA AREA(ACRES) = 109.30 SUBAREA RUNOFF(CFS) = 102.24
EFFECTIVE AREA(ACRES) = 367.24 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 367.2 PEAK FLOW RATE(CFS) = 343.51
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 3.38 FLOW VELOCITY(FEET/SEC.) = 6.08
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13515.00 = 7679.54 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 773.74 DOWNSTREAM(FEET) = 717.04
CHANNEL LENGTH THRU SUBAREA(FEET) = 2279.49 CHANNEL SLOPE = 0.0249
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.69
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.229

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 231.44 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 440.30  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.99  
 AVERAGE FLOW DEPTH(FEET) = 3.64 TRAVEL TIME(MIN.) = 5.43  
 Tc(MIN.) = 40.30  
 SUBAREA AREA(ACRES) = 231.44 SUBAREA RUNOFF(CFS) = 193.45  
 EFFECTIVE AREA(ACRES) = 598.68 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 598.7 PEAK FLOW RATE(CFS) = 500.40  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.89 FLOW VELOCITY(FEET/SEC.) = 7.24  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13520.00 = 9959.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 40.30  
 RAINFALL INTENSITY(INCH/HR) = 1.23  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 598.68  
 TOTAL STREAM AREA(ACRES) = 598.68  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 500.40

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	285.42	48.77	1.103	0.30( 0.27)	0.89	379.5	13500.00
2	500.40	40.30	1.229	0.30( 0.30)	1.00	598.7	13510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	771.62	40.30	1.229	0.30( 0.29)	0.96	912.2	13510.00
2	718.25	48.77	1.103	0.30( 0.29)	0.96	978.1	13500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 771.62 Tc(MIN.) = 40.30  
 EFFECTIVE AREA(ACRES) = 912.21 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 978.1  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.00 TO NODE 13520.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 717.04 DOWNSTREAM(FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2019.22 CHANNEL SLOPE = 0.0084  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.31  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.151

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 846.61  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.43  
 AVERAGE FLOW DEPTH(FEET) = 3.30 TRAVEL TIME(MIN.) = 5.23  
 Tc(MIN.) = 45.53

SUBAREA AREA(ACRES) = 193.31 SUBAREA RUNOFF(CFS) = 149.93  
 EFFECTIVE AREA(ACRES) = 1105.52 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 1171.4 PEAK FLOW RATE(CFS) = 857.99  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.32

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.32 FLOW VELOCITY(FEET/SEC.) = 6.46  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.50 = 14246.39 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	857.99	45.53	1.151	0.30( 0.29)	0.96	1105.5	13510.00
2	781.89	54.13	1.029	0.30( 0.29)	0.96	1171.4	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 857.99 Tc(MIN.) = 45.53  
 AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 1105.52

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.50 TO NODE 13521.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 661.95  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1622.36 CHANNEL SLOPE = 0.0235  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.58  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.108

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 129.79 0.30 0.897 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 907.01  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.33  
 AVERAGE FLOW DEPTH(FEET) = 2.58 TRAVEL TIME(MIN.) = 2.90  
 Tc(MIN.) = 48.43  
 SUBAREA AREA(ACRES) = 129.79 SUBAREA RUNOFF(CFS) = 98.04  
 EFFECTIVE AREA(ACRES) = 1235.31 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 1301.2 PEAK FLOW RATE(CFS) = 913.37  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.59 FLOW VELOCITY(FEET/SEC.) = 9.34  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13521.00 = 15868.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	913.37	48.43	1.108	0.30( 0.29)	0.96	1235.3	13510.00
2	823.44	57.12	0.989	0.30( 0.29)	0.95	1301.2	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 913.37 Tc(MIN.) = 48.43  
 AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 1235.31

\*\*\*\*\*

FLOW PROCESS FROM NODE 13521.00 TO NODE 13522.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 661.95 DOWNSTREAM(FEET) = 632.19  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2746.01 CHANNEL SLOPE = 0.0108  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.41  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 1.023  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	278.60	0.30	0.905	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1007.59  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.40  
 AVERAGE FLOW DEPTH(FEET) = 3.39 TRAVEL TIME(MIN.) = 6.19  
 Tc(MIN.) = 54.62  
 SUBAREA AREA(ACRES) = 278.60 SUBAREA RUNOFF(CFS) = 188.38  
 EFFECTIVE AREA(ACRES) = 1513.91 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
 TOTAL AREA(ACRES) = 1579.8 PEAK FLOW RATE(CFS) = 1006.57  
 GIVEN CHANNEL BASE(FEET) = 30.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.39 FLOW VELOCITY(FEET/SEC.) = 7.39  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13522.00 = 18614.76 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1006.57	54.62	1.023	0.30( 0.28)	0.95	1513.9	13510.00
2	918.88	63.50	0.930	0.30( 0.28)	0.94	1579.8	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1006.57 Tc(MIN.) = 54.62  
 AREA-AVERAGED Fm(INCH/HR) = 0.28 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.95 EFFECTIVE AREA(ACRES) = 1513.91

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1579.8 TC(MIN.) = 54.62  
 EFFECTIVE AREA(ACRES) = 1513.91 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.947  
 PEAK FLOW RATE(CFS) = 1006.57

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1006.57	54.62	1.023	0.30( 0.28)	0.95	1513.9	13510.00
2	918.88	63.50	0.930	0.30( 0.28)	0.94	1579.8	13500.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2011 Advanced Engineering Software (aes)  
Ver. 18.0 Release Date: 07/01/2011 License ID 1264

Analysis prepared by:

RBF Consulting

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 50-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P50EVAA.DAT  
TIME/DATE OF STUDY: 15:21 11/13/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.254
- 2) 10.00; 3.396
- 3) 15.00; 2.615
- 4) 20.00; 2.190
- 5) 25.00; 1.899
- 6) 30.00; 1.707
- 7) 40.00; 1.447
- 8) 50.00; 1.285
- 9) 60.00; 1.174
- 10) 90.00; 0.972
- 11) 120.00; 0.842
- 12) 180.00; 0.717
- 13) 360.00; 0.527
- 14) 1200.00; 0.230

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE/ WAY		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 571.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.305  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.397

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56	7.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 3.12  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 3.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.397

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.170  
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 12.91  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 16.03

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.397

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56



RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.60 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 10.15  
 EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19  
 TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 26.18

\*\*\*\*\*

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<<

UPSTREAM ELEVATION(FEET) = 571.00 DOWNSTREAM ELEVATION(FEET) = 530.50  
 STREET LENGTH(FEET) = 1215.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.50

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.47  
 HALFSTREET FLOOD WIDTH(FEET) = 17.46  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.40  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.56  
 STREET FLOW TRAVEL TIME(MIN.) = 3.75 Tc(MIN.) = 11.05

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.231

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.20	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	2.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.135  
 SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 10.63  
 EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 29.77

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 17.07  
 FLOW VELOCITY(FEET/SEC.) = 5.32 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.49  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1542.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 11.05  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.231  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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APARTMENTS B 4.40 0.30 0.200 56  
 COMMERCIAL B 18.20 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.119  
 SUBAREA AREA(ACRES) = 22.60 SUBAREA RUNOFF(CFS) = 64.99  
 EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.13  
 TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 94.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 11.05  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.231  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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APARTMENTS B 6.20 0.30 0.200 56  
 COMMERCIAL B 0.10 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198  
 SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 17.98  
 EFFECTIVE AREA(ACRES) = 39.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA(ACRES) = 39.3 PEAK FLOW RATE(CFS) = 112.75

\*\*\*\*\*

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.50 DOWNSTREAM(FEET) = 522.00  
 FLOW LENGTH(FEET) = 837.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.93  
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 112.75  
 PIPE TRAVEL TIME(MIN.) = 1.17 Tc(MIN.) = 12.22  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2379.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

MAINLINE Tc(MIN.) = 12.22  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.049  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	15.30	0.30	0.100	56
PUBLIC PARK	B	0.70	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.133  
SUBAREA AREA(ACRES) = 16.00 SUBAREA RUNOFF(CFS) = 43.33  
EFFECTIVE AREA(ACRES) = 55.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
TOTAL AREA(ACRES) = 55.3 PEAK FLOW RATE(CFS) = 149.62

\*\*\*\*\*  
FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 522.00 DOWNSTREAM(FEET) = 473.00  
FLOW LENGTH(FEET) = 568.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.24  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 149.62  
PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 12.55  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2947.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 12.55  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.998

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	2.10	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
COMMERCIAL	B	0.50	0.30	0.100	56
PUBLIC PARK	B	13.00	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.820  
SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 39.38  
EFFECTIVE AREA(ACRES) = 71.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
TOTAL AREA(ACRES) = 71.2 PEAK FLOW RATE(CFS) = 186.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 104.00 TO NODE 127.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 435.00  
FLOW LENGTH(FEET) = 588.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.28

ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 186.48  
PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 12.91  
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 10  
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 121.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 574.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.977

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56	8.44

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 2.11  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 2.11

\*\*\*\*\*  
FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 574.00 DOWNSTREAM ELEVATION(FEET) = 557.00  
STREET LENGTH(FEET) = 221.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 25.97

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.40  
HALFSTREET FLOOD WIDTH(FEET) = 13.55  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.08  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.86

STREET FLOW TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 8.96  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.783  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 7.90 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.10 0.30 0.400 56  
 APARTMENTS B 2.20 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.257  
 SUBAREA AREA(ACRES) = 14.30 SUBAREA RUNOFF(CFS) = 47.70  
 EFFECTIVE AREA(ACRES) = 14.90 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.26  
 TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 49.71

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 17.77  
 FLOW VELOCITY(FEET/SEC.) = 8.24 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.96  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 551.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 557.00 DOWNSTREAM ELEVATION(FEET) = 527.00  
 STREET LENGTH(FEET) = 317.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 64.23  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.50  
 HALFSTREET FLOOD WIDTH(FEET) = 18.87  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.52  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.76  
 STREET FLOW TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 9.51  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.577

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.50 0.30 0.400 56  
 APARTMENTS B 0.70 0.30 0.200 56

COMMERCIAL B 0.40 0.30 0.100 56  
 CONDOMINIUMS B 3.50 0.30 0.350 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.352  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 29.06  
 EFFECTIVE AREA(ACRES) = 24.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 24.2 PEAK FLOW RATE(CFS) = 76.00

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 20.20  
 FLOW VELOCITY(FEET/SEC.) = 9.91 DEPTH\*VELOCITY(FT\*FT/SEC.) = 5.18  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 123.00 = 868.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 527.00 DOWNSTREAM ELEVATION(FEET) = 496.00  
 STREET LENGTH(FEET) = 315.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 92.81  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.55  
 HALFSTREET FLOOD WIDTH(FEET) = 21.68  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.57  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 5.81  
 STREET FLOW TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 10.01  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.394

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 2.90 0.30 0.400 56  
 CONDOMINIUMS B 1.40 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.00 0.30 0.400 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 CONDOMINIUMS B 2.70 0.30 0.350 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387  
 SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 33.64  
 EFFECTIVE AREA(ACRES) = 35.60 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32

TOTAL AREA (ACRES) = 35.6 PEAK FLOW RATE (CFS) = 105.66

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.57 HALFSTREET FLOOD WIDTH (FEET) = 22.85
FLOW VELOCITY (FEET/SEC.) = 10.88 DEPTH\*VELOCITY (FT\*FT/SEC.) = 6.21
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 124.00 = 1183.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 10.01
RAINFALL INTENSITY (INCH/HR) = 3.39
AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA (ACRES) = 35.60
TOTAL STREAM AREA (ACRES) = 35.60
PEAK FLOW RATE (CFS) AT CONFLUENCE = 105.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 317.00
ELEVATION DATA: UPSTREAM (FEET) = 699.00 DOWNSTREAM (FEET) = 610.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.111

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.726

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER
"OPEN BRUSH" B 1.50 0.30 1.000 66 9.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 4.63

TOTAL AREA (ACRES) = 1.50 PEAK FLOW RATE (CFS) = 4.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 610.00 DOWNSTREAM (FEET) = 575.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 206.00 CHANNEL SLOPE = 0.1699

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.543

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 2.80 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.71

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.97

AVERAGE FLOW DEPTH (FEET) = 0.65 TRAVEL TIME (MIN.) = 0.49

Tc (MIN.) = 9.60

SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 8.17

EFFECTIVE AREA (ACRES) = 4.30 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 4.3 PEAK FLOW RATE (CFS) = 12.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.74 FLOW VELOCITY (FEET/SEC.) = 7.58

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 523.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 575.00 DOWNSTREAM (FEET) = 548.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.1350

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.389

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 3.30 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.14

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.60

AVERAGE FLOW DEPTH (FEET) = 0.87 TRAVEL TIME (MIN.) = 0.44

Tc (MIN.) = 10.04

SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 9.18

EFFECTIVE AREA (ACRES) = 7.60 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 7.6 PEAK FLOW RATE (CFS) = 21.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.94 FLOW VELOCITY (FEET/SEC.) = 7.95

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 723.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 548.00 DOWNSTREAM (FEET) = 524.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 318.00 CHANNEL SLOPE = 0.0755

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.264  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 2.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 24.20  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.63  
 AVERAGE FLOW DEPTH (FEET) = 1.10 TRAVEL TIME (MIN.) = 0.80  
 Tc (MIN.) = 10.84  
 SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 6.14  
 EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 26.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.14 FLOW VELOCITY (FEET/SEC.) = 6.78  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 1041.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 524.00 DOWNSTREAM (FEET) = 515.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 94.00 CHANNEL SLOPE = 0.0957  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.233  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 3.70 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.30  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.72  
 AVERAGE FLOW DEPTH (FEET) = 1.16 TRAVEL TIME (MIN.) = 0.20  
 Tc (MIN.) = 11.05  
 SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 9.77  
 EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 35.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.22 FLOW VELOCITY (FEET/SEC.) = 7.99  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 1135.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 515.00 DOWNSTREAM (FEET) = 507.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 207.00 CHANNEL SLOPE = 0.0386  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.144  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 8.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 46.52  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.08  
 AVERAGE FLOW DEPTH (FEET) = 1.60 TRAVEL TIME (MIN.) = 0.57  
 Tc (MIN.) = 11.61  
 SUBAREA AREA (ACRES) = 8.30 SUBAREA RUNOFF (CFS) = 21.25  
 EFFECTIVE AREA (ACRES) = 21.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 21.9 PEAK FLOW RATE (CFS) = 56.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.71 FLOW VELOCITY (FEET/SEC.) = 6.36  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 1342.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 507.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 338.00 CHANNEL SLOPE = 0.0207  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.981  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.60 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 13.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 73.09  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.39  
 AVERAGE FLOW DEPTH (FEET) = 2.13 TRAVEL TIME (MIN.) = 1.04  
 Tc (MIN.) = 12.66  
 SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 34.07  
 EFFECTIVE AREA (ACRES) = 36.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 36.0 PEAK FLOW RATE (CFS) = 86.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.27 FLOW VELOCITY(FEET/SEC.) = 5.62  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 1680.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 137.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 496.00  
FLOW LENGTH(FEET) = 726.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.05  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 86.91  
PIPE TRAVEL TIME(MIN.) = 1.34 Tc(MIN.) = 13.99  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 13.99  
RAINFALL INTENSITY(INCH/HR) = 2.77  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 36.00  
TOTAL STREAM AREA(ACRES) = 36.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 86.91

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	105.66	10.01	3.394	0.30( 0.10)	0.32	35.6	100.00
2	86.91	13.99	2.772	0.30( 0.30)	1.00	36.0	130.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	183.46	10.01	3.394	0.30( 0.18)	0.60	61.3	100.00
2	172.62	13.99	2.772	0.30( 0.20)	0.66	71.6	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 183.46 Tc(MIN.) = 10.01  
EFFECTIVE AREA(ACRES) = 61.35 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 71.6  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 444.00  
FLOW LENGTH(FEET) = 888.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 30.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.03  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 183.46  
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 10.58  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 125.00 = 3294.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.58  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.306  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	1.00	0.30	0.400	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	7.50	0.30	0.400	56
NATURAL FAIR COVER "OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.407  
SUBAREA AREA(ACRES) = 8.60 SUBAREA RUNOFF(CFS) = 24.64  
EFFECTIVE AREA(ACRES) = 69.95 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 197.14

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 444.00 DOWNSTREAM(FEET) = 438.00  
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 44.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.20  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 197.14  
PIPE TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 11.41  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.41

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.176  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	4.30	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.70	0.30	0.400	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.20	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 7.10 SUBAREA RUNOFF (CFS) = 19.86  
 EFFECTIVE AREA (ACRES) = 77.05 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 87.3 PEAK FLOW RATE (CFS) = 208.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN.) = 11.41  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.176  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.56  
 EFFECTIVE AREA (ACRES) = 77.25 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 87.5 PEAK FLOW RATE (CFS) = 209.37

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 11.41  
 RAINFALL INTENSITY (INCH/HR) = 3.18  
 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.55  
 EFFECTIVE STREAM AREA (ACRES) = 77.25  
 TOTAL STREAM AREA (ACRES) = 87.50  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 209.37

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21  
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-----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====  
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 557.00 DOWNSTREAM (FEET) = 546.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.105  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.843  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.50	0.30	0.100	56	6.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 2.17  
 TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 2.17

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION (FEET) = 546.00 DOWNSTREAM ELEVATION (FEET) = 488.00  
 STREET LENGTH (FEET) = 671.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.97  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.33  
 HALfstREET FLOOD WIDTH (FEET) = 9.22  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.28  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.06  
 STREET FLOW TRAVEL TIME (MIN.) = 1.78 Tc (MIN.) = 7.89  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.182

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.50	0.30	0.200	56
COMMERCIAL	B	0.90	0.30	0.100	56
CONDOMINIUMS	B	3.90	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293  
 SUBAREA AREA (ACRES) = 5.30 SUBAREA RUNOFF (CFS) = 19.53  
 EFFECTIVE AREA (ACRES) = 5.80 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA (ACRES) = 5.8 PEAK FLOW RATE (CFS) = 21.40

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.15  
 FLOW VELOCITY(FEET/SEC.) = 7.08 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.69  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1001.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 7.89  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.182  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	14.60	0.30	0.200	56
COMMERCIAL	B	1.10	0.30	0.100	56
CONDOMINIUMS	B	4.30	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.227  
 SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 74.05  
 EFFECTIVE AREA(ACRES) = 25.80 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 25.8 PEAK FLOW RATE(CFS) = 95.44

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

-----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

-----  
 UPSTREAM ELEVATION(FEET) = 488.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
 STREET LENGTH(FEET) = 371.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 119.45  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.61  
 HALFSTREET FLOOD WIDTH(FEET) = 25.27  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.13  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.22  
 STREET FLOW TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 8.50  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.955

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.50	0.30	0.200	56

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 10.00 0.30 0.200 56  
 APARTMENTS B 1.70 0.30 0.200 56  
 COMMERCIAL B 0.50 0.30 0.100 56  
 CONDOMINIUMS B 1.00 0.30 0.350 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.207  
 SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 48.00  
 EFFECTIVE AREA(ACRES) = 39.50 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA(ACRES) = 39.5 PEAK FLOW RATE(CFS) = 138.17

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.64 HALFSTREET FLOOD WIDTH(FEET) = 26.76  
 FLOW VELOCITY(FEET/SEC.) = 10.49 DEPTH\*VELOCITY(FT\*FT/SEC.) = 6.72  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1372.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 113.00 TO NODE 126.00 IS CODE = 31

-----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
 ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 438.00  
 FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.19  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 138.17  
 PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 8.87  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 1872.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

-----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 8.87  
 RAINFALL INTENSITY(INCH/HR) = 3.82  
 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.23  
 EFFECTIVE STREAM AREA(ACRES) = 39.50  
 TOTAL STREAM AREA(ACRES) = 39.50  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 138.17

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	209.37	11.41	3.176	0.30( 0.16)	0.55	77.2	100.00
1	189.04	15.41	2.580	0.30( 0.18)	0.60	87.5	130.00
2	138.17	8.87	3.815	0.30( 0.07)	0.23	39.5	110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.



\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	335.52	8.87	3.815	0.30 ( 0.13)	0.42	99.6	110.00
2	323.95	11.41	3.176	0.30 ( 0.13)	0.44	116.7	100.00
3	281.67	15.41	2.580	0.30 ( 0.15)	0.48	127.0	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 335.52 Tc(MIN.) = 8.87  
EFFECTIVE AREA(ACRES) = 99.56 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 127.0  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 435.00  
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 69.0 INCH PIPE IS 52.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.79  
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 335.52  
PIPE TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 9.18  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.18  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.699  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	5.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.366  
SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 25.20  
EFFECTIVE AREA(ACRES) = 107.36 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 134.8 PEAK FLOW RATE(CFS) = 345.36

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.18  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.699  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	1.50	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 15.63  
EFFECTIVE AREA(ACRES) = 112.26 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 139.7 PEAK FLOW RATE(CFS) = 360.98

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	360.98	9.18	3.699	0.30 ( 0.13)	0.42	112.3	110.00
2	348.97	11.72	3.127	0.30 ( 0.13)	0.44	129.4	100.00
3	302.85	15.74	2.552	0.30 ( 0.14)	0.48	139.7	130.00

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	186.48	12.91	2.942	0.30 ( 0.09)	0.29	71.2	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	528.88	9.18	3.699	0.30 ( 0.11)	0.38	162.9	110.00
2	529.33	11.72	3.127	0.30 ( 0.12)	0.39	194.1	100.00
3	521.87	12.91	2.942	0.30 ( 0.12)	0.39	203.7	100.00
4	463.87	15.74	2.552	0.30 ( 0.12)	0.42	210.9	130.00

TOTAL AREA(ACRES) = 210.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 529.33 Tc(MIN.) = 11.725  
EFFECTIVE AREA(ACRES) = 194.13 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
TOTAL AREA(ACRES) = 210.9  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.10 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 500.20 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 46.16
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 529.33
PIPE TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 11.91
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.10 = 4750.20 FEET.

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*****
FLOW PROCESS FROM NODE 127.10 TO NODE 127.20 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 353.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 595.30 CHANNEL SLOPE = 0.0218
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.908
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         3.50   0.30  0.100  56
COMMERCIAL          B         0.10   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 533.99
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.16
AVERAGE FLOW DEPTH(FEET) = 1.25 TRAVEL TIME(MIN.) = 1.22
Tc(MIN.) = 13.12
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 9.33
EFFECTIVE AREA(ACRES) = 197.73 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 214.5 PEAK FLOW RATE(CFS) = 529.33
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.24 FLOW VELOCITY(FEET/SEC.) = 8.13
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.20 = 5345.50 FEET.

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FLOW PROCESS FROM NODE 127.20 TO NODE 127.30 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 340.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 476.00 CHANNEL SLOPE = 0.0273
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.767
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS

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LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         3.10   0.30  0.100  56
COMMERCIAL          B         0.10   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 533.27
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.75
AVERAGE FLOW DEPTH(FEET) = 1.16 TRAVEL TIME(MIN.) = 0.91
Tc(MIN.) = 14.03
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 7.88
EFFECTIVE AREA(ACRES) = 200.93 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 217.7 PEAK FLOW RATE(CFS) = 529.33
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.16 FLOW VELOCITY(FEET/SEC.) = 8.70
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.30 = 5821.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.30 TO NODE 13569.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 338.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 506.00 CHANNEL SLOPE = 0.0040
CHANNEL BASE(FEET) = 150.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.477
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         2.80   0.30  0.100  56
COMMERCIAL          B         0.60   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 533.07
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.24
AVERAGE FLOW DEPTH(FEET) = 1.08 TRAVEL TIME(MIN.) = 2.60
Tc(MIN.) = 16.63
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 7.49
EFFECTIVE AREA(ACRES) = 204.33 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 221.1 PEAK FLOW RATE(CFS) = 529.33
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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```

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.08 FLOW VELOCITY(FEET/SEC.) = 3.23
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 13569.00 = 6327.50 FEET.

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*****
FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 12
-----

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>>>>CLEAR MEMORY BANK # 1 <<<<
=====
END OF STUDY SUMMARY:

```

TOTAL AREA (ACRES) = 221.1 TC (MIN.) = 16.63  
 EFFECTIVE AREA (ACRES) = 204.33 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.375  
 PEAK FLOW RATE (CFS) = 529.33

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	528.88	14.09	2.758	0.30 ( 0.11)	0.36	173.1	110.00
2	529.33	16.63	2.477	0.30 ( 0.11)	0.37	204.3	100.00
3	521.87	17.83	2.374	0.30 ( 0.11)	0.38	213.9	100.00
4	463.87	20.89	2.138	0.30 ( 0.12)	0.40	221.1	130.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 50-YR ULTIMATE EV DECEMBER 2013 MCHANDOO/TMULI \*  
\*\*\*\*\*

FILE NAME: 2P50EVBB.DAT  
TIME/DATE OF STUDY: 16:36 12/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.305
- 2) 10.00; 3.420
- 3) 15.00; 2.629
- 4) 20.00; 2.200
- 5) 25.00; 1.906
- 6) 30.00; 1.714
- 7) 40.00; 1.452
- 8) 50.00; 1.290
- 9) 60.00; 1.181
- 10) 90.00; 0.979
- 11) 120.00; 0.849
- 12) 180.00; 0.725
- 13) 360.00; 0.534
- 14) 1200.00; 0.233

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00  
ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 543.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.596  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.326  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.80	0.30	0.100	56	7.60

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 3.09  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 3.09

\*\*\*\*\*  
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 543.00 DOWNSTREAM ELEVATION(FEET) = 523.00  
STREET LENGTH(FEET) = 502.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.92  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.30  
HALFSTREET FLOOD WIDTH(FEET) = 7.30  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.10  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.25  
STREET FLOW TRAVEL TIME(MIN.) = 2.04 Tc(MIN.) = 9.64  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.557

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.20	0.30	0.200	56
COMMERCIAL	B	1.30	0.30	0.100	56

NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.261  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.63  
 EFFECTIVE AREA(ACRES) = 2.60 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 8.17

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.65  
 FLOW VELOCITY(FEET/SEC.) = 4.36 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.44  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 810.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.64  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.557  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 1.40 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 4.44  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 12.62

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 523.00 DOWNSTREAM ELEVATION(FEET) = 468.00  
 STREET LENGTH(FEET) = 987.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.13  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.39  
 HALFSTREET FLOOD WIDTH(FEET) = 11.58  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.92  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.31  
 STREET FLOW TRAVEL TIME(MIN.) = 2.78 Tc(MIN.) = 12.41  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.038  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56  
 COMMERCIAL B 2.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.426  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 11.00  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 21.75

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 12.52  
 FLOW VELOCITY(FEET/SEC.) = 6.19 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.53  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 1797.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 468.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 25.33  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.42  
 HALFSTREET FLOOD WIDTH(FEET) = 14.18  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.37  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.65  
 STREET FLOW TRAVEL TIME(MIN.) = 2.56 Tc(MIN.) = 14.97  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.633  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.10 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 COMMERCIAL B 1.90 0.30 0.100 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.232  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 7.15  
 EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 25.92

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 14.34  
 FLOW VELOCITY(FEET/SEC.) = 6.39 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.67  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2774.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
 MAINLINE Tc(MIN.) = 14.97  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.633  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	1.30	0.30	1.000	66

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 2.73  
 EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
 TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 28.65

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 204.00 TO NODE 218.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

-----  
 UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 343.00  
 STREET LENGTH(FEET) = 1228.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 32.66  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.45  
 HALFSTREET FLOOD WIDTH(FEET) = 16.05  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.54  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.94  
 STREET FLOW TRAVEL TIME(MIN.) = 3.13 Tc(MIN.) = 18.10  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.363

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
COMMERCIAL	B	0.50	0.30	0.100	56
NATURAL FAIR COVER "OPEN BRUSH"	B	0.40	0.30	1.000	66
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	0.70	0.30	0.500	56
COMMERCIAL	B	1.50	0.30	0.100	56
NATURAL FAIR COVER "OPEN BRUSH"	B	0.80	0.30	1.000	66

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 8.02  
 EFFECTIVE AREA(ACRES) = 16.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 16.6 PEAK FLOW RATE(CFS) = 33.60

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.45 HALFSTREET FLOOD WIDTH(FEET) = 16.21  
 FLOW VELOCITY(FEET/SEC.) = 6.61 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.99  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
 MAINLINE Tc(MIN.) = 18.10  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.363  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	1.20	0.30	0.500	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
COMMERCIAL	B	0.10	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.450  
 SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 3.21  
 EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 36.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

-----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 18.10  
 RAINFALL INTENSITY(INCH/HR) = 2.36  
 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.39  
EFFECTIVE STREAM AREA (ACRES) = 18.20  
TOTAL STREAM AREA (ACRES) = 18.20  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 36.81

\*\*\*\*\*  
FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----

INITIAL SUBAREA FLOW-LENGTH (FEET) = 268.00  
ELEVATION DATA: UPSTREAM (FEET) = 514.00 DOWNSTREAM (FEET) = 511.50

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.724  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.278

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	B	2.30	0.30	0.500	56	9.27
APARTMENTS	B	0.40	0.30	0.200	56	7.72

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456

SUBAREA RUNOFF (CFS) = 10.06

TOTAL AREA (ACRES) = 2.70 PEAK FLOW RATE (CFS) = 10.06

\*\*\*\*\*  
FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 511.50 DOWNSTREAM ELEVATION (FEET) = 503.00  
STREET LENGTH (FEET) = 503.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 20.81  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.47  
HALFSTREET FLOOD WIDTH (FEET) = 16.99  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.75  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.75  
STREET FLOW TRAVEL TIME (MIN.) = 2.23 Tc (MIN.) = 9.96  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.436  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.20	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.475  
SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 21.34  
EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.14  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47  
TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 29.36

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.51 HALFSTREET FLOOD WIDTH (FEET) = 19.49  
FLOW VELOCITY (FEET/SEC.) = 4.09 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.09  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 771.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc (MIN.) = 9.96

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.436

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.281

SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 3.92

EFFECTIVE AREA (ACRES) = 11.20 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45

TOTAL AREA (ACRES) = 11.2 PEAK FLOW RATE (CFS) = 33.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<  
-----

UPSTREAM ELEVATION (FEET) = 503.00 DOWNSTREAM ELEVATION (FEET) = 476.00  
STREET LENGTH (FEET) = 423.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.97  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.45  
HALFSTREET FLOOD WIDTH(FEET) = 15.98  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.07  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.17  
STREET FLOW TRAVEL TIME(MIN.) = 1.00 Tc(MIN.) = 10.95  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.269

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 1.00 0.30 0.500 56  
COMMERCIAL B 0.10 0.30 0.100 56  
CONDOMINIUMS B 0.10 0.30 0.350 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.454  
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 3.38  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 34.98

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.45 HALFSTREET FLOOD WIDTH(FEET) = 15.98  
FLOW VELOCITY(FEET/SEC.) = 7.07 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.17  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 10.95  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.269  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.50 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
COMMERCIAL B 0.30 0.30 0.100 56  
CONDOMINIUMS B 3.30 0.30 0.350 56  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.332  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 13.98  
EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 48.96

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 10.95  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.269  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 3.40 0.30 0.100 56  
CONDOMINIUMS B 8.10 0.30 0.350 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.276  
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 32.98  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 81.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 476.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
STREET LENGTH(FEET) = 789.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 81.94  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.67  
HALFSTREET FLOOD WIDTH(FEET) = 28.16  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.63  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.75  
STREET FLOW TRAVEL TIME(MIN.) = 2.34 Tc(MIN.) = 13.29  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.899  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 81.94  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.67 HALFSTREET FLOOD WIDTH(FEET) = 28.16  
FLOW VELOCITY(FEET/SEC.) = 5.63 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.75  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1983.00 FEET.

\*\*\*\*\*



FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.29  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.899  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	8.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.40	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 35.63  
 EFFECTIVE AREA(ACRES) = 43.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
 TOTAL AREA(ACRES) = 43.2 PEAK FLOW RATE(CFS) = 107.99

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 460.00 DOWNSTREAM ELEVATION(FEET) = 419.00  
STREET LENGTH(FEET) = 529.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 112.69  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.60  
 HALFSTREET FLOOD WIDTH(FEET) = 24.57  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.09  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.07  
 STREET FLOW TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 14.16  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.761  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 9.40  
 EFFECTIVE AREA(ACRES) = 47.20 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 47.2 PEAK FLOW RATE(CFS) = 112.02

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.60 HALFSTREET FLOOD WIDTH(FEET) = 24.49  
FLOW VELOCITY(FEET/SEC.) = 10.09 DEPTH\*VELOCITY(FT\*FT/SEC.) = 6.05  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 2512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.16  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.761  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.70	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 13.16  
 EFFECTIVE AREA(ACRES) = 52.80 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
 TOTAL AREA(ACRES) = 52.8 PEAK FLOW RATE(CFS) = 125.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.16  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.761  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.90	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.50	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 17.63  
 EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 142.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 419.00 DOWNSTREAM ELEVATION(FEET) = 405.00  
STREET LENGTH(FEET) = 174.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 142.80  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.64  
HALFSTREET FLOOD WIDTH(FEET) = 26.76  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.84  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.94  
STREET FLOW TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 14.43  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.719  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 142.80  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.64 HALFSTREET FLOOD WIDTH(FEET) = 26.76  
FLOW VELOCITY(FEET/SEC.) = 10.84 DEPTH\*VELOCITY(FT\*FT/SEC.) = 6.94  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 2686.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 372.00  
FLOW LENGTH(FEET) = 395.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.83  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 142.80  
PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 14.67  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 3081.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

-----  
MAINLINE Tc(MIN.) = 14.67  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.681  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500					
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 5.01					
EFFECTIVE AREA(ACRES) = 62.50 AREA-AVERAGED Fm(INCH/HR) = 0.13					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44					
TOTAL AREA(ACRES) = 62.5 PEAK FLOW RATE(CFS) = 143.49					

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

-----  
MAINLINE Tc(MIN.) = 14.67  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.681  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 3.50 0.30 0.500 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 6.90 0.30 0.500 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 24.15  
EFFECTIVE AREA(ACRES) = 73.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 73.1 PEAK FLOW RATE(CFS) = 167.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 343.00  
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.52  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 167.64  
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 15.10  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 3688.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

-----  
MAINLINE Tc(MIN.) = 15.10

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.621  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.443  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.57  
 EFFECTIVE AREA (ACRES) = 73.80 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 73.8 PEAK FLOW RATE (CFS) = 167.64  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
 -----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 15.10  
 RAINFALL INTENSITY (INCH/HR) = 2.62  
 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.44  
 EFFECTIVE STREAM AREA (ACRES) = 73.80  
 TOTAL STREAM AREA (ACRES) = 73.80  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 167.64

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	36.81	18.10	2.363	0.30 ( 0.12)	0.39	18.2	200.00
2	167.64	15.10	2.621	0.30 ( 0.13)	0.44	73.8	210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	201.86	15.10	2.621	0.30 ( 0.13)	0.43	89.0	210.00
2	187.09	18.10	2.363	0.30 ( 0.13)	0.43	92.0	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 201.86 Tc (MIN.) = 15.10  
 EFFECTIVE AREA (ACRES) = 88.98 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA (ACRES) = 92.0  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 343.00 DOWNSTREAM (FEET) = 326.50  
 FLOW LENGTH (FEET) = 734.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.8 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 18.53  
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 201.86  
 PIPE TRAVEL TIME (MIN.) = 0.66 Tc (MIN.) = 15.76  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 219.00 = 4736.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 15.76  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.564  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56  
 COMMERCIAL  
 B 0.60 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.70 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.90 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 6.26  
 EFFECTIVE AREA (ACRES) = 91.88 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 94.9 PEAK FLOW RATE (CFS) = 201.86  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 15.76  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.564  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL  
 B 0.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 1.32  
 EFFECTIVE AREA (ACRES) = 92.48 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA (ACRES) = 95.5 PEAK FLOW RATE (CFS) = 202.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 326.50 DOWNSTREAM(FEET) = 325.00  
FLOW LENGTH(FEET) = 161.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.38  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 202.47  
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 15.96  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 220.00 = 4897.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.96  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.547  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.90	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.60	0.30	0.400	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	18.40	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	4.30	0.30	0.400	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.50	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	6.90	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462  
SUBAREA AREA(ACRES) = 38.60 SUBAREA RUNOFF(CFS) = 83.66  
EFFECTIVE AREA(ACRES) = 131.08 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 134.1 PEAK FLOW RATE(CFS) = 284.70

\*\*\*\*\*

FLOW PROCESS FROM NODE 220.00 TO NODE 245.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 315.00  
FLOW LENGTH(FEET) = 1019.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 66.0 INCH PIPE IS 49.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.04  
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 284.70  
PIPE TRAVEL TIME(MIN.) = 1.13 Tc(MIN.) = 17.09  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.09  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.450  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.30	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.00	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379  
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 6.10  
EFFECTIVE AREA(ACRES) = 133.98 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 137.0 PEAK FLOW RATE(CFS) = 284.70  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.09  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.450  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.264  
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 2.35  
EFFECTIVE AREA(ACRES) = 135.08 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 138.1 PEAK FLOW RATE(CFS) = 284.70  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.09  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.450  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.40	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.434  
 SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 6.68  
 EFFECTIVE AREA(ACRES) = 138.28 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA(ACRES) = 141.3 PEAK FLOW RATE(CFS) = 288.39

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3<<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 220.50 TO NODE 221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 251.00  
 ELEVATION DATA: UPSTREAM(FEET) = 551.00 DOWNSTREAM(FEET) = 547.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.785  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.501  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"1 DWELLING/ACRE"	B	3.10	0.30	0.800	56	9.79
RESIDENTIAL						
"1 DWELLING/ACRE"	B	3.10	0.30	0.800	56	9.79

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA RUNOFF(CFS) = 18.20  
 TOTAL AREA(ACRES) = 6.20 PEAK FLOW RATE(CFS) = 18.20

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 542.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00 CHANNEL SLOPE = 0.0130  
 CHANNEL BASE(FEET) = 10.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.278  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.163  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 25.03  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.77  
 AVERAGE FLOW DEPTH(FEET) = 0.40 TRAVEL TIME(MIN.) = 1.11  
 Tc(MIN.) = 10.90  
 SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 13.66  
 EFFECTIVE AREA(ACRES) = 10.90 AREA-AVERAGED Fm(INCH/HR) = 0.16  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA(ACRES) = 10.9 PEAK FLOW RATE(CFS) = 30.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.45 FLOW VELOCITY(FEET/SEC.) = 6.20  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 222.00 = 637.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 542.00 DOWNSTREAM ELEVATION(FEET) = 531.00  
 STREET LENGTH(FEET) = 1146.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 50.26  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.64  
 HALFSTREET FLOOD WIDTH(FEET) = 26.91  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.77  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.43  
 STREET FLOW TRAVEL TIME(MIN.) = 5.06 Tc(MIN.) = 15.96  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.546

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					

"11+ DWELLINGS/ACRE" B 11.50 0.30 0.200 56  
 APARTMENTS B 2.90 0.30 0.200 56  
 COMMERCIAL B 0.70 0.30 0.100 56  
 PUBLIC PARK B 2.60 0.30 0.850 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.292  
 SUBAREA AREA(ACRES) = 17.70 SUBAREA RUNOFF(CFS) = 39.17  
 EFFECTIVE AREA(ACRES) = 28.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 28.6 PEAK FLOW RATE(CFS) = 62.60

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.69 HALFSTREET FLOOD WIDTH(FEET) = 30.33  
 FLOW VELOCITY(FEET/SEC.) = 3.97 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.72  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 223.00 = 1783.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 531.00 DOWNSTREAM ELEVATION(FEET) = 520.00  
 STREET LENGTH(FEET) = 702.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 74.99  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.67  
 HALFSTREET FLOOD WIDTH(FEET) = 29.00  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.99  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.36  
 STREET FLOW TRAVEL TIME(MIN.) = 2.35 Tc(MIN.) = 18.31  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.345  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.40	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
CONDOMINIUMS	B	0.70	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175  
 SUBAREA AREA(ACRES) = 12.00 SUBAREA RUNOFF(CFS) = 24.76  
 EFFECTIVE AREA(ACRES) = 40.60 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32

TOTAL AREA(ACRES) = 40.6 PEAK FLOW RATE(CFS) = 82.18

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.69 HALFSTREET FLOOD WIDTH(FEET) = 30.92  
 FLOW VELOCITY(FEET/SEC.) = 5.10 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.53  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 224.00 = 2485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 463.00  
 FLOW LENGTH(FEET) = 1760.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.23  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 82.18  
 PIPE TRAVEL TIME(MIN.) = 1.70 Tc(MIN.) = 20.01  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 225.00 = 4245.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.01  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.199  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.20	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	0.30	0.30	0.350	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	2.00	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.235  
 SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 22.03  
 EFFECTIVE AREA(ACRES) = 52.10 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 52.1 PEAK FLOW RATE(CFS) = 98.89

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.01  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.199  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.20	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	0.30	0.30	0.350	56

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      6.40     0.30      0.500     56
CONDOMINIUMS          B      0.90     0.30      0.350     56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      5.20     0.30      0.500     56
CONDOMINIUMS          B      0.80     0.30      0.350     56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.481
SUBAREA AREA(ACRES) = 13.30      SUBAREA RUNOFF(CFS) = 24.60
EFFECTIVE AREA(ACRES) = 65.40    AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 65.4        PEAK FLOW RATE(CFS) = 123.49

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FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 425.00
FLOW LENGTH(FEET) = 639.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.25
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 123.49
PIPE TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 20.45
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 226.00 = 4884.00 FEET.

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FLOW PROCESS FROM NODE 226.00 TO NODE 226.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 20.45
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.174
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B      2.90     0.30     0.200     56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      2.90     0.30     0.500     56
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B      6.30     0.30     0.200     56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      6.00     0.30     0.500     56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348
SUBAREA AREA(ACRES) = 18.10      SUBAREA RUNOFF(CFS) = 33.71
EFFECTIVE AREA(ACRES) = 83.50    AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 83.5        PEAK FLOW RATE(CFS) = 155.68

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*****
FLOW PROCESS FROM NODE 226.00 TO NODE 243.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

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>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 653.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.32
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 155.68
PIPE TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 20.92
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 243.00 = 5537.00 FEET.

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FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 20.92
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.146
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B      2.90     0.30     0.200     56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"  B      1.60     0.30     0.500     56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307
SUBAREA AREA(ACRES) = 4.50      SUBAREA RUNOFF(CFS) = 8.32
EFFECTIVE AREA(ACRES) = 88.00    AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 88.0        PEAK FLOW RATE(CFS) = 161.93

```

```

*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1
-----

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```

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 20.92
RAINFALL INTENSITY(INCH/HR) = 2.15
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.34
EFFECTIVE STREAM AREA(ACRES) = 88.00
TOTAL STREAM AREA(ACRES) = 88.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 161.93

```

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*****
FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21
-----

```

```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 547.50

```

```

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

```

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.751  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.891  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 APARTMENTS B 0.60 0.30 0.200 56 8.75  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 2.07  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 2.07

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 547.50 DOWNSTREAM(FEET) = 541.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 802.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 3.00  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.214  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 APARTMENTS B 0.20 0.30 0.200 56  
 COMMERCIAL B 5.90 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.85  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.24  
 AVERAGE FLOW DEPTH(FEET) = 1.02 TRAVEL TIME(MIN.) = 2.55  
 Tc(MIN.) = 11.30  
 SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 17.47  
 EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 19.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.26 FLOW VELOCITY(FEET/SEC.) = 6.08  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1132.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 541.00 DOWNSTREAM(FEET) = 533.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 849.00 CHANNEL SLOPE = 0.0094  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.921  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 14.90 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.59  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.64  
 AVERAGE FLOW DEPTH(FEET) = 1.59 TRAVEL TIME(MIN.) = 1.85  
 Tc(MIN.) = 13.16  
 SUBAREA AREA(ACRES) = 14.90 SUBAREA RUNOFF(CFS) = 38.77  
 EFFECTIVE AREA(ACRES) = 21.60 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 21.6 PEAK FLOW RATE(CFS) = 56.18

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.83 FLOW VELOCITY(FEET/SEC.) = 8.40  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1981.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.16  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.921  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 APARTMENTS B 0.20 0.30 0.200 56  
 COMMERCIAL B 1.80 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124  
 SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 5.45  
 EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 61.63

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.16  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.921  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.40 0.30 0.100 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 COMMERCIAL B 1.30 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.117  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.68  
 EFFECTIVE AREA(ACRES) = 25.50 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 25.5 PEAK FLOW RATE(CFS) = 66.30

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31



```

=====
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 537.00 DOWNSTREAM(FEET) = 510.00
FLOW LENGTH(FEET) = 513.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.33
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 66.30
PIPE TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 13.60
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2494.00 FEET.

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

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=====
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.60
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.851
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B        9.40    0.30    0.400    56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 23.10
EFFECTIVE AREA(ACRES) = 34.90 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 34.9 PEAK FLOW RATE(CFS) = 87.80

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

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=====
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.60
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.851
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        0.70    0.30    0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B        2.50    0.30    0.400    56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.356
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 7.90
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 95.70

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*****
FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31

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```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 478.00
FLOW LENGTH(FEET) = 474.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.43
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 95.70
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 13.93
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 2968.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81

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=====
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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```

MAINLINE Tc(MIN.) = 13.93
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.798
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        1.70    0.30    0.200    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B        1.60    0.30    0.400    56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.297
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 8.04
EFFECTIVE AREA(ACRES) = 41.40 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21
TOTAL AREA(ACRES) = 41.4 PEAK FLOW RATE(CFS) = 101.92

```

```

*****
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31

```

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=====
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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```

ELEVATION DATA: UPSTREAM(FEET) = 478.00 DOWNSTREAM(FEET) = 471.00
FLOW LENGTH(FEET) = 473.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.61
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 101.92
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 14.51
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 3441.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

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=====
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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MAINLINE Tc(MIN.) = 14.51
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.706
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA      Fp        Ap      SCS
LAND USE             GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B        1.40    0.30    0.200    56

```

RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 7.10 0.30 0.400 56  
 APARTMENTS B 2.70 0.30 0.200 56  
 COMMERCIAL B 1.10 0.30 0.100 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.307  
 SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 28.94  
 EFFECTIVE AREA(ACRES) = 53.70 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA(ACRES) = 53.7 PEAK FLOW RATE(CFS) = 127.44

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.51  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.706  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.90 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 5.40 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
 COMMERCIAL B 0.60 0.30 0.100 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.378  
 SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 23.10  
 EFFECTIVE AREA(ACRES) = 63.60 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 63.6 PEAK FLOW RATE(CFS) = 150.54

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 471.00 DOWNSTREAM(FEET) = 468.00  
 FLOW LENGTH(FEET) = 283.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 38.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.18  
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 150.54  
 PIPE TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 14.87  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 237.00 = 3724.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.87  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.649  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 6.10 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.60 0.30 0.400 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.218  
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 15.58  
 EFFECTIVE AREA(ACRES) = 70.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 70.3 PEAK FLOW RATE(CFS) = 162.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 468.00 DOWNSTREAM(FEET) = 461.00  
 FLOW LENGTH(FEET) = 698.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.24  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 162.88  
 PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 15.75  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 238.00 = 4422.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.75  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.565  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 8.40 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.220  
 SUBAREA AREA(ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 20.24  
 EFFECTIVE AREA(ACRES) = 79.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 79.3 PEAK FLOW RATE(CFS) = 177.76

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.75  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.565  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

```

LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      2.10      0.30      0.200      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 2.10      SUBAREA RUNOFF (CFS) = 4.73
EFFECTIVE AREA (ACRES) = 81.40      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.25
TOTAL AREA (ACRES) = 81.4      PEAK FLOW RATE (CFS) = 182.49

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*****
FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 461.00 DOWNSTREAM(FEET) = 440.00
FLOW LENGTH(FEET) = 582.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 22.09
ESTIMATED PIPE DIAMETER(INCH) = 45.00      NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 182.49
PIPE TRAVEL TIME (MIN.) = 0.44      Tc (MIN.) = 16.19
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 5004.00 FEET.

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*****
FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.19
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.527
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      5.00      0.30      0.200      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 5.00      SUBAREA RUNOFF (CFS) = 11.10
EFFECTIVE AREA (ACRES) = 86.40      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 86.4      PEAK FLOW RATE (CFS) = 190.83

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*****
FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 418.00
FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 21.64
ESTIMATED PIPE DIAMETER(INCH) = 45.00      NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 190.83
PIPE TRAVEL TIME (MIN.) = 0.50      Tc (MIN.) = 16.69
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 5654.00 FEET.

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FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.69
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.484
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      5.30      0.30      0.200      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 5.30      SUBAREA RUNOFF (CFS) = 11.56
EFFECTIVE AREA (ACRES) = 91.70      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 91.7      PEAK FLOW RATE (CFS) = 199.06

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FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.69
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.484
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      1.20      0.30      0.200      56
COMMERCIAL              B      0.20      0.30      0.100      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186
SUBAREA AREA (ACRES) = 1.40      SUBAREA RUNOFF (CFS) = 3.06
EFFECTIVE AREA (ACRES) = 93.10      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24
TOTAL AREA (ACRES) = 93.1      PEAK FLOW RATE (CFS) = 202.12

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FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.69
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.484
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"      B      1.20      0.30      0.200      56
SCHOOL                  B      0.70      0.30      0.600      56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA (ACRES) = 1.90      SUBAREA RUNOFF (CFS) = 4.07
EFFECTIVE AREA (ACRES) = 95.00      AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.24

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TOTAL AREA (ACRES) = 95.0 PEAK FLOW RATE (CFS) = 206.18

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FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 418.00 DOWNSTREAM(FEET) = 404.00
FLOW LENGTH(FEET) = 1279.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 42.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.43
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 206.18
PIPE TRAVEL TIME(MIN.) = 1.48 Tc(MIN.) = 18.17
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 241.00 = 6933.00 FEET.

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FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.17
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.357
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.10 0.30 0.200 56
COMMERCIAL B 1.20 0.30 0.100 56
PUBLIC PARK B 6.30 0.30 0.850 56
SCHOOL B 4.60 0.30 0.600 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.60 0.30 0.200 56
COMMERCIAL B 4.00 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 18.80 SUBAREA RUNOFF(CFS) = 37.41
EFFECTIVE AREA(ACRES) = 113.80 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 113.8 PEAK FLOW RATE(CFS) = 232.75

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FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.17
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.357
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK B 3.90 0.30 0.850 56
SCHOOL B 10.80 0.30 0.600 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.666
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 28.54
EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 261.29

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 403.00
FLOW LENGTH(FEET) = 66.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 46.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.06
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 261.29
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 18.23
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 6999.00 FEET.

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FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.23
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.352
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.40 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 16.40 0.30 0.200 56
COMMERCIAL B 1.30 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.193
SUBAREA AREA(ACRES) = 19.10 SUBAREA RUNOFF(CFS) = 39.43
EFFECTIVE AREA(ACRES) = 147.60 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 147.6 PEAK FLOW RATE(CFS) = 300.08

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 1270.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 56.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.26
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 300.08
PIPE TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 19.83
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

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FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN.) = 19.83  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.215  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.00	0.30	0.200	56
PUBLIC PARK	B	2.00	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.80	0.30	0.200	56
COMMERCIAL	B	1.50	0.30	0.100	56
CONDOMINIUMS	B	0.10	0.30	0.350	56
PUBLIC PARK	B	1.10	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.421  
 SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 15.98  
 EFFECTIVE AREA(ACRES) = 156.10 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32  
 TOTAL AREA(ACRES) = 156.1 PEAK FLOW RATE(CFS) = 300.08  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

-----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 19.83  
 RAINFALL INTENSITY(INCH/HR) = 2.21  
 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.32  
 EFFECTIVE STREAM AREA(ACRES) = 156.10  
 TOTAL STREAM AREA(ACRES) = 156.10  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 300.08

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	161.93	20.92	2.146	0.30( 0.10)	0.34	88.0	220.50
2	300.08	19.83	2.215	0.30( 0.09)	0.32	156.1	230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	458.74	19.83	2.215	0.30( 0.10)	0.32	239.5	230.00
2	452.31	20.92	2.146	0.30( 0.10)	0.32	244.1	220.50

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 458.74 Tc(MIN.) = 19.83  
 EFFECTIVE AREA(ACRES) = 239.52 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32  
 TOTAL AREA(ACRES) = 244.1  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 244.00 IS CODE = 31

-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----

ELEVATION DATA: UPSTREAM(FEET) = 394.00 DOWNSTREAM(FEET) = 340.00  
 FLOW LENGTH(FEET) = 849.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 33.71  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 458.74  
 PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 20.25  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 244.00 = 9118.00 FEET.

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FLOW PROCESS FROM NODE 244.00 TO NODE 244.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN.) = 20.25  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.185  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.70	0.30	0.500	56
PUBLIC PARK	B	0.30	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
PUBLIC PARK	B	0.10	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.537  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.47  
 EFFECTIVE AREA(ACRES) = 242.52 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33  
 TOTAL AREA(ACRES) = 247.1 PEAK FLOW RATE(CFS) = 458.74  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 244.00 TO NODE 245.00 IS CODE = 31

-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 315.00  
 FLOW LENGTH(FEET) = 777.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.42  
 ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 458.74  
 PIPE TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 20.74

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

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FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.74

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.157

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56

PUBLIC PARK B 0.20 0.30 0.850 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56

PUBLIC PARK B 0.10 0.30 0.850 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631

SUBAREA AREA(ACRES) = 0.80 SUBAREA RUNOFF(CFS) = 1.42

EFFECTIVE AREA(ACRES) = 243.32 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33

TOTAL AREA(ACRES) = 247.9 PEAK FLOW RATE(CFS) = 458.74

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	458.74	20.74	2.157	0.30( 0.10)	0.33	243.3	230.00
2	452.31	21.83	2.092	0.30( 0.10)	0.33	247.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	288.39	17.09	2.450	0.30( 0.13)	0.44	138.3	210.00
2	262.02	20.13	2.193	0.30( 0.13)	0.44	141.3	200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	720.23	17.09	2.450	0.30( 0.11)	0.37	338.8	210.00
2	714.99	20.13	2.193	0.30( 0.11)	0.37	377.4	200.00
3	716.17	20.74	2.157	0.30( 0.11)	0.37	384.6	230.00
4	701.60	21.83	2.092	0.30( 0.11)	0.37	389.2	220.50

TOTAL AREA(ACRES) = 389.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 720.23 Tc(MIN.) = 17.088

EFFECTIVE AREA(ACRES) = 338.77 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 389.2

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

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FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 3 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 246.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 306.00

FLOW LENGTH(FEET) = 619.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 84.0 INCH PIPE IS 67.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.65

ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 720.23

PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 17.57

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 246.00 = 10514.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.57

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.409

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.90 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.50 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56

CONDOMINIUMS B 9.10 0.30 0.350 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.80 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.410

SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 33.53

EFFECTIVE AREA(ACRES) = 355.07 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38

TOTAL AREA(ACRES) = 405.5 PEAK FLOW RATE(CFS) = 733.81

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.57  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.409  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.60	0.30	0.400	56
CONDOMINIUMS	B	7.40	0.30	0.350	56
PUBLIC PARK	B	0.30	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.375  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 19.22  
 EFFECTIVE AREA(ACRES) = 364.37 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 414.8 PEAK FLOW RATE(CFS) = 753.03

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 246.00 TO NODE 247.00 IS CODE = 31  
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 306.00 DOWNSTREAM(FEET) = 300.00  
 FLOW LENGTH(FEET) = 185.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 75.0 INCH PIPE IS 57.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 29.88  
 ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 753.03  
 PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 17.67  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 247.00 = 10699.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
 -----  
 MAINLINE Tc(MIN.) = 17.67  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.400  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.30	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.413  
 SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 4.10  
 EFFECTIVE AREA(ACRES) = 366.37 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 416.8 PEAK FLOW RATE(CFS) = 754.23

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
 -----  
 MAINLINE Tc(MIN.) = 17.67  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.400  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.40	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.80	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.365  
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 5.36  
 EFFECTIVE AREA(ACRES) = 368.97 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 419.4 PEAK FLOW RATE(CFS) = 759.59

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 248.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 271.00  
 FLOW LENGTH(FEET) = 859.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 75.0 INCH PIPE IS 56.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 30.45  
 ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 759.59  
 PIPE TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 18.14  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
 -----  
 MAINLINE Tc(MIN.) = 18.14  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.60	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.60	0.30	0.400	56
COMMERCIAL	B	1.00	0.30	0.100	56

NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356  
 SUBAREA AREA(ACRES) = 4.80 SUBAREA RUNOFF(CFS) = 9.73  
 EFFECTIVE AREA(ACRES) = 373.77 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 424.2 PEAK FLOW RATE(CFS) = 759.59  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.14  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.50 0.30 0.400 56  
 COMMERCIAL B 0.30 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367  
 SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.82  
 EFFECTIVE AREA(ACRES) = 374.67 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 425.1 PEAK FLOW RATE(CFS) = 759.59  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.14  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 2.20 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.80 0.30 0.400 56  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 3.20 0.30 0.500 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.466  
 SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 16.38  
 EFFECTIVE AREA(ACRES) = 382.87 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 433.3 PEAK FLOW RATE(CFS) = 774.13

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.14  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 5.70 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 11.49  
 EFFECTIVE AREA(ACRES) = 388.57 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 439.0 PEAK FLOW RATE(CFS) = 785.62

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.14  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 6.40 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.40 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.60 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 8.40 SUBAREA RUNOFF(CFS) = 15.57  
 EFFECTIVE AREA(ACRES) = 396.97 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA(ACRES) = 447.4 PEAK FLOW RATE(CFS) = 801.19

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====  
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00



ELEVATION DATA: UPSTREAM(FEET) = 413.04 DOWNSTREAM(FEET) = 405.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.928

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.578

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
CONDOMINIUMS RESIDENTIAL	B	0.20	0.30	0.350	56	7.70
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56	6.93
CONDOMINIUMS	B	0.10	0.30	0.350	56	7.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.312  
SUBAREA RUNOFF(CFS) = 1.61  
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.61

\*\*\*\*\*

FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 405.00 DOWNSTREAM ELEVATION(FEET) = 385.00

STREET LENGTH(FEET) = 587.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.94

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.31

HALFSTREET FLOOD WIDTH(FEET) = 8.16

AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.77

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.16

STREET FLOW TRAVEL TIME(MIN.) = 2.60 Tc(MIN.) = 9.52

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.599

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.20	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.224  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 8.58  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.07

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24

TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 9.85

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.51

FLOW VELOCITY(FEET/SEC.) = 4.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.46

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 917.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 385.00 DOWNSTREAM(FEET) = 378.50

FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.9 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.26

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 9.85

PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 9.76

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1079.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.76

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.509

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56
COMMERCIAL	B	1.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 7.51

EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.05

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18

TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 17.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 378.50 DOWNSTREAM(FEET) = 348.50

FLOW LENGTH(FEET) = 637.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 13.57

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 17.11

PIPE TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 10.55

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 1716.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.55

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.334

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.60	0.30	0.500	56
COMMERCIAL	B	1.70	0.30	0.100	56
CONDOMINIUMS	B	1.00	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
COMMERCIAL	B	0.70	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.240					
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 13.21					
EFFECTIVE AREA(ACRES) = 10.00 AREA-AVERAGED Fm(INCH/HR) = 0.06					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21					
TOTAL AREA(ACRES) = 10.0 PEAK FLOW RATE(CFS) = 29.45					

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 348.50 DOWNSTREAM(FEET) = 306.00  
 FLOW LENGTH(FEET) = 944.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.05  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 29.45  
 PIPE TRAVEL TIME(MIN.) = 1.05 Tc(MIN.) = 11.59  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.59

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.168

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.20	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.50	0.30	0.500	56
RESIDENTIAL					

"8-10 DWELLINGS/ACRE" B 1.90 0.30 0.400 56  
 COMMERCIAL B 2.00 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
 SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 20.13  
 EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.27  
 TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 48.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.59

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.168

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	4.40	0.30	0.200	56
COMMERCIAL	B	0.10	0.30	0.100	56
APARTMENTS	B	6.70	0.30	0.200	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.199					
SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 31.33					
EFFECTIVE AREA(ACRES) = 28.50 AREA-AVERAGED Fm(INCH/HR) = 0.07					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24					
TOTAL AREA(ACRES) = 28.5 PEAK FLOW RATE(CFS) = 79.42					

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.59

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.168

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.10	0.30	1.000	66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 8.00					
EFFECTIVE AREA(ACRES) = 31.60 AREA-AVERAGED Fm(INCH/HR) = 0.09					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31					
TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 87.42					

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 11.59  
 RAINFALL INTENSITY(INCH/HR) = 3.17  
 AREA-AVERAGED Fm(INCH/HR) = 0.09

AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.31  
EFFECTIVE STREAM AREA(ACRES) = 31.60  
TOTAL STREAM AREA(ACRES) = 31.60  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 87.42

\*\*\*\*\*  
FLOW PROCESS FROM NODE 400.00 TO NODE 420.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----

INITIAL SUBAREA FLOW-LENGTH(FEET) = 300.40  
ELEVATION DATA: UPSTREAM(FEET) = 312.80 DOWNSTREAM(FEET) = 310.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.115  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.131  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL B 0.50 0.30 0.100 56 8.11  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 1.85  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<  
-----

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 307.00  
STREET LENGTH(FEET) = 266.50 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 67.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 62.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.78  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 10.18  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.58  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.87  
STREET FLOW TRAVEL TIME(MIN.) = 1.72 Tc(MIN.) = 9.83  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.483

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.60 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.86  
EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 3.42

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 11.21  
FLOW VELOCITY(FEET/SEC.) = 2.71 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.96  
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.00 = 566.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.00 TO NODE 421.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 307.00 DOWNSTREAM(FEET) = 305.50  
FLOW LENGTH(FEET) = 105.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.82  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 3.42  
PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 10.13  
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.10 = 671.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
-----

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 10.13  
RAINFALL INTENSITY(INCH/HR) = 3.40  
AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 1.10  
TOTAL STREAM AREA(ACRES) = 1.10  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.42

\*\* CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 87.42 11.59 3.168 0.30( 0.09) 0.31 31.6 300.00  
2 3.42 10.13 3.399 0.30( 0.03) 0.10 1.1 400.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 85.59 10.13 3.399 0.30( 0.09) 0.31 28.7 400.00

2 90.61 11.59 3.168 0.30( 0.09) 0.31 32.7 300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 90.61 Tc(MIN.) = 11.59
EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.7
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 421.10 TO NODE 426.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 305.50 DOWNSTREAM(FEET) = 301.00
FLOW LENGTH(FEET) = 261.40 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.98
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.61
PIPE TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 11.90
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.10 = 2921.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.90
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.119
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.54
EFFECTIVE AREA(ACRES) = 32.90 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.9 PEAK FLOW RATE(CFS) = 90.61
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.10 TO NODE 426.20 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 289.00
FLOW LENGTH(FEET) = 448.56 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.51
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.61
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 12.36
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.20 = 3369.96 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.20 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.36
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.047
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.32
EFFECTIVE AREA(ACRES) = 33.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 33.4 PEAK FLOW RATE(CFS) = 90.61
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.20 TO NODE 426.30 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 289.00 DOWNSTREAM(FEET) = 282.00
FLOW LENGTH(FEET) = 260.45 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.54
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.61
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 12.62
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.30 = 3630.41 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 426.30 TO NODE 426.30 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.62
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.006
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.80 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 2.86
EFFECTIVE AREA(ACRES) = 34.50 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 34.5 PEAK FLOW RATE(CFS) = 90.61

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 426.30 TO NODE 248.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 271.00
FLOW LENGTH(FEET) = 411.44 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.50
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 90.61
PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 13.03
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.
*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.03
RAINFALL INTENSITY(INCH/HR) = 2.94
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 34.50
TOTAL STREAM AREA(ACRES) = 34.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 90.61
*****
FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----
INITIAL SUBAREA FLOW-LENGTH(FEET) = 233.60
ELEVATION DATA: UPSTREAM(FEET) = 306.50 DOWNSTREAM(FEET) = 301.80

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.882
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.972
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.20 0.30 0.100 56 5.88
COMMERCIAL B 0.20 0.30 0.100 56 5.88
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 1.78
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.78
*****
FLOW PROCESS FROM NODE 426.00 TO NODE 427.00 IS CODE = 61
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 301.80 DOWNSTREAM ELEVATION(FEET) = 294.00
STREET LENGTH(FEET) = 478.70 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.00
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.34
HALFSTREET FLOOD WIDTH(FEET) = 10.23
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.77
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.94
STREET FLOW TRAVEL TIME(MIN.) = 2.88 Tc(MIN.) = 8.76
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.886
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.20 0.30 0.100 56
COMMERCIAL B 0.50 0.30 0.100 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 2.43
EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 3.82

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.42
FLOW VELOCITY(FEET/SEC.) = 2.93 DEPTH*VELOCITY(FT*FT/SEC.) = 1.05
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 427.00 = 712.30 FEET.
*****
FLOW PROCESS FROM NODE 427.00 TO NODE 428.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 294.00 DOWNSTREAM ELEVATION(FEET) = 286.00
STREET LENGTH(FEET) = 300.80 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

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Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.58

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.35

HALFSTREET FLOOD WIDTH(FEET) = 11.07

AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.70

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.30

STREET FLOW TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 10.12

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.401

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.52

EFFECTIVE AREA(ACRES) = 1.60 AREA-AVERAGED Fm(INCH/HR) = 0.03

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 4.85

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.39

FLOW VELOCITY(FEET/SEC.) = 3.74 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.34

LONGEST FLOWPATH FROM NODE 425.00 TO NODE 428.00 = 1013.10 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 428.00 TO NODE 429.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 286.00 DOWNSTREAM ELEVATION(FEET) = 276.00

STREET LENGTH(FEET) = 242.40 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.44

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.35

HALFSTREET FLOOD WIDTH(FEET) = 10.85

AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.54

PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.58

STREET FLOW TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 11.01

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.16

EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.03

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10

TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 5.81

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 11.18

FLOW VELOCITY(FEET/SEC.) = 4.62 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.64

LONGEST FLOWPATH FROM NODE 425.00 TO NODE 429.00 = 1255.50 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 429.00 TO NODE 429.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.01

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL	B	0.50	0.30	0.400	56
RESIDENTIAL	B	1.50	0.30	0.400	56

"8-10 DWELLINGS/ACRE"

"8-10 DWELLINGS/ACRE"

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 5.65

EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.08

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25

TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 11.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 429.00 TO NODE 248.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 276.00 DOWNSTREAM(FEET) = 273.00

FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.45

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 11.47

PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 11.17

LONGEST FLOWPATH FROM NODE 425.00 TO NODE 248.00 = 1355.50 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 11.17

RAINFALL INTENSITY(INCH/HR) = 3.23

AREA-AVERAGED Fm(INCH/HR) = 0.08  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.25  
EFFECTIVE STREAM AREA(ACRES) = 4.00  
TOTAL STREAM AREA(ACRES) = 4.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.47

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	86.31	11.59	3.169	0.30( 0.09)	0.31	30.5	400.00
1	90.61	13.03	2.940	0.30( 0.09)	0.31	34.5	300.00
2	11.47	11.17	3.235	0.30( 0.08)	0.25	4.0	425.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	96.45	11.17	3.235	0.30( 0.09)	0.30	33.4	425.00
2	97.54	11.59	3.169	0.30( 0.09)	0.30	34.5	400.00
3	101.01	13.03	2.940	0.30( 0.09)	0.31	38.5	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 101.01 Tc(MIN.) = 13.03  
EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.09  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
TOTAL AREA(ACRES) = 38.5  
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	96.45	11.17	3.235	0.30( 0.09)	0.30	33.4	425.00
2	97.54	11.59	3.169	0.30( 0.09)	0.30	34.5	400.00
3	101.01	13.03	2.940	0.30( 0.09)	0.31	38.5	300.00

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	801.19	18.14	2.360	0.30( 0.12)	0.39	397.0	210.00
2	790.08	21.18	2.131	0.30( 0.12)	0.39	435.6	200.00
3	788.87	21.79	2.095	0.30( 0.12)	0.38	442.8	230.00
4	771.04	22.89	2.030	0.30( 0.12)	0.38	447.4	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	782.38	11.17	3.235	0.30( 0.11)	0.38	277.9	425.00

2	794.10	11.59	3.169	0.30( 0.11)	0.38	288.2	400.00
3	825.71	13.03	2.940	0.30( 0.11)	0.38	323.8	300.00
4	881.62	18.14	2.360	0.30( 0.11)	0.38	435.5	210.00
5	862.39	21.18	2.131	0.30( 0.11)	0.38	474.1	200.00
6	859.90	21.79	2.095	0.30( 0.11)	0.38	481.3	230.00
7	839.78	22.89	2.030	0.30( 0.11)	0.38	485.9	220.50

TOTAL AREA(ACRES) = 485.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 881.62 Tc(MIN.) = 18.138  
EFFECTIVE AREA(ACRES) = 435.47 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA(ACRES) = 485.9  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 249.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 261.00  
FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 81.0 INCH PIPE IS 62.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.76  
ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 881.62  
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 18.33  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 429.00 TO NODE 430.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 262.70

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.459

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.755

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.20	0.30	0.100	56	6.46

COMMERCIAL B 0.40 0.30 0.100 56 6.46  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF (CFS) = 2.55  
TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 2.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION (FEET) = 262.70 DOWNSTREAM ELEVATION (FEET) = 258.98  
STREET LENGTH (FEET) = 345.60 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 51.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.59

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.37  
HALFSTREET FLOOD WIDTH (FEET) = 12.22  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.45  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.91  
STREET FLOW TRAVEL TIME (MIN.) = 2.35 Tc (MIN.) = 8.81  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.869

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.50	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 2.07  
EFFECTIVE AREA (ACRES) = 1.20 AREA-AVERAGED Fm (INCH/HR) = 0.03  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA (ACRES) = 1.2 PEAK FLOW RATE (CFS) = 4.15

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.39 HALFSTREET FLOOD WIDTH (FEET) = 13.02  
FLOW VELOCITY (FEET/SEC.) = 2.53 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.98  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.00 = 675.60 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.00 TO NODE 431.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 258.98 DOWNSTREAM (FEET) = 258.00  
FLOW LENGTH (FEET) = 91.03 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.9 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.53  
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 4.15  
PIPE TRAVEL TIME (MIN.) = 0.27 Tc (MIN.) = 9.08  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.10 = 766.63 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 9.08  
RAINFALL INTENSITY (INCH/HR) = 3.77  
AREA-AVERAGED Fm (INCH/HR) = 0.03  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA (ACRES) = 1.20  
TOTAL STREAM AREA (ACRES) = 1.20  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 4.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 410.00 TO NODE 440.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 299.70  
ELEVATION DATA: UPSTREAM (FEET) = 312.69 DOWNSTREAM (FEET) = 310.80

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.196  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.100  
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.40	0.30	0.100	56	8.20

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF (CFS) = 1.47  
TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 1.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION (FEET) = 310.80 DOWNSTREAM ELEVATION (FEET) = 306.50  
STREET LENGTH (FEET) = 299.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 55.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017



SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.07  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 8.81  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.42  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.76  
STREET FLOW TRAVEL TIME(MIN.) = 2.06 Tc(MIN.) = 10.26  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.379

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.10 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.21  
EFFECTIVE AREA(ACRES) = 0.80 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 2.41

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 9.46  
FLOW VELOCITY(FEET/SEC.) = 2.52 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.82  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 441.00 = 598.70 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 306.50 DOWNSTREAM ELEVATION(FEET) = 299.00  
STREET LENGTH(FEET) = 341.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.24  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.33  
HALFSTREET FLOOD WIDTH(FEET) = 9.83  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.18  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.06  
STREET FLOW TRAVEL TIME(MIN.) = 1.79 Tc(MIN.) = 12.04  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.097

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.20 0.30 0.100 56  
COMMERCIAL B 0.40 0.30 0.100 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.66  
EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 3.86

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.73  
FLOW VELOCITY(FEET/SEC.) = 3.29 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.14  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 442.00 = 940.30 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 299.00 DOWNSTREAM ELEVATION(FEET) = 288.50  
STREET LENGTH(FEET) = 390.10 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.62  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 11.13  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.70  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.31  
STREET FLOW TRAVEL TIME(MIN.) = 1.76 Tc(MIN.) = 13.80  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.819

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.30 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.51  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 5.02

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.52

FLOW VELOCITY(FEET/SEC.) = 3.79 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.37  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 443.00 = 1330.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 443.00 TO NODE 444.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 288.50 DOWNSTREAM ELEVATION(FEET) = 281.00  
STREET LENGTH(FEET) = 272.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.49  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 12.02  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.85  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.42  
STREET FLOW TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 14.98  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.632

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.40 0.30 0.100 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.94  
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 5.62

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 12.12  
FLOW VELOCITY(FEET/SEC.) = 3.89 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.44  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 444.00 = 1603.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 444.00 TO NODE 445.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 281.00 DOWNSTREAM ELEVATION(FEET) = 268.10  
STREET LENGTH(FEET) = 462.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.39  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 12.82  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.01  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.53  
STREET FLOW TRAVEL TIME(MIN.) = 1.92 Tc(MIN.) = 16.90  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.466

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.70 0.30 0.100 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.53  
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 6.80

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 13.12  
FLOW VELOCITY(FEET/SEC.) = 4.10 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.59  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 445.00 = 2065.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 445.00 TO NODE 446.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 268.10 DOWNSTREAM ELEVATION(FEET) = 257.00  
STREET LENGTH(FEET) = 532.90 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.80  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.42  
HALFSTREET FLOOD WIDTH(FEET) = 14.83  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.78  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.57  
STREET FLOW TRAVEL TIME(MIN.) = 2.35 Tc(MIN.) = 19.25  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.264

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.60	0.30	0.100	56
COMMERCIAL	B	0.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 2.01  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 8.24

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 15.15  
FLOW VELOCITY(FEET/SEC.) = 3.84 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.62  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 446.00 = 2598.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 446.00 TO NODE 431.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 257.00 DOWNSTREAM(FEET) = 256.50  
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.88  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 8.24  
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 19.60  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 19.60  
RAINFALL INTENSITY(INCH/HR) = 2.23  
AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 4.10  
TOTAL STREAM AREA(ACRES) = 4.10  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 8.24

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	4.15	9.08	3.765	0.30( 0.03)	0.10	1.2	429.00
2	8.24	19.60	2.235	0.30( 0.03)	0.10	4.1	410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	10.62	9.08	3.765	0.30( 0.03)	0.10	3.1	429.00
2	10.69	19.60	2.235	0.30( 0.03)	0.10	5.3	410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 10.69 Tc(MIN.) = 19.60  
EFFECTIVE AREA(ACRES) = 5.30 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 5.3  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 249.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 258.00 DOWNSTREAM(FEET) = 257.00  
FLOW LENGTH(FEET) = 230.42 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.95  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 10.69  
PIPE TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 20.37  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	10.62	9.86	3.472	0.30( 0.03)	0.10	3.1	429.00
2	10.69	20.37	2.178	0.30( 0.03)	0.10	5.3	410.00

LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	782.38	11.37	3.204	0.30( 0.11)	0.38	277.9	425.00
2	794.10	11.79	3.137	0.30( 0.11)	0.38	288.2	400.00
3	825.71	13.23	2.909	0.30( 0.11)	0.38	323.8	300.00
4	881.62	18.33	2.343	0.30( 0.11)	0.38	435.5	210.00
5	862.39	21.37	2.119	0.30( 0.11)	0.38	474.1	200.00
6	859.90	21.98	2.083	0.30( 0.11)	0.38	481.3	230.00
7	839.78	23.09	2.018	0.30( 0.11)	0.38	485.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	748.33	9.86	3.472	0.30( 0.11)	0.38	244.2	429.00

2	793.01	11.37	3.204	0.30	( 0.11)	0.38	281.3	425.00		
3	804.73	11.79	3.137	0.30	( 0.11)	0.38	291.7	400.00		
4	836.36	13.23	2.909	0.30	( 0.11)	0.38	327.6	300.00		
5	892.30	18.33	2.343	0.30	( 0.11)	0.38	440.3	210.00		
6	879.40	20.37	2.178	0.30	( 0.11)	0.38	466.7	410.00		
7	872.79	21.37	2.119	0.30	( 0.11)	0.38	479.4	200.00		
8	870.12	21.98	2.083	0.30	( 0.11)	0.38	486.6	230.00		
9	849.67	23.09	2.018	0.30	( 0.11)	0.37	491.2	220.50		
TOTAL AREA (ACRES) =			491.2							

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 892.30 Tc (MIN.) = 18.332  
EFFECTIVE AREA (ACRES) = 440.34 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA (ACRES) = 491.2  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<<

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 491.2 TC (MIN.) = 18.33  
EFFECTIVE AREA (ACRES) = 440.34 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.380  
PEAK FLOW RATE (CFS) = 892.30

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	748.33	9.86	3.472	0.30 ( 0.11)	0.38	244.2	429.00
2	793.01	11.37	3.204	0.30 ( 0.11)	0.38	281.3	425.00
3	804.73	11.79	3.137	0.30 ( 0.11)	0.38	291.7	400.00
4	836.36	13.23	2.909	0.30 ( 0.11)	0.38	327.6	300.00
5	892.30	18.33	2.343	0.30 ( 0.11)	0.38	440.3	210.00
6	879.40	20.37	2.178	0.30 ( 0.11)	0.38	466.7	410.00
7	872.79	21.37	2.119	0.30 ( 0.11)	0.38	479.4	200.00
8	870.12	21.98	2.083	0.30 ( 0.11)	0.38	486.6	230.00
9	849.67	23.09	2.018	0.30 ( 0.11)	0.37	491.2	220.50

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

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FILE NAME: 0506101C.DAT  
TIME/DATE OF STUDY: 12:41 04/15/2013  
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--\*TIME-OF-CONCENTRATION MODEL\*--  
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\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167 0.0150	

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10100.00 TO NODE 10101.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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INITIAL SUBAREA FLOW-LENGTH (FEET) = 327.00

ELEVATION DATA: UPSTREAM (FEET) = 895.00 DOWNSTREAM (FEET) = 820.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.606

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.971

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER

"GRASS" - 0.10 0.30 1.000 98 9.61

NATURAL FAIR COVER

"OPEN BRUSH" - 0.30 0.30 1.000 98 9.61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 0.96

TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 0.96

\*\*\*\*\*

FLOW PROCESS FROM NODE 10101.00 TO NODE 10102.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 820.00 DOWNSTREAM (FEET) = 790.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 152.00 CHANNEL SLOPE = 0.1974

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00

CHANNEL FLOW THRU SUBAREA (CFS) = 0.96

FLOW VELOCITY (FEET/SEC.) = 4.16 FLOW DEPTH (FEET) = 0.28

TRAVEL TIME (MIN.) = 0.61 Tc (MIN.) = 10.21

LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10102.00 = 479.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10102.00 TO NODE 10102.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====

MAINLINE Tc (MIN.) = 10.21

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.868

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.50      0.30      1.000      -
USER-DEFINED  -        0.30      0.30      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.80 SUBAREA RUNOFF (CFS) = 1.85
EFFECTIVE AREA (ACRES) = 1.20 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.2 PEAK FLOW RATE (CFS) = 2.77

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*****
FLOW PROCESS FROM NODE 10102.00 TO NODE 10103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 762.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.1400
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.77
FLOW VELOCITY(FEET/SEC.) = 4.82 FLOW DEPTH(FEET) = 0.44
TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 10.91
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10103.00 = 679.00 FEET.

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FLOW PROCESS FROM NODE 10103.00 TO NODE 10103.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 10.91
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.764
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -        0.40    0.30    1.000  -
USER-DEFINED       -        0.80    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 2.66
EFFECTIVE AREA (ACRES) = 2.40 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 2.4 PEAK FLOW RATE (CFS) = 5.32

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*****
FLOW PROCESS FROM NODE 10103.00 TO NODE 10104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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ELEVATION DATA: UPSTREAM(FEET) = 762.00 DOWNSTREAM(FEET) = 754.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 124.00 CHANNEL SLOPE = 0.0645
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.32
FLOW VELOCITY(FEET/SEC.) = 4.28 FLOW DEPTH(FEET) = 0.64
TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 11.39
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10104.00 = 803.00 FEET.

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10104.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.39
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.696
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -        0.70    0.30    1.000  -
USER-DEFINED       -        1.10    0.30    1.000  -
USER-DEFINED       -        0.10    0.30    1.000  -
USER-DEFINED       -        0.40    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 4.96
EFFECTIVE AREA (ACRES) = 4.70 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.7 PEAK FLOW RATE (CFS) = 10.13

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*****
FLOW PROCESS FROM NODE 10104.00 TO NODE 10105.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 754.00 DOWNSTREAM(FEET) = 740.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00 CHANNEL SLOPE = 0.0255
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.13
FLOW VELOCITY(FEET/SEC.) = 3.56 FLOW DEPTH(FEET) = 0.97
TRAVEL TIME(MIN.) = 2.57 Tc(MIN.) = 13.96
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10105.00 = 1353.00 FEET.

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10105.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.96
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.394
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -        3.40    0.30    1.000  -
USER-DEFINED       -        0.60    0.30    1.000  -
USER-DEFINED       -        6.00    0.30    1.000  -
USER-DEFINED       -        0.60    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 10.60 SUBAREA RUNOFF (CFS) = 19.98
EFFECTIVE AREA (ACRES) = 15.30 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 15.3 PEAK FLOW RATE (CFS) = 28.84

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10106.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 740.00 DOWNSTREAM(FEET) = 623.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 929.00 CHANNEL SLOPE = 0.1259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 28.84
FLOW VELOCITY(FEET/SEC.) = 8.38 FLOW DEPTH(FEET) = 1.07
TRAVEL TIME(MIN.) = 1.85 Tc(MIN.) = 15.81
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10106.00 = 2282.00 FEET.
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10106.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.81
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.243
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 10.40 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 4.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 27.11
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 53.87
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 592.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 417.00 CHANNEL SLOPE = 0.0743
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 53.87
FLOW VELOCITY(FEET/SEC.) = 8.06 FLOW DEPTH(FEET) = 1.49
TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 16.67
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10107.00 = 2699.00 FEET.
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10107.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.67

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* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.183
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 5.10 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 2.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 16.10
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 68.30
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 592.00 DOWNSTREAM(FEET) = 590.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0333
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.000
CHANNEL FLOW THRU SUBAREA(CFS) = 68.30
FLOW VELOCITY(FEET/SEC.) = 6.33 FLOW DEPTH(FEET) = 1.90
TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 16.83
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10108.00 = 2759.00 FEET.
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.83
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.172
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 7.00 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 7.50 0.30 1.000 -
USER-DEFINED - 1.80 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 30.50
EFFECTIVE AREA(ACRES) = 58.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.4 PEAK FLOW RATE(CFS) = 98.40
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.83
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.172
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.34
EFFECTIVE AREA(ACRES) = 58.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.6 PEAK FLOW RATE(CFS) = 98.73

\*\*\*\*\*
FLOW PROCESS FROM NODE 10108.00 TO NODE 10109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 526.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 973.00 CHANNEL SLOPE = 0.0658
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 98.73
FLOW VELOCITY(FEET/SEC.) = 8.95 FLOW DEPTH(FEET) = 1.92
TRAVEL TIME(MIN.) = 1.81 Tc(MIN.) = 18.64
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10109.00 = 3732.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10109.00 TO NODE 10109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.64
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.045
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 16.40 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 3.00 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 31.41
EFFECTIVE AREA(ACRES) = 78.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.6 PEAK FLOW RATE(CFS) = 123.46

\*\*\*\*\*
FLOW PROCESS FROM NODE 10109.00 TO NODE 10110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 526.00 DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1045.00 CHANNEL SLOPE = 0.0679

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 123.46
FLOW VELOCITY(FEET/SEC.) = 9.58 FLOW DEPTH(FEET) = 2.07
TRAVEL TIME(MIN.) = 1.82 Tc(MIN.) = 20.46
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10110.00 = 4777.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10110.00 TO NODE 10110.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.46
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.929
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.30 1.000 -
USER-DEFINED - 0.50 0.30 1.000 -
USER-DEFINED - 31.60 0.30 1.000 -
USER-DEFINED - 1.60 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.10 SUBAREA RUNOFF(CFS) = 51.46
EFFECTIVE AREA(ACRES) = 113.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.7 PEAK FLOW RATE(CFS) = 166.70

\*\*\*\*\*
FLOW PROCESS FROM NODE 10110.00 TO NODE 10111.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 675.00 CHANNEL SLOPE = 0.0667
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 166.70
FLOW VELOCITY(FEET/SEC.) = 10.24 FLOW DEPTH(FEET) = 2.33
TRAVEL TIME(MIN.) = 1.10 Tc(MIN.) = 21.56
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10111.00 = 5452.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10111.00 TO NODE 10111.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.56
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.878
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.40 0.30 1.000 -
USER-DEFINED - 6.00 0.30 1.000 -
USER-DEFINED - 24.80 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -



USER-DEFINED - 4.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 43.20 SUBAREA RUNOFF (CFS) = 61.37  
EFFECTIVE AREA (ACRES) = 156.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 156.9 PEAK FLOW RATE (CFS) = 222.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10111.00 TO NODE 10112.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	410.00	DOWNSTREAM (FEET) =	405.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	143.00	CHANNEL SLOPE =	0.0350
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	4.00
CHANNEL FLOW THRU SUBAREA (CFS) =	222.89		
FLOW VELOCITY (FEET/SEC.) =	8.64	FLOW DEPTH (FEET) =	2.93
TRAVEL TIME (MIN.) =	0.28	Tc (MIN.) =	21.83
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10112.00 =	5595.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 21.83  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.866

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	7.90	0.30	1.000	-
USER-DEFINED	-	25.90	0.30	1.000	-
USER-DEFINED	-	19.30	0.30	1.000	-
USER-DEFINED	-	2.10	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 56.20 SUBAREA RUNOFF (CFS) = 79.20  
EFFECTIVE AREA (ACRES) = 213.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 213.1 PEAK FLOW RATE (CFS) = 300.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10113.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	405.00	DOWNSTREAM (FEET) =	363.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	1642.00	CHANNEL SLOPE =	0.0256
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	300.30		
FLOW VELOCITY (FEET/SEC.) =	8.29	FLOW DEPTH (FEET) =	3.47

TRAVEL TIME (MIN.) = 3.30 Tc (MIN.) = 25.13  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10113.00 = 7237.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 25.13  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.715

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	33.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 35.40 SUBAREA RUNOFF (CFS) = 45.10  
EFFECTIVE AREA (ACRES) = 248.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 248.5 PEAK FLOW RATE (CFS) = 316.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10114.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	363.00	DOWNSTREAM (FEET) =	340.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	918.00	CHANNEL SLOPE =	0.0251
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	316.59		
FLOW VELOCITY (FEET/SEC.) =	8.34	FLOW DEPTH (FEET) =	3.56
TRAVEL TIME (MIN.) =	1.84	Tc (MIN.) =	26.97
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10114.00 =	8155.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 26.97  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.653

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	10.10	0.30	1.000	-
USER-DEFINED	-	17.70	0.30	1.000	-
USER-DEFINED	-	52.90	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 83.10 SUBAREA RUNOFF (CFS) = 101.20

EFFECTIVE AREA(ACRES) = 331.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 331.6 PEAK FLOW RATE(CFS) = 403.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 26.97  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.653  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 1.83  
EFFECTIVE AREA(ACRES) = 333.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 333.1 PEAK FLOW RATE(CFS) = 405.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10115.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 301.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1467.00 CHANNEL SLOPE = 0.0266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 405.66  
FLOW VELOCITY(FEET/SEC.) = 9.06 FLOW DEPTH(FEET) = 3.86  
TRAVEL TIME(MIN.) = 2.70 Tc(MIN.) = 29.67  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10115.00 = 9622.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10115.00 TO NODE 10115.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 29.67  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.561  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.60 0.30 1.000 -  
USER-DEFINED - 24.30 0.30 1.000 -  
USER-DEFINED - 47.70 0.30 1.000 -  
USER-DEFINED - 9.80 0.30 1.000 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 94.00 SUBAREA RUNOFF(CFS) = 106.71  
EFFECTIVE AREA(ACRES) = 427.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 427.1 PEAK FLOW RATE(CFS) = 484.87

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10115.00 TO NODE 10116.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 272.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1696.00 CHANNEL SLOPE = 0.0171  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 484.87  
FLOW VELOCITY(FEET/SEC.) = 8.04 FLOW DEPTH(FEET) = 4.48  
TRAVEL TIME(MIN.) = 3.52 Tc(MIN.) = 33.18  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10116.00 = 11318.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 33.18  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.474  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.90 0.30 1.000 -  
USER-DEFINED - 4.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 32.00 0.30 1.000 -  
USER-DEFINED - 3.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 45.60 SUBAREA RUNOFF(CFS) = 48.17  
EFFECTIVE AREA(ACRES) = 472.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 472.7 PEAK FLOW RATE(CFS) = 499.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 33.18  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.474  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 1.000 -  
USER-DEFINED - 7.70 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.70 SUBAREA RUNOFF(CFS) = 10.25  
EFFECTIVE AREA(ACRES) = 482.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 482.4 PEAK FLOW RATE(CFS) = 509.57

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*****
FLOW PROCESS FROM NODE 10116.00 TO NODE 10117.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 272.00 DOWNSTREAM(FEET) = 252.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 878.00 CHANNEL SLOPE = 0.0228
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 509.57
FLOW VELOCITY(FEET/SEC.) = 9.06 FLOW DEPTH(FEET) = 4.33
TRAVEL TIME(MIN.) = 1.62 Tc(MIN.) = 34.80
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10117.00 = 12196.00 FEET.
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 34.80
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.435
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 8.20 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 12.59
EFFECTIVE AREA(ACRES) = 494.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 494.7 PEAK FLOW RATE(CFS) = 509.57
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 34.80
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.435
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 14.60 0.30 1.000 -
USER-DEFINED - 6.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 3.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996
SUBAREA AREA(ACRES) = 25.00 SUBAREA RUNOFF(CFS) = 25.56
EFFECTIVE AREA(ACRES) = 519.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

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AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 519.7 PEAK FLOW RATE(CFS) = 530.88
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10118.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 252.00 DOWNSTREAM(FEET) = 249.00
FLOW LENGTH(FEET) = 280.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 81.0 INCH PIPE IS 62.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.08
ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 530.88
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 35.06
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10118.00 = 12476.00 FEET.
*****
FLOW PROCESS FROM NODE 10118.00 TO NODE 10119.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 249.00 DOWNSTREAM(FEET) = 240.00
FLOW LENGTH(FEET) = 892.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 81.0 INCH PIPE IS 63.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.58
ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 530.88
PIPE TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 35.90
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10119.00 = 13368.00 FEET.
*****
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 35.90
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.408
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.100 -
USER-DEFINED - 1.00 0.30 0.600 -
USER-DEFINED - 0.80 0.30 0.850 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.706
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 3.88
EFFECTIVE AREA(ACRES) = 523.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 523.3 PEAK FLOW RATE(CFS) = 530.88
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****

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FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 35.90  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.408  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	9.60	0.30	0.600	-
USER-DEFINED	-	1.00	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.627  
 SUBAREA AREA (ACRES) = 13.60 SUBAREA RUNOFF (CFS) = 14.94  
 EFFECTIVE AREA (ACRES) = 536.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 536.9 PEAK FLOW RATE (CFS) = 537.31

FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 35.90  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.408  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.10  
 EFFECTIVE AREA (ACRES) = 537.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 537.0 PEAK FLOW RATE (CFS) = 537.41

FLOW PROCESS FROM NODE 10119.00 TO NODE 10120.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 240.00 DOWNSTREAM(FEET) = 239.00  
 FLOW LENGTH(FEET) = 120.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 66.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.38  
 ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 537.41  
 PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 36.02  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10120.00 = 13488.00 FEET.

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.02  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.405  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.657  
 SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 6.09  
 EFFECTIVE AREA (ACRES) = 542.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA (ACRES) = 542.6 PEAK FLOW RATE (CFS) = 542.08

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.02  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.405  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.717  
 SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 5.46  
 EFFECTIVE AREA (ACRES) = 547.70 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA (ACRES) = 547.7 PEAK FLOW RATE (CFS) = 547.54

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 36.02  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.405  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	2.70	0.30	1.000	-
USER-DEFINED	-	11.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 15.72  
EFFECTIVE AREA(ACRES) = 563.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 563.5 PEAK FLOW RATE(CFS) = 563.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10121.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	239.00	DOWNSTREAM(FEET) =	213.00
FLOW LENGTH(FEET) =	194.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	51.0 INCH PIPE IS	40.1 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) =	47.07		
ESTIMATED PIPE DIAMETER(INCH) =	51.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	563.26		
PIPE TRAVEL TIME(MIN.) =	0.07	Tc(MIN.) =	36.09
LONGEST FLOWPATH FROM NODE	10100.00 TO NODE	10121.00 =	13682.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10121.00 TO NODE 10122.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	213.00	DOWNSTREAM(FEET) =	176.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	995.00	CHANNEL SLOPE =	0.0372
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH(FEET) =	6.00
CHANNEL FLOW THRU SUBAREA(CFS) =	563.26		
FLOW VELOCITY(FEET/SEC.) =	11.16	FLOW DEPTH(FEET) =	4.10
TRAVEL TIME(MIN.) =	1.49	Tc(MIN.) =	37.58
LONGEST FLOWPATH FROM NODE	10100.00 TO NODE	10122.00 =	14677.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	37.58				
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	1.368				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	4.80	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	1.000				
SUBAREA AREA(ACRES) =	7.30	SUBAREA RUNOFF(CFS) =	7.02		
EFFECTIVE AREA(ACRES) =	570.80	AREA-AVERAGED Fm(INCH/HR) =	0.29		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.98		

TOTAL AREA(ACRES) = 570.8 PEAK FLOW RATE(CFS) = 563.26  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	37.58				
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	1.368				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	3.00	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	1.000				
SUBAREA AREA(ACRES) =	10.50	SUBAREA RUNOFF(CFS) =	10.09		
EFFECTIVE AREA(ACRES) =	581.30	AREA-AVERAGED Fm(INCH/HR) =	0.29		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.98		
TOTAL AREA(ACRES) =	581.3	PEAK FLOW RATE(CFS) =	563.26		
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE					

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	37.58				
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	1.368				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	3.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	1.000				
SUBAREA AREA(ACRES) =	7.90	SUBAREA RUNOFF(CFS) =	7.59		
EFFECTIVE AREA(ACRES) =	589.20	AREA-AVERAGED Fm(INCH/HR) =	0.30		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.98		
TOTAL AREA(ACRES) =	589.2	PEAK FLOW RATE(CFS) =	569.05		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) =	37.58				
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	1.368				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN

USER-DEFINED - 1.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$  (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 1.73  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.98  
TOTAL AREA (ACRES) = 591.0 PEAK FLOW RATE (CFS) = 570.78

=====  
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 591.0 TC (MIN.) = 37.58  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.984  
PEAK FLOW RATE (CFS) = 570.78

=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.4 Release Date: 01/25/2007 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506102C.DAT  
TIME/DATE OF STUDY: 14:26 01/08/2009  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

=====

=====

- =====
- USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14
- 1) 5.00; 4.440
  - 2) 10.00; 3.011
  - 3) 15.00; 2.390
  - 4) 20.00; 2.029
  - 5) 25.00; 1.787
  - 6) 30.00; 1.600
  - 7) 40.00; 1.368
  - 8) 50.00; 1.205
  - 9) 60.00; 1.060
  - 10) 90.00; 0.862
  - 11) 120.00; 0.732
  - 12) 180.00; 0.593
  - 13) 360.00; 0.412
  - 14) 1440.00; 0.172

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10200.00 TO NODE 10201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 293.00  
ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 617.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.991  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.014

SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
RESIDENTIAL  
"3-4 DWELLINGS/ACRE" - 0.73 0.30 0.600 0 9.99  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA RUNOFF(CFS) = 1.87  
TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 1.87

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10201.00 TO NODE 10202.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 617.00 DOWNSTREAM ELEVATION(FEET) = 613.00  
STREET LENGTH(FEET) = 323.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.89  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.35  
HALFSTREET FLOOD WIDTH(FEET) = 9.68  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.56  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.90  
STREET FLOW TRAVEL TIME(MIN.) = 2.10 Tc(MIN.) = 12.09  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.751

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.88 0.30 0.600 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 0.88 SUBAREA RUNOFF(CFS) = 2.05  
EFFECTIVE AREA(ACRES) = 1.62 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 3.74

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 10.89  
FLOW VELOCITY(FEET/SEC.) = 2.72 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.02  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10202.00 = 616.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10202.00 TO NODE 10203.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 613.00 DOWNSTREAM ELEVATION(FEET) = 594.00  
STREET LENGTH(FEET) = 613.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.60  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 10.67  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.22  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.57  
STREET FLOW TRAVEL TIME(MIN.) = 2.42 Tc(MIN.) = 14.51  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.451

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.82 0.30 0.614 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.614  
SUBAREA AREA(ACRES) = 1.82 SUBAREA RUNOFF(CFS) = 3.72  
EFFECTIVE AREA(ACRES) = 3.44 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 7.02

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.76  
FLOW VELOCITY(FEET/SEC.) = 4.46 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.76  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10203.00 = 1229.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10203.00 TO NODE 10204.00 IS CODE = 63  
-----

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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 594.00 DOWNSTREAM ELEVATION(FEET) = 578.00  
STREET LENGTH(FEET) = 433.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.17  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.40  
HALFSTREET FLOOD WIDTH(FEET) = 12.09  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.95  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.98  
STREET FLOW TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 15.97  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.320

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.21 0.30 0.655 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.655  
SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 2.31  
EFFECTIVE AREA(ACRES) = 4.64 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 8.92

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 12.58  
FLOW VELOCITY(FEET/SEC.) = 5.03 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.06  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10204.00 = 1662.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 578.00 DOWNSTREAM(FEET) = 575.00  
FLOW LENGTH(FEET) = 147.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.50  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 8.92  
PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 16.26  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10205.00 = 1809.00 FEET.

\*\*\*\*\*



FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.26  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.299  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.61	0.30	0.917	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917  
 SUBAREA AREA(ACRES) = 3.61 SUBAREA RUNOFF(CFS) = 6.57  
 EFFECTIVE AREA(ACRES) = 8.25 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
 TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 15.40

FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 563.00  
 FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.86  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 15.40  
 PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 17.21  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10206.00 = 2374.00 FEET.

FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.21  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.230  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.75	0.30	0.669	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.669  
 SUBAREA AREA(ACRES) = 4.75 SUBAREA RUNOFF(CFS) = 8.67  
 EFFECTIVE AREA(ACRES) = 13.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA(ACRES) = 13.0 PEAK FLOW RATE(CFS) = 23.56

FLOW PROCESS FROM NODE 10206.00 TO NODE 10207.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 563.00 DOWNSTREAM(FEET) = 547.00  
 FLOW LENGTH(FEET) = 599.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.63  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 23.56  
 PIPE TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 18.07  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10207.00 = 2973.00 FEET.

FLOW PROCESS FROM NODE 10206.10 TO NODE 10207.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.07  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.168  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.59	0.30	0.664	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.664  
 SUBAREA AREA(ACRES) = 4.59 SUBAREA RUNOFF(CFS) = 8.13  
 EFFECTIVE AREA(ACRES) = 17.58 AREA-AVERAGED Fm(INCH/HR) = 0.21  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71  
 TOTAL AREA(ACRES) = 17.6 PEAK FLOW RATE(CFS) = 30.97

FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 516.00  
 FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.7 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.09  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 30.97  
 PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 18.69  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10208.00 = 3573.00 FEET.

FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.69  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.123  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.60	0.30	0.697	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.697  
 SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 6.20  
 EFFECTIVE AREA(ACRES) = 21.18 AREA-AVERAGED Fm(INCH/HR) = 0.21  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
 TOTAL AREA(ACRES) = 21.2 PEAK FLOW RATE(CFS) = 36.46

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*****
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 516.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 604.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 17.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.40
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 36.46
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 19.27
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10209.00 = 4177.00 FEET.

*****
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.27
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.082
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 8.21 0.30 0.645 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645
SUBAREA AREA(ACRES) = 8.21 SUBAREA RUNOFF(CFS) = 13.96
EFFECTIVE AREA(ACRES) = 29.40 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 29.4 PEAK FLOW RATE(CFS) = 49.62

*****
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 438.00
FLOW LENGTH(FEET) = 678.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.31
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 49.62
PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 19.86
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10210.00 = 4855.00 FEET.

*****
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.86
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.039
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

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USER-DEFINED - 10.49 0.30 0.986 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 10.49 SUBAREA RUNOFF(CFS) = 16.47
EFFECTIVE AREA(ACRES) = 39.89 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 39.9 PEAK FLOW RATE(CFS) = 64.97

*****
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 280.00
FLOW LENGTH(FEET) = 2662.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.39
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 64.97
PIPE TRAVEL TIME(MIN.) = 2.18 Tc(MIN.) = 22.03
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10211.00 = 7517.00 FEET.

*****
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.03
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.931
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 10.00 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.00 SUBAREA RUNOFF(CFS) = 14.68
EFFECTIVE AREA(ACRES) = 49.89 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 49.9 PEAK FLOW RATE(CFS) = 75.75

*****
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 280.00 DOWNSTREAM(FEET) = 176.00
FLOW LENGTH(FEET) = 935.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.21
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 75.75
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 22.60
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10212.00 = 8452.00 FEET.

*****
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 81

```

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 22.60  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.903  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.37 0.30 0.926 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.926  
SUBAREA AREA(ACRES) = 18.37 SUBAREA RUNOFF(CFS) = 26.87  
EFFECTIVE AREA(ACRES) = 68.26 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 68.3 PEAK FLOW RATE(CFS) = 101.37

\*\*\*\*\*

FLOW PROCESS FROM NODE 10212.00 TO NODE 10242.00 IS CODE = 51

=====  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====  
ELEVATION DATA: UPSTREAM(FEET) = 176.00 DOWNSTREAM(FEET) = 169.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00 CHANNEL SLOPE = 0.0211  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.858  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.97 0.30 0.970 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 102.76  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.91  
AVERAGE FLOW DEPTH(FEET) = 2.41 TRAVEL TIME(MIN.) = 0.94  
Tc(MIN.) = 23.54  
SUBAREA AREA(ACRES) = 1.97 SUBAREA RUNOFF(CFS) = 2.78  
EFFECTIVE AREA(ACRES) = 70.23 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 101.37  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.40 FLOW VELOCITY(FEET/SEC.) = 5.87  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 10

=====  
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10220.00 TO NODE 10221.00 IS CODE = 21

=====  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 308.00 DOWNSTREAM(FEET) = 300.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.111  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.382  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"GRASS" - 1.03 0.30 1.000 0 15.11  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.93  
TOTAL AREA(ACRES) = 1.03 PEAK FLOW RATE(CFS) = 1.93

\*\*\*\*\*

FLOW PROCESS FROM NODE 10221.10 TO NODE 10222.00 IS CODE = 63

=====  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

=====  
UPSTREAM ELEVATION(FEET) = 300.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.40

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.22  
HALFSTREET FLOOD WIDTH(FEET) = 3.29  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.70  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.28  
STREET FLOW TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 16.38

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.290

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.64 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 2.93  
EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 4.78

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.26 HALFSTREET FLOOD WIDTH(FEET) = 4.87

FLOW VELOCITY(FEET/SEC.) = 5.60 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.43  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10222.00 = 764.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10221.20 TO NODE 10222.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 16.38  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.290  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.12 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.12 SUBAREA RUNOFF(CFS) = 5.58  
EFFECTIVE AREA(ACRES) = 5.78 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 5.8 PEAK FLOW RATE(CFS) = 10.36

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10222.10 TO NODE 10223.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<

-----  
UPSTREAM ELEVATION(FEET) = 261.00 DOWNSTREAM ELEVATION(FEET) = 208.00  
STREET LENGTH(FEET) = 622.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.84  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.33  
HALFSTREET FLOOD WIDTH(FEET) = 8.58  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.40  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.11  
STREET FLOW TRAVEL TIME(MIN.) = 1.62 Tc(MIN.) = 18.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.173

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.75 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.75 SUBAREA RUNOFF(CFS) = 2.96  
EFFECTIVE AREA(ACRES) = 7.54 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 7.5 PEAK FLOW RATE(CFS) = 12.71

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 8.88  
FLOW VELOCITY(FEET/SEC.) = 6.50 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.18  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10223.00 = 1386.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10222.20 TO NODE 10223.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 18.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.173  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.91 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.91 SUBAREA RUNOFF(CFS) = 13.34  
EFFECTIVE AREA(ACRES) = 15.45 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 26.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.10 TO NODE 10224.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<

-----  
UPSTREAM ELEVATION(FEET) = 208.00 DOWNSTREAM ELEVATION(FEET) = 204.00  
STREET LENGTH(FEET) = 758.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.44  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.62  
HALFSTREET FLOOD WIDTH(FEET) = 22.88  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.71  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.67  
STREET FLOW TRAVEL TIME(MIN.) = 4.66 Tc(MIN.) = 22.66  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.900

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.70 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.70 SUBAREA RUNOFF (CFS) = 6.77  
EFFECTIVE AREA (ACRES) = 20.15 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.1 PEAK FLOW RATE (CFS) = 29.02

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.61 HALFSTREET FLOOD WIDTH (FEET) = 22.76  
FLOW VELOCITY (FEET/SEC.) = 2.70 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.66  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10224.00 = 2144.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10223.20 TO NODE 10224.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 22.66  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.900  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.21 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.21 SUBAREA RUNOFF (CFS) = 1.74  
EFFECTIVE AREA (ACRES) = 21.35 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 21.4 PEAK FLOW RATE (CFS) = 30.76

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 204.00 DOWNSTREAM (FEET) = 201.00  
FLOW LENGTH (FEET) = 422.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.1 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 7.60  
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 30.76  
PIPE TRAVEL TIME (MIN.) = 0.93 Tc (MIN.) = 23.58  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10225.00 = 2566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 23.58  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.856  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.81 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.81 SUBAREA RUNOFF (CFS) = 6.74

EFFECTIVE AREA (ACRES) = 26.17 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.2 PEAK FLOW RATE (CFS) = 36.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 201.00 DOWNSTREAM (FEET) = 197.00  
FLOW LENGTH (FEET) = 799.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 7.06  
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 36.64  
PIPE TRAVEL TIME (MIN.) = 1.88 Tc (MIN.) = 25.47  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10238.00 = 3365.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 25.47  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.770  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.24 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.24 SUBAREA RUNOFF (CFS) = 5.61  
EFFECTIVE AREA (ACRES) = 30.41 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 30.4 PEAK FLOW RATE (CFS) = 40.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 25.47  
RAINFALL INTENSITY (INCH/HR) = 1.77  
AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA (ACRES) = 30.41  
TOTAL STREAM AREA (ACRES) = 30.41  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 40.22

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10230.00 TO NODE 10231.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 276.00
ELEVATION DATA: UPSTREAM (FEET) = 503.00 DOWNSTREAM (FEET) = 390.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.944
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.170
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
AGRICULTURAL POOR COVER
"FALLOW" - 0.95 0.30 1.000 0 5.94
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 3.31
TOTAL AREA (ACRES) = 0.95 PEAK FLOW RATE (CFS) = 3.31

\*\*\*\*\*
FLOW PROCESS FROM NODE 10231.10 TO NODE 10232.00 IS CODE = 51
-----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<
>>>> TRAVEL TIME THRU SUBAREA (EXISTING ELEMENT) <<<<

=====
ELEVATION DATA: UPSTREAM (FEET) = 390.00 DOWNSTREAM (FEET) = 301.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 394.00 CHANNEL SLOPE = 0.2259
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.959
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.68 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.08
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.88
AVERAGE FLOW DEPTH (FEET) = 0.48 TRAVEL TIME (MIN.) = 0.74
Tc (MIN.) = 6.68
SUBAREA AREA (ACRES) = 1.68 SUBAREA RUNOFF (CFS) = 5.55
EFFECTIVE AREA (ACRES) = 2.63 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 2.6 PEAK FLOW RATE (CFS) = 8.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.55 FLOW VELOCITY (FEET/SEC.) = 9.69
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10232.00 = 670.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10231.20 TO NODE 10232.00 IS CODE = 81
-----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<

=====
MAINLINE Tc (MIN.) = 6.68
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.959
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.38 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 6.38 SUBAREA RUNOFF (CFS) = 21.00
EFFECTIVE AREA (ACRES) = 9.01 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 9.0 PEAK FLOW RATE (CFS) = 29.68

\*\*\*\*\*
FLOW PROCESS FROM NODE 10232.00 TO NODE 10233.00 IS CODE = 63
-----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<
>>>> (STREET TABLE SECTION # 4 USED) <<<<

=====
UPSTREAM ELEVATION (FEET) = 301.00 DOWNSTREAM ELEVATION (FEET) = 277.00
STREET LENGTH (FEET) = 341.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.61

\*\* TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 35.11
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.45
HALFSTREET FLOOD WIDTH (FEET) = 14.62
AVERAGE FLOW VELOCITY (FEET/SEC.) = 7.54
PRODUCT OF DEPTH & VELOCITY (FT\*FT/SEC.) = 3.40
STREET FLOW TRAVEL TIME (MIN.) = 0.75 Tc (MIN.) = 7.44
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.744

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 3.50 SUBAREA RUNOFF (CFS) = 10.86
EFFECTIVE AREA (ACRES) = 12.52 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 12.5 PEAK FLOW RATE (CFS) = 38.79

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.46 HALFSTREET FLOOD WIDTH (FEET) = 15.21
FLOW VELOCITY (FEET/SEC.) = 7.75 DEPTH\*VELOCITY (FT\*FT/SEC.) = 3.58
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10233.00 = 1011.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10233.10 TO NODE 10234.00 IS CODE = 63
-----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<
>>>> (STREET TABLE SECTION # 4 USED) <<<<

=====
UPSTREAM ELEVATION (FEET) = 277.00 DOWNSTREAM ELEVATION (FEET) = 226.00

STREET LENGTH(FEET) = 682.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 44.65  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.48  
HALFSTREET FLOOD WIDTH(FEET) = 15.97  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.15  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.89  
STREET FLOW TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 8.83  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.345  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.27 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.27 SUBAREA RUNOFF(CFS) = 11.70  
EFFECTIVE AREA(ACRES) = 16.78 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 46.00

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 16.14  
FLOW VELOCITY(FEET/SEC.) = 8.23 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.96  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10234.00 = 1693.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10233.20 TO NODE 10234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.83  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.345  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 15.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 42.75  
EFFECTIVE AREA(ACRES) = 32.38 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 88.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10234.10 TO NODE 10235.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 3 USED)<<<<

UPSTREAM ELEVATION(FEET) = 226.00 DOWNSTREAM ELEVATION(FEET) = 205.00  
STREET LENGTH(FEET) = 759.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 94.35  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.68  
HALFSTREET FLOOD WIDTH(FEET) = 26.85  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.72  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.57  
STREET FLOW TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 10.71  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.922  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.74 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 11.20  
EFFECTIVE AREA(ACRES) = 37.13 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 88.75  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.67 HALFSTREET FLOOD WIDTH(FEET) = 25.60  
FLOW VELOCITY(FEET/SEC.) = 6.63 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.43

\*NOTE: ESTIMATED STREET FLOW DEPTH IS GREATER THAN  
THE MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67  
SIZE PIPE(S) TO SATISFY THE STREET CONSTRAINT AS FOLLOWS:  
\*\* PIPE SIZED TO MAXIMIZE STREETFLOW AT DOWNSTREAM NODE \*\*  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
ASSUME FULL-FLOWING PIPELINE  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.37  
PIPE-FLOW(CFS) = 16.57  
PIPEFLOW TRAVEL TIME(MIN.) = 1.35 Tc(MIN.) = 10.18  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.988  
SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 11.48  
TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 89.84  
STREETFLOW HYDRAULICS BASED ON MAINLINE Tc :  
STREET HYDRAULICS COMPUTED USING ESTIMATED FLOW(CFS) = 73.27  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.63  
HALFSTREET FLOOD WIDTH(FEET) = 23.63

AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.34  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 4.00  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10235.00 = 2452.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.20 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.18  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.988  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.02 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 8.02 SUBAREA RUNOFF (CFS) = 19.40  
EFFECTIVE AREA (ACRES) = 45.15 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 45.1 PEAK FLOW RATE (CFS) = 109.24

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.30 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.18  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.988  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.62 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.62 SUBAREA RUNOFF (CFS) = 6.33  
EFFECTIVE AREA (ACRES) = 47.76 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 47.8 PEAK FLOW RATE (CFS) = 115.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.00 TO NODE 10236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 205.00 DOWNSTREAM (FEET) = 201.00  
FLOW LENGTH (FEET) = 489.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.9 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.15  
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 115.57  
PIPE TRAVEL TIME (MIN.) = 0.73 Tc (MIN.) = 10.91  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10236.00 = 2941.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.10 TO NODE 10236.00 IS CODE = 81

\*\*\*\*\*

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.91  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.898  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.89 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 2.89 SUBAREA RUNOFF (CFS) = 6.76  
EFFECTIVE AREA (ACRES) = 50.65 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 50.7 PEAK FLOW RATE (CFS) = 118.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10235.20 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.91  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.898  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.84 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.84 SUBAREA RUNOFF (CFS) = 11.31  
EFFECTIVE AREA (ACRES) = 55.49 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 55.5 PEAK FLOW RATE (CFS) = 129.74

\*\*\*\*\*

FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 201.00 DOWNSTREAM (FEET) = 199.00  
FLOW LENGTH (FEET) = 278.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 39.9 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.90  
ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 129.74  
PIPE TRAVEL TIME (MIN.) = 0.42 Tc (MIN.) = 11.34  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10237.00 = 3219.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.34  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.845  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN



USER-DEFINED - 1.62 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.62 SUBAREA RUNOFF (CFS) = 3.71  
 EFFECTIVE AREA (ACRES) = 57.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 57.1 PEAK FLOW RATE (CFS) = 130.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 199.00 DOWNSTREAM (FEET) = 197.00  
 FLOW LENGTH (FEET) = 345.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.9 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.13  
 ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 130.81  
 PIPE TRAVEL TIME (MIN.) = 0.57 Tc (MIN.) = 11.90  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 11.90  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.774  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.38 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.38 SUBAREA RUNOFF (CFS) = 3.07  
 EFFECTIVE AREA (ACRES) = 58.49 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 58.5 PEAK FLOW RATE (CFS) = 130.81  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
 =====  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 11.90  
 RAINFALL INTENSITY (INCH/HR) = 2.77  
 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 58.49  
 TOTAL STREAM AREA (ACRES) = 58.49  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 130.81

\*\* CONFLUENCE DATA \*\*  
 STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 40.22 25.47 1.770 0.30 ( 0.30) 1.00 30.4 10220.00  
 2 130.81 11.90 2.774 0.30 ( 0.30) 1.00 58.5 10230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 162.47 11.90 2.774 0.30 ( 0.30) 1.00 72.7 10230.00  
 2 117.91 25.47 1.770 0.30 ( 0.30) 1.00 88.9 10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 162.47 Tc (MIN.) = 11.90  
 EFFECTIVE AREA (ACRES) = 72.71 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 88.9  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.00 TO NODE 10239.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 197.00 DOWNSTREAM (FEET) = 193.00  
 FLOW LENGTH (FEET) = 753.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 60.0 INCH PIPE IS 44.6 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.38  
 ESTIMATED PIPE DIAMETER (INCH) = 60.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 162.47  
 PIPE TRAVEL TIME (MIN.) = 1.21 Tc (MIN.) = 13.11  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10239.00 = 4317.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.10 TO NODE 10239.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 13.11  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.624  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.72 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.72 SUBAREA RUNOFF (CFS) = 5.69  
 EFFECTIVE AREA (ACRES) = 75.43 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 91.6 PEAK FLOW RATE (CFS) = 162.47  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.20 TO NODE 10239.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.11
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.624
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 34.37 0.30 0.991 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.991
SUBAREA AREA(ACRES) = 34.37 SUBAREA RUNOFF(CFS) = 71.98
EFFECTIVE AREA(ACRES) = 109.79 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 126.0 PEAK FLOW RATE(CFS) = 229.77

FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 193.00 DOWNSTREAM(FEET) = 191.00
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 48.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.34
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 229.77
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 13.52
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10240.00 = 4618.00 FEET.

FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.52
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.574
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.22 0.30 0.916 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.916
SUBAREA AREA(ACRES) = 2.22 SUBAREA RUNOFF(CFS) = 4.60
EFFECTIVE AREA(ACRES) = 112.02 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 128.2 PEAK FLOW RATE(CFS) = 229.77
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 10240.00 TO NODE 10241.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 191.00 DOWNSTREAM(FEET) = 180.00

FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 30.35
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 229.77
PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 13.60
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10241.00 = 4768.00 FEET.

FLOW PROCESS FROM NODE 10241.00 TO NODE 10242.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 169.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 267.00 CHANNEL SLOPE = 0.0412
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.516
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.16 0.30 0.958 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 231.93
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.53
AVERAGE FLOW DEPTH(FEET) = 2.59 TRAVEL TIME(MIN.) = 0.39
Tc(MIN.) = 13.99
SUBAREA AREA(ACRES) = 2.16 SUBAREA RUNOFF(CFS) = 4.33
EFFECTIVE AREA(ACRES) = 114.18 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 130.4 PEAK FLOW RATE(CFS) = 229.77
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.58 FLOW VELOCITY(FEET/SEC.) = 11.49
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 229.77 13.99 2.516 0.30( 0.30) 0.99 114.2 10230.00
2 162.67 27.73 1.685 0.30( 0.30) 1.00 130.4 10220.00
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 101.37 23.54 1.858 0.30( 0.25) 0.85 70.2 10200.00
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	314.72	13.99	2.516	0.30 ( 0.29)	0.96	155.9	10230.00
2	284.49	23.54	1.858	0.30 ( 0.28)	0.94	195.7	10200.00
3	253.13	27.73	1.685	0.30 ( 0.28)	0.94	200.6	10220.00
TOTAL AREA (ACRES) =			200.6				

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 314.72 Tc(MIN.) = 13.988  
EFFECTIVE AREA (ACRES) = 155.91 AREA-AVERAGED Fm (INCH/HR) = 0.29  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
TOTAL AREA (ACRES) = 200.6  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10242.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 169.00 DOWNSTREAM(FEET) = 163.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 315.00 CHANNEL SLOPE = 0.0190  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.446

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.10	0.30	0.995	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) =			0.30		
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =			0.995		
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) =			323.52		
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) =			9.38		
AVERAGE FLOW DEPTH (FEET) = 3.39		TRAVEL TIME (MIN.) = 0.56			
Tc (MIN.) = 14.55					
SUBAREA AREA (ACRES) = 9.10		SUBAREA RUNOFF (CFS) = 17.60			
EFFECTIVE AREA (ACRES) = 165.02		AREA-AVERAGED Fm (INCH/HR) = 0.29			
AREA-AVERAGED Fp (INCH/HR) = 0.30		AREA-AVERAGED Ap = 0.96			
TOTAL AREA (ACRES) = 209.7		PEAK FLOW RATE (CFS) = 320.64			

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 3.38 FLOW VELOCITY (FEET/SEC.) = 9.37  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10243.00 TO NODE 10256.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.55  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.446

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.01	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) =			0.30		
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =			1.000		
SUBAREA AREA (ACRES) = 7.01		SUBAREA RUNOFF (CFS) = 13.53			
EFFECTIVE AREA (ACRES) = 172.02		AREA-AVERAGED Fm (INCH/HR) = 0.29			
AREA-AVERAGED Fp (INCH/HR) = 0.30		AREA-AVERAGED Ap = 0.96			
TOTAL AREA (ACRES) = 216.7		PEAK FLOW RATE (CFS) = 334.17			

\*\*\*\*\*

FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 14.55

RAINFALL INTENSITY (INCH/HR) = 2.45

AREA-AVERAGED Fm (INCH/HR) = 0.29

AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.96

EFFECTIVE STREAM AREA (ACRES) = 172.02

TOTAL STREAM AREA (ACRES) = 216.71

PEAK FLOW RATE (CFS) AT CONFLUENCE = 334.17

\*\*\*\*\*

FLOW PROCESS FROM NODE 10250.00 TO NODE 10251.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 284.00

ELEVATION DATA: UPSTREAM (FEET) = 246.00 DOWNSTREAM (FEET) = 243.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 16.802

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.260

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "WOODLAND, GRASS"	-	1.04	0.30	1.000	0	16.80
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) =			0.30			
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =			1.000			
SUBAREA RUNOFF (CFS) =			1.84			
TOTAL AREA (ACRES) = 1.04			PEAK FLOW RATE (CFS) = 1.84			

\*\*\*\*\*

FLOW PROCESS FROM NODE 10251.00 TO NODE 10252.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 243.00 DOWNSTREAM ELEVATION (FEET) = 240.00

STREET LENGTH (FEET) = 301.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.02  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.34  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.07  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.63  
STREET FLOW TRAVEL TIME(MIN.) = 2.42 Tc(MIN.) = 19.23  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.085  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.47	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 2.36  
EFFECTIVE AREA(ACRES) = 2.51 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 4.03

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.59  
FLOW VELOCITY(FEET/SEC.) = 2.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.72  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10252.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10252.00 TO NODE 10253.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 240.00 DOWNSTREAM ELEVATION(FEET) = 234.00  
STREET LENGTH(FEET) = 544.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.35  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38

HALFSTREET FLOOD WIDTH(FEET) = 11.13  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.57  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.98  
STREET FLOW TRAVEL TIME(MIN.) = 3.53 Tc(MIN.) = 22.75  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.896

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.60 SUBAREA RUNOFF(CFS) = 6.61  
EFFECTIVE AREA(ACRES) = 7.12 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 10.22

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 12.85  
FLOW VELOCITY(FEET/SEC.) = 2.78 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.15  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10253.00 = 1129.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 234.00 DOWNSTREAM(FEET) = 219.00  
FLOW LENGTH(FEET) = 362.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.50  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 10.22  
PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 23.28  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10254.00 = 1491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----

MAINLINE Tc(MIN.) = 23.28  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.870  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.55	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 12.08  
EFFECTIVE AREA(ACRES) = 15.66 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.7 PEAK FLOW RATE(CFS) = 22.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10254.00 TO NODE 10255.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 219.00 DOWNSTREAM(FEET) = 182.00
FLOW LENGTH(FEET) = 716.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.61
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 22.14
PIPE TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 24.09
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10255.00 = 2207.00 FEET.

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*****
FLOW PROCESS FROM NODE 10255.00 TO NODE 10256.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 182.00 DOWNSTREAM(FEET) = 163.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.0833
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.811
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 13.88 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 31.57
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.14
AVERAGE FLOW DEPTH(FEET) = 1.07 TRAVEL TIME(MIN.) = 0.42
Tc(MIN.) = 24.51
SUBAREA AREA(ACRES) = 13.88 SUBAREA RUNOFF(CFS) = 18.87
EFFECTIVE AREA(ACRES) = 29.54 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 29.5 PEAK FLOW RATE(CFS) = 40.17

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.18 FLOW VELOCITY(FEET/SEC.) = 9.65
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10256.00 = 2435.00 FEET.

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*****
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 24.51
RAINFALL INTENSITY(INCH/HR) = 1.81
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 29.54
TOTAL STREAM AREA(ACRES) = 29.54
PEAK FLOW RATE(CFS) AT CONFLUENCE = 40.17

```

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	334.17	14.55	2.446	0.30 ( 0.29)	0.96	172.0	10230.00
1	294.68	24.11	1.830	0.30 ( 0.28)	0.95	211.8	10200.00
1	268.89	28.32	1.663	0.30 ( 0.28)	0.95	216.7	10220.00
2	40.17	24.51	1.811	0.30 ( 0.30)	1.00	29.5	10250.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	368.04	14.55	2.446	0.30 ( 0.29)	0.96	189.6	10230.00
2	334.70	24.11	1.830	0.30 ( 0.29)	0.95	240.8	10200.00
3	332.42	24.51	1.811	0.30 ( 0.29)	0.95	241.8	10250.00
4	305.13	28.32	1.663	0.30 ( 0.29)	0.95	246.3	10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

```

PEAK FLOW RATE(CFS) = 368.04 Tc(MIN.) = 14.55
EFFECTIVE AREA(ACRES) = 189.56 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 246.3
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.
=====

```

END OF STUDY SUMMARY:

```

TOTAL AREA(ACRES) = 246.3 TC(MIN.) = 14.55
EFFECTIVE AREA(ACRES) = 189.56 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.963
PEAK FLOW RATE(CFS) = 368.04

```

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	368.04	14.55	2.446	0.30 ( 0.29)	0.96	189.6	10230.00
2	334.70	24.11	1.830	0.30 ( 0.29)	0.95	240.8	10200.00
3	332.42	24.51	1.811	0.30 ( 0.29)	0.95	241.8	10250.00
4	305.13	28.32	1.663	0.30 ( 0.29)	0.95	246.3	10220.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506103C.DAT  
TIME/DATE OF STUDY: 12:44 04/15/2013  
=====

=====

-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

=====

=====

- USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.00; 4.310  
2) 6.00; 3.880  
3) 7.00; 3.560  
4) 8.00; 3.300  
5) 9.00; 3.080  
6) 10.00; 2.900  
7) 11.00; 2.750  
8) 12.00; 2.610  
9) 13.00; 2.500  
10) 14.00; 2.390  
11) 15.00; 2.300  
12) 20.00; 1.950  
13) 25.00; 1.720  
14) 30.00; 1.550  
15) 40.00; 1.310  
16) 50.00; 1.160  
17) 60.00; 1.040  
18) 90.00; 0.830  
19) 120.00; 0.700  
20) 180.00; 0.560

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE (FT)	FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10300.00 TO NODE 10301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 627.00 DOWNSTREAM(FEET) = 540.00  
  
Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.147  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.247  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" - 1.20 0.30 0.500 95 5.15  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA RUNOFF(CFS) = 4.42  
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 4.42

\*\*\*\*\*

FLOW PROCESS FROM NODE 10301.00 TO NODE 10302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

=====

\*\*\*\*\*

FLOW PROCESS FROM NODE 10302.00 TO NODE 10302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

=====

MAINLINE Tc(MIN.) = 5.43  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.127  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 0.500 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 5.37  
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 9.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10302.00 TO NODE 10303.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 467.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.2575  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 9.66  
FLOW VELOCITY(FEET/SEC.) = 8.36 FLOW DEPTH(FEET) = 0.62  
TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 5.76  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10303.00 = 610.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10303.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.76  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.984  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 7.59  
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 16.91

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10304.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 467.00 DOWNSTREAM(FEET) = 446.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 16.91  
FLOW VELOCITY(FEET/SEC.) = 8.40 FLOW DEPTH(FEET) = 0.82  
TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 5.99  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10304.00 = 725.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10304.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.99  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.886  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.500 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 8.02  
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 24.49

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10305.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 446.00 DOWNSTREAM(FEET) = 366.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 423.00 CHANNEL SLOPE = 0.1891  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 24.49  
FLOW VELOCITY(FEET/SEC.) = 9.37 FLOW DEPTH(FEET) = 0.93  
TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 6.74  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10305.00 = 1148.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10305.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.74  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.643  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.912  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 10.31  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.65  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 33.21

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10306.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 300.00



CHANNEL LENGTH THRU SUBAREA (FEET) = 574.00 CHANNEL SLOPE = 0.1150  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 33.21  
FLOW VELOCITY (FEET/SEC.) = 8.41 FLOW DEPTH (FEET) = 1.15  
TRAVEL TIME (MIN.) = 1.14 Tc (MIN.) = 7.88  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10306.00 = 1722.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10306.00 TO NODE 10306.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 7.88  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.332  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 9.84  
EFFECTIVE AREA (ACRES) = 14.30 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA (ACRES) = 14.3 PEAK FLOW RATE (CFS) = 40.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10306.00 TO NODE 10307.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 300.00 DOWNSTREAM (FEET) = 293.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0350  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 40.05  
FLOW VELOCITY (FEET/SEC.) = 5.64 FLOW DEPTH (FEET) = 1.54  
TRAVEL TIME (MIN.) = 0.59 Tc (MIN.) = 8.47  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10307.00 = 1922.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10307.00 TO NODE 10307.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 8.47  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.197  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.83  
EFFECTIVE AREA (ACRES) = 15.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 15.0 PEAK FLOW RATE (CFS) = 40.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10307.00 TO NODE 10308.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 293.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0850  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 40.14  
FLOW VELOCITY (FEET/SEC.) = 9.77 FLOW DEPTH (FEET) = 1.17  
TRAVEL TIME (MIN.) = 0.34 Tc (MIN.) = 8.81  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10308.00 = 2122.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10308.00 TO NODE 10308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 8.81  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.122  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	8.50	0.30	0.500	-
USER-DEFINED	-	3.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.696  
SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 36.71  
EFFECTIVE AREA (ACRES) = 29.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA (ACRES) = 29.0 PEAK FLOW RATE (CFS) = 75.83

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10308.00 TO NODE 10309.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 250.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 600.00 CHANNEL SLOPE = 0.0433  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 75.83  
FLOW VELOCITY (FEET/SEC.) = 8.86 FLOW DEPTH (FEET) = 1.69  
TRAVEL TIME (MIN.) = 1.13 Tc (MIN.) = 9.94  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10309.00 = 2722.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.94  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.911  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.00	0.30	0.600	-
USER-DEFINED	-	1.80	0.30	0.850	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	0.500	-
USER-DEFINED	-	2.10	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.662  
 SUBAREA AREA(ACRES) = 15.40 SUBAREA RUNOFF(CFS) = 37.60  
 EFFECTIVE AREA(ACRES) = 44.40 AREA-AVERAGED Fm(INCH/HR) = 0.21  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
 TOTAL AREA(ACRES) = 44.4 PEAK FLOW RATE(CFS) = 107.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.94  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.911  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.30	0.850	-
USER-DEFINED	-	8.80	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.967  
 SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 37.28  
 EFFECTIVE AREA(ACRES) = 60.20 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA(ACRES) = 60.2 PEAK FLOW RATE(CFS) = 145.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10309.00 TO NODE 10310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 250.00 DOWNSTREAM(FEET) = 208.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1021.00 CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 145.20  
 FLOW VELOCITY(FEET/SEC.) = 10.26 FLOW DEPTH(FEET) = 2.17  
 TRAVEL TIME(MIN.) = 1.66 Tc(MIN.) = 11.60  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10310.00 = 3743.00 FEET.

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.60  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.667  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	1.80	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.668  
 SUBAREA AREA(ACRES) = 6.60 SUBAREA RUNOFF(CFS) = 14.65  
 EFFECTIVE AREA(ACRES) = 66.80 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA(ACRES) = 66.8 PEAK FLOW RATE(CFS) = 146.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.60  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.667  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	8.00	0.30	0.600	-
USER-DEFINED	-	7.10	0.30	0.850	-
USER-DEFINED	-	8.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814  
 SUBAREA AREA(ACRES) = 23.50 SUBAREA RUNOFF(CFS) = 51.24  
 EFFECTIVE AREA(ACRES) = 90.30 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA(ACRES) = 90.3 PEAK FLOW RATE(CFS) = 197.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10310.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 208.00 DOWNSTREAM(FEET) = 189.00  
 FLOW LENGTH(FEET) = 1595.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 42.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.59  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 197.84  
 PIPE TRAVEL TIME(MIN.) = 1.82 Tc(MIN.) = 13.42  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10335.00 = 5338.00 FEET.

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*****
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.42
RAINFALL INTENSITY(INCH/HR) = 2.45
AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.77
EFFECTIVE STREAM AREA(ACRES) = 90.30
TOTAL STREAM AREA(ACRES) = 90.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 197.84

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FLOW PROCESS FROM NODE 10320.00 TO NODE 10321.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 671.00 DOWNSTREAM(FEET) = 622.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.795
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.968
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.00 0.30 0.500 95 5.79
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 3.44
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 3.44

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*****
FLOW PROCESS FROM NODE 10321.00 TO NODE 10322.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 622.00 DOWNSTREAM(FEET) = 599.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 227.00 CHANNEL SLOPE = 0.1013
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.44
FLOW VELOCITY(FEET/SEC.) = 5.58 FLOW DEPTH(FEET) = 0.45
TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 6.47
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10322.00 = 557.00 FEET.

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*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10322.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 6.47
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.729
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.30 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 4.51
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 7.73

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*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10323.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 599.00 DOWNSTREAM(FEET) = 539.00
FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.55
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.73
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 6.59
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10323.00 = 719.00 FEET.

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*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10323.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 6.59
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.692
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.30 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.59
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 9.25

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*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10324.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 539.00 DOWNSTREAM(FEET) = 530.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 97.00 CHANNEL SLOPE = 0.0928
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 9.25

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FLOW VELOCITY(FEET/SEC.) = 5.67 FLOW DEPTH(FEET) = 0.74  
TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 6.87  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10324.00 = 816.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10324.00 TO NODE 10324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.87  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.601

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.59  
EFFECTIVE AREA(ACRES) = 4.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.7 PEAK FLOW RATE(CFS) = 14.60

\*\*\*\*\*

FLOW PROCESS FROM NODE 10324.00 TO NODE 10325.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 210.00 CHANNEL SLOPE = 0.1429  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 14.60  
FLOW VELOCITY(FEET/SEC.) = 7.39 FLOW DEPTH(FEET) = 0.81  
TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 7.35  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10325.00 = 1026.00 FEET.

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FLOW PROCESS FROM NODE 10325.00 TO NODE 10325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.35  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.470

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 5.08  
EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 19.12

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10326.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 460.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 345.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 19.12  
FLOW VELOCITY(FEET/SEC.) = 7.31 FLOW DEPTH(FEET) = 0.93  
TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 8.13  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10326.00 = 1371.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10326.00 TO NODE 10326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.13  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.271

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 5.34  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 23.31

\*\*\*\*\*

FLOW PROCESS FROM NODE 10326.00 TO NODE 10327.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 430.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 263.00 CHANNEL SLOPE = 0.1141  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 23.31  
FLOW VELOCITY(FEET/SEC.) = 7.71 FLOW DEPTH(FEET) = 1.00  
TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 8.70  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10327.00 = 1634.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10327.00 TO NODE 10327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.70  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.146

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.10	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500

SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 11.05  
EFFECTIVE AREA (ACRES) = 12.40 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 12.4 PEAK FLOW RATE (CFS) = 33.43

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FLOW PROCESS FROM NODE 10327.00 TO NODE 10328.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 375.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 437.00 CHANNEL SLOPE = 0.1259  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 33.43  
FLOW VELOCITY (FEET/SEC.) = 10.76 FLOW DEPTH (FEET) = 1.02  
TRAVEL TIME (MIN.) = 0.68 Tc (MIN.) = 9.38  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10328.00 = 2071.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10328.00 TO NODE 10328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.38  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.012  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.500 -  
USER-DEFINED - 1.20 0.30 0.850 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.772  
SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 8.01  
EFFECTIVE AREA (ACRES) = 15.60 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 15.6 PEAK FLOW RATE (CFS) = 39.95

\*\*\*\*\*

FLOW PROCESS FROM NODE 10328.00 TO NODE 10329.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 375.00 DOWNSTREAM(FEET) = 372.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 224.00 CHANNEL SLOPE = 0.0134  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 39.95  
FLOW VELOCITY (FEET/SEC.) = 4.88 FLOW DEPTH (FEET) = 1.65  
TRAVEL TIME (MIN.) = 0.77 Tc (MIN.) = 10.14  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10329.00 = 2295.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10329.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.14  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.878  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.20 0.30 0.500 -  
USER-DEFINED - 1.40 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.571  
SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 27.29  
EFFECTIVE AREA (ACRES) = 26.80 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 26.8 PEAK FLOW RATE (CFS) = 65.36

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10330.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 300.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 452.00 CHANNEL SLOPE = 0.1593  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 65.36  
FLOW VELOCITY (FEET/SEC.) = 13.98 FLOW DEPTH (FEET) = 1.25  
TRAVEL TIME (MIN.) = 0.54 Tc (MIN.) = 10.68  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10330.00 = 2747.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10330.00 TO NODE 10330.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.68  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.798  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 4.20 0.30 0.500 -  
USER-DEFINED - 2.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.673  
SUBAREA AREA (ACRES) = 7.80 SUBAREA RUNOFF (CFS) = 18.22  
EFFECTIVE AREA (ACRES) = 34.60 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 34.6 PEAK FLOW RATE (CFS) = 81.64

\*\*\*\*\*

FLOW PROCESS FROM NODE 10330.00 TO NODE 10331.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 295.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 182.00 CHANNEL SLOPE = 0.0275  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 81.64  
FLOW VELOCITY(FEET/SEC.) = 7.62 FLOW DEPTH(FEET) = 1.89  
TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 11.08  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10331.00 = 2929.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10331.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 11.08  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.739  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 11.30 0.30 0.500 -  
USER-DEFINED - 0.20 0.30 0.600 -  
USER-DEFINED - 4.20 0.30 0.850 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.652  
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 43.49  
EFFECTIVE AREA(ACRES) = 53.60 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 53.6 PEAK FLOW RATE(CFS) = 123.29

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10332.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 295.00 DOWNSTREAM(FEET) = 245.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.00 CHANNEL SLOPE = 0.0542  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 123.29  
FLOW VELOCITY(FEET/SEC.) = 10.91 FLOW DEPTH(FEET) = 1.94  
TRAVEL TIME(MIN.) = 1.41 Tc(MIN.) = 12.49  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10332.00 = 3851.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10332.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 12.49  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.556  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.850 -

USER-DEFINED - 1.40 0.30 0.500 -  
USER-DEFINED - 15.40 0.30 0.850 -  
USER-DEFINED - 8.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.881  
SUBAREA AREA(ACRES) = 25.60 SUBAREA RUNOFF(CFS) = 52.81  
EFFECTIVE AREA(ACRES) = 79.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 79.2 PEAK FLOW RATE(CFS) = 167.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10333.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 199.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 564.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 167.30  
FLOW VELOCITY(FEET/SEC.) = 13.71 FLOW DEPTH(FEET) = 2.02  
TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 13.17  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10333.00 = 4415.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10333.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 13.17  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.481  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 0.500 -  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 5.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.761  
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 16.83  
EFFECTIVE AREA(ACRES) = 87.50 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 87.5 PEAK FLOW RATE(CFS) = 178.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10334.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 195.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 454.00 CHANNEL SLOPE = 0.0088  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 178.75  
FLOW VELOCITY(FEET/SEC.) = 6.05 FLOW DEPTH(FEET) = 3.14

TRAVEL TIME(MIN.) = 1.25 Tc(MIN.) = 14.43  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10334.00 = 4869.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10334.00 TO NODE 10334.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 14.43

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.352

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN

USER-DEFINED	-	1.10	0.30	0.800	-
USER-DEFINED	-	2.60	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835

SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 7.00

EFFECTIVE AREA(ACRES) = 91.20 AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71

TOTAL AREA(ACRES) = 91.2 PEAK FLOW RATE(CFS) = 178.75

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10334.00 TO NODE 10335.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 195.00 DOWNSTREAM(FEET) = 189.00

FLOW LENGTH(FEET) = 1291.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 63.0 INCH PIPE IS 48.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 10.07

ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 178.75

PIPE TRAVEL TIME(MIN.) = 2.14 Tc(MIN.) = 16.56

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 16.56

RAINFALL INTENSITY(INCH/HR) = 2.19

AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.71

EFFECTIVE STREAM AREA(ACRES) = 91.20

TOTAL STREAM AREA(ACRES) = 91.20

PEAK FLOW RATE(CFS) AT CONFLUENCE = 178.75

\*\* CONFLUENCE DATA \*\*

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE

--	--	--	--	--	--	--	--

1	197.84	13.42	2.454	0.30( 0.23)	0.77	90.3	10300.00
2	178.75	16.56	2.191	0.30( 0.21)	0.71	91.2	10320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	361.93	13.42	2.454	0.30( 0.22)	0.75	164.2	10300.00
2	353.12	16.56	2.191	0.30( 0.22)	0.74	181.5	10320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 361.93 Tc(MIN.) = 13.42

EFFECTIVE AREA(ACRES) = 164.18 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75

TOTAL AREA(ACRES) = 181.5

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10335.00 TO NODE 10336.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 189.00 DOWNSTREAM(FEET) = 188.00

FLOW LENGTH(FEET) = 103.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.87

ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 361.93

PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 13.53

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10336.00 = 6263.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10336.00 TO NODE 10337.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 180.00

FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 54.0 INCH PIPE IS 44.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 25.97

ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 361.93

PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 13.66

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10337.00 = 6475.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10337.00 TO NODE 10338.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 161.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0218

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 361.93  
FLOW VELOCITY (FEET/SEC.) = 10.16 FLOW DEPTH (FEET) = 3.45  
TRAVEL TIME (MIN.) = 1.43 Tc (MIN.) = 15.09  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10338.00 = 7347.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.09  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.294  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.850 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.943  
SUBAREA AREA (ACRES) = 4.20 SUBAREA RUNOFF (CFS) = 7.60  
EFFECTIVE AREA (ACRES) = 168.38 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 185.7 PEAK FLOW RATE (CFS) = 361.93  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.09  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.294  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 8.97  
EFFECTIVE AREA (ACRES) = 173.38 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 190.7 PEAK FLOW RATE (CFS) = 361.93  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10339.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 161.00 DOWNSTREAM (FEET) = 159.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 328.00 CHANNEL SLOPE = 0.0061

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 361.93  
FLOW VELOCITY (FEET/SEC.) = 6.30 FLOW DEPTH (FEET) = 4.38  
TRAVEL TIME (MIN.) = 0.87 Tc (MIN.) = 15.96  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10339.00 = 7675.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.96  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.233  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 2.30 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.767  
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 12.44  
EFFECTIVE AREA (ACRES) = 180.28 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 361.93  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.96  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.233  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 6.30 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 2.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.876  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 16.31  
EFFECTIVE AREA (ACRES) = 189.48 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 206.8 PEAK FLOW RATE (CFS) = 361.93  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10390.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<



```

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 159.00 DOWNSTREAM(FEET) = 155.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 782.00 CHANNEL SLOPE = 0.0051
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 361.93
FLOW VELOCITY(FEET/SEC.) = 5.90 FLOW DEPTH(FEET) = 4.52
TRAVEL TIME(MIN.) = 2.21 Tc(MIN.) = 18.17
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 18.17
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.078
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.30    0.30    0.800  -
USER-DEFINED        -        3.70    0.30    0.850  -
USER-DEFINED        -        0.10    0.30    1.000  -
USER-DEFINED        -        2.10    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.901
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 10.09
EFFECTIVE AREA(ACRES) = 195.68 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 213.0 PEAK FLOW RATE(CFS) = 361.93
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10
-----

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```

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====

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*****
FLOW PROCESS FROM NODE 10340.00 TO NODE 10341.00 IS CODE = 21
-----

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```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

```

```

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 585.00

```

```

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.581
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.813
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS  Tc
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE"  -        0.10    0.30    0.800  95  10.58
PUBLIC PARK        -        0.50    0.30    0.850  95  10.90
AGRICULTURAL GOOD COVER

```

```

"ROW CROPS, STRAIGHT ROW" - 0.40 0.30 1.000 95 21.09
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA RUNOFF(CFS) = 2.29
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.29

```

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*****
FLOW PROCESS FROM NODE 10341.00 TO NODE 10342.00 IS CODE = 63
-----

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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====

```

```

UPSTREAM ELEVATION(FEET) = 585.00 DOWNSTREAM ELEVATION(FEET) = 570.00
STREET LENGTH(FEET) = 250.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

```

```

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

```

```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.56
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.27
HALFSTREET FLOOD WIDTH(FEET) = 5.48
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.66
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.25
STREET FLOW TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 11.48
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.683

```

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.70    0.30    0.800  -
USER-DEFINED        -        1.40    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 4.54
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 6.71

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.00
FLOW VELOCITY(FEET/SEC.) = 4.94 DEPTH*VELOCITY(FT*FT/SEC.) = 1.47
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10342.00 = 558.00 FEET.

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*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
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UPSTREAM ELEVATION(FEET) = 570.00 DOWNSTREAM ELEVATION(FEET) = 560.00

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STREET LENGTH(FEET) = 415.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.10  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.36  
 HALfstREET FLOOD WIDTH(FEET) = 10.25  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.67  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.33  
 STREET FLOW TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 13.36  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.460  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.800	-
USER-DEFINED	-	1.20	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.825  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.78  
 EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
 TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 10.87

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.38 HALfstREET FLOOD WIDTH(FEET) = 11.12  
 FLOW VELOCITY(FEET/SEC.) = 3.81 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.45  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10343.00 = 973.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10343.00 TO NODE 10344.00 IS CODE = 63  
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 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 4 USED)<<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 560.00 DOWNSTREAM ELEVATION(FEET) = 550.00  
 STREET LENGTH(FEET) = 616.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.43  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.42  
 HALfstREET FLOOD WIDTH(FEET) = 13.30  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.43  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.46  
 STREET FLOW TRAVEL TIME(MIN.) = 2.99 Tc(MIN.) = 16.35  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.205  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.30	0.800	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814  
 SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 5.12  
 EFFECTIVE AREA(ACRES) = 8.40 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 14.73

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.43 HALfstREET FLOOD WIDTH(FEET) = 13.81  
 FLOW VELOCITY(FEET/SEC.) = 3.51 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.53  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10344.00 = 1589.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10344.00 TO NODE 10345.00 IS CODE = 63  
 -----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
 >>>>(STREET TABLE SECTION # 4 USED)<<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 550.00 DOWNSTREAM ELEVATION(FEET) = 510.00  
 STREET LENGTH(FEET) = 474.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.27  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.36  
 HALfstREET FLOOD WIDTH(FEET) = 10.30  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.90  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.51  
 STREET FLOW TRAVEL TIME(MIN.) = 1.14 Tc(MIN.) = 17.50  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.125  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.80	0.30	0.800	-
USER-DEFINED	-	0.20	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.09  
EFFECTIVE AREA(ACRES) = 11.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 11.4 PEAK FLOW RATE(CFS) = 19.21

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 10.81  
FLOW VELOCITY(FEET/SEC.) = 7.07 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.65  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10345.00 = 2063.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10345.00 TO NODE 10346.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 510.00 DOWNSTREAM ELEVATION(FEET) = 484.00  
STREET LENGTH(FEET) = 231.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.54

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.21  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.37  
HALFSTREET FLOOD WIDTH(FEET) = 10.61  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.07  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.99  
STREET FLOW TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 17.98  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.092

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.40 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.00  
EFFECTIVE AREA(ACRES) = 13.80 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 13.8 PEAK FLOW RATE(CFS) = 22.87

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 10.96  
FLOW VELOCITY(FEET/SEC.) = 8.22 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.10  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10346.00 = 2294.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10346.00 TO NODE 10347.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 484.00 DOWNSTREAM ELEVATION(FEET) = 378.00  
STREET LENGTH(FEET) = 995.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.55

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.02  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.78  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.26  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.25  
STREET FLOW TRAVEL TIME(MIN.) = 2.01 Tc(MIN.) = 19.98  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.951

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 6.31  
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 27.43

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 12.03  
FLOW VELOCITY(FEET/SEC.) = 8.38 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.34  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10347.00 = 3289.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10347.00 TO NODE 10348.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 378.00 DOWNSTREAM ELEVATION(FEET) = 303.00  
STREET LENGTH(FEET) = 751.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.56

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.50

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.42  
HALFSTREET FLOOD WIDTH(FEET) = 13.30  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.55  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.63  
STREET FLOW TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 21.45

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.883

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.20	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 12.13  
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 38.47

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 14.11  
FLOW VELOCITY(FEET/SEC.) = 8.82 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.89  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10348.00 = 4040.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10348.00 TO NODE 10349.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 303.00 DOWNSTREAM ELEVATION(FEET) = 252.00  
STREET LENGTH(FEET) = 607.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.82

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.47  
HALFSTREET FLOOD WIDTH(FEET) = 15.73  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.60  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.07  
STREET FLOW TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 22.62

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.829

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	12.60	0.30	0.800	-
USER-DEFINED	-	0.50	0.30	0.850	-

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	7.30	0.30	0.800	-
USER-DEFINED	-	3.00	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.815  
SUBAREA AREA(ACRES) = 10.30 SUBAREA RUNOFF(CFS) = 14.69  
EFFECTIVE AREA(ACRES) = 36.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA(ACRES) = 36.4 PEAK FLOW RATE(CFS) = 51.89

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 16.55  
FLOW VELOCITY(FEET/SEC.) = 8.86 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.33  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10349.00 = 4647.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10349.00 TO NODE 10350.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 252.00 DOWNSTREAM ELEVATION(FEET) = 246.00  
STREET LENGTH(FEET) = 224.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 61.09

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.60  
HALFSTREET FLOOD WIDTH(FEET) = 22.18  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.98  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.60  
STREET FLOW TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 23.25

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.801

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	12.60	0.30	0.800	-
USER-DEFINED	-	0.50	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.802  
SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 18.39  
EFFECTIVE AREA(ACRES) = 49.50 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 49.5 PEAK FLOW RATE(CFS) = 69.34

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 23.29  
FLOW VELOCITY(FEET/SEC.) = 6.18 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.85

LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10350.00 = 4871.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10350.00 TO NODE 10351.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 237.00
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.19
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 69.34
PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 23.90
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10351.00 = 5390.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10351.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.90
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.770
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 0.100 -
USER-DEFINED - 5.60 0.30 0.800 -
USER-DEFINED - 0.70 0.30 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.784
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 8.98
EFFECTIVE AREA(ACRES) = 56.00 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 56.0 PEAK FLOW RATE(CFS) = 76.98

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10352.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 237.00 DOWNSTREAM(FEET) = 230.00
FLOW LENGTH(FEET) = 675.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 30.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.95
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 76.98
PIPE TRAVEL TIME(MIN.) = 1.03 Tc(MIN.) = 24.93
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10352.00 = 6065.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.93

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.723

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.30 0.100 -
USER-DEFINED - 0.40 0.30 0.800 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.300
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.06
EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 76.98
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.93
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.723
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.80 0.30 0.100 -
USER-DEFINED - 9.40 0.30 0.800 -
USER-DEFINED - 1.10 0.30 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 15.22
EFFECTIVE AREA(ACRES) = 68.70 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79
TOTAL AREA(ACRES) = 68.7 PEAK FLOW RATE(CFS) = 91.88

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10353.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 230.00 DOWNSTREAM(FEET) = 180.00
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 33.20
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 91.88
PIPE TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 25.08
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10353.00 = 6366.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10353.00 TO NODE 10353.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 25.08
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.717
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            0.10       0.30       0.100       -  
 USER-DEFINED       -            6.00       0.30       0.800       -  
 USER-DEFINED       -            1.30       0.30       0.850       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.799  
 SUBAREA AREA(ACRES) = 7.40       SUBAREA RUNOFF(CFS) = 9.84  
 EFFECTIVE AREA(ACRES) = 76.10    AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 76.1        PEAK FLOW RATE(CFS) = 101.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10353.00 TO NODE 10354.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 180.00    DOWNSTREAM(FEET) = 172.00  
 FLOW LENGTH(FEET) = 458.00    MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.22  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00    NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 101.35  
 PIPE TRAVEL TIME(MIN.) = 0.54    Tc(MIN.) = 25.62  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10354.00 = 6824.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10354.00 TO NODE 10390.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 172.00    DOWNSTREAM(FEET) = 155.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00    CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030    MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 101.35  
 FLOW VELOCITY(FEET/SEC.) = 9.39    FLOW DEPTH(FEET) = 1.90  
 TRAVEL TIME(MIN.) = 0.73    Tc(MIN.) = 26.35  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 26.35  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.674  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS  
                           LAND USE    GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            0.60       0.30       0.100       -  
 USER-DEFINED       -            0.10       0.30       0.850       -  
 USER-DEFINED       -            0.10       0.30       1.000       -  
 USER-DEFINED       -            0.30       0.30       0.100       -  
 USER-DEFINED       -            0.90       0.30       0.850       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.520

SUBAREA AREA(ACRES) = 2.00        SUBAREA RUNOFF(CFS) = 2.73  
 EFFECTIVE AREA(ACRES) = 78.10    AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.78  
 TOTAL AREA(ACRES) = 78.1        PEAK FLOW RATE(CFS) = 101.35  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 26.35  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.674  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS  
                           LAND USE    GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            0.60       0.30       1.000       -  
 USER-DEFINED       -            0.60       0.30       1.000       -  
 USER-DEFINED       -            0.30       0.30       0.850       -  
 USER-DEFINED       -            0.10       0.30       1.000       -  
 USER-DEFINED       -            0.10       0.30       0.100       -  
 USER-DEFINED       -            2.10       0.30       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.964  
 SUBAREA AREA(ACRES) = 3.80        SUBAREA RUNOFF(CFS) = 4.74  
 EFFECTIVE AREA(ACRES) = 81.90    AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 81.9        PEAK FLOW RATE(CFS) = 105.86

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 26.35  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.674  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS  
                           LAND USE    GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -            2.50       0.30       1.000       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.50        SUBAREA RUNOFF(CFS) = 3.09  
 EFFECTIVE AREA(ACRES) = 84.40    AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 84.4        PEAK FLOW RATE(CFS) = 108.95

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
 =====  
 \*\* MAIN STREAM CONFLUENCE DATA \*\*  
 STREAM            Q        Tc    Intensity    Fp(Fm)    Ap    Ae    HEADWATER  
 NUMBER            (CFS)    (MIN.)    (INCH/HR)    (INCH/HR)    (ACRES)    NODE  
 1            108.95    26.35    1.674    0.30( 0.24)    0.80    84.4    10340.00  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	361.93	18.17	2.078	0.30 ( 0.23)	0.77	195.7	10300.00
2	353.12	21.35	1.888	0.30 ( 0.23)	0.76	213.0	10320.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	458.20	18.17	2.078	0.30 ( 0.23)	0.77	253.9	10300.00
2	454.55	21.35	1.888	0.30 ( 0.23)	0.77	281.4	10320.00
3	416.52	26.35	1.674	0.30 ( 0.23)	0.77	297.4	10340.00

TOTAL AREA (ACRES) = 297.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 458.20 Tc (MIN.) = 18.168  
EFFECTIVE AREA (ACRES) = 253.87 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
TOTAL AREA (ACRES) = 297.4  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10360.00 TO NODE 10361.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
ELEVATION DATA: UPSTREAM (FEET) = 337.00 DOWNSTREAM (FEET) = 292.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.697

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.795

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.30	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"GRASS"	-	0.50	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.10	0.30	1.000	95	10.70

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 2.02  
TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 2.02

\*\*\*\*\*

FLOW PROCESS FROM NODE 10361.00 TO NODE 10362.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 292.00 DOWNSTREAM (FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 199.00 CHANNEL SLOPE = 0.0101  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.02  
FLOW VELOCITY (FEET/SEC.) = 2.08 FLOW DEPTH (FEET) = 0.57  
TRAVEL TIME (MIN.) = 1.60 Tc (MIN.) = 12.29  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10362.00 = 529.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.29

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.578

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.26  
EFFECTIVE AREA (ACRES) = 2.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 4.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10363.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 290.00 DOWNSTREAM (FEET) = 288.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.10  
FLOW VELOCITY (FEET/SEC.) = 2.75 FLOW DEPTH (FEET) = 0.70  
TRAVEL TIME (MIN.) = 0.89 Tc (MIN.) = 13.18  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10363.00 = 676.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10363.00 TO NODE 10363.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.18  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.480  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.40 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 0.850 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.72  
 EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 8.64

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10363.00 TO NODE 10364.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 288.00 DOWNSTREAM(FEET) = 286.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 8.64  
 FLOW VELOCITY(FEET/SEC.) = 3.35 FLOW DEPTH(FEET) = 0.93  
 TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 13.91  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10364.00 = 823.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10364.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.91  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.399  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.40 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
 SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 3.60  
 EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 11.92

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10365.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 286.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 11.92  
 FLOW VELOCITY(FEET/SEC.) = 2.98 FLOW DEPTH(FEET) = 1.15  
 TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 15.30  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10365.00 = 1071.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10365.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.30  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.279  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.90 0.30 1.000 -  
 USER-DEFINED - 1.80 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.850 -  
 USER-DEFINED - 0.50 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 6.25  
 EFFECTIVE AREA(ACRES) = 9.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 17.49

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10366.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 17.49  
 FLOW VELOCITY(FEET/SEC.) = 3.28 FLOW DEPTH(FEET) = 1.33  
 TRAVEL TIME(MIN.) = 1.26 Tc(MIN.) = 16.56  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10366.00 = 1319.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10366.00 TO NODE 10366.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.56  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.191  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.20 0.30 1.000 -  
 USER-DEFINED - 2.30 0.30 1.000 -



USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 2.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995  
SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 14.48  
EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 31.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 10366.00 TO NODE 10367.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 279.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 292.00 CHANNEL SLOPE = 0.0103  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.19  
FLOW VELOCITY (FEET/SEC.) = 4.14 FLOW DEPTH (FEET) = 1.58  
TRAVEL TIME (MIN.) = 1.17 Tc (MIN.) = 17.73  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10367.00 = 1611.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10367.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.73

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.109

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972

SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 2.62

EFFECTIVE AREA (ACRES) = 19.90 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 19.9 PEAK FLOW RATE (CFS) = 32.45

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10368.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 279.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 378.00 CHANNEL SLOPE = 0.0079  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 32.45  
FLOW VELOCITY (FEET/SEC.) = 3.79 FLOW DEPTH (FEET) = 1.69

TRAVEL TIME (MIN.) = 1.66 Tc (MIN.) = 19.40  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10368.00 = 1989.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10368.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 19.40

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.992

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.973

SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 3.37

EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 33.73

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10369.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 247.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 229.00 CHANNEL SLOPE = 0.1266  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 33.73  
FLOW VELOCITY (FEET/SEC.) = 10.86 FLOW DEPTH (FEET) = 1.02  
TRAVEL TIME (MIN.) = 0.35 Tc (MIN.) = 19.75  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10369.00 = 2218.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10369.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 19.75

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.968

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	9.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996

SUBAREA AREA (ACRES) = 11.60 SUBAREA RUNOFF (CFS) = 17.42

EFFECTIVE AREA (ACRES) = 33.70 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 33.7 PEAK FLOW RATE (CFS) = 50.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10369.00 TO NODE 10370.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	247.00	DOWNSTREAM(FEET) =	226.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	179.00	CHANNEL SLOPE =	0.1173
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH(FEET) =	2.00
CHANNEL FLOW THRU SUBAREA(CFS) =	50.67		
FLOW VELOCITY(FEET/SEC.) =	11.68	FLOW DEPTH(FEET) =	1.20
TRAVEL TIME(MIN.) =	0.26	Tc(MIN.) =	20.00
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10370.00 =	2397.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10370.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) =	20.00				
* 50 YEAR RAINFALL INTENSITY(INCH/HR) =	1.950				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	3.60	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	5.60	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.997				
SUBAREA AREA(ACRES) =	11.10	SUBAREA RUNOFF(CFS) =	16.49		
EFFECTIVE AREA(ACRES) =	44.80	AREA-AVERAGED Fm(INCH/HR) =	0.30		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.99		
TOTAL AREA(ACRES) =	44.8	PEAK FLOW RATE(CFS) =	66.62		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10371.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	226.00	DOWNSTREAM(FEET) =	188.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	434.00	CHANNEL SLOPE =	0.0876
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH(FEET) =	2.00
CHANNEL FLOW THRU SUBAREA(CFS) =	66.62		
FLOW VELOCITY(FEET/SEC.) =	11.19	FLOW DEPTH(FEET) =	1.41
TRAVEL TIME(MIN.) =	0.65	Tc(MIN.) =	20.65
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10371.00 =	2831.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10371.00 TO NODE 10371.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.65  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.920  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.20	0.30	0.850	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	7.20	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.958				
SUBAREA AREA(ACRES) =	10.70	SUBAREA RUNOFF(CFS) =	15.72		
EFFECTIVE AREA(ACRES) =	55.50	AREA-AVERAGED Fm(INCH/HR) =	0.30		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.99		
TOTAL AREA(ACRES) =	55.5	PEAK FLOW RATE(CFS) =	81.14		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10371.00 TO NODE 10389.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	188.00	DOWNSTREAM(FEET) =	157.00
FLOW LENGTH(FEET) =	1918.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	39.0 INCH PIPE IS	26.7 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) =	13.38		
ESTIMATED PIPE DIAMETER(INCH) =	39.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	81.14		
PIPE TRAVEL TIME(MIN.) =	2.39	Tc(MIN.) =	23.04
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 =	4749.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS =	2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:	
TIME OF CONCENTRATION(MIN.) =	23.04
RAINFALL INTENSITY(INCH/HR) =	1.81
AREA-AVERAGED Fm(INCH/HR) =	0.30
AREA-AVERAGED Fp(INCH/HR) =	0.30
AREA-AVERAGED Ap =	0.99
EFFECTIVE STREAM AREA(ACRES) =	55.50
TOTAL STREAM AREA(ACRES) =	55.50
PEAK FLOW RATE(CFS) AT CONFLUENCE =	81.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10380.00 TO NODE 10381.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) =	241.00		
ELEVATION DATA: UPSTREAM(FEET) =	275.00	DOWNSTREAM(FEET) =	273.00

Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.110  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.531  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.30	0.100	95	7.11
PUBLIC PARK	-	1.10	0.30	0.850	95	11.30

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.735  
 SUBAREA RUNOFF(CFS) = 3.87  
 TOTAL AREA(ACRES) = 1.30 PEAK FLOW RATE(CFS) = 3.87

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10381.00 TO NODE 10382.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 273.00 DOWNSTREAM ELEVATION(FEET) = 271.00  
 STREET LENGTH(FEET) = 238.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.09  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.37  
 HALfstREET FLOOD WIDTH(FEET) = 10.82  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.24  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.84  
 STREET FLOW TRAVEL TIME(MIN.) = 1.77 Tc(MIN.) = 8.88

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.106  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	1.40	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.718  
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 4.42  
 EFFECTIVE AREA(ACRES) = 3.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 7.80

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.40 HALfstREET FLOOD WIDTH(FEET) = 12.15  
 FLOW VELOCITY(FEET/SEC.) = 2.34 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.94  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10382.00 = 479.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10382.00 TO NODE 10383.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 271.00 DOWNSTREAM ELEVATION(FEET) = 268.00  
 STREET LENGTH(FEET) = 357.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.29  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.44  
 HALfstREET FLOOD WIDTH(FEET) = 14.18  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.57  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.13  
 STREET FLOW TRAVEL TIME(MIN.) = 2.32 Tc(MIN.) = 11.20

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.722  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	1.30	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.452  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 6.98  
 EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 13.74

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.47 HALfstREET FLOOD WIDTH(FEET) = 15.35  
 FLOW VELOCITY(FEET/SEC.) = 2.70 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.26  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10383.00 = 836.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10383.00 TO NODE 10384.00 IS CODE = 63  
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 268.00 DOWNSTREAM ELEVATION(FEET) = 264.00  
 STREET LENGTH(FEET) = 473.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.07  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.50  
 HALFSTREET FLOOD WIDTH(FEET) = 17.15  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.89  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.45  
 STREET FLOW TRAVEL TIME(MIN.) = 2.73 Tc(MIN.) = 13.93  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.397

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.60	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 8.64  
 EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.57  
 TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 20.63

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 18.16  
 FLOW VELOCITY(FEET/SEC.) = 2.96 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.54  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10384.00 = 1309.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10384.00 TO NODE 10385.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 264.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
 STREET LENGTH(FEET) = 463.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.38  
 \*\*\*STREET FLOWING FULL\*\*\*

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.58  
 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.90  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.67  
 STREET FLOW TRAVEL TIME(MIN.) = 2.66 Tc(MIN.) = 16.59  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.189

SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.600	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.650  
 SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 11.48  
 EFFECTIVE AREA(ACRES) = 16.70 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.7 PEAK FLOW RATE(CFS) = 30.18

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
 FLOW VELOCITY(FEET/SEC.) = 3.07 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.83  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10385.00 = 1772.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10385.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 16.59  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.189  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.37  
 EFFECTIVE AREA(ACRES) = 16.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.9 PEAK FLOW RATE(CFS) = 30.55

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10386.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 261.00 DOWNSTREAM(FEET) = 200.00  
 FLOW LENGTH(FEET) = 712.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.76  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 30.55

PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 17.19  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10386.00 = 2484.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.19

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.561

SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.49

EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60

TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 32.40

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.19

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	1.70	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.544

SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 7.32

EFFECTIVE AREA(ACRES) = 22.40 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59

TOTAL AREA(ACRES) = 22.4 PEAK FLOW RATE(CFS) = 39.72

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.19

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	2.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223

SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 6.55

EFFECTIVE AREA(ACRES) = 25.90 AREA-AVERAGED Fm(INCH/HR) = 0.16

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54

TOTAL AREA(ACRES) = 25.9 PEAK FLOW RATE(CFS) = 46.27

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.19

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.228

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 3.74

EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52

TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 50.01

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.19

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	0.850	-
USER-DEFINED	-	2.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.225

SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.61

EFFECTIVE AREA(ACRES) = 30.90 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49

TOTAL AREA(ACRES) = 30.9 PEAK FLOW RATE(CFS) = 55.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.19  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.147  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.100 -  
USER-DEFINED - 1.50 0.30 0.600 -  
USER-DEFINED - 1.70 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.204  
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 13.51  
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 69.14

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10387.00 IS CODE = 31  
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 200.00 DOWNSTREAM(FEET) = 163.00  
FLOW LENGTH(FEET) = 1145.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.25  
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 69.14  
PIPE TRAVEL TIME(MIN.) = 1.17 Tc(MIN.) = 18.37  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10387.00 = 3629.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.37  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.064  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.100 -  
USER-DEFINED - 23.80 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 0.100 -  
USER-DEFINED - 6.90 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.830  
SUBAREA AREA(ACRES) = 32.90 SUBAREA RUNOFF(CFS) = 53.75  
EFFECTIVE AREA(ACRES) = 71.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 71.0 PEAK FLOW RATE(CFS) = 120.08

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81  
=====

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.37  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.064  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 1.20 0.30 0.100 -  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.641  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 6.40  
EFFECTIVE AREA(ACRES) = 74.80 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 74.8 PEAK FLOW RATE(CFS) = 126.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10388.00 IS CODE = 31  
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 163.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.46  
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 126.48  
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 18.50  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10388.00 = 3779.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.50  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.055  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.80 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.400 -  
USER-DEFINED - 0.60 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 10.92  
EFFECTIVE AREA(ACRES) = 80.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 80.9 PEAK FLOW RATE(CFS) = 136.79

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*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.055
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.30     0.100    -
USER-DEFINED        -        10.70     0.30     0.400    -
USER-DEFINED        -         2.30     0.30     0.850    -
USER-DEFINED        -         0.50     0.30     1.000    -
USER-DEFINED        -         0.30     0.30     1.000    -
USER-DEFINED        -         0.70     0.30     0.400    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.502
SUBAREA AREA(ACRES) = 14.60   SUBAREA RUNOFF(CFS) = 25.03
EFFECTIVE AREA(ACRES) = 95.50   AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 95.5     PEAK FLOW RATE(CFS) = 161.82

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.055
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70     0.30     0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.70   SUBAREA RUNOFF(CFS) = 1.13
EFFECTIVE AREA(ACRES) = 96.20   AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 96.2     PEAK FLOW RATE(CFS) = 162.95

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10389.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 158.00   DOWNSTREAM(FEET) = 157.00
FLOW LENGTH(FEET) = 51.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.06
ESTIMATED PIPE DIAMETER(INCH) = 48.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 162.95
PIPE TRAVEL TIME(MIN.) = 0.05   Tc(MIN.) = 18.55
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10389.00 = 3830.00 FEET.

*****

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FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 18.55
RAINFALL INTENSITY(INCH/HR) = 2.05
AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.58
EFFECTIVE STREAM AREA(ACRES) = 96.20
TOTAL STREAM AREA(ACRES) = 96.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 162.95

** CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER     (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1          81.14 23.04  1.810 0.30( 0.30) 0.99 55.5 10360.00
2         162.95 18.55  2.052 0.30( 0.17) 0.58 96.2 10380.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER     (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1          238.69 18.55  2.052 0.30( 0.21) 0.71 140.9 10380.00
2          223.14 23.04  1.810 0.30( 0.22) 0.73 151.7 10360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 238.69   Tc(MIN.) = 18.55
EFFECTIVE AREA(ACRES) = 140.88   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 151.7
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

*****
FLOW PROCESS FROM NODE 10389.00 TO NODE 10390.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 157.00   DOWNSTREAM(FEET) = 155.00
FLOW LENGTH(FEET) = 312.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 50.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.20
ESTIMATED PIPE DIAMETER(INCH) = 66.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 238.69
PIPE TRAVEL TIME(MIN.) = 0.43   Tc(MIN.) = 18.97
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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MAINLINE Tc(MIN.) = 18.97  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.022  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 5.70 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 14.73  
 EFFECTIVE AREA(ACRES) = 150.38 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 161.2 PEAK FLOW RATE(CFS) = 244.21

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.97  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.022  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 3.41  
 EFFECTIVE AREA(ACRES) = 152.58 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 163.4 PEAK FLOW RATE(CFS) = 247.62

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	247.62	18.97	2.022	0.30( 0.22)	0.73	152.6	10380.00
2	230.33	23.48	1.790	0.30( 0.22)	0.75	163.4	10360.00

LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	458.20	18.17	2.078	0.30( 0.23)	0.77	253.9	10300.00
2	454.55	21.35	1.888	0.30( 0.23)	0.77	281.4	10320.00
3	416.52	26.35	1.674	0.30( 0.23)	0.77	297.4	10340.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	702.74	18.17	2.078	0.30( 0.23)	0.76	400.0	10300.00
2	704.90	18.97	2.022	0.30( 0.23)	0.76	413.4	10380.00
3	693.05	21.35	1.888	0.30( 0.23)	0.76	439.7	10320.00
4	668.71	23.48	1.790	0.30( 0.23)	0.76	451.6	10360.00
5	629.78	26.35	1.674	0.30( 0.23)	0.76	460.8	10340.00

TOTAL AREA(ACRES) = 460.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 704.90 Tc(MIN.) = 18.971  
 EFFECTIVE AREA(ACRES) = 413.39 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA(ACRES) = 460.8  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12  
 -----

>>>>CLEAR MEMORY BANK # 1 <<<<<

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 460.8 TC(MIN.) = 18.97  
 EFFECTIVE AREA(ACRES) = 413.39 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.758  
 PEAK FLOW RATE(CFS) = 704.90

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	702.74	18.17	2.078	0.30( 0.23)	0.76	400.0	10300.00
2	704.90	18.97	2.022	0.30( 0.23)	0.76	413.4	10380.00
3	693.05	21.35	1.888	0.30( 0.23)	0.76	439.7	10320.00
4	668.71	23.48	1.790	0.30( 0.23)	0.76	451.6	10360.00
5	629.78	26.35	1.674	0.30( 0.23)	0.76	460.8	10340.00

END OF RATIONAL METHOD ANALYSIS





\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506104C.DAT  
TIME/DATE OF STUDY: 12:47 04/15/2013  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.310
- 2) 6.00; 3.880
- 3) 7.00; 3.560
- 4) 8.00; 3.300
- 5) 9.00; 3.080
- 6) 10.00; 2.900
- 7) 11.00; 2.750
- 8) 12.00; 2.610
- 9) 13.00; 2.500
- 10) 14.00; 2.390
- 11) 15.00; 2.300
- 12) 20.00; 1.950
- 13) 25.00; 1.720
- 14) 30.00; 1.550
- 15) 40.00; 1.310
- 16) 50.00; 1.160
- 17) 60.00; 1.040
- 18) 90.00; 0.830
- 19) 120.00; 0.700
- 20) 180.00; 0.560

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10400.00 TO NODE 10401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00  
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.434  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.741  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
PUBLIC PARK	-	0.50	0.30	0.850	95	6.43

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.850  
 SUBAREA RUNOFF(CFS) = 1.57  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 10401.00 TO NODE 10402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.3419  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.57  
 FLOW VELOCITY(FEET/SEC.) = 5.79 FLOW DEPTH(FEET) = 0.30  
 TRAVEL TIME(MIN.) = 0.34  $T_c$ (MIN.) = 6.77  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10402.00 = 424.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 6.77  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.634  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.940  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.51  
EFFECTIVE AREA(ACRES) = 1.00 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 3.03

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10402.00 TO NODE 10403.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.2439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.03  
FLOW VELOCITY(FEET/SEC.) = 6.09 FLOW DEPTH(FEET) = 0.41  
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 7.11  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10403.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10403.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.11  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.532  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 2.64  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 5.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10404.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 420.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 266.00 CHANNEL SLOPE = 0.1880  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 5.58  
FLOW VELOCITY(FEET/SEC.) = 6.45 FLOW DEPTH(FEET) = 0.54  
TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 7.79  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10404.00 = 813.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.79  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.532  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.863  
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 6.41  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 11.68

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10405.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 370.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 289.00 CHANNEL SLOPE = 0.1730  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 11.68  
FLOW VELOCITY(FEET/SEC.) = 7.51 FLOW DEPTH(FEET) = 0.72  
TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 8.44  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10405.00 = 1102.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.44  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.204  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 10.62  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 21.73

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10406.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 367.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 23.00 CHANNEL SLOPE = 0.1304

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 21.73  
FLOW VELOCITY (FEET/SEC.) = 7.92 FLOW DEPTH (FEET) = 0.96  
TRAVEL TIME (MIN.) = 0.05 Tc (MIN.) = 8.48  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10406.00 = 1125.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.48  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.193  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 5.55  
EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 27.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 367.00 DOWNSTREAM (FEET) = 344.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 214.00 CHANNEL SLOPE = 0.1075  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 27.20  
FLOW VELOCITY (FEET/SEC.) = 7.79 FLOW DEPTH (FEET) = 1.08  
TRAVEL TIME (MIN.) = 0.46 Tc (MIN.) = 8.94  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10407.00 = 1339.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.94  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.093  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 5.11  
EFFECTIVE AREA (ACRES) = 12.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 31.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 344.00 DOWNSTREAM (FEET) = 327.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 919.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.38  
FLOW VELOCITY (FEET/SEC.) = 5.17 FLOW DEPTH (FEET) = 1.42  
TRAVEL TIME (MIN.) = 2.96 Tc (MIN.) = 11.90  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10408.00 = 2258.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10408.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.90  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.624  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.800 -  
USER-DEFINED - 7.90 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.849  
SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 17.06  
EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 43.24

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 327.00 DOWNSTREAM (FEET) = 314.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 807.00 CHANNEL SLOPE = 0.0161  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 43.24  
FLOW VELOCITY (FEET/SEC.) = 5.33 FLOW DEPTH (FEET) = 1.65  
TRAVEL TIME (MIN.) = 2.53 Tc (MIN.) = 14.43  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10409.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10409.00 TO NODE 10409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 14.43  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.351  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.90 0.30 0.800 -  
 USER-DEFINED - 5.70 0.30 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.823  
 SUBAREA AREA (ACRES) = 12.60 SUBAREA RUNOFF (CFS) = 23.87  
 EFFECTIVE AREA (ACRES) = 32.90 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA (ACRES) = 32.9 PEAK FLOW RATE (CFS) = 62.14

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10409.00 TO NODE 10410.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 314.00 DOWNSTREAM(FEET) = 266.00  
 FLOW LENGTH(FEET) = 213.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 33.42  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 62.14  
 PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 14.53  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10410.00 = 3278.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10410.00 TO NODE 10411.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 266.00 DOWNSTREAM(FEET) = 170.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1470.00 CHANNEL SLOPE = 0.0653  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 62.14  
 FLOW VELOCITY(FEET/SEC.) = 9.90 FLOW DEPTH(FEET) = 1.45  
 TRAVEL TIME(MIN.) = 2.48 Tc(MIN.) = 17.01  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10411.00 = 4748.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10411.00 TO NODE 10411.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 17.01  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.159  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	6.60	0.30	0.800	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.723  
 SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 14.86

EFFECTIVE AREA (ACRES) = 41.40 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 41.4 PEAK FLOW RATE (CFS) = 71.30

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10411.00 TO NODE 10412.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 170.00 DOWNSTREAM(FEET) = 161.00  
 FLOW LENGTH(FEET) = 1129.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.92  
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 71.30  
 PIPE TRAVEL TIME(MIN.) = 1.90 Tc(MIN.) = 18.91  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10412.00 = 5877.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10412.00 TO NODE 10413.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 161.00 DOWNSTREAM(FEET) = 141.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 360.00 CHANNEL SLOPE = 0.0556  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 71.30  
 FLOW VELOCITY(FEET/SEC.) = 9.59 FLOW DEPTH(FEET) = 1.57  
 TRAVEL TIME(MIN.) = 0.63 Tc(MIN.) = 19.53  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10413.00 = 6237.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10413.00 TO NODE 10413.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 19.53  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.983  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.509  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 4.78  
 EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA (ACRES) = 44.3 PEAK FLOW RATE (CFS) = 71.30  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 44.3 TC (MIN.) = 19.53  
EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.798  
PEAK FLOW RATE (CFS) = 71.30

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END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

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FILE NAME: 0506105J.DAT  
TIME/DATE OF STUDY: 12:50 04/15/2013  
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--\*TIME-OF-CONCENTRATION MODEL\*--  
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GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10500.00 TO NODE 10501.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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FLOW PROCESS FROM NODE 10501.00 TO NODE 10502.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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FLOW PROCESS FROM NODE 10502.00 TO NODE 10502.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.10     0.30      1.000     -
USER-DEFINED  -        0.80     0.30      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 1.91
EFFECTIVE AREA (ACRES) = 1.40  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.4    PEAK FLOW RATE (CFS) = 2.97

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*****
FLOW PROCESS FROM NODE 10502.00 TO NODE 10503.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1025.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 193.00  CHANNEL SLOPE = 0.1295
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 2.97
FLOW VELOCITY(FEET/SEC.) = 4.82  FLOW DEPTH(FEET) = 0.45
TRAVEL TIME(MIN.) = 0.67  Tc(MIN.) = 12.36
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10503.00 = 700.00 FEET.

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10503.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.36
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.571
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.50   0.30  1.000  -
USER-DEFINED      -        1.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 4.70
EFFECTIVE AREA (ACRES) = 3.70  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 3.7    PEAK FLOW RATE (CFS) = 7.56

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10504.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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```

ELEVATION DATA: UPSTREAM(FEET) = 1025.00  DOWNSTREAM(FEET) = 1020.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00  CHANNEL SLOPE = 0.0151
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 7.56
FLOW VELOCITY(FEET/SEC.) = 3.35  FLOW DEPTH(FEET) = 0.87
TRAVEL TIME(MIN.) = 1.65  Tc(MIN.) = 14.00
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10504.00 = 1032.00 FEET.

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10504.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.390
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.10   0.30  1.000  -
USER-DEFINED      -        0.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 1.69
EFFECTIVE AREA (ACRES) = 4.60  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.6    PEAK FLOW RATE (CFS) = 8.65

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10505.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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```

ELEVATION DATA: UPSTREAM(FEET) = 1020.00  DOWNSTREAM(FEET) = 975.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 397.00  CHANNEL SLOPE = 0.1134
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 8.65
FLOW VELOCITY(FEET/SEC.) = 7.44  FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 0.89  Tc(MIN.) = 14.89
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10505.00 = 1429.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10505.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.89
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.309
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.20   0.30  1.000  -
USER-DEFINED      -        1.20   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.40  SUBAREA RUNOFF (CFS) = 2.53
EFFECTIVE AREA (ACRES) = 6.00  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.0    PEAK FLOW RATE (CFS) = 10.85

```

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10506.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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```
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 905.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 334.00 CHANNEL SLOPE = 0.2096
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.85
FLOW VELOCITY(FEET/SEC.) = 9.86 FLOW DEPTH(FEET) = 0.61
TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 15.46
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10506.00 = 1763.00 FEET.
```

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10506.00 IS CODE = 81
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```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

```
MAINLINE Tc(MIN.) = 15.46
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.268
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.10 0.30 1.000 -
USER-DEFINED - 3.70 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 17.36
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 27.98
```

```
*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10507.00 IS CODE = 51
-----
```

```
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
```

```
ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 790.00 CHANNEL SLOPE = 0.0380
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 27.98
FLOW VELOCITY(FEET/SEC.) = 5.32 FLOW DEPTH(FEET) = 1.32
TRAVEL TIME(MIN.) = 2.48 Tc(MIN.) = 17.94
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10507.00 = 2553.00 FEET.
```

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10507.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
```

```
MAINLINE Tc(MIN.) = 17.94
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.095
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.70 0.30 1.000 -
USER-DEFINED - 6.30 0.30 1.000 -
USER-DEFINED - 0.30 0.30 1.000 -
```

```
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 15.02
EFFECTIVE AREA(ACRES) = 25.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 40.54
```

```
*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10508.00 IS CODE = 51
-----
```

```
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
```

```
ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 755.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 40.54
FLOW VELOCITY(FEET/SEC.) = 8.59 FLOW DEPTH(FEET) = 1.25
TRAVEL TIME(MIN.) = 2.17 Tc(MIN.) = 20.11
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10508.00 = 3673.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10508.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
```

```
MAINLINE Tc(MIN.) = 20.11
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.945
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.80 0.30 1.000 -
USER-DEFINED - 11.10 0.30 1.000 -
USER-DEFINED - 3.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 22.21
EFFECTIVE AREA(ACRES) = 40.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 59.37
```

```
*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10509.00 IS CODE = 51
-----
```

```
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
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```
ELEVATION DATA: UPSTREAM(FEET) = 755.00 DOWNSTREAM(FEET) = 533.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1578.00 CHANNEL SLOPE = 0.1407
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 59.37
FLOW VELOCITY(FEET/SEC.) = 10.45 FLOW DEPTH(FEET) = 1.38
TRAVEL TIME(MIN.) = 2.52 Tc(MIN.) = 22.62
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10509.00 = 5251.00 FEET.
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FLOW PROCESS FROM NODE 10509.00 TO NODE 10509.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.62

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.829

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.80	0.30	1.000	-
USER-DEFINED	-	11.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	8.30	0.30	1.000	-
USER-DEFINED	-	38.10	0.30	1.000	-
USER-DEFINED	-	8.70	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 77.40 SUBAREA RUNOFF (CFS) = 106.53

EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 161.73

\*\*\*\*\*

FLOW PROCESS FROM NODE 10509.00 TO NODE 10510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 415.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1236.00 CHANNEL SLOPE = 0.0955  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 161.73  
 FLOW VELOCITY (FEET/SEC.) = 11.62 FLOW DEPTH (FEET) = 2.15  
 TRAVEL TIME (MIN.) = 1.77 Tc (MIN.) = 24.40  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10510.00 = 6487.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 24.40

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.748

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	30.10	0.30	1.000	-
USER-DEFINED	-	15.30	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	11.30	0.30	1.000	-
USER-DEFINED	-	5.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 64.90 SUBAREA RUNOFF (CFS) = 84.56

EFFECTIVE AREA (ACRES) = 182.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 182.4 PEAK FLOW RATE (CFS) = 237.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10511.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1161.00 CHANNEL SLOPE = 0.0973  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 237.66  
 FLOW VELOCITY (FEET/SEC.) = 12.91 FLOW DEPTH (FEET) = 2.48  
 TRAVEL TIME (MIN.) = 1.50 Tc (MIN.) = 25.90  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10511.00 = 7648.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10511.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 25.90

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.690

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.50	0.30	1.000	-
USER-DEFINED	-	10.80	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	22.10	0.30	1.000	-
USER-DEFINED	-	4.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 54.80 SUBAREA RUNOFF (CFS) = 68.53

EFFECTIVE AREA (ACRES) = 237.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 237.2 PEAK FLOW RATE (CFS) = 296.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 302.00 DOWNSTREAM (FEET) = 190.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1644.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 296.65  
 FLOW VELOCITY (FEET/SEC.) = 11.93 FLOW DEPTH (FEET) = 2.88  
 TRAVEL TIME (MIN.) = 2.30 Tc (MIN.) = 28.19  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10512.00 = 9292.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10512.00 TO NODE 10512.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 28.19
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.611
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.50     0.30     1.000     -
USER-DEFINED            -        0.20     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     1.000     -
USER-DEFINED            -        0.10     0.30     1.000     -
USER-DEFINED            -       14.20     0.30     1.000     -
USER-DEFINED            -        2.80     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 19.50      SUBAREA RUNOFF(CFS) = 23.02
EFFECTIVE AREA(ACRES) = 256.70   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 256.7      PEAK FLOW RATE(CFS) = 302.99

*****
FLOW PROCESS FROM NODE 10512.00 TO NODE 10513.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 190.00 DOWNSTREAM(FEET) = 183.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 86.00 CHANNEL SLOPE = 0.0814
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 4.00
CHANNEL FLOW THRU SUBAREA(CFS) = 302.99
FLOW VELOCITY(FEET/SEC.) = 12.84 FLOW DEPTH(FEET) = 2.80
TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 28.31
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10513.00 = 9378.00 FEET.

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 28.31
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.608
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.10     0.30     0.100     -
USER-DEFINED            -        1.30     0.30     1.000     -
USER-DEFINED            -       29.90     0.30     1.000     -
USER-DEFINED            -       11.90     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     1.000     -
USER-DEFINED            -        0.60     0.30     0.100     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 45.50      SUBAREA RUNOFF(CFS) = 53.72
EFFECTIVE AREA(ACRES) = 302.20   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 302.2      PEAK FLOW RATE(CFS) = 355.84

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FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 28.31
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.608
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        9.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30      SUBAREA RUNOFF(CFS) = 10.95
EFFECTIVE AREA(ACRES) = 311.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 311.5      PEAK FLOW RATE(CFS) = 366.78

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10514.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 171.00
FLOW LENGTH(FEET) = 1209.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.05
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 366.78
PIPE TRAVEL TIME(MIN.) = 1.26 Tc(MIN.) = 29.56
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10514.00 = 10587.00 FEET.

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10514.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 29.56
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.565
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.20     0.30     0.100     -
USER-DEFINED            -        0.40     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     0.100     -
USER-DEFINED            -       31.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 33.60      SUBAREA RUNOFF(CFS) = 38.72
EFFECTIVE AREA(ACRES) = 345.10   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 345.1      PEAK FLOW RATE(CFS) = 393.53

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10515.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 171.00 DOWNSTREAM(FEET) = 165.00  
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 72.0 INCH PIPE IS 56.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.66  
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 393.53  
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 30.13  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10515.00 = 11152.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10515.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 30.13  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.547  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 1.30 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 15.30 0.30 0.100 -  
USER-DEFINED - 1.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.202  
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 25.68  
EFFECTIVE AREA(ACRES) = 364.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 364.3 PEAK FLOW RATE(CFS) = 413.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10525.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 709.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 75.0 INCH PIPE IS 57.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.48  
ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 413.64  
PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 30.84  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 30.84  
RAINFALL INTENSITY(INCH/HR) = 1.53  
AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.95  
EFFECTIVE STREAM AREA(ACRES) = 364.30  
TOTAL STREAM AREA(ACRES) = 364.30  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 413.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10520.00 TO NODE 10521.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

\*\*\*\*\*  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 289.00  
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 180.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.311  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.479  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL - 0.30 0.30 0.100 95 7.31  
PUBLIC PARK - 1.20 0.30 0.850 95 11.62  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.700  
SUBAREA RUNOFF(CFS) = 4.41  
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 4.41

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10521.00 TO NODE 10522.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

\*\*\*\*\*  
UPSTREAM ELEVATION(FEET) = 180.00 DOWNSTREAM ELEVATION(FEET) = 176.00  
STREET LENGTH(FEET) = 408.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.50  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.52  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.47  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.96  
STREET FLOW TRAVEL TIME(MIN.) = 2.75 Tc(MIN.) = 10.06  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.890

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.60	0.30	0.100	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520  
 SUBAREA AREA (ACRES) = 2.50 SUBAREA RUNOFF (CFS) = 6.15  
 EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 9.77

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 12.93  
 FLOW VELOCITY (FEET/SEC.) = 2.62 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.09  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10522.00 = 697.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10522.00 TO NODE 10523.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 176.00 DOWNSTREAM ELEVATION (FEET) = 173.00  
 STREET LENGTH (FEET) = 333.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 16.04  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.48  
 HALFSTREET FLOOD WIDTH (FEET) = 16.13  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.87  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.38  
 STREET FLOW TRAVEL TIME (MIN.) = 1.93 Tc (MIN.) = 12.00  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.611

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	4.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.109  
 SUBAREA AREA (ACRES) = 5.40 SUBAREA RUNOFF (CFS) = 12.53  
 EFFECTIVE AREA (ACRES) = 9.40 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA (ACRES) = 9.4 PEAK FLOW RATE (CFS) = 21.29

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.52 HALFSTREET FLOOD WIDTH (FEET) = 18.16  
 FLOW VELOCITY (FEET/SEC.) = 3.05 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.59  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10523.00 = 1030.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10523.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.00  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.611  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.90	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	0.100	-
USER-DEFINED	-	4.80	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	4.90	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.785  
 SUBAREA AREA (ACRES) = 12.70 SUBAREA RUNOFF (CFS) = 27.15  
 EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 48.44

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10524.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 173.00 DOWNSTREAM (FEET) = 165.00  
 FLOW LENGTH (FEET) = 736.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.1 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.00  
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 48.44  
 PIPE TRAVEL TIME (MIN.) = 1.23 Tc (MIN.) = 13.22  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10524.00 = 1766.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10524.00 TO NODE 10524.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.22  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.475  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.109  
 SUBAREA AREA (ACRES) = 5.40 SUBAREA RUNOFF (CFS) = 12.53  
 EFFECTIVE AREA (ACRES) = 9.40 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA (ACRES) = 9.4 PEAK FLOW RATE (CFS) = 21.29

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.308  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 3.86  
EFFECTIVE AREA(ACRES) = 23.90 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 23.9 PEAK FLOW RATE(CFS) = 49.61

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10524.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 623.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.17  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 49.61  
PIPE TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 14.24  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10525.00 = 2389.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.24  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.368  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 6.80 0.30 0.850 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 17.30  
EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64  
TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 64.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.24  
RAINFALL INTENSITY(INCH/HR) = 2.37  
AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.64  
EFFECTIVE STREAM AREA(ACRES) = 33.00

TOTAL STREAM AREA(ACRES) = 33.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 64.60

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	413.64	30.84	1.530	0.30( 0.29)	0.95	364.3	10500.00
2	64.60	14.24	2.368	0.30( 0.19)	0.64	33.0	10520.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	384.31	14.24	2.368	0.30( 0.27)	0.90	201.2	10520.00
2	453.34	30.84	1.530	0.30( 0.28)	0.93	397.3	10500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 453.34 Tc(MIN.) = 30.84  
EFFECTIVE AREA(ACRES) = 397.30 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
TOTAL AREA(ACRES) = 397.3  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10526.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 158.00 DOWNSTREAM(FEET) = 148.00  
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 63.95  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 453.34  
PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 30.85  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10526.00 = 11891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10526.00 TO NODE 10527.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 148.00 DOWNSTREAM(FEET) = 135.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 296.00 CHANNEL SLOPE = 0.0439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 453.34  
FLOW VELOCITY(FEET/SEC.) = 13.95 FLOW DEPTH(FEET) = 3.29  
TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 31.20  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10527.00 = 12187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 31.20  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.521  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.54  
 EFFECTIVE AREA(ACRES) = 398.70 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 398.7 PEAK FLOW RATE(CFS) = 453.34  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 31.20  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.521  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
 SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 5.41  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 403.6 PEAK FLOW RATE(CFS) = 453.34  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 403.6 TC(MIN.) = 31.20  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.927  
 PEAK FLOW RATE(CFS) = 453.34

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	385.37	14.62	2.334	0.30( 0.27)	0.90	207.5	10520.00
2	453.34	31.20	1.521	0.30( 0.28)	0.93	403.6	10500.00

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

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FILE NAME: 0506106C.DAT  
TIME/DATE OF STUDY: 12:51 04/15/2013  
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--\*TIME-OF-CONCENTRATION MODEL\*--  
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5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10600.00 TO NODE 10601.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 311.00

ELEVATION DATA: UPSTREAM (FEET) = 166.00 DOWNSTREAM (FEET) = 164.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.602

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.810

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

RESIDENTIAL

"5-7 DWELLINGS/ACRE" - 0.50 0.30 0.500 95 10.60

PUBLIC PARK - 0.60 0.30 0.850 95 13.16

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.691

SUBAREA RUNOFF (CFS) = 2.58

TOTAL AREA (ACRES) = 1.10 PEAK FLOW RATE (CFS) = 2.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 10601.00 TO NODE 10602.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<<

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=====

UPSTREAM ELEVATION (FEET) = 164.00 DOWNSTREAM ELEVATION (FEET) = 162.00

STREET LENGTH (FEET) = 220.00 CURB HEIGHT (INCHES) = 8.0

STREET HALF WIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.87

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.35

HALFSTREET FLOOD WIDTH (FEET) = 9.59

AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.19



PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.77  
 STREET FLOW TRAVEL TIME (MIN.) = 1.67 Tc (MIN.) = 12.27  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.580  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.517  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 4.58  
 EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.17  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
 TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 6.93

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.38 HALFSTREET FLOOD WIDTH (FEET) = 11.29  
 FLOW VELOCITY (FEET/SEC.) = 2.37 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.91  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10602.00 = 531.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10602.00 TO NODE 10603.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 162.00 DOWNSTREAM ELEVATION (FEET) = 159.00  
 STREET LENGTH (FEET) = 328.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.79  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.43  
 HALFSTREET FLOOD WIDTH (FEET) = 13.71  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.61  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.13  
 STREET FLOW TRAVEL TIME (MIN.) = 2.10 Tc (MIN.) = 14.37  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.357

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.500	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	2.40	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527  
 SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 7.72

EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 14.01

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.46 HALFSTREET FLOOD WIDTH (FEET) = 15.27  
 FLOW VELOCITY (FEET/SEC.) = 2.78 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.29  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10603.00 = 859.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10603.00 TO NODE 10604.00 IS CODE = 63

-----  
 >>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 5 USED) <<<<<

-----  
 UPSTREAM ELEVATION (FEET) = 159.00 DOWNSTREAM ELEVATION (FEET) = 155.00  
 STREET LENGTH (FEET) = 465.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 20.79  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.52  
 HALFSTREET FLOOD WIDTH (FEET) = 18.09  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.00  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.56  
 STREET FLOW TRAVEL TIME (MIN.) = 2.58 Tc (MIN.) = 16.95  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.163

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.30	0.500	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.513  
 SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 13.57  
 EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
 TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 26.34

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.56 HALFSTREET FLOOD WIDTH (FEET) = 19.88  
 FLOW VELOCITY (FEET/SEC.) = 3.18 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.77  
 LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10604.00 = 1324.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10604.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.95
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.163
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.30     0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.10     SUBAREA RUNOFF(CFS) = 0.17
EFFECTIVE AREA(ACRES) = 14.70   AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 14.7       PEAK FLOW RATE(CFS) = 26.51

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10605.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 155.00 DOWNSTREAM(FEET) = 140.00
FLOW LENGTH(FEET) = 214.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.71
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 26.51
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 17.15
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10605.00 = 1538.00 FEET.

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10605.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.15
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.149
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20     0.30     0.100    -
USER-DEFINED        -         1.70     0.30     0.100    -
USER-DEFINED        -        10.20     0.30     0.800    -
USER-DEFINED        -         2.90     0.30     0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.682
SUBAREA AREA(ACRES) = 16.00     SUBAREA RUNOFF(CFS) = 28.00
EFFECTIVE AREA(ACRES) = 30.70   AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 30.7       PEAK FLOW RATE(CFS) = 54.33

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10606.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

```

```

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 140.00 DOWNSTREAM(FEET) = 133.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00 CHANNEL SLOPE = 0.0400
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 54.33
FLOW VELOCITY(FEET/SEC.) = 7.91 FLOW DEPTH(FEET) = 1.51
TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 17.52
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10606.00 = 1713.00 FEET.

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.52
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.124
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     0.500    -
USER-DEFINED        -         0.30     0.30     0.850    -
USER-DEFINED        -         0.10     0.30     1.000    -
USER-DEFINED        -         1.10     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 1.80     SUBAREA RUNOFF(CFS) = 2.99
EFFECTIVE AREA(ACRES) = 32.50   AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 32.5       PEAK FLOW RATE(CFS) = 56.61

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.52
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.124
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40     0.30     0.850    -
USER-DEFINED        -         1.20     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     1.000    -
USER-DEFINED        -         1.80     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     0.850    -
USER-DEFINED        -         0.20     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980
SUBAREA AREA(ACRES) = 3.80     SUBAREA RUNOFF(CFS) = 6.26
EFFECTIVE AREA(ACRES) = 36.30   AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.66
TOTAL AREA(ACRES) = 36.3       PEAK FLOW RATE(CFS) = 62.86

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81

```

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.52

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.124

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 0.98

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.67

TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 63.85  
=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 36.9 TC(MIN.) = 17.52

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.670

PEAK FLOW RATE(CFS) = 63.85  
=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 2 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 50-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P201XX50.DAT  
TIME/DATE OF STUDY: 10:20 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.470
2)	6.000;	4.030
3)	7.000;	3.690
4)	8.000;	3.420
5)	9.000;	3.200
6)	10.000;	3.010
7)	11.000;	2.850
8)	12.000;	2.710
9)	13.000;	2.590
10)	14.000;	2.490
11)	15.000;	2.390
12)	20.000;	2.030
13)	25.000;	1.790
14)	30.000;	1.610
15)	40.000;	1.370
16)	50.000;	1.200
17)	60.000;	1.090
18)	90.000;	0.860
19)	120.000;	0.730
20)	180.000;	0.580

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	(FT)	(FT)	SIDE /	HEIGHT	WIDTH	LIP	HIKE	FACTOR
			SIDE /	(FT)	(FT)	(FT)	(FT)	(n)
			WAY					

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20100.00 TO NODE 20101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 830.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.230  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.156  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.30	1.000	95	9.23
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.23

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.54  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.54

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20101.00 TO NODE 20102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 276.00 CHANNEL SLOPE = 0.2899  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.54  
FLOW VELOCITY(FEET/SEC.) = 5.42 FLOW DEPTH(FEET) = 0.31  
TRAVEL TIME(MIN.) = 0.85  $T_c$ (MIN.) = 10.08  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20102.00 = 595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20102.00 TO NODE 20102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN) = 10.08
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.997
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.80    0.30    1.000   -
USER-DEFINED        -         0.20    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.00    SUBAREA RUNOFF(CFS) = 2.43
EFFECTIVE AREA(ACRES) = 1.60    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6        PEAK FLOW RATE(CFS) = 3.88

```

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*****
FLOW PROCESS FROM NODE 20102.00 TO NODE 20103.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.1863
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.88
FLOW VELOCITY(FEET/SEC.) = 5.91 FLOW DEPTH(FEET) = 0.47
TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 10.53
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20103.00 = 756.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20103.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 10.53
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.925
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50    0.30    1.000   -
USER-DEFINED        -         0.10    0.30    1.000   -
USER-DEFINED        -         0.30    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90    SUBAREA RUNOFF(CFS) = 2.13
EFFECTIVE AREA(ACRES) = 2.50    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.5        PEAK FLOW RATE(CFS) = 5.91

```

```

*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20104.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 690.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 64.00 CHANNEL SLOPE = 0.4688

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```

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 5.91
FLOW VELOCITY(FEET/SEC.) = 9.20 FLOW DEPTH(FEET) = 0.48
TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 10.65
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20104.00 = 820.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20104.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN) = 10.65
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.906
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40    0.30    1.000   -
USER-DEFINED        -         3.30    0.30    1.000   -
USER-DEFINED        -         0.10    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 8.91
EFFECTIVE AREA(ACRES) = 6.30    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.3        PEAK FLOW RATE(CFS) = 14.78

```

```

*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20105.00 IS CODE = 51
-----

```

```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 690.00 DOWNSTREAM(FEET) = 670.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 159.00 CHANNEL SLOPE = 0.1258
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 14.78
FLOW VELOCITY(FEET/SEC.) = 7.07 FLOW DEPTH(FEET) = 0.83
TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 11.02
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20105.00 = 979.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 20105.00 TO NODE 20105.00 IS CODE = 81
-----

```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

```

=====
MAINLINE Tc(MIN) = 11.02
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.847
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.30    1.000   -
USER-DEFINED        -         1.50    0.30    1.000   -
USER-DEFINED        -         2.20    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90    SUBAREA RUNOFF(CFS) = 8.94

```

EFFECTIVE AREA (ACRES) = 10.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 10.2 PEAK FLOW RATE (CFS) = 23.38

\*\*\*\*\*

FLOW PROCESS FROM NODE 20105.00 TO NODE 20106.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 670.00 DOWNSTREAM (FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 192.00 CHANNEL SLOPE = 0.1042  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 23.38  
FLOW VELOCITY (FEET/SEC.) = 7.41 FLOW DEPTH (FEET) = 1.03  
TRAVEL TIME (MIN.) = 0.43 Tc (MIN.) = 11.46  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20106.00 = 1171.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20106.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN) = 11.46  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.786  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.10 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 3.80 SUBAREA RUNOFF (CFS) = 8.50  
EFFECTIVE AREA (ACRES) = 14.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 14.0 PEAK FLOW RATE (CFS) = 31.33

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20107.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 650.00 DOWNSTREAM (FEET) = 640.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 156.00 CHANNEL SLOPE = 0.0641  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.33  
FLOW VELOCITY (FEET/SEC.) = 6.64 FLOW DEPTH (FEET) = 1.25  
TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 11.85  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20107.00 = 1327.00 FEET.

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FLOW PROCESS FROM NODE 20107.00 TO NODE 20107.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc (MIN) = 11.85  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.731

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.20 0.30 1.000 -  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.00 SUBAREA RUNOFF (CFS) = 8.75  
EFFECTIVE AREA (ACRES) = 18.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 18.0 PEAK FLOW RATE (CFS) = 39.39

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FLOW PROCESS FROM NODE 20107.00 TO NODE 20108.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM (FEET) = 640.00 DOWNSTREAM (FEET) = 609.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 512.00 CHANNEL SLOPE = 0.0605  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 39.39  
FLOW VELOCITY (FEET/SEC.) = 6.91 FLOW DEPTH (FEET) = 1.38  
TRAVEL TIME (MIN.) = 1.23 Tc (MIN.) = 13.08  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20108.00 = 1839.00 FEET.

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20108.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc (MIN) = 13.08  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.582  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.200 -  
USER-DEFINED - 1.50 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970  
SUBAREA AREA (ACRES) = 2.70 SUBAREA RUNOFF (CFS) = 5.57  
EFFECTIVE AREA (ACRES) = 20.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.7 PEAK FLOW RATE (CFS) = 42.53

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FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 600.00
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.69
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 42.53
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 13.27
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20109.00 = 2033.00 FEET.

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FLOW PROCESS FROM NODE 20109.00 TO NODE 20109.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 13.27
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.563
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.70    0.30    0.200  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.58
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 43.75

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FLOW PROCESS FROM NODE 20109.00 TO NODE 20110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 594.00
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.53
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 43.75
PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 13.80
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20110.00 = 2393.00 FEET.

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FLOW PROCESS FROM NODE 20110.00 TO NODE 20110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 13.80
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.510
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -        0.30    0.30    0.100  -
USER-DEFINED         -        3.50    0.30    0.200  -
USER-DEFINED         -        2.70    0.30    1.000  -
USER-DEFINED         -        0.20    0.30    1.000  -
USER-DEFINED         -        1.20    0.30    1.000  -

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USER-DEFINED         -        0.30    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 17.14
EFFECTIVE AREA(ACRES) = 29.60 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 29.6 PEAK FLOW RATE(CFS) = 59.89

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FLOW PROCESS FROM NODE 20110.00 TO NODE 20111.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 594.00 DOWNSTREAM(FEET) = 590.00
FLOW LENGTH(FEET) = 246.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.24
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 59.89
PIPE TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 14.13
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20111.00 = 2639.00 FEET.

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FLOW PROCESS FROM NODE 20111.00 TO NODE 20111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 14.13
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.477
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN

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USER-DEFINED         -        0.70    0.30    0.100  -
USER-DEFINED         -        2.10    0.30    0.200  -
USER-DEFINED         -        2.10    0.30    1.000  -
USER-DEFINED         -        0.60    0.30    1.000  -
USER-DEFINED         -        4.70    0.30    1.000  -
USER-DEFINED         -        0.90    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.792
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 22.37
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 81.37

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FLOW PROCESS FROM NODE 20111.00 TO NODE 20112.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 580.00
FLOW LENGTH(FEET) = 628.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.30
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 81.37

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PIPE TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 14.92  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20112.00 = 3267.00 FEET.

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FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 14.92

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.398

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.200	-
USER-DEFINED	-	4.40	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	7.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.797

SUBAREA AREA(ACRES) = 15.20 SUBAREA RUNOFF(CFS) = 29.54

EFFECTIVE AREA(ACRES) = 55.90 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 55.9 PEAK FLOW RATE(CFS) = 108.03

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FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 14.92

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.398

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.56

EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 112.59

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FLOW PROCESS FROM NODE 20112.00 TO NODE 20113.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 580.00 DOWNSTREAM(FEET) = 570.00

FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.46

ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 112.59  
PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 15.48  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20113.00 = 3786.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.48

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.356

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.100	-
USER-DEFINED	-	4.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.877

SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 23.73

EFFECTIVE AREA(ACRES) = 70.90 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 134.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.48

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.356

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	1.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.787

SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 6.87

EFFECTIVE AREA(ACRES) = 74.50 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 74.5 PEAK FLOW RATE(CFS) = 140.95

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20114.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00

FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.68



ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 140.95  
PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 16.34  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20114.00 = 4393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.34  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.293  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.30 0.100 -  
USER-DEFINED - 4.00 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 0.50 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.747  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 14.71  
EFFECTIVE AREA(ACRES) = 82.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 82.4 PEAK FLOW RATE(CFS) = 151.48

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FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.34  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.293  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 1.000 -  
USER-DEFINED - 8.20 0.30 1.000 -  
USER-DEFINED - 3.20 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 3.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.932  
SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 31.72  
EFFECTIVE AREA(ACRES) = 99.90 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 99.9 PEAK FLOW RATE(CFS) = 183.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20115.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 560.00  
FLOW LENGTH(FEET) = 461.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 54.0 INCH PIPE IS 41.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.89  
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 183.20  
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 16.90  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20115.00 = 4854.00 FEET.

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FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.90  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.253  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.60 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 0.100 -  
USER-DEFINED - 6.20 0.30 0.850 -  
USER-DEFINED - 2.20 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798  
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 23.20  
EFFECTIVE AREA(ACRES) = 112.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 112.7 PEAK FLOW RATE(CFS) = 202.82

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FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.90  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.253  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.23  
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 204.05

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FLOW PROCESS FROM NODE 20115.00 TO NODE 20116.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 560.00 DOWNSTREAM(FEET) = 528.00  
FLOW LENGTH(FEET) = 219.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 38.36

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 204.05  
 PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 16.99  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20116.00 = 5073.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20116.00 TO NODE 20117.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 489.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 174.00 CHANNEL SLOPE = 0.2241  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 204.05  
 FLOW VELOCITY(FEET/SEC.) = 21.09 FLOW DEPTH(FEET) = 1.80  
 TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 17.13  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20117.00 = 5247.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.13  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.237  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.910  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 4.42  
 EFFECTIVE AREA(ACRES) = 115.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 115.9 PEAK FLOW RATE(CFS) = 206.76

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.13  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.237  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.200	-
USER-DEFINED	-	3.30	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	6.50	0.30	1.000	-

USER-DEFINED - 0.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.855  
 SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 22.81  
 EFFECTIVE AREA(ACRES) = 128.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 128.7 PEAK FLOW RATE(CFS) = 229.57

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 17.13  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.237  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 8.92  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 133.8 PEAK FLOW RATE(CFS) = 238.49

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 133.8 TC(MIN.) = 17.13  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.854  
 PEAK FLOW RATE(CFS) = 238.49

=====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 50-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P501XX50.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.470
2)	6.000;	4.030
3)	7.000;	3.690
4)	8.000;	3.420
5)	9.000;	3.200
6)	10.000;	3.010
7)	11.000;	2.850
8)	12.000;	2.710
9)	13.000;	2.590
10)	14.000;	2.490
11)	15.000;	2.390
12)	20.000;	2.030
13)	25.000;	1.790
14)	30.000;	1.610
15)	40.000;	1.370
16)	50.000;	1.200
17)	60.000;	1.090
18)	90.000;	0.860
19)	120.000;	0.730
20)	180.000;	0.580

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50100.00 TO NODE 50101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 424.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.479  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.315  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "8-10 DWELLINGS/ACRE"	-	0.10	0.30	0.400	95	8.48
RESIDENTIAL "8-10 DWELLINGS/ACRE"	-	0.90	0.30	0.400	95	8.48

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 0.400  
SUBAREA RUNOFF(CFS) = 2.88  
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50101.00 TO NODE 50102.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 424.00 DOWNSTREAM ELEVATION(FEET) = 420.00  
STREET LENGTH(FEET) = 115.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.15
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 6.16
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.65
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.03
STREET FLOW TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 9.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.199
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.30   0.30   0.100   -
USER-DEFINED        -         0.10   0.30   0.400   -
USER-DEFINED        -         0.40   0.30   0.100   -
USER-DEFINED        -         0.10   0.30   0.500   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.178
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 2.55
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 5.32

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.16
FLOW VELOCITY(FEET/SEC.) = 3.79 DEPTH*VELOCITY(FT*FT/SEC.) = 1.14
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50102.00 = 445.00 FEET.

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*****
FLOW PROCESS FROM NODE 50102.00 TO NODE 50103.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 420.00 DOWNSTREAM ELEVATION(FEET) = 418.00
STREET LENGTH(FEET) = 84.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      6.94
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.34
HALFSTREET FLOOD WIDTH(FEET) = 9.03
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.45
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.17
STREET FLOW TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 9.41
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.122
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.90   0.30   0.500   -
USER-DEFINED        -         0.50   0.30   0.500   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 3.66
EFFECTIVE AREA(ACRES) = 4.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 4.5 PEAK FLOW RATE(CFS) = 11.88

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LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.30   0.100   -
USER-DEFINED        -         0.10   0.30   0.100   -
USER-DEFINED        -         0.90   0.30   0.500   -
USER-DEFINED        -         0.10   0.30   0.500   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.433
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 3.23
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 8.42

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 9.91
FLOW VELOCITY(FEET/SEC.) = 3.60 DEPTH*VELOCITY(FT*FT/SEC.) = 1.28
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50103.00 = 529.00 FEET.

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*****
FLOW PROCESS FROM NODE 50103.00 TO NODE 50104.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 418.00 DOWNSTREAM ELEVATION(FEET) = 416.00
STREET LENGTH(FEET) = 84.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

```

```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.25
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 10.82
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.77
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.41
STREET FLOW TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 9.78
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.051
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.90   0.30   0.500   -
USER-DEFINED        -         0.50   0.30   0.500   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 3.66
EFFECTIVE AREA(ACRES) = 4.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 4.5 PEAK FLOW RATE(CFS) = 11.88

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END OF SUBAREA STREET FLOW HYDRAULICS:

```

DEPTH (FEET) = 0.39 HALFSTREET FLOOD WIDTH (FEET) = 11.60  
FLOW VELOCITY (FEET/SEC.) = 3.87 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.51  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50104.00 = 613.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50104.00 TO NODE 50105.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

-----  
UPSTREAM ELEVATION (FEET) = 416.00 DOWNSTREAM ELEVATION (FEET) = 400.00  
STREET LENGTH (FEET) = 513.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.87

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.41

HALFSTREET FLOOD WIDTH (FEET) = 12.38

AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.61

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.87

STREET FLOW TRAVEL TIME (MIN.) = 1.86 Tc (MIN.) = 11.64

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.761

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	0.500	-
USER-DEFINED	-	0.40	0.30	0.600	-
USER-DEFINED	-	2.40	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.512  
SUBAREA AREA (ACRES) = 3.40 SUBAREA RUNOFF (CFS) = 7.98  
EFFECTIVE AREA (ACRES) = 7.90 AREA-AVERAGED Fm (INCH/HR) = 0.13  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45  
TOTAL AREA (ACRES) = 7.9 PEAK FLOW RATE (CFS) = 18.68

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 13.32  
FLOW VELOCITY (FEET/SEC.) = 4.76 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.02  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50105.00 = 1126.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50105.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN) = 11.64

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.761

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	2.50	0.30	0.600	-
USER-DEFINED	-	1.00	0.30	0.500	-
USER-DEFINED	-	3.00	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 15.36  
EFFECTIVE AREA (ACRES) = 14.50 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.51  
TOTAL AREA (ACRES) = 14.5 PEAK FLOW RATE (CFS) = 34.04

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50106.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

-----  
UPSTREAM ELEVATION (FEET) = 400.00 DOWNSTREAM ELEVATION (FEET) = 390.00  
STREET LENGTH (FEET) = 562.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 44.76

\*\*\*STREET FLOWING FULL\*\*\*

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.58

HALFSTREET FLOOD WIDTH (FEET) = 20.00

AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.87

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.82

STREET FLOW TRAVEL TIME (MIN.) = 1.92 Tc (MIN.) = 13.56

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.534

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	3.70	0.30	0.600	-
USER-DEFINED	-	1.10	0.30	0.500	-
USER-DEFINED	-	5.20	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.588  
SUBAREA AREA (ACRES) = 10.10 SUBAREA RUNOFF (CFS) = 21.43  
EFFECTIVE AREA (ACRES) = 24.60 AREA-AVERAGED Fm (INCH/HR) = 0.16  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54  
TOTAL AREA (ACRES) = 24.6 PEAK FLOW RATE (CFS) = 52.51

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.60 HALFSTREET FLOOD WIDTH (FEET) = 20.00

FLOW VELOCITY(FEET/SEC.) = 5.19 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.12  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50106.00 = 1688.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50106.00 TO NODE 50107.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 390.00 DOWNSTREAM ELEVATION(FEET) = 381.00  
STREET LENGTH(FEET) = 252.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 59.62

\*\*\*STREET FLOWING FULL\*\*\*

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.57  
HALFSTREET FLOOD WIDTH(FEET) = 20.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.71  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.83  
STREET FLOW TRAVEL TIME(MIN.) = 0.63 Tc(MIN.) = 14.19  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.471

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	6.80	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 6.90 SUBAREA RUNOFF(CFS) = 14.23  
EFFECTIVE AREA(ACRES) = 31.50 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
TOTAL AREA(ACRES) = 31.5 PEAK FLOW RATE(CFS) = 65.35

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
FLOW VELOCITY(FEET/SEC.) = 6.97 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.06  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50107.00 = 1940.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50107.00 TO NODE 50108.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 381.00 DOWNSTREAM(FEET) = 345.00  
FLOW LENGTH(FEET) = 109.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 39.48  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 65.35  
PIPE TRAVEL TIME(MIN.) = 0.05 Tc(MIN.) = 14.23  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50108.00 = 2049.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50108.00 TO NODE 50109.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 220.00 CHANNEL SLOPE = 0.1364  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 65.35  
FLOW VELOCITY(FEET/SEC.) = 10.63 FLOW DEPTH(FEET) = 1.43  
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 14.58  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50109.00 = 2269.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN) = 14.58

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.432

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.667  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.21  
EFFECTIVE AREA(ACRES) = 32.10 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 32.1 PEAK FLOW RATE(CFS) = 65.45

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 14.58

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.432

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	2.30	0.30	0.600	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	8.30	0.30	1.000	-
USER-DEFINED	-	6.90	0.30	1.000	-
USER-DEFINED	-	13.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965  
SUBAREA AREA (ACRES) = 31.60 SUBAREA RUNOFF (CFS) = 60.94  
EFFECTIVE AREA (ACRES) = 63.70 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 63.7 PEAK FLOW RATE (CFS) = 126.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 14.58  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.432  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.90 0.30 0.600 -  
USER-DEFINED - 4.30 0.30 1.000 -  
USER-DEFINED - 4.10 0.30 1.000 -  
USER-DEFINED - 37.30 0.30 1.000 -  
USER-DEFINED - 37.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990  
SUBAREA AREA (ACRES) = 84.90 SUBAREA RUNOFF (CFS) = 163.16  
EFFECTIVE AREA (ACRES) = 148.60 AREA-AVERAGED Fm (INCH/HR) = 0.27  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
TOTAL AREA (ACRES) = 148.6 PEAK FLOW RATE (CFS) = 289.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 14.58  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.432  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.600 -  
USER-DEFINED - 1.20 0.30 1.000 -  
USER-DEFINED - 4.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.985  
SUBAREA AREA (ACRES) = 5.50 SUBAREA RUNOFF (CFS) = 10.58  
EFFECTIVE AREA (ACRES) = 154.10 AREA-AVERAGED Fm (INCH/HR) = 0.27  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
TOTAL AREA (ACRES) = 154.1 PEAK FLOW RATE (CFS) = 300.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50119.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 315.00 DOWNSTREAM (FEET) = 284.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 893.00 CHANNEL SLOPE = 0.0347  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 300.13  
FLOW VELOCITY (FEET/SEC.) = 9.28 FLOW DEPTH (FEET) = 3.28  
TRAVEL TIME (MIN.) = 1.60 Tc (MIN.) = 16.18  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50119.00 = 3162.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 16.18  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.305  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.600 -  
USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 5.30 0.30 1.000 -  
USER-DEFINED - 2.70 0.30 1.000 -  
USER-DEFINED - 2.50 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 0.600 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.904  
SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 25.63  
EFFECTIVE AREA (ACRES) = 168.10 AREA-AVERAGED Fm (INCH/HR) = 0.27  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA (ACRES) = 168.1 PEAK FLOW RATE (CFS) = 308.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 16.18  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.305  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 1.50 0.30 1.000 -  
USER-DEFINED - 1.10 0.30 0.850 -  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980  
SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 15.20  
EFFECTIVE AREA (ACRES) = 176.50 AREA-AVERAGED Fm (INCH/HR) = 0.27  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA (ACRES) = 176.5 PEAK FLOW RATE (CFS) = 323.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2



CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 16.18
RAINFALL INTENSITY(INCH/HR) = 2.30
AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.90
EFFECTIVE STREAM AREA(ACRES) = 176.50
TOTAL STREAM AREA(ACRES) = 176.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 323.30

\*\*\*\*\*
FLOW PROCESS FROM NODE 50110.00 TO NODE 50111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 420.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.342
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.598

SUBAREA Tc AND LOSS RATE DATA(AMC II):

Table with 7 columns: DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.). Rows include Residential with 5-7 dwellings/acre and 3-4 dwellings/acre.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.513
SUBAREA RUNOFF(CFS) = 4.65
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 4.65

\*\*\*\*\*
FLOW PROCESS FROM NODE 50111.00 TO NODE 50112.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 420.00 DOWNSTREAM ELEVATION(FEET) = 415.00
STREET LENGTH(FEET) = 122.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.73
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.31
HALFSTREET FLOOD WIDTH(FEET) = 7.78
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.23
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.33
STREET FLOW TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 7.82
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.468

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include User-defined areas.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.571
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 4.15
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 8.63

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.78
FLOW VELOCITY(FEET/SEC.) = 4.49 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.50
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50112.00 = 452.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 50112.00 TO NODE 50113.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 415.00 DOWNSTREAM ELEVATION(FEET) = 410.00
STREET LENGTH(FEET) = 122.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.92

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.36
HALFSTREET FLOOD WIDTH(FEET) = 9.84
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.71
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.67
STREET FLOW TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 8.25
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.364

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include User-defined areas.

USER-DEFINED - 1.00 0.30 0.600 -  
 USER-DEFINED - 0.20 0.30 0.500 -  
 USER-DEFINED - 0.10 0.30 0.600 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.581  
 SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 4.59  
 EFFECTIVE AREA (ACRES) = 4.50 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
 TOTAL AREA (ACRES) = 4.5 PEAK FLOW RATE (CFS) = 12.95

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 10.66  
 FLOW VELOCITY (FEET/SEC.) = 4.88 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.81  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50113.00 = 574.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50113.00 TO NODE 50113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 8.25  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.364  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.500	-
USER-DEFINED	-	1.90	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.600	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.575  
 SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 8.04  
 EFFECTIVE AREA (ACRES) = 7.30 AREA-AVERAGED Fm (INCH/HR) = 0.17  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
 TOTAL AREA (ACRES) = 7.3 PEAK FLOW RATE (CFS) = 20.99

\*\*\*\*\*

FLOW PROCESS FROM NODE 50113.00 TO NODE 50114.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<

UPSTREAM ELEVATION (FEET) = 410.00 DOWNSTREAM ELEVATION (FEET) = 400.00  
 STREET LENGTH (FEET) = 238.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 25.09  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.44  
 HALFSTREET FLOOD WIDTH (FEET) = 14.18  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.70  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.52  
 STREET FLOW TRAVEL TIME (MIN.) = 0.70 Tc (MIN.) = 8.95  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.211

SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.600	-
USER-DEFINED	-	1.90	0.30	0.600	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
 SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 8.18  
 EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.17  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.57  
 TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 28.17

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.46 HALFSTREET FLOOD WIDTH (FEET) = 14.88  
 FLOW VELOCITY (FEET/SEC.) = 5.86 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.67  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50114.00 = 812.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50114.00 TO NODE 50115.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<

UPSTREAM ELEVATION (FEET) = 400.00 DOWNSTREAM ELEVATION (FEET) = 390.00  
 STREET LENGTH (FEET) = 241.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 35.49

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.49  
 HALFSTREET FLOOD WIDTH (FEET) = 16.37  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.19  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.00  
 STREET FLOW TRAVEL TIME (MIN.) = 0.65 Tc (MIN.) = 9.60  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.086

SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	1.50	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.607  
SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 14.64  
EFFECTIVE AREA(ACRES) = 15.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 15.9 PEAK FLOW RATE(CFS) = 41.65

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.51 HALFSTREET FLOOD WIDTH(FEET) = 17.46  
FLOW VELOCITY(FEET/SEC.) = 6.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.26  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50115.00 = 1053.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50115.00 TO NODE 50116.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 390.00 DOWNSTREAM ELEVATION(FEET) = 380.00  
STREET LENGTH(FEET) = 268.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 47.03  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.53  
HALFSTREET FLOOD WIDTH(FEET) = 18.71  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.37  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.39  
STREET FLOW TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 10.30  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.962

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 0.600 -  
USER-DEFINED - 3.50 0.30 0.600 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 10.77  
EFFECTIVE AREA(ACRES) = 20.20 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 20.2 PEAK FLOW RATE(CFS) = 50.64

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 19.26  
FLOW VELOCITY(FEET/SEC.) = 6.50 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.53  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50116.00 = 1321.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50116.00 TO NODE 50117.00 IS CODE = 63  
-----

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 380.00 DOWNSTREAM ELEVATION(FEET) = 355.00  
STREET LENGTH(FEET) = 507.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 67.63  
\*\*\*STREET FLOWING FULL\*\*\*

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.57  
HALFSTREET FLOOD WIDTH(FEET) = 20.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.78  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.40  
STREET FLOW TRAVEL TIME(MIN.) = 1.09 Tc(MIN.) = 11.39  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.796

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 6.80 0.30 0.600 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 6.10 0.30 0.600 -  
USER-DEFINED - 1.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.644  
SUBAREA AREA(ACRES) = 14.50 SUBAREA RUNOFF(CFS) = 33.96  
EFFECTIVE AREA(ACRES) = 34.70 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 34.7 PEAK FLOW RATE(CFS) = 81.58

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
FLOW VELOCITY(FEET/SEC.) = 8.39 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.97  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50117.00 = 1828.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50117.00 TO NODE 50118.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 355.00 DOWNSTREAM(FEET) = 315.00  
FLOW LENGTH(FEET) = 171.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 36.59

ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 81.58  
 PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 11.47  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50118.00 = 1999.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50118.00 TO NODE 50119.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 180.00 CHANNEL SLOPE = 0.1722  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 81.58  
 FLOW VELOCITY(FEET/SEC.) = 12.24 FLOW DEPTH(FEET) = 1.49  
 TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 11.71  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50119.00 = 2179.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 11.71  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.751  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	2.30	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.688  
 SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 7.33  
 EFFECTIVE AREA(ACRES) = 37.90 AREA-AVERAGED Fm(INCH/HR) = 0.19  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
 TOTAL AREA(ACRES) = 37.9 PEAK FLOW RATE(CFS) = 87.50

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 11.71  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.751  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.32

EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.19  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
 TOTAL AREA(ACRES) = 38.5 PEAK FLOW RATE(CFS) = 88.82

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 11.71  
 RAINFALL INTENSITY(INCH/HR) = 2.75  
 AREA-AVERAGED Fm(INCH/HR) = 0.19  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.62  
 EFFECTIVE STREAM AREA(ACRES) = 38.50  
 TOTAL STREAM AREA(ACRES) = 38.50  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 88.82

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	323.30	16.18	2.305	0.30( 0.27)	0.90	176.5	50100.00
2	88.82	11.71	2.751	0.30( 0.19)	0.62	38.5	50110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	374.01	11.71	2.751	0.30( 0.25)	0.84	166.2	50110.00
2	396.68	16.18	2.305	0.30( 0.25)	0.85	215.0	50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 396.68 Tc(MIN.) = 16.18  
 EFFECTIVE AREA(ACRES) = 215.00 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 215.0  
 LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50119.00 = 3162.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50119.00 TO NODE 50120.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 240.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00 CHANNEL SLOPE = 0.0437  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 396.68  
 FLOW VELOCITY(FEET/SEC.) = 10.86 FLOW DEPTH(FEET) = 3.49  
 TRAVEL TIME(MIN.) = 1.55 Tc(MIN.) = 17.73  
 LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50120.00 = 4170.00 FEET.

```

*****
FLOW PROCESS FROM NODE 50120.00 TO NODE 50120.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 17.73
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.194
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     0.100    -
USER-DEFINED        -         0.30     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     1.000    -
USER-DEFINED        -         0.70     0.30     0.100    -
USER-DEFINED        -         0.70     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.640
SUBAREA AREA(ACRES) = 2.00      SUBAREA RUNOFF(CFS) = 3.60
EFFECTIVE AREA(ACRES) = 217.00  AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 217.0      PEAK FLOW RATE(CFS) = 396.68
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 50120.00 TO NODE 50120.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 17.73
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.194
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50     0.30     1.000    -
USER-DEFINED        -         1.70     0.30     1.000    -
USER-DEFINED        -         0.40     0.30     0.100    -
USER-DEFINED        -         0.10     0.30     0.850    -
USER-DEFINED        -         0.50     0.30     1.000    -
USER-DEFINED        -         2.10     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.929
SUBAREA AREA(ACRES) = 5.30      SUBAREA RUNOFF(CFS) = 9.13
EFFECTIVE AREA(ACRES) = 222.30  AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 222.3      PEAK FLOW RATE(CFS) = 396.68
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 50120.00 TO NODE 50120.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 17.73
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.194
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN

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USER-DEFINED        -         0.90     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90      SUBAREA RUNOFF(CFS) = 1.53
EFFECTIVE AREA(ACRES) = 223.20  AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 223.2      PEAK FLOW RATE(CFS) = 396.68
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 223.2 TC(MIN.) = 17.73
EFFECTIVE AREA(ACRES) = 223.20  AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.851
PEAK FLOW RATE(CFS) = 396.68

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc      Intensity  Fp(Fm)  Ap      Ae      HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1          374.01 13.28   2.562 0.30( 0.25) 0.84   174.4  50110.00
2          396.68 17.73   2.194 0.30( 0.26) 0.85   223.2  50100.00
=====
END OF RATIONAL METHOD ANALYSIS

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\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PA3 & PA4 ROMP \*  
\* REGIONAL WATERSHED S29 - FREE DRAINING - ULTIMATE CONDITION \*  
\* 50-YR RM EV JULY 2018 ROKAMOTO \*  
\*\*\*\*\*

FILE NAME: P503XX50.DAT  
TIME/DATE OF STUDY: 15:37 03/26/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.00;	4.470
2)	6.00;	4.030
3)	7.00;	3.690
4)	8.00;	3.420
5)	9.00;	3.200
6)	10.00;	3.010
7)	11.00;	2.850
8)	12.00;	2.710
9)	13.00;	2.590
10)	14.00;	2.490
11)	15.00;	2.390
12)	20.00;	2.030
13)	25.00;	1.790
14)	30.00;	1.610
15)	40.00;	1.370
16)	50.00;	1.200
17)	60.00;	1.090
18)	90.00;	0.860
19)	120.00;	0.730
20)	180.00;	0.580

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50300.00 TO NODE 50301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 660.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.792  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.049  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.70	0.30	1.000	69	9.79
NATURAL FAIR COVER						
"GRASS"	-	0.40	0.30	1.000	69	9.79
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.20	0.30	1.000	69	9.79
NATURAL FAIR COVER						
"GRASS"	-	0.10	0.30	1.000	69	9.79

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 3.46  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 3.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50301.00 TO NODE 50302.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 660.00 DOWNSTREAM ELEVATION(FEET) = 650.00  
STREET LENGTH(FEET) = 259.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.55  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.30  
HALFSTREET FLOOD WIDTH(FEET) = 7.09  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.01  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.20  
STREET FLOW TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 10.87  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.871

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 0.50 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.700 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.967  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.18  
EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 7.42

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 8.28  
FLOW VELOCITY(FEET/SEC.) = 4.24 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.37  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50302.00 = 589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50302.00 TO NODE 50303.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 650.00 DOWNSTREAM ELEVATION(FEET) = 630.00  
STREET LENGTH(FEET) = 298.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.01  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 7.97

AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.46  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.74  
STREET FLOW TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 11.78  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.741  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.30 0.30 0.700 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.721  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 3.18  
EFFECTIVE AREA(ACRES) = 4.60 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 10.23

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.47  
FLOW VELOCITY(FEET/SEC.) = 5.64 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.85  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50303.00 = 887.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50303.00 TO NODE 50304.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 630.00 DOWNSTREAM ELEVATION(FEET) = 590.00  
STREET LENGTH(FEET) = 724.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.62

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.40  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 11.13  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.74  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.19  
STREET FLOW TRAVEL TIME(MIN.) = 2.10 Tc(MIN.) = 13.88  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.502

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.40 0.30 0.700 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 0.700 -  
USER-DEFINED - 0.50 0.30 1.000 -  
USER-DEFINED - 1.00 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -



SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.848  
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 12.34  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 21.58

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 12.54  
FLOW VELOCITY(FEET/SEC.) = 6.12 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.50  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50304.00 = 1611.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50304.00 TO NODE 50304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 13.88  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.502  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.20  
EFFECTIVE AREA(ACRES) = 10.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 10.8 PEAK FLOW RATE(CFS) = 21.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50304.00 TO NODE 50305.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 590.00 DOWNSTREAM ELEVATION(FEET) = 550.00  
STREET LENGTH(FEET) = 788.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.63

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 32.90  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.46  
HALFSTREET FLOOD WIDTH(FEET) = 15.20  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.58  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.04  
STREET FLOW TRAVEL TIME(MIN.) = 1.99 Tc(MIN.) = 15.87  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.327

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.60	0.30	0.600	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.30	0.30	0.600	-
USER-DEFINED	-	2.20	0.30	1.000	-
USER-DEFINED	-	4.00	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.835  
SUBAREA AREA(ACRES) = 11.90 SUBAREA RUNOFF(CFS) = 22.24  
EFFECTIVE AREA(ACRES) = 22.70 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 22.7 PEAK FLOW RATE(CFS) = 42.32

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 16.84  
FLOW VELOCITY(FEET/SEC.) = 7.00 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.46  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50305.00 = 2399.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 15.87  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.327  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.700	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.950  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.10  
EFFECTIVE AREA(ACRES) = 23.30 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA(ACRES) = 23.3 PEAK FLOW RATE(CFS) = 43.42

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 15.87  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.327  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.30	0.600	-
USER-DEFINED	-	1.20	0.30	0.700	-
USER-DEFINED	-	2.50	0.30	0.600	-
USER-DEFINED	-	7.60	0.30	0.700	-
USER-DEFINED	-	0.50	0.30	0.600	-
USER-DEFINED	-	1.30	0.30	0.700	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.666  
 SUBAREA AREA (ACRES) = 15.20 SUBAREA RUNOFF (CFS) = 29.10  
 EFFECTIVE AREA (ACRES) = 38.50 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
 TOTAL AREA (ACRES) = 38.5 PEAK FLOW RATE (CFS) = 72.52

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50305.00 TO NODE 50306.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 510.00  
 FLOW LENGTH (FEET) = 813.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.1 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 19.70  
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 72.52  
 PIPE TRAVEL TIME (MIN.) = 0.69 Tc (MIN.) = 16.56  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50306.00 = 3212.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.56  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.277  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	2.80	0.30	0.600	-
USER-DEFINED	-	2.00	0.30	0.100	-
USER-DEFINED	-	10.00	0.30	0.600	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.536  
 SUBAREA AREA (ACRES) = 15.90 SUBAREA RUNOFF (CFS) = 30.29  
 EFFECTIVE AREA (ACRES) = 54.40 AREA-AVERAGED Fm (INCH/HR) = 0.21  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71  
 TOTAL AREA (ACRES) = 54.4 PEAK FLOW RATE (CFS) = 101.09

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.56  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.277  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 3.20

EFFECTIVE AREA (ACRES) = 56.20 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 56.2 PEAK FLOW RATE (CFS) = 104.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50306.00 TO NODE 50307.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 510.00 DOWNSTREAM (FEET) = 470.00  
 FLOW LENGTH (FEET) = 919.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.9 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 20.09  
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 104.29  
 PIPE TRAVEL TIME (MIN.) = 0.76 Tc (MIN.) = 17.32  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50307.00 = 4131.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.32  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.223  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.30	0.600	-
USER-DEFINED	-	2.20	0.30	0.100	-
USER-DEFINED	-	1.50	0.30	0.400	-
USER-DEFINED	-	10.50	0.30	0.600	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.533  
 SUBAREA AREA (ACRES) = 17.90 SUBAREA RUNOFF (CFS) = 33.23  
 EFFECTIVE AREA (ACRES) = 74.10 AREA-AVERAGED Fm (INCH/HR) = 0.20  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.67  
 TOTAL AREA (ACRES) = 74.1 PEAK FLOW RATE (CFS) = 134.75

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.32  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.223  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 5.19  
 EFFECTIVE AREA (ACRES) = 77.10 AREA-AVERAGED Fm (INCH/HR) = 0.21

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA (ACRES) = 77.1 PEAK FLOW RATE (CFS) = 139.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50307.00 TO NODE 50308.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 425.00  
FLOW LENGTH (FEET) = 1006.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.5 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 22.39  
ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 139.94  
PIPE TRAVEL TIME (MIN.) = 0.75 Tc (MIN.) = 18.07  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50308.00 = 5137.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 18.07  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.169  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.100	-
USER-DEFINED	-	2.10	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	0.100	-
USER-DEFINED	-	2.50	0.30	0.400	-
USER-DEFINED	-	6.30	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.495  
SUBAREA AREA (ACRES) = 12.90 SUBAREA RUNOFF (CFS) = 23.45  
EFFECTIVE AREA (ACRES) = 90.00 AREA-AVERAGED Fm (INCH/HR) = 0.20  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.66  
TOTAL AREA (ACRES) = 90.0 PEAK FLOW RATE (CFS) = 159.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 18.07  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.169  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.893  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.20  
EFFECTIVE AREA (ACRES) = 90.70 AREA-AVERAGED Fm (INCH/HR) = 0.20  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.66

TOTAL AREA (ACRES) = 90.7 PEAK FLOW RATE (CFS) = 160.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 18.07  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.169  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	0.400	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	5.20	0.30	0.100	-
USER-DEFINED	-	11.00	0.30	0.400	-
USER-DEFINED	-	8.80	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.419  
SUBAREA AREA (ACRES) = 26.80 SUBAREA RUNOFF (CFS) = 49.28  
EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 210.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 18.07  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.169  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.60	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	2.80	0.30	0.400	-
USER-DEFINED	-	0.20	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.749  
SUBAREA AREA (ACRES) = 13.70 SUBAREA RUNOFF (CFS) = 23.97  
EFFECTIVE AREA (ACRES) = 131.20 AREA-AVERAGED Fm (INCH/HR) = 0.19  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA (ACRES) = 131.2 PEAK FLOW RATE (CFS) = 234.10

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50309.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 425.00 DOWNSTREAM (FEET) = 410.00  
FLOW LENGTH (FEET) = 296.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.6 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 26.48  
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 234.10

PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 18.26  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 5433.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 15.1

>>>>DEFINE MEMORY BANK # 2<<<<<

PEAK FLOWRATE TABLE FILE NAME: P502XX50.DNA

MEMORY BANK # 2 DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	968.39	13.10	0.30 ( 0.23)	0.76	453.7	50240.00
2	1012.23	17.05	0.30 ( 0.23)	0.76	557.8	50280.00
3	1004.90	19.45	0.30 ( 0.23)	0.76	602.3	50220.00
4	945.85	23.21	0.30 ( 0.23)	0.76	638.1	50260.00
5	878.70	26.32	0.30 ( 0.23)	0.76	645.2	50200.00
TOTAL AREA(ACRES) =						645.2

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 14.0

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<<

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	968.39	13.10	0.30 ( 0.23)	0.76	453.7	50240.00
2	1012.23	17.05	0.30 ( 0.23)	0.76	557.8	50280.00
3	1004.90	19.45	0.30 ( 0.23)	0.76	602.3	50220.00
4	945.85	23.21	0.30 ( 0.23)	0.76	638.1	50260.00
5	878.70	26.32	0.30 ( 0.23)	0.76	645.2	50200.00
TOTAL AREA(ACRES) =						645.2

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2<<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	968.39	13.10	2.580	0.30 ( 0.23)	0.76	453.7	50240.00
2	1012.23	17.05	2.242	0.30 ( 0.23)	0.76	557.8	50280.00

3 1004.90 19.45 2.070 0.30 ( 0.23) 0.76 602.3 50220.00  
4 945.85 23.21 1.876 0.30 ( 0.23) 0.76 638.1 50260.00  
5 878.70 26.32 1.743 0.30 ( 0.23) 0.76 645.2 50200.00  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50309.00 = 11241.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	234.10	18.26	2.155	0.30 ( 0.19)	0.62	131.2	50300.00

LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 5433.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1172.53	13.10	2.580	0.30 ( 0.22)	0.74	547.8	50240.00
2	1240.49	17.05	2.242	0.30 ( 0.22)	0.74	680.3	50280.00
3	1242.63	18.26	2.155	0.30 ( 0.22)	0.74	711.4	50300.00
4	1228.83	19.45	2.070	0.30 ( 0.22)	0.74	733.5	50220.00
5	1146.75	23.21	1.876	0.30 ( 0.22)	0.74	769.3	50260.00
6	1063.72	26.32	1.743	0.30 ( 0.22)	0.74	776.4	50200.00
TOTAL AREA(ACRES) =						776.4	

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1242.63 Tc(MIN.) = 18.260  
EFFECTIVE AREA(ACRES) = 711.42 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
TOTAL AREA(ACRES) = 776.4  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50309.00 = 11241.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1<<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50310.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 407.00  
FLOW LENGTH(FEET) = 898.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 138.0 INCH PIPE IS 106.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.41  
ESTIMATED PIPE DIAMETER(INCH) = 138.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 1242.63  
PIPE TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 19.30  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50310.00 = 12139.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.30  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.081  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.20 0.30 0.100 -  
 USER-DEFINED - 4.60 0.30 0.400 -  
 USER-DEFINED - 2.60 0.30 0.850 -  
 USER-DEFINED - 1.00 0.30 0.100 -  
 USER-DEFINED - 9.60 0.30 0.400 -  
 USER-DEFINED - 0.50 0.30 0.500 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.446  
 SUBAREA AREA (ACRES) = 18.50 SUBAREA RUNOFF (CFS) = 32.41  
 EFFECTIVE AREA (ACRES) = 729.92 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 794.9 PEAK FLOW RATE (CFS) = 1242.63  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 19.30  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.081  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.600 -  
 USER-DEFINED - 10.70 0.30 0.850 -  
 USER-DEFINED - 3.20 0.30 0.400 -  
 USER-DEFINED - 0.50 0.30 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.749  
 SUBAREA AREA (ACRES) = 14.50 SUBAREA RUNOFF (CFS) = 24.22  
 EFFECTIVE AREA (ACRES) = 744.42 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 809.4 PEAK FLOW RATE (CFS) = 1247.04

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1179.83	14.14	2.476	0.30 (0.22)	0.73	580.8	50240.00
2	1250.67	18.09	2.168	0.30 (0.22)	0.73	713.3	50280.00
3	1247.04	19.30	2.081	0.30 (0.22)	0.73	744.4	50300.00
4	1232.83	20.49	2.007	0.30 (0.22)	0.73	766.5	50220.00
5	1158.96	24.27	1.825	0.30 (0.22)	0.73	802.3	50260.00
6	1080.91	27.39	1.704	0.30 (0.22)	0.73	809.4	50200.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 1250.67 Tc (MIN.) = 18.09  
 AREA-AVERAGED Fm (INCH/HR) = 0.22 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.73 EFFECTIVE AREA (ACRES) = 713.28

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50310.00 TO NODE 50345.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 407.00 DOWNSTREAM (FEET) = 403.00

FLOW LENGTH (FEET) = 1487.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 144.0 INCH PIPE IS 111.5 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.31  
 ESTIMATED PIPE DIAMETER (INCH) = 144.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 1250.67  
 PIPE TRAVEL TIME (MIN.) = 1.86 Tc (MIN.) = 19.95  
 LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50345.00 = 13626.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50320.00 TO NODE 50321.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 322.00  
 ELEVATION DATA: UPSTREAM (FEET) = 1110.00 DOWNSTREAM (FEET) = 1035.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.517  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.102  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 NATURAL FAIR COVER  
 "GRASS" - 0.60 0.30 1.000 69 9.52  
 NATURAL FAIR COVER  
 "WOODLAND, GRASS" - 0.30 0.30 1.000 69 9.52  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 2.27  
 TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 2.27

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50321.00 TO NODE 50322.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1035.00 DOWNSTREAM (FEET) = 960.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 225.00 CHANNEL SLOPE = 0.3333  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 2.27  
 FLOW VELOCITY (FEET/SEC.) = 6.31 FLOW DEPTH (FEET) = 0.35  
 TRAVEL TIME (MIN.) = 0.59 Tc (MIN.) = 10.11  
 LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50322.00 = 547.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50322.00 TO NODE 50322.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.11  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.992  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 1.00 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 2.67  
 EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 4.85

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50322.00 TO NODE 50323.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 955.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 33.00 CHANNEL SLOPE = 0.1515  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.85  
 FLOW VELOCITY(FEET/SEC.) = 5.77 FLOW DEPTH(FEET) = 0.53  
 TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 10.21  
 LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50323.00 = 580.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50323.00 TO NODE 50323.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.21  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.977  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.70 0.30 1.000 -  
 USER-DEFINED - 1.50 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 7.71  
 EFFECTIVE AREA(ACRES) = 5.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 5.2 PEAK FLOW RATE(CFS) = 12.53

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50323.00 TO NODE 50324.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 955.00 DOWNSTREAM(FEET) = 915.00  
 FLOW LENGTH(FEET) = 254.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 19.86  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 12.53  
 PIPE TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 10.42  
 LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50324.00 = 834.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50324.00 TO NODE 50324.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.42  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.943  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.00 0.30 0.800 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.818  
 SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 5.34  
 EFFECTIVE AREA(ACRES) = 7.40 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
 TOTAL AREA(ACRES) = 7.4 PEAK FLOW RATE(CFS) = 17.71

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50324.00 TO NODE 50324.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.42  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.943  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.80 0.30 0.800 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 2.00 0.30 0.800 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.804  
 SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 11.91  
 EFFECTIVE AREA(ACRES) = 12.30 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
 TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 29.62

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50324.00 TO NODE 50325.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 880.00  
 FLOW LENGTH(FEET) = 548.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.47  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 29.62  
 PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 10.94

LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50325.00 = 1382.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50325.00 TO NODE 50325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 10.94  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.859  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.90 0.30 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 3.90 SUBAREA RUNOFF(CFS) = 9.19  
EFFECTIVE AREA(ACRES) = 16.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 16.2 PEAK FLOW RATE(CFS) = 37.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50325.00 TO NODE 50326.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 880.00 DOWNSTREAM(FEET) = 850.00  
FLOW LENGTH(FEET) = 441.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.57  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 37.89  
PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 11.34  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50326.00 = 1823.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50326.00 TO NODE 50326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 11.34  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.803  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.30 0.30 0.800 -  
USER-DEFINED - 1.20 0.30 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 10.38  
EFFECTIVE AREA(ACRES) = 20.70 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 20.7 PEAK FLOW RATE(CFS) = 47.45

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50326.00 TO NODE 50327.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 810.00  
FLOW LENGTH(FEET) = 616.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.60  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 47.45  
PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 11.86  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50327.00 = 2439.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50327.00 TO NODE 50327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 11.86  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.729  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.30 0.800 -  
USER-DEFINED - 5.00 0.30 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 16.13  
EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 62.21

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50327.00 TO NODE 50328.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 760.00  
FLOW LENGTH(FEET) = 724.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.60  
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 62.21  
PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 12.42  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50328.00 = 3163.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50328.00 TO NODE 50328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 12.42  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.659  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.90 0.30 0.800 -  
USER-DEFINED - 6.30 0.30 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 20.03  
EFFECTIVE AREA (ACRES) = 37.10 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA (ACRES) = 37.1 PEAK FLOW RATE (CFS) = 80.49

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50328.00 TO NODE 50328.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 12.42  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.659  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.90 0.30 0.800 -  
USER-DEFINED - 3.10 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 6.00 SUBAREA RUNOFF (CFS) = 13.07  
EFFECTIVE AREA (ACRES) = 43.10 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA (ACRES) = 43.1 PEAK FLOW RATE (CFS) = 93.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50328.00 TO NODE 50329.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 760.00 DOWNSTREAM (FEET) = 700.00  
FLOW LENGTH (FEET) = 769.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.5 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 24.90  
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 93.56  
PIPE TRAVEL TIME (MIN.) = 0.51 Tc (MIN.) = 12.94  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50329.00 = 3932.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50329.00 TO NODE 50329.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 12.94  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.598  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.10 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 7.10 SUBAREA RUNOFF (CFS) = 15.07  
EFFECTIVE AREA (ACRES) = 50.20 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA (ACRES) = 50.2 PEAK FLOW RATE (CFS) = 106.23

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50329.00 TO NODE 50340.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 660.00  
FLOW LENGTH (FEET) = 478.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 26.08  
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 106.23  
PIPE TRAVEL TIME (MIN.) = 0.31 Tc (MIN.) = 13.24  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50340.00 = 4410.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 13.24  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.566  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.70 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 8.70 SUBAREA RUNOFF (CFS) = 18.21  
EFFECTIVE AREA (ACRES) = 58.90 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA (ACRES) = 58.9 PEAK FLOW RATE (CFS) = 123.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 13.24  
RAINFALL INTENSITY (INCH/HR) = 2.57  
AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.82  
EFFECTIVE STREAM AREA (ACRES) = 58.90  
TOTAL STREAM AREA (ACRES) = 58.90  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 123.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50330.00 TO NODE 50331.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH (FEET) = 294.00  
ELEVATION DATA: UPSTREAM (FEET) = 990.00 DOWNSTREAM (FEET) = 965.00



Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.457  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.566  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "1 DWELLING/ACRE"	-	1.60	0.30	0.800	69	7.46

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA RUNOFF(CFS) = 4.79  
 TOTAL AREA(ACRES) = 1.60 PEAK FLOW RATE(CFS) = 4.79

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50331.00 TO NODE 50332.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 965.00 DOWNSTREAM ELEVATION(FEET) = 960.00  
 STREET LENGTH(FEET) = 285.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.27  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.37  
 HALfstREET FLOOD WIDTH(FEET) = 10.59  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.16  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.17  
 STREET FLOW TRAVEL TIME(MIN.) = 1.51 Tc(MIN.) = 8.96

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.208  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.60	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 6.95  
 EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 11.22

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.40 HALfstREET FLOOD WIDTH(FEET) = 12.07  
 FLOW VELOCITY(FEET/SEC.) = 3.41 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.36  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50332.00 = 579.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50332.00 TO NODE 50333.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 960.00 DOWNSTREAM ELEVATION(FEET) = 940.00  
 STREET LENGTH(FEET) = 364.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.62

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.20  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.38  
 HALfstREET FLOOD WIDTH(FEET) = 11.05  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.74  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.18  
 STREET FLOW TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 10.02  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.007

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.90	0.30	0.800	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.805  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 9.96  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 20.41

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.40 HALfstREET FLOOD WIDTH(FEET) = 12.23  
 FLOW VELOCITY(FEET/SEC.) = 6.06 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.44  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50333.00 = 943.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50333.00 TO NODE 50334.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 940.00 DOWNSTREAM ELEVATION(FEET) = 920.00  
 STREET LENGTH(FEET) = 405.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.98  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.44  
HALFSTREET FLOOD WIDTH(FEET) = 14.34  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.23  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.77  
STREET FLOW TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 11.10  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.836

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.50	0.30	0.800	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.831  
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 15.13  
EFFECTIVE AREA(ACRES) = 14.70 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 14.7 PEAK FLOW RATE(CFS) = 34.28

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 15.59  
FLOW VELOCITY(FEET/SEC.) = 6.55 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.08  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50334.00 = 1348.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50334.00 TO NODE 50335.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 920.00 DOWNSTREAM ELEVATION(FEET) = 905.00  
STREET LENGTH(FEET) = 270.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.62

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 59.71  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.54  
HALFSTREET FLOOD WIDTH(FEET) = 19.02  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.84  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.22

STREET FLOW TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 11.68  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.755  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	12.90	0.30	0.800	-
USER-DEFINED	-	4.00	0.30	1.000	-
USER-DEFINED	-	5.40	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.886  
SUBAREA AREA(ACRES) = 22.70 SUBAREA RUNOFF(CFS) = 50.86  
EFFECTIVE AREA(ACRES) = 37.40 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA(ACRES) = 37.4 PEAK FLOW RATE(CFS) = 84.07

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
FLOW VELOCITY(FEET/SEC.) = 8.83 DEPTH\*VELOCITY(FT\*FT/SEC.) = 5.18  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50335.00 = 1618.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50335.00 TO NODE 50336.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 870.00  
FLOW LENGTH(FEET) = 898.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.72  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 84.07  
PIPE TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 12.48  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50336.00 = 2516.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50336.00 TO NODE 50336.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 12.48  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.653  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.40	0.30	0.800	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 13.90  
EFFECTIVE AREA(ACRES) = 43.80 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 43.8 PEAK FLOW RATE(CFS) = 94.53

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50336.00 TO NODE 50337.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 820.00  
 FLOW LENGTH(FEET) = 799.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.60  
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 94.53  
 PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 13.07  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50337.00 = 3315.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50337.00 TO NODE 50337.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====  
 MAINLINE Tc(MIN.) = 13.07  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.583  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.00	0.30	0.800	-
USER-DEFINED	-	7.20	0.30	0.800	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.839  
 SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 23.92  
 EFFECTIVE AREA(ACRES) = 55.20 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 55.2 PEAK FLOW RATE(CFS) = 115.71

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50337.00 TO NODE 50338.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 750.00  
 FLOW LENGTH(FEET) = 1063.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 24.53  
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 115.71  
 PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 13.79  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50338.00 = 4378.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50338.00 TO NODE 50338.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====  
 MAINLINE Tc(MIN.) = 13.79  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.511  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.70	0.30	0.800	-

USER-DEFINED - 4.20 0.30 0.800 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 18.19  
 EFFECTIVE AREA(ACRES) = 64.10 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA(ACRES) = 64.1 PEAK FLOW RATE(CFS) = 130.32

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50338.00 TO NODE 50339.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 685.00  
 FLOW LENGTH(FEET) = 1107.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 24.35  
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 130.32  
 PIPE TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 14.55  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50339.00 = 5485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50339.00 TO NODE 50339.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====  
 MAINLINE Tc(MIN.) = 14.55  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.435  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.10	0.30	0.800	-
USER-DEFINED	-	1.20	0.30	0.800	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 14.42  
 EFFECTIVE AREA(ACRES) = 71.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA(ACRES) = 71.4 PEAK FLOW RATE(CFS) = 140.37

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50339.00 TO NODE 50340.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 685.00 DOWNSTREAM(FEET) = 660.00  
 FLOW LENGTH(FEET) = 592.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 21.86  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 140.37  
 PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 15.00  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50340.00 = 6077.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.00  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.390  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.00 0.30 0.800 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 9.68  
 EFFECTIVE AREA(ACRES) = 76.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA(ACRES) = 76.4 PEAK FLOW RATE(CFS) = 147.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 15.00  
 RAINFALL INTENSITY(INCH/HR) = 2.39  
 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.83  
 EFFECTIVE STREAM AREA(ACRES) = 76.40  
 TOTAL STREAM AREA(ACRES) = 76.40  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 147.15

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	123.00	13.24	2.566	0.30( 0.25)	0.82	58.9	50320.00
2	147.15	15.00	2.390	0.30( 0.25)	0.83	76.4	50330.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	263.58	13.24	2.566	0.30( 0.25)	0.83	126.4	50320.00
2	260.84	15.00	2.390	0.30( 0.25)	0.83	135.3	50330.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 263.58 Tc(MIN.) = 13.24  
 EFFECTIVE AREA(ACRES) = 126.35 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA(ACRES) = 135.3  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50340.00 = 6077.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50340.00 TO NODE 50341.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 660.00 DOWNSTREAM(FEET) = 575.00  
 FLOW LENGTH(FEET) = 1133.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 31.87  
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 263.58  
 PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 13.83  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50341.00 = 7210.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50341.00 TO NODE 50341.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.83  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.507  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 4.30 0.30 0.600 -  
 USER-DEFINED - 3.10 0.30 0.800 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.684  
 SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 15.33  
 EFFECTIVE AREA(ACRES) = 133.75 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA(ACRES) = 142.7 PEAK FLOW RATE(CFS) = 272.17

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50341.00 TO NODE 50342.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 540.00  
 FLOW LENGTH(FEET) = 495.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 31.22  
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 272.17  
 PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 14.10  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50342.00 = 7705.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50342.00 TO NODE 50342.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.10  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.480  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.90 0.30 0.600 -

USER-DEFINED - 0.20 0.30 0.600 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 4.35  
 EFFECTIVE AREA (ACRES) = 135.85 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 144.8 PEAK FLOW RATE (CFS) = 273.33

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50342.00 TO NODE 50342.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.10  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.480  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.10	0.30	0.600	-
USER-DEFINED	-	17.00	0.30	0.800	-
USER-DEFINED	-	0.90	0.30	0.600	-
USER-DEFINED	-	0.90	0.30	0.800	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.738  
 SUBAREA AREA (ACRES) = 25.90 SUBAREA RUNOFF (CFS) = 52.65  
 EFFECTIVE AREA (ACRES) = 161.75 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA (ACRES) = 170.7 PEAK FLOW RATE (CFS) = 325.99

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50342.00 TO NODE 50343.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 540.00 DOWNSTREAM (FEET) = 470.00  
 FLOW LENGTH (FEET) = 894.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.1 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 34.09  
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 325.99  
 PIPE TRAVEL TIME (MIN.) = 0.44 Tc (MIN.) = 14.53  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50343.00 = 8599.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50343.00 TO NODE 50343.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.53  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.437  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.60	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.800	-
USER-DEFINED	-	0.20	0.30	0.600	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.603  
 SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 14.01  
 EFFECTIVE AREA (ACRES) = 168.65 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA (ACRES) = 177.6 PEAK FLOW RATE (CFS) = 333.63

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50343.00 TO NODE 50343.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.53  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.437  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.500	-
USER-DEFINED	-	1.80	0.30	0.600	-
USER-DEFINED	-	17.90	0.30	0.800	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.777  
 SUBAREA AREA (ACRES) = 20.00 SUBAREA RUNOFF (CFS) = 39.66  
 EFFECTIVE AREA (ACRES) = 188.65 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 373.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50343.00 TO NODE 50344.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 416.00  
 FLOW LENGTH (FEET) = 780.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 37.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 33.55  
 ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 373.29  
 PIPE TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 14.92  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50344.00 = 9379.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50344.00 TO NODE 50344.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 14.92  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.398  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.60	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	1.90	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.400	-
USER-DEFINED	-	14.70	0.30	0.500	-
USER-DEFINED	-	33.20	0.30	0.600	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA (ACRES) = 53.70 SUBAREA RUNOFF (CFS) = 107.94  
 EFFECTIVE AREA (ACRES) = 242.35 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
 TOTAL AREA (ACRES) = 251.3 PEAK FLOW RATE (CFS) = 474.66

\*\*\*\*\*

FLOW PROCESS FROM NODE 50344.00 TO NODE 50344.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 14.92  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.398  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 4.60 0.30 0.800 -  
 USER-DEFINED - 0.40 0.30 0.500 -  
 USER-DEFINED - 0.10 0.30 0.600 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.773  
 SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 9.94  
 EFFECTIVE AREA (ACRES) = 247.45 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
 TOTAL AREA (ACRES) = 256.4 PEAK FLOW RATE (CFS) = 484.60

\*\*\*\*\*

FLOW PROCESS FROM NODE 50344.00 TO NODE 50345.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 416.00 DOWNSTREAM (FEET) = 403.00  
 FLOW LENGTH (FEET) = 526.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 66.0 INCH PIPE IS 52.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 24.02  
 ESTIMATED PIPE DIAMETER (INCH) = 66.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 484.60  
 PIPE TRAVEL TIME (MIN.) = 0.37 Tc (MIN.) = 15.29  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50345.00 = 9905.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	484.60	15.29	2.369	0.30 (0.22)	0.74	247.5	50320.00
2	471.69	17.08	2.241	0.30 (0.22)	0.74	256.4	50330.00

LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50345.00 = 9905.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1179.83	16.05	2.314	0.30 (0.22)	0.73	580.8	50240.00

2	1250.67	19.95	2.033	0.30 (0.22)	0.73	713.3	50280.00
3	1247.04	21.16	1.974	0.30 (0.22)	0.73	744.4	50300.00
4	1232.83	22.35	1.917	0.30 (0.22)	0.73	766.5	50220.00
5	1158.96	26.19	1.747	0.30 (0.22)	0.73	802.3	50260.00
6	1080.91	29.31	1.635	0.30 (0.22)	0.73	809.4	50200.00

LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50345.00 = 13626.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1637.72	15.29	2.369	0.30 (0.22)	0.73	800.5	50320.00
2	1658.91	16.05	2.314	0.30 (0.22)	0.73	832.0	50240.00
3	1670.10	17.08	2.241	0.30 (0.22)	0.73	871.9	50330.00
4	1673.94	19.95	2.033	0.30 (0.22)	0.73	969.7	50280.00
5	1656.48	21.16	1.974	0.30 (0.22)	0.73	1000.8	50300.00
6	1628.91	22.35	1.917	0.30 (0.22)	0.73	1022.9	50220.00
7	1515.34	26.19	1.747	0.30 (0.22)	0.74	1058.7	50260.00
8	1410.97	29.31	1.635	0.30 (0.22)	0.74	1065.8	50200.00
TOTAL AREA (ACRES) =							1065.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1673.94 Tc (MIN.) = 19.952  
 EFFECTIVE AREA (ACRES) = 969.68 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 1065.8  
 LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50345.00 = 13626.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 19.95  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.033  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 1.40 0.30 0.500 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 6.30 0.30 0.100 -  
 USER-DEFINED - 8.70 0.30 0.400 -  
 USER-DEFINED - 10.80 0.30 0.500 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.376  
 SUBAREA AREA (ACRES) = 27.40 SUBAREA RUNOFF (CFS) = 47.36  
 EFFECTIVE AREA (ACRES) = 997.08 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 1093.2 PEAK FLOW RATE (CFS) = 1673.94  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.95

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.033

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.600	-
USER-DEFINED	-	1.60	0.30	0.850	-
USER-DEFINED	-	1.80	0.30	0.100	-
USER-DEFINED	-	6.20	0.30	0.400	-
USER-DEFINED	-	2.80	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.456

SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 23.39

EFFECTIVE AREA(ACRES) = 1010.78 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72

TOTAL AREA(ACRES) = 1106.9 PEAK FLOW RATE(CFS) = 1673.94

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 50345.00 TO NODE 50346.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 350.00

FLOW LENGTH(FEET) = 1031.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 93.0 INCH PIPE IS 70.9 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 43.40

ESTIMATED PIPE DIAMETER(INCH) = 93.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 1673.94

PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 20.35

LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50346.00 = 14657.00 FEET.

FLOW PROCESS FROM NODE 50346.00 TO NODE 50346.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.35

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.013

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	1.40	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	0.500	-
USER-DEFINED	-	2.40	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.423

SUBAREA AREA(ACRES) = 6.00 SUBAREA RUNOFF(CFS) = 10.19

EFFECTIVE AREA(ACRES) = 1016.78 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72

TOTAL AREA(ACRES) = 1112.9 PEAK FLOW RATE(CFS) = 1673.94

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50346.00 TO NODE 50347.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 313.00

FLOW LENGTH(FEET) = 240.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 75.0 INCH PIPE IS 58.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 65.25

ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 1673.94

PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 20.41

LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50347.00 = 14897.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50347.00 TO NODE 50347.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.41

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.010

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	0.500	-
USER-DEFINED	-	1.90	0.30	0.800	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.749

SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 8.20

EFFECTIVE AREA(ACRES) = 1021.88 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72

TOTAL AREA(ACRES) = 1118.0 PEAK FLOW RATE(CFS) = 1673.94

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50347.00 TO NODE 50347.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.41

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.010

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.500	-
USER-DEFINED	-	1.00	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.02

EFFECTIVE AREA(ACRES) = 1024.28 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA(ACRES) = 1120.4 PEAK FLOW RATE(CFS) = 1673.94  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50347.00 TO NODE 50348.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 313.00 DOWNSTREAM(FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1690.00 CHANNEL SLOPE = 0.0473  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 7.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1673.94  
FLOW VELOCITY(FEET/SEC.) = 16.06 FLOW DEPTH(FEET) = 5.89  
TRAVEL TIME(MIN.) = 1.75 Tc(MIN.) = 22.16  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50348.00 = 16587.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 22.16  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.926  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.30 0.30 0.500 -  
USER-DEFINED - 0.10 0.30 0.600 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.10 0.30 1.000 -  
USER-DEFINED - 5.50 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.949  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 10.78  
EFFECTIVE AREA(ACRES) = 1031.58 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA(ACRES) = 1127.7 PEAK FLOW RATE(CFS) = 1673.94  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 22.16  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.926  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.70 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.600 -  
USER-DEFINED - 42.40 0.30 0.800 -

USER-DEFINED - 3.00 0.30 1.000 -  
USER-DEFINED - 4.20 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.827  
SUBAREA AREA(ACRES) = 54.60 SUBAREA RUNOFF(CFS) = 82.46  
EFFECTIVE AREA(ACRES) = 1086.18 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1182.3 PEAK FLOW RATE(CFS) = 1673.94  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 22.16  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.926  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.90 0.30 1.000 -  
USER-DEFINED - 3.70 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 0.100 -  
USER-DEFINED - 4.10 0.30 0.800 -  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.948  
SUBAREA AREA(ACRES) = 21.10 SUBAREA RUNOFF(CFS) = 31.18  
EFFECTIVE AREA(ACRES) = 1107.28 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1203.4 PEAK FLOW RATE(CFS) = 1701.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 22.16  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.926  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.29  
EFFECTIVE AREA(ACRES) = 1107.48 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1203.6 PEAK FLOW RATE(CFS) = 1701.64

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 22.16  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.926



SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	1.70	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	4.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.944  
SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 13.16  
EFFECTIVE AREA(ACRES) = 1116.38 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1212.5 PEAK FLOW RATE(CFS) = 1714.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.16  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.926  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.02  
EFFECTIVE AREA(ACRES) = 1117.08 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1213.2 PEAK FLOW RATE(CFS) = 1715.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.16  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.926  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	3.50	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.556  
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 7.13  
EFFECTIVE AREA(ACRES) = 1121.58 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1217.7 PEAK FLOW RATE(CFS) = 1722.95

\*\*\*\*\*

FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.16  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.926  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.80	0.30	0.600	-
USER-DEFINED	-	1.50	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.732  
SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 20.89  
EFFECTIVE AREA(ACRES) = 1135.18 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1231.3 PEAK FLOW RATE(CFS) = 1743.84

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.16  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.926  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 2.49  
EFFECTIVE AREA(ACRES) = 1136.88 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1233.0 PEAK FLOW RATE(CFS) = 1746.33

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50349.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 233.00 DOWNSTREAM(FEET) = 214.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1010.00 CHANNEL SLOPE = 0.0188  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 8.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1746.33  
FLOW VELOCITY(FEET/SEC.) = 14.23 FLOW DEPTH(FEET) = 6.40  
TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 23.35  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50349.00 = 17597.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc(MIN.) = 23.35  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.869  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.40 0.30 0.100 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 1.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.817  
SUBAREA AREA(ACRES) = 6.90 SUBAREA RUNOFF(CFS) = 10.09  
EFFECTIVE AREA(ACRES) = 1143.78 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1239.9 PEAK FLOW RATE(CFS) = 1746.33  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc(MIN.) = 23.35  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.869  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.20 0.30 1.000 -  
USER-DEFINED - 1.60 0.30 1.000 -  
USER-DEFINED - 5.10 0.30 0.850 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 7.20 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.958  
SUBAREA AREA(ACRES) = 18.40 SUBAREA RUNOFF(CFS) = 26.20  
EFFECTIVE AREA(ACRES) = 1162.18 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
TOTAL AREA(ACRES) = 1258.3 PEAK FLOW RATE(CFS) = 1746.33  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc(MIN.) = 23.35  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.869  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.28  
EFFECTIVE AREA(ACRES) = 1162.38 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
TOTAL AREA(ACRES) = 1258.5 PEAK FLOW RATE(CFS) = 1746.33  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc(MIN.) = 23.35  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.869  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.70 0.30 0.100 -  
USER-DEFINED - 3.50 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 3.00 0.30 1.000 -  
USER-DEFINED - 11.70 0.30 1.000 -  
USER-DEFINED - 12.40 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.874  
SUBAREA AREA(ACRES) = 34.10 SUBAREA RUNOFF(CFS) = 49.32  
EFFECTIVE AREA(ACRES) = 1196.48 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
TOTAL AREA(ACRES) = 1292.6 PEAK FLOW RATE(CFS) = 1774.11

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc(MIN.) = 23.35  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.869  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 6.00 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.00 SUBAREA RUNOFF(CFS) = 8.47  
EFFECTIVE AREA(ACRES) = 1202.48 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
TOTAL AREA(ACRES) = 1298.6 PEAK FLOW RATE(CFS) = 1782.58

\*\*\*\*\*  
END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 1298.6 TC(MIN.) = 23.35  
EFFECTIVE AREA(ACRES) = 1202.48 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.741  
PEAK FLOW RATE(CFS) = 1782.58

\*\*\*\*\* PEAK FLOW RATE TABLE \*\*\*\*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 1768.30 18.70 2.124 0.30( 0.22) 0.74 1033.3 50320.00

2	1770.28	19.45	2.069	0.30 ( 0.22)	0.74	1064.8	50240.00
3	1774.79	20.47	2.007	0.30 ( 0.22)	0.74	1104.7	50330.00
4	1782.58	23.35	1.869	0.30 ( 0.22)	0.74	1202.5	50280.00
5	1764.12	24.56	1.811	0.30 ( 0.22)	0.74	1233.6	50300.00
6	1740.24	25.78	1.762	0.30 ( 0.22)	0.74	1255.7	50220.00
7	1627.11	29.66	1.622	0.30 ( 0.22)	0.74	1291.5	50260.00
8	1541.67	32.85	1.542	0.30 ( 0.22)	0.74	1298.6	50200.00

=====  
=====  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2013 Advanced Engineering Software (aes)  
Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PA3 7 PA4 ROMP \*  
\* REGIONAL WATERSHED S29 - FREE DRAINING - ULTIMATE CONDITION \*  
\* 50-YR RM EV JUNE 2018 ROKAMOTO \*  
\*\*\*\*\*

FILE NAME: P504XX50.DAT  
TIME/DATE OF STUDY: 15:37 03/26/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.00;	4.470
2)	6.00;	4.030
3)	7.00;	3.690
4)	8.00;	3.420
5)	9.00;	3.200
6)	10.00;	3.010
7)	11.00;	2.850
8)	12.00;	2.710
9)	13.00;	2.590
10)	14.00;	2.490
11)	15.00;	2.390
12)	20.00;	2.030
13)	25.00;	1.790
14)	30.00;	1.610
15)	40.00;	1.370
16)	50.00;	1.200
17)	60.00;	1.090
18)	90.00;	0.860
19)	120.00;	0.730
20)	180.00;	0.580

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.963  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.703  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "1 DWELLING/ACRE"	-	0.50	0.30	0.800	69	6.96

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.800  
SUBAREA RUNOFF(CFS) = 1.56  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.56  
FLOW VELOCITY(FEET/SEC.) = 5.21 FLOW DEPTH(FEET) = 0.32  
TRAVEL TIME(MIN.) = 0.84  $T_c$ (MIN.) = 7.80  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN.) = 7.80

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.474  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.30 0.800 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 1.16  
 EFFECTIVE AREA (ACRES) = 0.90 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 2.62

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 239.00 CHANNEL SLOPE = 0.4184  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 2.62  
 FLOW VELOCITY (FEET/SEC.) = 7.21 FLOW DEPTH (FEET) = 0.35  
 TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 8.35  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50403.00 IS CODE = 81  
 -----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----  
 MAINLINE Tc (MIN.) = 8.35  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.342  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.30 0.800 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 1.11  
 EFFECTIVE AREA (ACRES) = 1.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 1.3 PEAK FLOW RATE (CFS) = 3.62

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00 CHANNEL SLOPE = 0.7042  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 3.62  
 FLOW VELOCITY (FEET/SEC.) = 9.55 FLOW DEPTH (FEET) = 0.36

TRAVEL TIME (MIN.) = 0.12 Tc (MIN.) = 8.48  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50404.00 IS CODE = 81  
 -----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----  
 MAINLINE Tc (MIN.) = 8.48  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.315  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.90 0.30 0.800 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.862  
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 3.58  
 EFFECTIVE AREA (ACRES) = 2.60 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA (ACRES) = 2.6 PEAK FLOW RATE (CFS) = 7.17

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 145.00 CHANNEL SLOPE = 0.3448  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 7.17  
 FLOW VELOCITY (FEET/SEC.) = 8.72 FLOW DEPTH (FEET) = 0.52  
 TRAVEL TIME (MIN.) = 0.28 Tc (MIN.) = 8.75  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50405.00 TO NODE 50405.00 IS CODE = 81  
 -----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----  
 MAINLINE Tc (MIN.) = 8.75  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.254  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.20 0.30 0.800 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.964  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.94  
 EFFECTIVE AREA (ACRES) = 3.70 AREA-AVERAGED Fm (INCH/HR) = 0.26  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
 TOTAL AREA (ACRES) = 3.7 PEAK FLOW RATE (CFS) = 9.96

```

*****
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 9.96
FLOW VELOCITY(FEET/SEC.) = 9.05 FLOW DEPTH(FEET) = 0.61
TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 9.05
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50406.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.05
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.191
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20   0.30  1.000  -
USER-DEFINED        -         0.20   0.30  1.000  -
USER-DEFINED        -         0.80   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 3.12
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 12.88

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.2193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 12.88
FLOW VELOCITY(FEET/SEC.) = 8.46 FLOW DEPTH(FEET) = 0.71
TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 9.50
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50407.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.106
SUBAREA LOSS RATE DATA(AMC II):

```

```

DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.70   0.30  0.800  -
USER-DEFINED        -         1.00   0.30  1.000  -
USER-DEFINED        -         1.60   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.883
SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 16.11
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 28.61

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 325.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 490.00 CHANNEL SLOPE = 0.1531
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 28.61
FLOW VELOCITY(FEET/SEC.) = 9.04 FLOW DEPTH(FEET) = 1.03
TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 10.40
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.40
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.946
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.30  1.000  -
USER-DEFINED        -         0.10   0.30  1.000  -
USER-DEFINED        -         0.60   0.30  1.000  -
USER-DEFINED        -         1.40   0.30  1.000  -
USER-DEFINED        -         0.50   0.30  1.000  -
USER-DEFINED        -         1.20   0.30  1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90 SUBAREA RUNOFF(CFS) = 9.29
EFFECTIVE AREA(ACRES) = 15.10 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 15.1 PEAK FLOW RATE(CFS) = 36.29

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.40
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.946
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 2.14  
EFFECTIVE AREA(ACRES) = 16.00 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
TOTAL AREA(ACRES) = 16.0 PEAK FLOW RATE(CFS) = 38.43

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 38.43  
FLOW VELOCITY(FEET/SEC.) = 7.16 FLOW DEPTH(FEET) = 1.34  
TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 10.57  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 10.57  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.919  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	4.30	0.30	0.800	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	3.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.910  
SUBAREA AREA(ACRES) = 9.60 SUBAREA RUNOFF(CFS) = 22.86  
EFFECTIVE AREA(ACRES) = 25.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
TOTAL AREA(ACRES) = 25.6 PEAK FLOW RATE(CFS) = 60.90

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 10.57  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.919  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.30	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 5.90 SUBAREA RUNOFF(CFS) = 13.91  
EFFECTIVE AREA(ACRES) = 31.50 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
TOTAL AREA(ACRES) = 31.5 PEAK FLOW RATE(CFS) = 74.81

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 74.81  
FLOW VELOCITY(FEET/SEC.) = 8.90 FLOW DEPTH(FEET) = 1.67  
TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 10.76  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 10.76  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.888  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 14.91  
EFFECTIVE AREA(ACRES) = 37.90 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 37.9 PEAK FLOW RATE(CFS) = 88.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 10.76  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.888  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA (ACRES) =		0.60	SUBAREA RUNOFF (CFS) =		1.40
EFFECTIVE AREA (ACRES) =		38.50	AREA-AVERAGED Fm (INCH/HR) =		0.28
AREA-AVERAGED Fp (INCH/HR) =		0.30	AREA-AVERAGED Ap =		0.95
TOTAL AREA (ACRES) =		38.5	PEAK FLOW RATE (CFS) =		90.25

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	312.00	DOWNSTREAM (FEET) =	282.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	566.00	CHANNEL SLOPE =	0.0530
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	3.00
CHANNEL FLOW THRU SUBAREA (CFS) =	90.25		
FLOW VELOCITY (FEET/SEC.) =	8.05	FLOW DEPTH (FEET) =	1.93
TRAVEL TIME (MIN.) =	1.17	Tc (MIN.) =	11.93
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 11.93  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.720

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658					
SUBAREA AREA (ACRES) =		5.00	SUBAREA RUNOFF (CFS) =		11.35
EFFECTIVE AREA (ACRES) =		43.50	AREA-AVERAGED Fm (INCH/HR) =		0.27
AREA-AVERAGED Fp (INCH/HR) =		0.30	AREA-AVERAGED Ap =		0.91
TOTAL AREA (ACRES) =		43.5	PEAK FLOW RATE (CFS) =		95.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 11.93  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.720

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	5.80	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA (ACRES) =		10.50	SUBAREA RUNOFF (CFS) =		22.87
EFFECTIVE AREA (ACRES) =		54.00	AREA-AVERAGED Fm (INCH/HR) =		0.28
AREA-AVERAGED Fp (INCH/HR) =		0.30	AREA-AVERAGED Ap =		0.93
TOTAL AREA (ACRES) =		54.0	PEAK FLOW RATE (CFS) =		118.61

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	282.00	DOWNSTREAM (FEET) =	216.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	954.00	CHANNEL SLOPE =	0.0692
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH (FEET) =	3.00
CHANNEL FLOW THRU SUBAREA (CFS) =	118.61		
FLOW VELOCITY (FEET/SEC.) =	11.85	FLOW DEPTH (FEET) =	1.83
TRAVEL TIME (MIN.) =	1.34	Tc (MIN.) =	13.27
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 13.27  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.563

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875					
SUBAREA AREA (ACRES) =		3.60	SUBAREA RUNOFF (CFS) =		7.45
EFFECTIVE AREA (ACRES) =		57.60	AREA-AVERAGED Fm (INCH/HR) =		0.28
AREA-AVERAGED Fp (INCH/HR) =		0.30	AREA-AVERAGED Ap =		0.93
TOTAL AREA (ACRES) =		57.6	PEAK FLOW RATE (CFS) =		118.61
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE					

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 13.27  
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.563

SUBAREA LOSS RATE DATA (AMC II):



DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	9.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 SUBAREA AREA (ACRES) = 10.60      SUBAREA RUNOFF (CFS) = 21.59  
 EFFECTIVE AREA (ACRES) = 68.20      AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.94  
 TOTAL AREA (ACRES) = 68.2      PEAK FLOW RATE (CFS) = 140.03

\*\*\*\*\*

FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 13.27  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.563  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.934  
 SUBAREA AREA (ACRES) = 2.50      SUBAREA RUNOFF (CFS) = 5.14  
 EFFECTIVE AREA (ACRES) = 70.70      AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.94  
 TOTAL AREA (ACRES) = 70.7      PEAK FLOW RATE (CFS) = 145.17

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 70.7      TC (MIN.) = 13.27  
 EFFECTIVE AREA (ACRES) = 70.70      AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.938  
 PEAK FLOW RATE (CFS) = 145.17

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 5 \*  
\* HYDROLOGIC ANALYSIS - 50-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P505XX50.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.470
2)	6.000;	4.030
3)	7.000;	3.690
4)	8.000;	3.420
5)	9.000;	3.200
6)	10.000;	3.010
7)	11.000;	2.850
8)	12.000;	2.710
9)	13.000;	2.590
10)	14.000;	2.490
11)	15.000;	2.390
12)	20.000;	2.030
13)	25.000;	1.790
14)	30.000;	1.610
15)	40.000;	1.370
16)	50.000;	1.200
17)	60.000;	1.090
18)	90.000;	0.860
19)	120.000;	0.730
20)	180.000;	0.580

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50500.00 TO NODE 50501.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 254.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 779.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.543  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.845  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "1 DWELLING/ACRE"	-	2.00	0.30	0.800	95	6.54

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.800  
SUBAREA RUNOFF(CFS) = 6.49  
TOTAL AREA(ACRES) = 2.00 PEAK FLOW RATE(CFS) = 6.49

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50501.00 TO NODE 50502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 779.00 DOWNSTREAM(FEET) = 765.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 382.00 CHANNEL SLOPE = 0.0366  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 6.49  
FLOW VELOCITY(FEET/SEC.) = 3.62 FLOW DEPTH(FEET) = 0.77  
TRAVEL TIME(MIN.) = 1.76  $T_c$ (MIN.) = 8.30  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50502.00 = 636.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50502.00 TO NODE 50502.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 8.30

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.353  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.60 0.30 0.800 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.840  
 SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 5.58  
 EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 11.19

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50502.00 TO NODE 50503.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 765.00 DOWNSTREAM (FEET) = 750.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 355.00 CHANNEL SLOPE = 0.0423  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 11.19  
 FLOW VELOCITY (FEET/SEC.) = 4.40 FLOW DEPTH (FEET) = 0.92  
 TRAVEL TIME (MIN.) = 1.34 Tc (MIN.) = 9.65  
 LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50503.00 = 991.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50503.00 TO NODE 50503.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 9.65  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.077  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.70 0.30 0.800 -  
 USER-DEFINED - 1.30 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.890  
 SUBAREA AREA (ACRES) = 3.10 SUBAREA RUNOFF (CFS) = 7.84  
 EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.26  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 18.03

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50503.00 TO NODE 50504.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 750.00 DOWNSTREAM (FEET) = 712.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 261.00 CHANNEL SLOPE = 0.1456  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 18.03  
 FLOW VELOCITY (FEET/SEC.) = 7.89 FLOW DEPTH (FEET) = 0.87  
 TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 10.20  
 LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50504.00 = 1252.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50504.00 TO NODE 50504.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 10.20  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.978  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.90 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 15.19  
 EFFECTIVE AREA (ACRES) = 13.40 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
 TOTAL AREA (ACRES) = 13.4 PEAK FLOW RATE (CFS) = 32.59

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50504.00 TO NODE 50505.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 464.00 CHANNEL SLOPE = 0.2414  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 32.59  
 FLOW VELOCITY (FEET/SEC.) = 10.98 FLOW DEPTH (FEET) = 0.99  
 TRAVEL TIME (MIN.) = 0.70 Tc (MIN.) = 10.90  
 LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50505.00 = 1716.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50505.00 TO NODE 50505.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 10.90  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.865  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.50 0.30 1.000 -  
 USER-DEFINED - 0.70 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.60 SUBAREA RUNOFF (CFS) = 6.00  
 EFFECTIVE AREA (ACRES) = 16.00 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93

TOTAL AREA (ACRES) = 16.0 PEAK FLOW RATE (CFS) = 37.23

\*\*\*\*\*

FLOW PROCESS FROM NODE 50505.00 TO NODE 50506.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 535.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 310.00 CHANNEL SLOPE = 0.2097
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 37.23
FLOW VELOCITY (FEET/SEC.) = 10.82 FLOW DEPTH (FEET) = 1.07
TRAVEL TIME (MIN.) = 0.48 Tc (MIN.) = 11.38
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50506.00 = 2026.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50506.00 TO NODE 50506.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 11.38
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.797
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.80 0.30 0.800 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.70 0.30 1.000 -
USER-DEFINED - 2.70 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.941
SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 13.80
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.28
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 50.04

\*\*\*\*\*

FLOW PROCESS FROM NODE 50506.00 TO NODE 50507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 405.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.2658
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 50.04
FLOW VELOCITY (FEET/SEC.) = 12.80 FLOW DEPTH (FEET) = 1.14
TRAVEL TIME (MIN.) = 0.64 Tc (MIN.) = 12.02
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50507.00 = 2515.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50507.00 TO NODE 50507.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 12.02
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.708
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.800 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 1.30 0.30 1.000 -
USER-DEFINED - 2.80 0.30 1.000 -
USER-DEFINED - 5.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988
SUBAREA AREA (ACRES) = 10.00 SUBAREA RUNOFF (CFS) = 21.70
EFFECTIVE AREA (ACRES) = 32.10 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 69.98

\*\*\*\*\*

FLOW PROCESS FROM NODE 50507.00 TO NODE 50508.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 285.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 706.00 CHANNEL SLOPE = 0.1700
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 69.98
FLOW VELOCITY (FEET/SEC.) = 11.76 FLOW DEPTH (FEET) = 1.41
TRAVEL TIME (MIN.) = 1.00 Tc (MIN.) = 13.02
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50508.00 = 3221.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50508.00 TO NODE 50508.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 13.02
\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.588
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.40 0.30 0.100 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 5.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.945
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 13.69
EFFECTIVE AREA (ACRES) = 38.70 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA (ACRES) = 38.7 PEAK FLOW RATE (CFS) = 80.21

\*\*\*\*\*

FLOW PROCESS FROM NODE 50508.00 TO NODE 50509.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 238.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1169.00 CHANNEL SLOPE = 0.0402
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 80.21
FLOW VELOCITY(FEET/SEC.) = 8.79 FLOW DEPTH(FEET) = 1.74
TRAVEL TIME(MIN.) = 2.22 Tc(MIN.) = 15.24
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50509.00 = 4390.00 FEET.

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*****
FLOW PROCESS FROM NODE 50509.00 TO NODE 50509.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 15.24
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.373
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE              GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED           -         0.10     0.30     1.000    -
USER-DEFINED           -         1.30     0.30     1.000    -
USER-DEFINED           -         6.90     0.30     1.000    -
USER-DEFINED           -         1.10     0.30     0.100    -
USER-DEFINED           -         0.80     0.30     1.000    -
USER-DEFINED           -         2.10     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.920
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 23.22
EFFECTIVE AREA(ACRES) = 51.00 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 51.0 PEAK FLOW RATE(CFS) = 95.94

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*****
FLOW PROCESS FROM NODE 50509.00 TO NODE 50509.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----

```

```

MAINLINE Tc(MIN) = 15.24
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.373
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE              GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED           -         9.40     0.30     1.000    -
USER-DEFINED           -         0.70     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.10 SUBAREA RUNOFF(CFS) = 18.84
EFFECTIVE AREA(ACRES) = 61.10 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 61.1 PEAK FLOW RATE(CFS) = 114.78

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*****
FLOW PROCESS FROM NODE 50509.00 TO NODE 50510.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 238.00 DOWNSTREAM(FEET) = 209.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1026.00 CHANNEL SLOPE = 0.0283
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 114.78
FLOW VELOCITY(FEET/SEC.) = 8.41 FLOW DEPTH(FEET) = 2.13
TRAVEL TIME(MIN.) = 2.03 Tc(MIN.) = 17.27
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50510.00 = 5416.00 FEET.

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 17.27
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.227
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE              GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED           -         0.10     0.30     1.000    -
USER-DEFINED           -         1.40     0.30     1.000    -
USER-DEFINED           -         4.40     0.30     1.000    -
USER-DEFINED           -         0.20     0.30     1.000    -
USER-DEFINED           -         1.50     0.30     1.000    -
USER-DEFINED           -        10.00     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 17.60 SUBAREA RUNOFF(CFS) = 30.52
EFFECTIVE AREA(ACRES) = 78.70 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 78.7 PEAK FLOW RATE(CFS) = 137.25

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 17.27
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.227
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
  LAND USE              GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED           -         1.70     0.30     0.100    -
USER-DEFINED           -        13.10     0.30     1.000    -
USER-DEFINED           -         1.60     0.30     1.000    -
USER-DEFINED           -        12.70     0.30     1.000    -
USER-DEFINED           -         0.60     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.948
SUBAREA AREA(ACRES) = 29.70 SUBAREA RUNOFF(CFS) = 51.91
EFFECTIVE AREA(ACRES) = 108.40 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 108.4 PEAK FLOW RATE(CFS) = 189.16

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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=====
MAINLINE Tc(MIN) = 17.27
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.227
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
  LAND USE          GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         1.90     0.30     1.000     -
USER-DEFINED        -         1.70     0.30     1.000     -
USER-DEFINED        -         0.40     0.30     0.850     -
USER-DEFINED        -         3.40     0.30     1.000     -
USER-DEFINED        -         2.10     0.30     1.000     -
USER-DEFINED        -         1.10     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.994
SUBAREA AREA(ACRES) = 10.60      SUBAREA RUNOFF(CFS) = 18.40
EFFECTIVE AREA(ACRES) = 119.00   AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 119.0       PEAK FLOW RATE(CFS) = 207.55

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\*\*\*\*\*  
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN) = 17.27
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.227
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
  LAND USE          GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         0.50     0.30     0.100     -
USER-DEFINED        -         0.30     0.30     1.000     -
USER-DEFINED        -         4.80     0.30     1.000     -
USER-DEFINED        -         2.60     0.30     1.000     -
USER-DEFINED        -         0.90     0.30     1.000     -
USER-DEFINED        -         7.50     0.30     0.850     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA AREA(ACRES) = 16.60      SUBAREA RUNOFF(CFS) = 29.21
EFFECTIVE AREA(ACRES) = 135.60   AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 135.6       PEAK FLOW RATE(CFS) = 236.76

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\*\*\*\*\*  
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN) = 17.27
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.227
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
  LAND USE          GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED        -         8.00     0.30     1.000     -
USER-DEFINED        -         2.80     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.80      SUBAREA RUNOFF(CFS) = 18.73
EFFECTIVE AREA(ACRES) = 146.40   AREA-AVERAGED Fm(INCH/HR) = 0.29

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=====
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 146.4       PEAK FLOW RATE(CFS) = 255.49
=====

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=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 146.4 TC(MIN.) = 17.27
EFFECTIVE AREA(ACRES) = 146.40 AREA-AVERAGED Fm(INCH/HR)= 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.959
PEAK FLOW RATE(CFS) = 255.49
=====

```

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2006 Advanced Engineering Software (aes)  
Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 6 \*  
\* HYDROLOGIC ANALYSIS - 50-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P506XX50.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.470
2)	6.000;	4.030
3)	7.000;	3.690
4)	8.000;	3.420
5)	9.000;	3.200
6)	10.000;	3.010
7)	11.000;	2.850
8)	12.000;	2.710
9)	13.000;	2.590
10)	14.000;	2.490
11)	15.000;	2.390
12)	20.000;	2.030
13)	25.000;	1.790
14)	30.000;	1.610
15)	40.000;	1.370
16)	50.000;	1.200
17)	60.000;	1.090
18)	90.000;	0.860
19)	120.000;	0.730
20)	180.000;	0.580

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50600.00 TO NODE 50601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00  
ELEVATION DATA: UPSTREAM(FEET) = 780.00 DOWNSTREAM(FEET) = 730.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.166  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.983  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	1.40	0.30	1.000	95	10.17

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 3.38  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 3.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50601.00 TO NODE 50602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.1541  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.38  
FLOW VELOCITY(FEET/SEC.) = 5.31 FLOW DEPTH(FEET) = 0.46  
TRAVEL TIME(MIN.) = 1.12  $T_c$ (MIN.) = 11.29  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50602.00 = 671.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50602.00 TO NODE 50602.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.29



\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.810  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.30 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 2.94  
 EFFECTIVE AREA (ACRES) = 2.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.7 PEAK FLOW RATE (CFS) = 6.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50602.00 TO NODE 50603.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 258.00 CHANNEL SLOPE = 0.2907  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 6.10  
 FLOW VELOCITY (FEET/SEC.) = 7.87 FLOW DEPTH (FEET) = 0.51  
 TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 11.83  
 LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50603.00 = 929.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50603.00 TO NODE 50603.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 11.83  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.733  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.30 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 2.85  
 EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 8.76

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50603.00 TO NODE 50604.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 585.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 116.00 CHANNEL SLOPE = 0.1293  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 8.76  
 FLOW VELOCITY (FEET/SEC.) = 6.28 FLOW DEPTH (FEET) = 0.68  
 TRAVEL TIME (MIN.) = 0.31 Tc (MIN.) = 12.14

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50604.00 = 1045.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50604.00 TO NODE 50604.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.14  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.693  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.60 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 3.45  
 EFFECTIVE AREA (ACRES) = 5.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.6 PEAK FLOW RATE (CFS) = 12.06

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50604.00 TO NODE 50605.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 585.00 DOWNSTREAM (FEET) = 584.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 16.00 CHANNEL SLOPE = 0.0625  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 12.06  
 FLOW VELOCITY (FEET/SEC.) = 5.19 FLOW DEPTH (FEET) = 0.88  
 TRAVEL TIME (MIN.) = 0.05 Tc (MIN.) = 12.19  
 LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50605.00 = 1061.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50605.00 TO NODE 50605.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.19  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.687  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.00 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 10.74  
 EFFECTIVE AREA (ACRES) = 10.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 10.6 PEAK FLOW RATE (CFS) = 22.77

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50605.00 TO NODE 50606.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 584.00 DOWNSTREAM(FEET) = 579.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 122.00 CHANNEL SLOPE = 0.0410  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 22.77  
FLOW VELOCITY(FEET/SEC.) = 5.20 FLOW DEPTH(FEET) = 1.21  
TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 12.58  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50606.00 = 1183.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50606.00 TO NODE 50606.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 12.58  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.640  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 5.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 10.95  
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 33.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50606.00 TO NODE 50607.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 579.00 DOWNSTREAM(FEET) = 528.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 637.00 CHANNEL SLOPE = 0.0801  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 33.28  
FLOW VELOCITY(FEET/SEC.) = 7.32 FLOW DEPTH(FEET) = 1.23  
TRAVEL TIME(MIN.) = 1.45 Tc(MIN.) = 14.03  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50607.00 = 1820.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50607.00 TO NODE 50607.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 14.03  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.487  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 14.37  
EFFECTIVE AREA(ACRES) = 23.10 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 23.1 PEAK FLOW RATE(CFS) = 45.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50607.00 TO NODE 50608.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 422.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 529.00 CHANNEL SLOPE = 0.2004  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 45.46  
FLOW VELOCITY(FEET/SEC.) = 11.18 FLOW DEPTH(FEET) = 1.16  
TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 14.82  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50608.00 = 2349.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50608.00 TO NODE 50608.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 14.82  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.408  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.69  
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 49.51

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50608.00 TO NODE 50609.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 422.00 DOWNSTREAM(FEET) = 297.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 708.00 CHANNEL SLOPE = 0.1766  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 49.51  
FLOW VELOCITY(FEET/SEC.) = 10.89 FLOW DEPTH(FEET) = 1.23  
TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 15.91  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50609.00 = 3057.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50609.00 TO NODE 50609.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 15.91

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.325  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.60	0.30	0.100	-
USER-DEFINED	-	7.90	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.880  
 SUBAREA AREA (ACRES) = 12.00 SUBAREA RUNOFF (CFS) = 22.26  
 EFFECTIVE AREA (ACRES) = 38.10 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 38.1 PEAK FLOW RATE (CFS) = 69.82

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50609.00 TO NODE 50610.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 297.00 DOWNSTREAM (FEET) = 207.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1321.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 69.82  
 FLOW VELOCITY (FEET/SEC.) = 10.34 FLOW DEPTH (FEET) = 1.50  
 TRAVEL TIME (MIN.) = 2.13 Tc (MIN.) = 18.04  
 LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50610.00 = 4378.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN) = 18.04  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.171  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	4.40	0.30	1.000	-
USER-DEFINED	-	3.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.974  
 SUBAREA AREA (ACRES) = 10.20 SUBAREA RUNOFF (CFS) = 17.25  
 EFFECTIVE AREA (ACRES) = 48.30 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 48.3 PEAK FLOW RATE (CFS) = 81.81

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN) = 18.04

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.171  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.17  
 EFFECTIVE AREA (ACRES) = 48.40 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 81.98

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN) = 18.04  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.171  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 1.85  
 EFFECTIVE AREA (ACRES) = 49.50 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 49.5 PEAK FLOW RATE (CFS) = 83.84

END OF STUDY SUMMARY:  
 TOTAL AREA (ACRES) = 49.5 TC (MIN.) = 18.04  
 EFFECTIVE AREA (ACRES) = 49.50 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.965  
 PEAK FLOW RATE (CFS) = 83.84  
 =====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 7 \*  
\* HYDROLOGIC ANALYSIS - 50-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P507XX50.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.470
2)	6.000;	4.030
3)	7.000;	3.690
4)	8.000;	3.420
5)	9.000;	3.200
6)	10.000;	3.010
7)	11.000;	2.850
8)	12.000;	2.710
9)	13.000;	2.590
10)	14.000;	2.490
11)	15.000;	2.390
12)	20.000;	2.030
13)	25.000;	1.790
14)	30.000;	1.610
15)	40.000;	1.370
16)	50.000;	1.200
17)	60.000;	1.090
18)	90.000;	0.860
19)	120.000;	0.730
20)	180.000;	0.580

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50700.00 TO NODE 50701.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 925.00 DOWNSTREAM(FEET) = 815.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.946  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.212  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"OPEN BRUSH"	-	0.20	0.30	1.000	95	8.95
NATURAL FAIR COVER						
"GRASS"	-	0.20	0.30	1.000	95	8.95
NATURAL FAIR COVER						
"OPEN BRUSH"	-	0.20	0.30	1.000	95	8.95

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.57  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50701.00 TO NODE 50702.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 815.00 DOWNSTREAM(FEET) = 800.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 169.00 CHANNEL SLOPE = 0.0888  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.57  
FLOW VELOCITY(FEET/SEC.) = 3.55 FLOW DEPTH(FEET) = 0.38  
TRAVEL TIME(MIN.) = 0.79  $T_c$ (MIN.) = 9.74  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50702.00 = 499.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50702.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.74  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.059  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 2.48  
EFFECTIVE AREA(ACRES) = 1.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 3.97

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50703.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====  
ELEVATION DATA: UPSTREAM(FEET) = 800.00 DOWNSTREAM(FEET) = 785.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 128.00 CHANNEL SLOPE = 0.1172  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.97  
FLOW VELOCITY(FEET/SEC.) = 4.98 FLOW DEPTH(FEET) = 0.52  
TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 10.17  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50703.00 = 627.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50703.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.17  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.983  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 3.86  
EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 7.73

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50704.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 775.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.73  
FLOW VELOCITY(FEET/SEC.) = 4.55 FLOW DEPTH(FEET) = 0.75  
TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 10.79  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50704.00 = 797.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50704.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.79  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.883  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 1.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 7.21  
EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 14.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50705.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====  
ELEVATION DATA: UPSTREAM(FEET) = 775.00 DOWNSTREAM(FEET) = 772.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 162.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 14.65  
FLOW VELOCITY(FEET/SEC.) = 3.46 FLOW DEPTH(FEET) = 1.19  
TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 11.57  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50705.00 = 959.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50705.00 TO NODE 50705.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 11.57  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.770  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -

USER-DEFINED - 2.50 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 9.56  
 EFFECTIVE AREA(ACRES) = 10.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 10.6 PEAK FLOW RATE(CFS) = 23.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 50705.00 TO NODE 50706.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 772.00 DOWNSTREAM(FEET) = 745.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.0756  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 23.57  
 FLOW VELOCITY(FEET/SEC.) = 6.56 FLOW DEPTH(FEET) = 1.09  
 TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 12.48  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50706.00 = 1316.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50706.00 TO NODE 50706.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 12.48  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.653

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 7.41  
 EFFECTIVE AREA(ACRES) = 14.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 14.1 PEAK FLOW RATE(CFS) = 29.86

\*\*\*\*\*

FLOW PROCESS FROM NODE 50706.00 TO NODE 50707.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 733.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 444.00 CHANNEL SLOPE = 0.0270  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 29.86  
 FLOW VELOCITY(FEET/SEC.) = 4.76 FLOW DEPTH(FEET) = 1.45  
 TRAVEL TIME(MIN.) = 1.56 Tc(MIN.) = 14.03

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50707.00 = 1760.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50707.00 TO NODE 50707.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 14.03  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.487

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.40	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 5.50 SUBAREA RUNOFF(CFS) = 10.82  
 EFFECTIVE AREA(ACRES) = 19.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 19.6 PEAK FLOW RATE(CFS) = 38.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 50707.00 TO NODE 50708.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 733.00 DOWNSTREAM(FEET) = 675.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 467.00 CHANNEL SLOPE = 0.1242  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 38.57  
 FLOW VELOCITY(FEET/SEC.) = 9.00 FLOW DEPTH(FEET) = 1.19  
 TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 14.90  
 LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50708.00 = 2227.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50708.00 TO NODE 50708.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 14.90  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.400

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 7.94  
 EFFECTIVE AREA(ACRES) = 23.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 23.8 PEAK FLOW RATE(CFS) = 44.99

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FLOW PROCESS FROM NODE 50708.00 TO NODE 50709.00 IS CODE = 51

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 619.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 516.00 CHANNEL SLOPE = 0.1085
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 44.99
FLOW VELOCITY(FEET/SEC.) = 8.88 FLOW DEPTH(FEET) = 1.30
TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 15.87
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50709.00 = 2743.00 FEET.

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*****
FLOW PROCESS FROM NODE 50709.00 TO NODE 50709.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 15.87
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.328
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 17.70 0.30 1.000 -
USER-DEFINED - 2.00 0.30 1.000 -
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.20 SUBAREA RUNOFF(CFS) = 36.86
EFFECTIVE AREA(ACRES) = 44.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 44.0 PEAK FLOW RATE(CFS) = 80.29

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*****
FLOW PROCESS FROM NODE 50709.00 TO NODE 50710.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 619.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 650.00 CHANNEL SLOPE = 0.0292
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 80.29
FLOW VELOCITY(FEET/SEC.) = 7.76 FLOW DEPTH(FEET) = 1.86
TRAVEL TIME(MIN.) = 1.40 Tc(MIN.) = 17.26
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50710.00 = 3393.00 FEET.

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*****
FLOW PROCESS FROM NODE 50710.00 TO NODE 50710.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 17.26
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.227
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.60 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 13.01
EFFECTIVE AREA(ACRES) = 51.50 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 51.5 PEAK FLOW RATE(CFS) = 89.32

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*****
FLOW PROCESS FROM NODE 50710.00 TO NODE 50711.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 528.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 794.00 CHANNEL SLOPE = 0.0907
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 89.32
FLOW VELOCITY(FEET/SEC.) = 12.22 FLOW DEPTH(FEET) = 1.56
TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 18.35
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50711.00 = 4187.00 FEET.

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*****
FLOW PROCESS FROM NODE 50711.00 TO NODE 50711.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 18.35
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.149
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 33.10 0.30 1.000 -
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 1.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 34.90 SUBAREA RUNOFF(CFS) = 58.08
EFFECTIVE AREA(ACRES) = 86.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 86.4 PEAK FLOW RATE(CFS) = 143.79

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FLOW PROCESS FROM NODE 50711.00 TO NODE 50712.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 423.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1215.00 CHANNEL SLOPE = 0.0864
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 143.79
FLOW VELOCITY(FEET/SEC.) = 13.54 FLOW DEPTH(FEET) = 1.88
TRAVEL TIME(MIN.) = 1.50 Tc(MIN.) = 19.84

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LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50712.00 = 5402.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50712.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 19.84

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.041

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.900	-
USER-DEFINED	-	18.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.998

SUBAREA AREA(ACRES) = 18.60 SUBAREA RUNOFF(CFS) = 29.16

EFFECTIVE AREA(ACRES) = 105.00 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 105.0 PEAK FLOW RATE(CFS) = 164.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50713.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 319.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 768.00 CHANNEL SLOPE = 0.1354

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00

CHANNEL FLOW THRU SUBAREA(CFS) = 164.58

FLOW VELOCITY(FEET/SEC.) = 16.55 FLOW DEPTH(FEET) = 1.82

TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 20.61

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50713.00 = 6170.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50713.00 TO NODE 50713.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 20.61

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.000

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	4.60	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.966

SUBAREA AREA(ACRES) = 5.30 SUBAREA RUNOFF(CFS) = 8.16

EFFECTIVE AREA(ACRES) = 110.30 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 110.3 PEAK FLOW RATE(CFS) = 168.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 50713.00 TO NODE 50714.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 319.00 DOWNSTREAM(FEET) = 182.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 1513.00 CHANNEL SLOPE = 0.0905

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00

CHANNEL FLOW THRU SUBAREA(CFS) = 168.87

FLOW VELOCITY(FEET/SEC.) = 14.35 FLOW DEPTH(FEET) = 1.98

TRAVEL TIME(MIN.) = 1.76 Tc(MIN.) = 22.37

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50714.00 = 7683.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 22.37

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.916

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	5.20	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	7.70	0.30	1.000	-
USER-DEFINED	-	2.60	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867

SUBAREA AREA(ACRES) = 17.60 SUBAREA RUNOFF(CFS) = 26.23

EFFECTIVE AREA(ACRES) = 127.90 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98

TOTAL AREA(ACRES) = 127.9 PEAK FLOW RATE(CFS) = 186.73

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 22.37

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.916

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	0.900	-
USER-DEFINED	-	52.70	0.30	1.000	-
USER-DEFINED	-	7.00	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999

SUBAREA AREA(ACRES) = 61.30 SUBAREA RUNOFF(CFS) = 89.18

EFFECTIVE AREA(ACRES) = 189.20 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 189.2 PEAK FLOW RATE(CFS) = 275.91

\*\*\*\*\*

FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.37

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.916

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	6.20	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 23.71

EFFECTIVE AREA(ACRES) = 205.50 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 205.5 PEAK FLOW RATE(CFS) = 299.62

\*\*\*\*\*

FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.37

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.916

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	7.60	0.30	1.000	-
USER-DEFINED	-	10.40	0.30	1.000	-
USER-DEFINED	-	7.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997

SUBAREA AREA(ACRES) = 25.90 SUBAREA RUNOFF(CFS) = 37.70

EFFECTIVE AREA(ACRES) = 231.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 231.4 PEAK FLOW RATE(CFS) = 337.32

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 231.4 TC(MIN.) = 22.37

EFFECTIVE AREA(ACRES) = 231.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.988

PEAK FLOW RATE(CFS) = 337.32

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 8 \*  
\* HYDROLOGIC ANALYSIS - 50-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P508XX50.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.470
2)	6.000;	4.030
3)	7.000;	3.690
4)	8.000;	3.420
5)	9.000;	3.200
6)	10.000;	3.010
7)	11.000;	2.850
8)	12.000;	2.710
9)	13.000;	2.590
10)	14.000;	2.490
11)	15.000;	2.390
12)	20.000;	2.030
13)	25.000;	1.790
14)	30.000;	1.610
15)	40.000;	1.370
16)	50.000;	1.200
17)	60.000;	1.090
18)	90.000;	0.860
19)	120.000;	0.730
20)	180.000;	0.580

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50800.00 TO NODE 50801.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00  
ELEVATION DATA: UPSTREAM(FEET) = 795.00 DOWNSTREAM(FEET) = 745.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.302  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.962  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.60	0.30	1.000	95	10.30

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.44  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50801.00 TO NODE 50802.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 725.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 245.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.44  
FLOW VELOCITY(FEET/SEC.) = 3.38 FLOW DEPTH(FEET) = 0.38  
TRAVEL TIME(MIN.) = 1.21  $T_c$ (MIN.) = 11.51  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50802.00 = 566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50802.00 TO NODE 50802.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.51

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.778  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 7.36  
 EFFECTIVE AREA (ACRES) = 3.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.9 PEAK FLOW RATE (CFS) = 8.70

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50802.00 TO NODE 50803.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 725.00 DOWNSTREAM (FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 325.00 CHANNEL SLOPE = 0.0769  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 8.70  
 FLOW VELOCITY (FEET/SEC.) = 5.15 FLOW DEPTH (FEET) = 0.75  
 TRAVEL TIME (MIN.) = 1.05 Tc (MIN.) = 12.56  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50803.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50803.00 TO NODE 50803.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN) = 12.56  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.642  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.50 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.50 SUBAREA RUNOFF (CFS) = 3.16  
 EFFECTIVE AREA (ACRES) = 5.40 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.4 PEAK FLOW RATE (CFS) = 11.38

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50803.00 TO NODE 50804.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 652.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 594.00 CHANNEL SLOPE = 0.0808  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 11.38  
 FLOW VELOCITY (FEET/SEC.) = 5.63 FLOW DEPTH (FEET) = 0.82

TRAVEL TIME (MIN.) = 1.76 Tc (MIN.) = 14.32  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50804.00 = 1485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50804.00 TO NODE 50804.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN) = 14.32  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.458  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 11.85  
 EFFECTIVE AREA (ACRES) = 11.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 11.5 PEAK FLOW RATE (CFS) = 22.33

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50804.00 TO NODE 50805.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 652.00 DOWNSTREAM (FEET) = 542.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 499.00 CHANNEL SLOPE = 0.2204  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 22.33  
 FLOW VELOCITY (FEET/SEC.) = 9.73 FLOW DEPTH (FEET) = 0.87  
 TRAVEL TIME (MIN.) = 0.85 Tc (MIN.) = 15.18  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50805.00 = 1984.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50805.00 TO NODE 50805.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc (MIN) = 15.18  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.377  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.70 0.30 1.000 -  
 USER-DEFINED - 1.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 5.20 SUBAREA RUNOFF (CFS) = 9.72  
 EFFECTIVE AREA (ACRES) = 16.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 16.7 PEAK FLOW RATE (CFS) = 31.22

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50805.00 TO NODE 50806.00 IS CODE = 51

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-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 542.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 650.00 CHANNEL SLOPE = 0.1415
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 31.22
FLOW VELOCITY(FEET/SEC.) = 8.95 FLOW DEPTH(FEET) = 1.08
TRAVEL TIME(MIN.) = 1.21 Tc(MIN.) = 16.39
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50806.00 = 2634.00 FEET.

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*****
FLOW PROCESS FROM NODE 50806.00 TO NODE 50806.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 16.39
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.290
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.20 0.30 1.000 -
USER-DEFINED - 1.50 0.30 1.000 -
USER-DEFINED - 0.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 9.31
EFFECTIVE AREA(ACRES) = 21.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 21.9 PEAK FLOW RATE(CFS) = 39.23

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*****
FLOW PROCESS FROM NODE 50806.00 TO NODE 50807.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 639.00 CHANNEL SLOPE = 0.0782
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 39.23
FLOW VELOCITY(FEET/SEC.) = 7.56 FLOW DEPTH(FEET) = 1.32
TRAVEL TIME(MIN.) = 1.41 Tc(MIN.) = 17.80
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50807.00 = 3273.00 FEET.

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*****
FLOW PROCESS FROM NODE 50807.00 TO NODE 50807.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 17.80
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.189
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

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USER-DEFINED - 15.50 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 27.03
EFFECTIVE AREA(ACRES) = 37.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 64.25

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*****
FLOW PROCESS FROM NODE 50807.00 TO NODE 50808.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 350.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 448.00 CHANNEL SLOPE = 0.1116
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 64.25
FLOW VELOCITY(FEET/SEC.) = 9.81 FLOW DEPTH(FEET) = 1.48
TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 18.56
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50808.00 = 3721.00 FEET.

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*****
FLOW PROCESS FROM NODE 50808.00 TO NODE 50808.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 18.56
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.134
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.90 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 12.38
EFFECTIVE AREA(ACRES) = 45.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 45.3 PEAK FLOW RATE(CFS) = 74.77

```

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*****
FLOW PROCESS FROM NODE 50808.00 TO NODE 50809.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 283.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 438.00 CHANNEL SLOPE = 0.1530
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 74.77
FLOW VELOCITY(FEET/SEC.) = 11.45 FLOW DEPTH(FEET) = 1.48
TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 19.19
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50809.00 = 4159.00 FEET.

```

```
*****
FLOW PROCESS FROM NODE 50809.00 TO NODE 50809.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 19.19
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.088
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     0.100    -
USER-DEFINED        -         5.70     0.30     1.000    -
USER-DEFINED        -         1.30     0.30     1.000    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.975
SUBAREA AREA(ACRES) = 7.20     SUBAREA RUNOFF(CFS) = 11.64
EFFECTIVE AREA(ACRES) = 52.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 52.5     PEAK FLOW RATE(CFS) = 84.53
```

```
*****
FLOW PROCESS FROM NODE 50809.00 TO NODE 50810.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 283.00 DOWNSTREAM(FEET) = 243.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.00 CHANNEL SLOPE = 0.0602
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 84.53
FLOW VELOCITY(FEET/SEC.) = 10.32 FLOW DEPTH(FEET) = 1.65
TRAVEL TIME(MIN.) = 1.07 Tc(MIN.) = 20.27
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50810.00 = 4824.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 50810.00 TO NODE 50810.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 20.27
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.017
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20     0.30     0.100    -
USER-DEFINED        -        41.90     0.30     1.000    -
USER-DEFINED        -         4.90     0.30     1.000    -
USER-DEFINED        -         4.40     0.30     1.000    -
USER-DEFINED        -         9.90     0.30     1.000    -
USER-DEFINED        -         1.20     0.30     1.000    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.983
SUBAREA AREA(ACRES) = 63.50     SUBAREA RUNOFF(CFS) = 98.43
EFFECTIVE AREA(ACRES) = 116.00   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 116.0     PEAK FLOW RATE(CFS) = 179.61
```

```
*****
FLOW PROCESS FROM NODE 50810.00 TO NODE 50811.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 243.00 DOWNSTREAM(FEET) = 173.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1122.00 CHANNEL SLOPE = 0.0624
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 179.61
FLOW VELOCITY(FEET/SEC.) = 10.20 FLOW DEPTH(FEET) = 2.42
TRAVEL TIME(MIN.) = 1.83 Tc(MIN.) = 22.10
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50811.00 = 5946.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 22.10
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.929
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         4.00     0.30     1.000    -
USER-DEFINED        -         0.40     0.30     1.000    -
USER-DEFINED        -         2.70     0.30     1.000    -
USER-DEFINED        -         0.30     0.30     0.100    -
USER-DEFINED        -         3.00     0.30     1.000    -
USER-DEFINED        -         1.10     0.30     1.000    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.977
SUBAREA AREA(ACRES) = 11.50     SUBAREA RUNOFF(CFS) = 16.93
EFFECTIVE AREA(ACRES) = 127.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 127.5     PEAK FLOW RATE(CFS) = 187.35
```

```
*****
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 22.10
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.929
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     1.000    -
USER-DEFINED        -         1.90     0.30     1.000    -
USER-DEFINED        -         0.20     0.30     1.000    -
USER-DEFINED        -         0.80     0.30     1.000    -
USER-DEFINED        -         0.20     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     1.000    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.40     SUBAREA RUNOFF(CFS) = 4.99
```

EFFECTIVE AREA(ACRES) = 130.90 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA(ACRES) = 130.9 PEAK FLOW RATE(CFS) = 192.34

\*\*\*\*\*

FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 22.10  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.929

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.59

EFFECTIVE AREA(ACRES) = 131.30 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 131.3 PEAK FLOW RATE(CFS) = 192.92

-----

END OF STUDY SUMMARY:  
TOTAL AREA(ACRES) = 131.3 TC(MIN.) = 22.10

EFFECTIVE AREA(ACRES) = 131.30 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.988

PEAK FLOW RATE(CFS) = 192.92

-----  
END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S31 \*  
\* Rational Method Hydrology Analysis - 50-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S31.DAT  
TIME/DATE OF STUDY: 15:49 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.440
- 2) 10.00; 3.011
- 3) 15.00; 2.390
- 4) 20.00; 2.029
- 5) 25.00; 1.787
- 6) 30.00; 1.600
- 7) 40.00; 1.368
- 8) 50.00; 1.205
- 9) 60.00; 1.060
- 10) 90.00; 0.862
- 11) 120.00; 0.732
- 12) 180.00; 0.593
- 13) 360.00; 0.412
- 14) 1440.00; 0.172

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13100.00 TO NODE 13101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.58  
ELEVATION DATA: UPSTREAM(FEET) = 1069.66 DOWNSTREAM(FEET) = 969.92

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.312  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.493  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.94	0.30	1.000	0	8.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.70  
TOTAL AREA(ACRES) = 0.94 PEAK FLOW RATE(CFS) = 2.70

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13101.00 TO NODE 13102.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 969.92 DOWNSTREAM(FEET) = 807.20  
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.89 CHANNEL SLOPE = 0.2444  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.27  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.925  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.67	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.80  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.66  
AVERAGE FLOW DEPTH(FEET) = 0.24 TRAVEL TIME(MIN.) = 2.38  
Tc(MIN.) = 10.69  
SUBAREA AREA(ACRES) = 7.67 SUBAREA RUNOFF(CFS) = 18.12  
EFFECTIVE AREA(ACRES) = 8.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 20.34  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.34

END OF SUBAREA CHANNEL FLOW HYDRAULICS:



DEPTH(FEET) = 0.34 FLOW VELOCITY(FEET/SEC.) = 5.63  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13102.00 = 948.47 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13102.00 TO NODE 13103.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 807.20 DOWNSTREAM(FEET) = 769.94  
CHANNEL LENGTH THRU SUBAREA(FEET) = 691.01 CHANNEL SLOPE = 0.0539  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.84  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.606

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	20.65	0.30	0.999	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.84

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.48

AVERAGE FLOW DEPTH(FEET) = 0.80 TRAVEL TIME(MIN.) = 2.57

Tc(MIN.) = 13.26

SUBAREA AREA(ACRES) = 20.65 SUBAREA RUNOFF(CFS) = 42.87

EFFECTIVE AREA(ACRES) = 29.26 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 29.3 PEAK FLOW RATE(CFS) = 60.74

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.00 FLOW VELOCITY(FEET/SEC.) = 5.08

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13103.00 = 1639.48 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 769.94 DOWNSTREAM(FEET) = 693.88

FLOW LENGTH(FEET) = 1563.10 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000

DEPTH OF FLOW IN 36.0 INCH PIPE IS 16.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 19.06

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 60.74

PIPE TRAVEL TIME(MIN.) = 1.37 Tc(MIN.) = 14.63

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13104.00 = 3202.58 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.63

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.437

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	28.00	0.30	0.750	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750

SUBAREA AREA(ACRES) = 28.00 SUBAREA RUNOFF(CFS) = 55.73

EFFECTIVE AREA(ACRES) = 57.26 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88

TOTAL AREA(ACRES) = 57.3 PEAK FLOW RATE(CFS) = 112.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 693.88 DOWNSTREAM(FEET) = 645.69

FLOW LENGTH(FEET) = 1068.98 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.27

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 112.01

PIPE TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 15.47

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13105.00 = 4271.56 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.47

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.357

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	35.28	0.30	0.867	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.867

SUBAREA AREA(ACRES) = 35.28 SUBAREA RUNOFF(CFS) = 66.58

EFFECTIVE AREA(ACRES) = 92.54 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87

TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 174.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 645.69 DOWNSTREAM(FEET) = 608.48

FLOW LENGTH(FEET) = 1127.55 MANNING'S N = 0.013

DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.13

ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 174.47

PIPE TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 16.35  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.35  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.293  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 37.68 0.30 0.889 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.889  
SUBAREA AREA(ACRES) = 37.68 SUBAREA RUNOFF(CFS) = 68.70  
EFFECTIVE AREA(ACRES) = 130.22 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 130.2 PEAK FLOW RATE(CFS) = 237.83

\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 15.1

>>>>DEFINE MEMORY BANK # 2 <<<<

PEAK FLOWRATE TABLE FILE NAME: S30.DNA  
MEMORY BANK # 2 DEFINED AS FOLLOWS:  
STREAM Q Tc Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (ACRES) NODE  
1 2145.57 37.08 0.30( 0.24) 0.81 1996.4 13000.00  
2 2081.84 39.11 0.30( 0.24) 0.81 2016.1 13010.00  
TOTAL AREA(ACRES) = 2016.1

\*\*\*\*\*

FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 14.0

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:  
STREAM Q Tc Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (ACRES) NODE  
1 2145.57 37.08 0.30( 0.24) 0.81 1996.4 13000.00  
2 2081.84 39.11 0.30( 0.24) 0.81 2016.1 13010.00  
TOTAL AREA(ACRES) = 2016.1

\*\*\*\*\*

FLOW PROCESS FROM NODE 13026.00 TO NODE 13106.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 662.66 DOWNSTREAM(FEET) = 608.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 3098.88 CHANNEL SLOPE = 0.0175  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.01  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.347  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 75.28 0.30 0.755 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.755  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2183.53  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.29  
AVERAGE FLOW DEPTH(FEET) = 3.01 TRAVEL TIME(MIN.) = 4.20  
Tc(MIN.) = 41.28  
SUBAREA AREA(ACRES) = 75.28 SUBAREA RUNOFF(CFS) = 75.93  
EFFECTIVE AREA(ACRES) = 2071.69 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 2091.4 PEAK FLOW RATE(CFS) = 2145.57  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.98 FLOW VELOCITY(FEET/SEC.) = 12.22  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 2145.57 41.28 1.347 0.30( 0.24) 0.80 2071.7 13000.00  
2 2081.84 43.35 1.313 0.30( 0.24) 0.80 2091.4 13010.00  
NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 2145.57 Tc(MIN.) = 41.28  
AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA(ACRES) = 2071.69

\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 2145.57 41.28 1.347 0.30( 0.24) 0.80 2071.7 13000.00  
2 2081.84 43.35 1.313 0.30( 0.24) 0.80 2091.4 13010.00  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 237.83 16.35 2.293 0.30( 0.26) 0.88 130.2 13100.00  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1814.42	16.35	2.293	0.30 ( 0.24)	0.81	950.9	13100.00
2	2272.58	41.28	1.347	0.30 ( 0.24)	0.81	2201.9	13000.00
3	2204.91	43.35	1.313	0.30 ( 0.24)	0.81	2221.6	13010.00
TOTAL AREA (ACRES) =							2221.6

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 2272.58 Tc (MIN.) = 41.283  
EFFECTIVE AREA (ACRES) = 2201.91 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA (ACRES) = 2221.6  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13106.00 TO NODE 13107.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 608.48 DOWNSTREAM (FEET) = 584.29  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1650.20 CHANNEL SLOPE = 0.0147  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.32

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.309

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	190.45	0.30	0.755	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.755

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2365.40

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.91

AVERAGE FLOW DEPTH (FEET) = 3.31 TRAVEL TIME (MIN.) = 2.31

Tc (MIN.) = 43.59

SUBAREA AREA (ACRES) = 190.45 SUBAREA RUNOFF (CFS) = 185.62

EFFECTIVE AREA (ACRES) = 2392.36 AREA-AVERAGED Fm (INCH/HR) = 0.24

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80

TOTAL AREA (ACRES) = 2412.1 PEAK FLOW RATE (CFS) = 2300.24

GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 3.26 FLOW VELOCITY (FEET/SEC.) = 11.80

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13107.00 = 20924.84 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1925.55	18.81	2.116	0.30 ( 0.24)	0.80	1141.4	13100.00
2	2300.24	43.59	1.309	0.30 ( 0.24)	0.80	2392.4	13000.00
3	2245.49	45.68	1.275	0.30 ( 0.24)	0.80	2412.1	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 2300.24 Tc (MIN.) = 43.59

AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA (ACRES) = 2392.36

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13107.00 TO NODE 13108.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 584.29 DOWNSTREAM (FEET) = 563.78  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1061.67 CHANNEL SLOPE = 0.0193  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.13

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.288

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	314.12	0.30	0.939	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.939

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2442.44

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.20

AVERAGE FLOW DEPTH (FEET) = 3.12 TRAVEL TIME (MIN.) = 1.34

Tc (MIN.) = 44.93

SUBAREA AREA (ACRES) = 314.12 SUBAREA RUNOFF (CFS) = 284.38

EFFECTIVE AREA (ACRES) = 2706.48 AREA-AVERAGED Fm (INCH/HR) = 0.25

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82

TOTAL AREA (ACRES) = 2726.2 PEAK FLOW RATE (CFS) = 2537.54

GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 3.19 FLOW VELOCITY (FEET/SEC.) = 13.37

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13108.00 = 21986.51 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2318.48	20.20	2.020	0.30 ( 0.25)	0.83	1455.5	13100.00
2	2537.54	44.93	1.288	0.30 ( 0.25)	0.82	2706.5	13000.00
3	2472.36	47.03	1.253	0.30 ( 0.25)	0.82	2726.2	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 2537.54 Tc (MIN.) = 44.93

AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2706.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13108.00 TO NODE 13109.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 563.78 DOWNSTREAM (FEET) = 541.61  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1657.28 CHANNEL SLOPE = 0.0134  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.61  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.250  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 203.63 0.30 0.785 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.785  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2630.50  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.97  
 AVERAGE FLOW DEPTH (FEET) = 3.61 TRAVEL TIME (MIN.) = 2.31  
 Tc (MIN.) = 47.24  
 SUBAREA AREA (ACRES) = 203.63 SUBAREA RUNOFF (CFS) = 185.91  
 EFFECTIVE AREA (ACRES) = 2910.11 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 2929.8 PEAK FLOW RATE (CFS) = 2631.73  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.61 FLOW VELOCITY (FEET/SEC.) = 11.97  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13109.00 = 23643.79 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 2475.07 22.56 1.906 0.30 ( 0.25) 0.83 1659.1 13100.00  
 2 2631.73 47.24 1.250 0.30 ( 0.25) 0.82 2910.1 13000.00  
 3 2558.73 49.36 1.215 0.30 ( 0.24) 0.82 2929.8 13010.00  
 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 2631.73 Tc (MIN.) = 47.24  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2910.11

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13109.00 TO NODE 13110.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 541.61 DOWNSTREAM (FEET) = 509.94  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 2016.96 CHANNEL SLOPE = 0.0157  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.55  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.207  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 283.06 0.30 0.791 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.791  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2755.27  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.82  
 AVERAGE FLOW DEPTH (FEET) = 3.54 TRAVEL TIME (MIN.) = 2.62  
 Tc (MIN.) = 49.86  
 SUBAREA AREA (ACRES) = 283.06 SUBAREA RUNOFF (CFS) = 247.08

EFFECTIVE AREA (ACRES) = 3193.17 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3212.9 PEAK FLOW RATE (CFS) = 2766.77  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.55 FLOW VELOCITY (FEET/SEC.) = 12.84  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13110.00 = 25660.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 2679.89 25.21 1.780 0.30 ( 0.25) 0.82 1942.2 13100.00  
 2 2766.77 49.86 1.207 0.30 ( 0.24) 0.81 3193.2 13000.00  
 3 2693.57 52.01 1.176 0.30 ( 0.24) 0.81 3212.9 13010.00  
 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 2766.77 Tc (MIN.) = 49.86  
 AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA (ACRES) = 3193.17

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13110.00 TO NODE 13111.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 509.94 DOWNSTREAM (FEET) = 461.07  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 3058.95 CHANNEL SLOPE = 0.0160  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.61  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.150  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 248.05 0.30 0.783 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2868.96  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.06  
 AVERAGE FLOW DEPTH (FEET) = 3.61 TRAVEL TIME (MIN.) = 3.90  
 Tc (MIN.) = 53.77  
 SUBAREA AREA (ACRES) = 248.05 SUBAREA RUNOFF (CFS) = 204.37  
 EFFECTIVE AREA (ACRES) = 3441.22 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3460.9 PEAK FLOW RATE (CFS) = 2807.85  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.57 FLOW VELOCITY (FEET/SEC.) = 12.97  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13111.00 = 28719.70 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	2735.03	29.13	1.633	0.30 ( 0.25)	0.82	2190.2 13100.00
2	2807.85	53.77	1.150	0.30 ( 0.24)	0.81	3441.2 13000.00
3	2726.06	55.94	1.119	0.30 ( 0.24)	0.81	3460.9 13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 2807.85 Tc(MIN.) = 53.77  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3441.22

\*\*\*\*\*

FLOW PROCESS FROM NODE 13111.00 TO NODE 13112.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 461.07 DOWNSTREAM(FEET) = 452.77  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1781.78 CHANNEL SLOPE = 0.0047  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 5.12  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.100

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	179.91	0.30	0.694	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.694  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2880.08  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.60  
 AVERAGE FLOW DEPTH(FEET) = 5.12 TRAVEL TIME(MIN.) = 3.45  
 Tc(MIN.) = 57.22

SUBAREA AREA(ACRES) = 179.91 SUBAREA RUNOFF(CFS) = 144.45  
 EFFECTIVE AREA(ACRES) = 3621.13 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3640.9 PEAK FLOW RATE(CFS) = 2807.85

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 5.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 5.05 FLOW VELOCITY(FEET/SEC.) = 8.54  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13112.00 = 30501.48 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2767.63	32.59	1.540	0.30 ( 0.24)	0.81	2370.2	13100.00
2	2807.85	57.22	1.100	0.30 ( 0.24)	0.81	3621.1	13000.00
3	2726.06	59.43	1.068	0.30 ( 0.24)	0.81	3640.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 2807.85 Tc(MIN.) = 57.22  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3621.13

\*\*\*\*\*

FLOW PROCESS FROM NODE 13112.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 452.77 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1625.01 CHANNEL SLOPE = 0.0155  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.64  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.070

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	155.96	0.30	0.836	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.836  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2865.34  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.94  
 AVERAGE FLOW DEPTH(FEET) = 3.63 TRAVEL TIME(MIN.) = 2.09  
 Tc(MIN.) = 59.31

SUBAREA AREA(ACRES) = 155.96 SUBAREA RUNOFF(CFS) = 114.99  
 EFFECTIVE AREA(ACRES) = 3777.09 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3796.8 PEAK FLOW RATE(CFS) = 2813.56  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.60

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.60 FLOW VELOCITY(FEET/SEC.) = 12.86  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13222.00 = 32126.49 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2838.09	34.69	1.491	0.30 ( 0.24)	0.81	2526.1	13100.00
2	2813.56	59.31	1.070	0.30 ( 0.24)	0.81	3777.1	13000.00
3	2759.78	61.54	1.050	0.30 ( 0.24)	0.81	3796.8	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 2838.09 Tc(MIN.) = 34.69  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 2526.12

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 3796.8 TC(MIN.) = 34.69  
 EFFECTIVE AREA(ACRES) = 2526.12 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.810  
 PEAK FLOW RATE(CFS) = 2838.09

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2838.09	34.69	1.491	0.30 ( 0.24)	0.81	2526.1	13100.00
2	2813.56	59.31	1.070	0.30 ( 0.24)	0.81	3777.1	13000.00
3	2759.78	61.54	1.050	0.30 ( 0.24)	0.81	3796.8	13010.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S32 \*  
\* Rational Method Hydrology Analysis - 50-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S32.DAT  
TIME/DATE OF STUDY: 15:49 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.440
- 2) 10.00; 3.011
- 3) 15.00; 2.390
- 4) 20.00; 2.029
- 5) 25.00; 1.787
- 6) 30.00; 1.600
- 7) 40.00; 1.368
- 8) 50.00; 1.205
- 9) 60.00; 1.060
- 10) 90.00; 0.862
- 11) 120.00; 0.732
- 12) 180.00; 0.593
- 13) 360.00; 0.412
- 14) 1440.00; 0.172

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13200.00 TO NODE 13201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 298.57  
ELEVATION DATA: UPSTREAM(FEET) = 1069.04 DOWNSTREAM(FEET) = 1005.76

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.179  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.67	0.30	1.000	0	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.74  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 1.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13201.00 TO NODE 13202.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.76 DOWNSTREAM(FEET) = 896.98  
CHANNEL LENGTH THRU SUBAREA(FEET) = 747.55 CHANNEL SLOPE = 0.1455  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.28  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.657  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.70  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.62  
AVERAGE FLOW DEPTH(FEET) = 0.25 TRAVEL TIME(MIN.) = 3.44  
Tc(MIN.) = 12.85  
SUBAREA AREA(ACRES) = 7.42 SUBAREA RUNOFF(CFS) = 15.74  
EFFECTIVE AREA(ACRES) = 8.09 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.1 PEAK FLOW RATE(CFS) = 17.17  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 FLOW VELOCITY(FEET/SEC.) = 4.51  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13202.00 = 1046.12 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 896.98 DOWNSTREAM(FEET) = 840.27  
FLOW LENGTH(FEET) = 1789.59 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 9.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.52  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 17.17  
PIPE TRAVEL TIME(MIN.) = 2.59 Tc(MIN.) = 15.44  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13203.00 = 2835.71 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.44  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.359  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.89 0.30 0.731 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.731  
SUBAREA AREA(ACRES) = 38.89 SUBAREA RUNOFF(CFS) = 74.89  
EFFECTIVE AREA(ACRES) = 46.98 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
TOTAL AREA(ACRES) = 47.0 PEAK FLOW RATE(CFS) = 89.88

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 840.27 DOWNSTREAM(FEET) = 782.97  
FLOW LENGTH(FEET) = 992.54 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 19.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.40  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 89.88  
PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 16.18  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13204.00 = 3828.25 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.18  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.306  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 83.09 0.30 0.645 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645  
SUBAREA AREA(ACRES) = 83.09 SUBAREA RUNOFF(CFS) = 157.94  
EFFECTIVE AREA(ACRES) = 130.07 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 130.1 PEAK FLOW RATE(CFS) = 245.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 782.97 DOWNSTREAM(FEET) = 692.52  
FLOW LENGTH(FEET) = 2046.57 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.62  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 245.57  
PIPE TRAVEL TIME(MIN.) = 1.33 Tc(MIN.) = 17.51  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13205.00 = 5874.82 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.51  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.209  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 88.51 0.30 0.679 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.679  
SUBAREA AREA(ACRES) = 88.51 SUBAREA RUNOFF(CFS) = 159.78  
EFFECTIVE AREA(ACRES) = 218.58 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 218.6 PEAK FLOW RATE(CFS) = 394.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 13205.00 TO NODE 13206.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 692.52 DOWNSTREAM(FEET) = 605.24  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2704.69 CHANNEL SLOPE = 0.0323  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.07  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.948



SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	163.73	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 518.84  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.79  
AVERAGE FLOW DEPTH(FEET) = 3.00 TRAVEL TIME(MIN.) = 4.18  
Tc(MIN.) = 21.68  
SUBAREA AREA(ACRES) = 163.73 SUBAREA RUNOFF(CFS) = 249.13  
EFFECTIVE AREA(ACRES) = 382.31 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 382.3 PEAK FLOW RATE(CFS) = 591.80  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.22 FLOW VELOCITY(FEET/SEC.) = 11.20  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13206.00 = 8579.51 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13206.00 TO NODE 13207.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 687.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.81  
AVERAGE FLOW DEPTH(FEET) = 3.93 TRAVEL TIME(MIN.) = 4.21  
Tc(MIN.) = 25.89  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 192.01  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 717.04  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.01

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 687.86  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.81  
AVERAGE FLOW DEPTH(FEET) = 3.93 TRAVEL TIME(MIN.) = 4.21  
Tc(MIN.) = 25.89  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 192.01  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 717.04  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 4.01 FLOW VELOCITY(FEET/SEC.) = 9.92  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13207.00 = 11058.66 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 795.08  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.61  
AVERAGE FLOW DEPTH(FEET) = 3.86 TRAVEL TIME(MIN.) = 2.49  
Tc(MIN.) = 28.38  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 156.05  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 828.92  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.94

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 795.08  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.61  
AVERAGE FLOW DEPTH(FEET) = 3.86 TRAVEL TIME(MIN.) = 2.49  
Tc(MIN.) = 28.38  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 156.05  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 828.92  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.94 FLOW VELOCITY(FEET/SEC.) = 11.76  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 28.38  
RAINFALL INTENSITY(INCH/HR) = 1.66  
AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.81  
EFFECTIVE STREAM AREA(ACRES) = 649.28  
TOTAL STREAM AREA(ACRES) = 649.28  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 828.92

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13210.00 TO NODE 13211.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.51  
ELEVATION DATA: UPSTREAM(FEET) = 949.80 DOWNSTREAM(FEET) = 828.64

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.525  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.432  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 NATURAL FAIR COVER  
 "OPEN BRUSH" - 1.96 0.30 1.000 0 8.53  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF(CFS) = 5.53  
 TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 5.53

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13211.00 TO NODE 13212.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 828.64 DOWNSTREAM(FEET) = 767.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 652.49 CHANNEL SLOPE = 0.0930  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.48  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.862  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 11.95 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.40  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.07  
 AVERAGE FLOW DEPTH(FEET) = 0.44 TRAVEL TIME(MIN.) = 2.67  
 Tc(MIN.) = 11.19  
 SUBAREA AREA(ACRES) = 11.95 SUBAREA RUNOFF(CFS) = 27.56  
 EFFECTIVE AREA(ACRES) = 13.91 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 32.08  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.59 FLOW VELOCITY(FEET/SEC.) = 4.86  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13212.00 = 967.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13212.00 TO NODE 13213.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 767.94 DOWNSTREAM(FEET) = 706.43  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 967.91 CHANNEL SLOPE = 0.0635  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 0.97  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.485

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 27.07 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 58.82  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.30  
 AVERAGE FLOW DEPTH(FEET) = 0.94 TRAVEL TIME(MIN.) = 3.05  
 Tc(MIN.) = 14.24  
 SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 53.22  
 EFFECTIVE AREA(ACRES) = 40.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 41.0 PEAK FLOW RATE(CFS) = 80.57  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.12 FLOW VELOCITY(FEET/SEC.) = 5.89  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13213.00 = 1934.91 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13213.00 TO NODE 13214.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 706.43 DOWNSTREAM(FEET) = 659.31  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 948.11 CHANNEL SLOPE = 0.0497  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.35  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.246  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 18.09 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 96.43  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.72  
 AVERAGE FLOW DEPTH(FEET) = 1.33 TRAVEL TIME(MIN.) = 2.76  
 Tc(MIN.) = 17.00  
 SUBAREA AREA(ACRES) = 18.09 SUBAREA RUNOFF(CFS) = 31.68  
 EFFECTIVE AREA(ACRES) = 59.07 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 103.46  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 1.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.38 FLOW VELOCITY(FEET/SEC.) = 5.86  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13214.00 = 2883.02 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13214.00 TO NODE 13215.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 659.31 DOWNSTREAM(FEET) = 628.91  
CHANNEL LENGTH THRU SUBAREA(FEET) = 970.24 CHANNEL SLOPE = 0.0313  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.05

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.041

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	71.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 159.48

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.69

AVERAGE FLOW DEPTH(FEET) = 2.00 TRAVEL TIME(MIN.) = 2.84

Tc(MIN.) = 19.84

SUBAREA AREA(ACRES) = 71.42 SUBAREA RUNOFF(CFS) = 111.90

EFFECTIVE AREA(ACRES) = 130.49 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 130.5 PEAK FLOW RATE(CFS) = 204.44

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.29 FLOW VELOCITY(FEET/SEC.) = 6.12

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13215.00 = 3853.26 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13215.00 TO NODE 13216.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 628.91 DOWNSTREAM(FEET) = 598.39  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.63 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.42

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.922

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	36.33	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 230.97

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.47

AVERAGE FLOW DEPTH(FEET) = 2.41 TRAVEL TIME(MIN.) = 2.38

Tc(MIN.) = 22.22

SUBAREA AREA(ACRES) = 36.33 SUBAREA RUNOFF(CFS) = 53.04

EFFECTIVE AREA(ACRES) = 166.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 166.8 PEAK FLOW RATE(CFS) = 243.55

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.48 FLOW VELOCITY(FEET/SEC.) = 6.56

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13216.00 = 4775.89 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13216.00 TO NODE 13217.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 598.39 DOWNSTREAM(FEET) = 568.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.40 CHANNEL SLOPE = 0.0470  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.41

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.855

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	42.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 273.30

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.69

AVERAGE FLOW DEPTH(FEET) = 2.40 TRAVEL TIME(MIN.) = 1.38

Tc(MIN.) = 23.60

SUBAREA AREA(ACRES) = 42.51 SUBAREA RUNOFF(CFS) = 59.51

EFFECTIVE AREA(ACRES) = 209.33 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 209.3 PEAK FLOW RATE(CFS) = 293.03

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.49 FLOW VELOCITY(FEET/SEC.) = 7.85

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13217.00 = 5412.29 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 568.48 DOWNSTREAM(FEET) = 505.65  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1896.50 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.98

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.676

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	73.24	0.30	0.951	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.951  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 338.89  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.21  
 AVERAGE FLOW DEPTH(FEET) = 2.96 TRAVEL TIME(MIN.) = 4.39  
 Tc(MIN.) = 27.98  
 SUBAREA AREA(ACRES) = 73.24 SUBAREA RUNOFF(CFS) = 91.65  
 EFFECTIVE AREA(ACRES) = 282.57 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 282.6 PEAK FLOW RATE(CFS) = 350.82  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.01 FLOW VELOCITY(FEET/SEC.) = 7.28  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13220.00 = 7308.79 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 27.98  
 RAINFALL INTENSITY(INCH/HR) = 1.68  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.99  
 EFFECTIVE STREAM AREA(ACRES) = 282.57  
 TOTAL STREAM AREA(ACRES) = 282.57  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 350.82

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	828.92	28.38	1.661	0.30( 0.24)	0.81	649.3	13200.00
2	350.82	27.98	1.676	0.30( 0.30)	0.99	282.6	13210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1176.70	27.98	1.676	0.30( 0.26)	0.86	922.7	13210.00
2	1175.92	28.38	1.661	0.30( 0.26)	0.86	931.8	13200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1176.70 Tc(MIN.) = 27.98  
 EFFECTIVE AREA(ACRES) = 922.70 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA(ACRES) = 931.8  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13220.00 TO NODE 13221.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 505.65 DOWNSTREAM(FEET) = 478.94  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1949.14 CHANNEL SLOPE = 0.0137  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 5.03  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.586

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 108.50 0.30 0.637 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.637  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1244.79  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.33  
 AVERAGE FLOW DEPTH(FEET) = 5.03 TRAVEL TIME(MIN.) = 2.63  
 Tc(MIN.) = 30.62

SUBAREA AREA(ACRES) = 108.50 SUBAREA RUNOFF(CFS) = 136.19  
 EFFECTIVE AREA(ACRES) = 1031.20 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA(ACRES) = 1040.3 PEAK FLOW RATE(CFS) = 1238.21  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 5.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 5.02 FLOW VELOCITY(FEET/SEC.) = 12.33  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13221.00 = 14742.35 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1238.21	30.62	1.586	0.30( 0.25)	0.84	1031.2	13210.00
2	1240.62	31.02	1.576	0.30( 0.25)	0.84	1040.3	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1240.62 Tc(MIN.) = 31.02  
 AREA-AVERAGED Fm(INCH/HR) = 0.25 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.84 EFFECTIVE AREA(ACRES) = 1040.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13221.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 478.94 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2078.70 CHANNEL SLOPE = 0.0247  
 GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 4.43  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.525

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 87.26 0.30 0.699 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$  (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.699  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1292.26  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 15.48  
 AVERAGE FLOW DEPTH (FEET) = 4.43 TRAVEL TIME (MIN.) = 2.24  
 $T_c$  (MIN.) = 33.25  
 SUBAREA AREA (ACRES) = 87.26 SUBAREA RUNOFF (CFS) = 103.26  
 EFFECTIVE AREA (ACRES) = 1127.61 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.25  
 AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.83  
 TOTAL AREA (ACRES) = 1127.6 PEAK FLOW RATE (CFS) = 1295.27  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 4.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 4.43 FLOW VELOCITY (FEET/SEC.) = 15.50  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13222.00 = 16821.05 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	$T_c$ (MIN.)	Intensity (INCH/HR)	$F_p$ ( $F_m$ ) (INCH/HR)	$A_p$	$A_e$ (ACRES)	HEADWATER NODE
1	1294.02	32.85	1.534	0.30 (0.25)	0.83	1118.5	13210.00
2	1295.27	33.25	1.525	0.30 (0.25)	0.83	1127.6	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1295.27  $T_c$  (MIN.) = 33.25  
 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.25 AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30  
 AREA-AVERAGED  $A_p$  = 0.83 EFFECTIVE AREA (ACRES) = 1127.61

=====  
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1127.6  $T_c$  (MIN.) = 33.25  
 EFFECTIVE AREA (ACRES) = 1127.61 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.25  
 AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.828  
 PEAK FLOW RATE (CFS) = 1295.27

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	$T_c$ (MIN.)	Intensity (INCH/HR)	$F_p$ ( $F_m$ ) (INCH/HR)	$A_p$	$A_e$ (ACRES)	HEADWATER NODE
1	1294.02	32.85	1.534	0.30 (0.25)	0.83	1118.5	13210.00
2	1295.27	33.25	1.525	0.30 (0.25)	0.83	1127.6	13200.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S35 \*  
\* Rational Method Hydrology Analysis - 50-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S35.DAT  
TIME/DATE OF STUDY: 15:49 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.440
- 2) 10.00; 3.011
- 3) 15.00; 2.390
- 4) 20.00; 2.029
- 5) 25.00; 1.787
- 6) 30.00; 1.600
- 7) 40.00; 1.368
- 8) 50.00; 1.205
- 9) 60.00; 1.060
- 10) 90.00; 0.862
- 11) 120.00; 0.732
- 12) 180.00; 0.593
- 13) 360.00; 0.412
- 14) 1440.00; 0.172

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.00 TO NODE 13500.50 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 548.43  
ELEVATION DATA: UPSTREAM(FEET) = 1183.47 DOWNSTREAM(FEET) = 1065.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.768  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	5.11	0.30	1.000	0	11.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 11.35  
TOTAL AREA(ACRES) = 5.11 PEAK FLOW RATE(CFS) = 11.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.50 TO NODE 13501.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1033.15  
CHANNEL LENGTH THRU SUBAREA(FEET) = 431.71 CHANNEL SLOPE = 0.0738  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.49  
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.538  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.87	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.29  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.88  
AVERAGE FLOW DEPTH(FEET) = 0.48 TRAVEL TIME(MIN.) = 1.86  
Tc(MIN.) = 13.81  
SUBAREA AREA(ACRES) = 8.87 SUBAREA RUNOFF(CFS) = 17.87  
EFFECTIVE AREA(ACRES) = 13.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 28.16  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.58

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.58 FLOW VELOCITY(FEET/SEC.) = 4.33  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13501.00 = 980.14 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13501.00 TO NODE 13502.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1033.15 DOWNSTREAM(FEET) = 990.26  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.63 CHANNEL SLOPE = 0.0452  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.88

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.207

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.82	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.64  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.25

AVERAGE FLOW DEPTH(FEET) = 0.86 TRAVEL TIME(MIN.) = 3.72  
Tc(MIN.) = 17.54

SUBAREA AREA(ACRES) = 16.82 SUBAREA RUNOFF(CFS) = 28.88  
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 52.87  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.97 FLOW VELOCITY(FEET/SEC.) = 4.56

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13502.00 = 1928.77 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13502.00 TO NODE 13503.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.26 DOWNSTREAM(FEET) = 956.06  
CHANNEL LENGTH THRU SUBAREA(FEET) = 940.98 CHANNEL SLOPE = 0.0363  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.42

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.997

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	46.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 88.07  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.01

AVERAGE FLOW DEPTH(FEET) = 1.38 TRAVEL TIME(MIN.) = 3.13

Tc(MIN.) = 20.67

SUBAREA AREA(ACRES) = 46.02 SUBAREA RUNOFF(CFS) = 70.30

EFFECTIVE AREA(ACRES) = 76.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 76.8 PEAK FLOW RATE(CFS) = 117.35

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.62 FLOW VELOCITY(FEET/SEC.) = 5.46

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13503.00 = 2869.75 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13503.00 TO NODE 13504.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 956.06 DOWNSTREAM(FEET) = 889.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2131.31 CHANNEL SLOPE = 0.0312  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.02

\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.713

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	58.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 154.63

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.63

AVERAGE FLOW DEPTH(FEET) = 1.97 TRAVEL TIME(MIN.) = 6.31

Tc(MIN.) = 26.98

SUBAREA AREA(ACRES) = 58.46 SUBAREA RUNOFF(CFS) = 74.36

EFFECTIVE AREA(ACRES) = 135.28 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 135.3 PEAK FLOW RATE(CFS) = 172.08

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.09 FLOW VELOCITY(FEET/SEC.) = 5.81

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13504.00 = 5001.06 FEET.

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FLOW PROCESS FROM NODE 13504.00 TO NODE 13505.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 889.48 DOWNSTREAM(FEET) = 848.10  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1661.97 CHANNEL SLOPE = 0.0249  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.43

\* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.555  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 49.30 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 199.94  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.60  
 AVERAGE FLOW DEPTH (FEET) = 2.41 TRAVEL TIME (MIN.) = 4.94  
 Tc (MIN.) = 31.92  
 SUBAREA AREA (ACRES) = 49.30 SUBAREA RUNOFF (CFS) = 55.71  
 EFFECTIVE AREA (ACRES) = 184.58 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 184.6 PEAK FLOW RATE (CFS) = 208.56  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.46  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.46 FLOW VELOCITY (FEET/SEC.) = 5.68  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.00 = 6663.03 FEET.

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 FLOW PROCESS FROM NODE 13505.00 TO NODE 13505.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 848.10 DOWNSTREAM (FEET) = 811.10  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1234.61 CHANNEL SLOPE = 0.0300  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.47  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.479  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 39.35 0.30 0.811 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.811  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 230.44  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.23  
 AVERAGE FLOW DEPTH (FEET) = 2.47 TRAVEL TIME (MIN.) = 3.30  
 Tc (MIN.) = 35.23  
 SUBAREA AREA (ACRES) = 39.35 SUBAREA RUNOFF (CFS) = 43.76  
 EFFECTIVE AREA (ACRES) = 223.93 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 223.9 PEAK FLOW RATE (CFS) = 239.59  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.52  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.52 FLOW VELOCITY (FEET/SEC.) = 6.31  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.50 = 7897.64 FEET.

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FLOW PROCESS FROM NODE 13505.50 TO NODE 13506.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 811.10 DOWNSTREAM (FEET) = 781.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1415.98 CHANNEL SLOPE = 0.0213  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.93  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.384  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 54.33 0.30 0.738 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.738  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 268.01  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.76  
 AVERAGE FLOW DEPTH (FEET) = 2.93 TRAVEL TIME (MIN.) = 4.10  
 Tc (MIN.) = 39.33  
 SUBAREA AREA (ACRES) = 54.33 SUBAREA RUNOFF (CFS) = 56.83  
 EFFECTIVE AREA (ACRES) = 278.26 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
 TOTAL AREA (ACRES) = 278.3 PEAK FLOW RATE (CFS) = 277.25  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.99  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.99 FLOW VELOCITY (FEET/SEC.) = 5.81  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.00 = 9313.62 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13506.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 781.00 DOWNSTREAM (FEET) = 743.17  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1542.62 CHANNEL SLOPE = 0.0245  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.04  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.312  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 61.33 0.30 0.783 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 306.99  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.30  
 AVERAGE FLOW DEPTH (FEET) = 3.03 TRAVEL TIME (MIN.) = 4.08  
 Tc (MIN.) = 43.41  
 SUBAREA AREA (ACRES) = 61.33 SUBAREA RUNOFF (CFS) = 59.48  
 EFFECTIVE AREA (ACRES) = 339.59 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90



TOTAL AREA (ACRES) = 339.6 PEAK FLOW RATE (CFS) = 318.89  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.09  
  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.09 FLOW VELOCITY (FEET/SEC.) = 6.37  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.50 = 10856.24 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.50 TO NODE 13520.00 IS CODE = 56  
 -----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 743.17 DOWNSTREAM (FEET) = 717.04  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1370.93 CHANNEL SLOPE = 0.0191  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.41  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.249  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.86	0.30	0.848	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.848  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 336.74  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.90  
 AVERAGE FLOW DEPTH (FEET) = 3.40 TRAVEL TIME (MIN.) = 3.87  
 Tc (MIN.) = 47.28  
 SUBAREA AREA (ACRES) = 39.86 SUBAREA RUNOFF (CFS) = 35.69  
 EFFECTIVE AREA (ACRES) = 379.45 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
 TOTAL AREA (ACRES) = 379.5 PEAK FLOW RATE (CFS) = 335.28  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.39 FLOW VELOCITY (FEET/SEC.) = 5.89  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13520.00 IS CODE = 1  
 -----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 -----  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 47.28  
 RAINFALL INTENSITY (INCH/HR) = 1.25  
 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.89  
 EFFECTIVE STREAM AREA (ACRES) = 379.45  
 TOTAL STREAM AREA (ACRES) = 379.45  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 335.28

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13510.00 TO NODE 13511.00 IS CODE = 21  
 -----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 -----  
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 903.68  
 ELEVATION DATA: UPSTREAM (FEET) = 1216.90 DOWNSTREAM (FEET) = 1022.78

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.615  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.438  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	6.66	0.30	1.000	0	14.62

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 12.82  
 TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 12.82

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13511.00 TO NODE 13512.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 1022.78 DOWNSTREAM (FEET) = 954.27  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1027.63 CHANNEL SLOPE = 0.0667  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.71  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.142  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.30	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 33.97  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.48  
 AVERAGE FLOW DEPTH (FEET) = 0.67 TRAVEL TIME (MIN.) = 3.82  
 Tc (MIN.) = 18.44  
 SUBAREA AREA (ACRES) = 25.40 SUBAREA RUNOFF (CFS) = 42.12  
 EFFECTIVE AREA (ACRES) = 32.06 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 53.16  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.87 FLOW VELOCITY (FEET/SEC.) = 5.23  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13512.00 = 1931.31 FEET.

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FLOW PROCESS FROM NODE 13512.00 TO NODE 13513.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 954.27 DOWNSTREAM(FEET) = 872.45
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.42 CHANNEL SLOPE = 0.0425
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.63
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.834

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 90.23 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 115.80
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.73
AVERAGE FLOW DEPTH(FEET) = 1.54 TRAVEL TIME(MIN.) = 5.60
Tc(MIN.) = 24.04

SUBAREA AREA(ACRES) = 90.23 SUBAREA RUNOFF(CFS) = 124.57
EFFECTIVE AREA(ACRES) = 122.29 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 122.3 PEAK FLOW RATE(CFS) = 168.84
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.90 FLOW VELOCITY(FEET/SEC.) = 6.43
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13513.00 = 3857.73 FEET.

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FLOW PROCESS FROM NODE 13513.00 TO NODE 13514.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 872.45 DOWNSTREAM(FEET) = 813.12
CHANNEL LENGTH THRU SUBAREA(FEET) = 1895.66 CHANNEL SLOPE = 0.0313
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.62
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.641

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 135.65 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 250.84
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.48
AVERAGE FLOW DEPTH(FEET) = 2.56 TRAVEL TIME(MIN.) = 4.87
Tc(MIN.) = 28.91

SUBAREA AREA(ACRES) = 135.65 SUBAREA RUNOFF(CFS) = 163.70
EFFECTIVE AREA(ACRES) = 257.94 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 257.9 PEAK FLOW RATE(CFS) = 311.28
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.87 FLOW VELOCITY(FEET/SEC.) = 6.90
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13514.00 = 5753.39 FEET.

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FLOW PROCESS FROM NODE 13514.00 TO NODE 13515.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 813.12 DOWNSTREAM(FEET) = 773.74
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.15 CHANNEL SLOPE = 0.0204
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.54
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.505

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 109.30 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 370.60
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.21
AVERAGE FLOW DEPTH(FEET) = 3.51 TRAVEL TIME(MIN.) = 5.17
Tc(MIN.) = 34.08

SUBAREA AREA(ACRES) = 109.30 SUBAREA RUNOFF(CFS) = 118.58
EFFECTIVE AREA(ACRES) = 367.24 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 367.2 PEAK FLOW RATE(CFS) = 398.42
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 3.64 FLOW VELOCITY(FEET/SEC.) = 6.33
LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13515.00 = 7679.54 FEET.

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FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 773.74 DOWNSTREAM(FEET) = 717.04
CHANNEL LENGTH THRU SUBAREA(FEET) = 2279.49 CHANNEL SLOPE = 0.0249
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.98
\* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.384

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 231.44 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 511.44  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.28  
 AVERAGE FLOW DEPTH (FEET) = 3.93 TRAVEL TIME (MIN.) = 5.22  
 Tc (MIN.) = 39.30  
 SUBAREA AREA (ACRES) = 231.44 SUBAREA RUNOFF (CFS) = 225.88  
 EFFECTIVE AREA (ACRES) = 598.68 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 598.7 PEAK FLOW RATE (CFS) = 584.29  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 4.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 4.21 FLOW VELOCITY (FEET/SEC.) = 7.54  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13520.00 = 9959.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 39.30  
 RAINFALL INTENSITY (INCH/HR) = 1.38  
 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 598.68  
 TOTAL STREAM AREA (ACRES) = 598.68  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 584.29

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	335.28	47.28	1.249	0.30 (0.27)	0.89	379.5	13500.00
2	584.29	39.30	1.384	0.30 (0.30)	1.00	598.7	13510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	901.29	39.30	1.384	0.30 (0.29)	0.96	914.1	13510.00
2	846.79	47.28	1.249	0.30 (0.29)	0.96	978.1	13500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 901.29 Tc (MIN.) = 39.30  
 EFFECTIVE AREA (ACRES) = 914.06 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 978.1  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.00 TO NODE 13520.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 717.04 DOWNSTREAM (FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 2019.22 CHANNEL SLOPE = 0.0084  
 GIVEN CHANNEL BASE (FEET) = 30.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.61  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.298  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 989.05  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.74  
 AVERAGE FLOW DEPTH (FEET) = 3.60 TRAVEL TIME (MIN.) = 4.99  
 Tc (MIN.) = 44.29  
 SUBAREA AREA (ACRES) = 193.31 SUBAREA RUNOFF (CFS) = 175.48  
 EFFECTIVE AREA (ACRES) = 1107.37 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 1171.4 PEAK FLOW RATE (CFS) = 1005.81  
 GIVEN CHANNEL BASE (FEET) = 30.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.63 FLOW VELOCITY (FEET/SEC.) = 6.78  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.50 = 14246.39 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1005.81	44.29	1.298	0.30 (0.29)	0.96	1107.4	13510.00
2	930.74	52.37	1.171	0.30 (0.29)	0.96	1171.4	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 1005.81 Tc (MIN.) = 44.29  
 AREA-AVERAGED Fm (INCH/HR) = 0.29 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA (ACRES) = 1107.37

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.50 TO NODE 13521.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 661.95  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1622.36 CHANNEL SLOPE = 0.0235  
 GIVEN CHANNEL BASE (FEET) = 30.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.82  
 \* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.253  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -        129.79      0.30        0.897       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1063.29  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.81  
 AVERAGE FLOW DEPTH(FEET) = 2.82    TRAVEL TIME(MIN.) = 2.76  
 Tc(MIN.) = 47.04  
 SUBAREA AREA(ACRES) = 129.79        SUBAREA RUNOFF(CFS) = 114.95  
 EFFECTIVE AREA(ACRES) = 1237.16    AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 1301.2        PEAK FLOW RATE(CFS) = 1075.96  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 2.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 2.84    FLOW VELOCITY(FEET/SEC.) = 9.86  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13521.00 = 15868.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1075.96	47.04	1.253	0.30( 0.29)	0.96	1237.2	13510.00
2	988.14	55.20	1.130	0.30( 0.29)	0.95	1301.2	13500.00

 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1075.96    Tc(MIN.) = 47.04  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96    EFFECTIVE AREA(ACRES) = 1237.16

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13521.00 TO NODE 13522.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 661.95    DOWNSTREAM(FEET) = 632.19  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2746.01    CHANNEL SLOPE = 0.0108  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.73  
 \* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 1.163  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	278.60	0.30	0.905	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1187.70  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.78  
 AVERAGE FLOW DEPTH(FEET) = 3.71    TRAVEL TIME(MIN.) = 5.88  
 Tc(MIN.) = 52.93  
 SUBAREA AREA(ACRES) = 278.60        SUBAREA RUNOFF(CFS) = 223.43  
 EFFECTIVE AREA(ACRES) = 1515.76    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.95  
 TOTAL AREA(ACRES) = 1579.8        PEAK FLOW RATE(CFS) = 1198.50  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.73  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.73    FLOW VELOCITY(FEET/SEC.) = 7.81  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13522.00 = 18614.76 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1198.50	52.93	1.163	0.30( 0.28)	0.95	1515.8	13510.00
2	1092.68	61.25	1.052	0.30( 0.28)	0.94	1579.8	13500.00

 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1198.50    Tc(MIN.) = 52.93  
 AREA-AVERAGED Fm(INCH/HR) = 0.28    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.95    EFFECTIVE AREA(ACRES) = 1515.76

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1579.8    TC(MIN.) = 52.93  
 EFFECTIVE AREA(ACRES) = 1515.76    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.947  
 PEAK FLOW RATE(CFS) = 1198.50

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1198.50	52.93	1.163	0.30( 0.28)	0.95	1515.8	13510.00
2	1092.68	61.25	1.052	0.30( 0.28)	0.94	1579.8	13500.00

 =====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2011 Advanced Engineering Software (aes)  
Ver. 18.0 Release Date: 07/01/2011 License ID 1264

Analysis prepared by:

RBF Consulting

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 100-YR ULTIMATE EV NOVEMBER 2013 MCHANDOO \*  
\*\*\*\*\*

FILE NAME: 2P00EVAA.DAT  
TIME/DATE OF STUDY: 15:06 11/13/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.785
- 2) 10.00; 3.745
- 3) 15.00; 2.904
- 4) 20.00; 2.401
- 5) 25.00; 2.083
- 6) 30.00; 1.861
- 7) 40.00; 1.606
- 8) 50.00; 1.392
- 9) 60.00; 1.279
- 10) 90.00; 1.075
- 11) 120.00; 0.938
- 12) 180.00; 0.782
- 13) 360.00; 0.577
- 14) 1200.00; 0.251

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / PARK- / WAY		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00  
ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 571.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.305  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.844  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56	7.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 3.44  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 3.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.844  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.170  
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 14.24  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.05  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 17.68

\*\*\*\*\*  
FLOW PROCESS FROM NODE 101.00 TO NODE 101.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.31  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.844  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	2.30	0.30	0.200	56
COMMERCIAL	B	1.00	0.30	0.100	56

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.60 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 11.20  
 EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19  
 TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 28.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 -----

UPSTREAM ELEVATION(FEET) = 571.00 DOWNSTREAM ELEVATION(FEET) = 530.50  
 STREET LENGTH(FEET) = 1215.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.79  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.49  
 HALFSTREET FLOOD WIDTH(FEET) = 18.24  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.49  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.68  
 STREET FLOW TRAVEL TIME(MIN.) = 3.69 Tc(MIN.) = 10.99

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.578  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

LAND USE	GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.20	0.30	0.200	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	2.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.135  
 SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 11.78  
 EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 33.02

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 17.85  
 FLOW VELOCITY(FEET/SEC.) = 5.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.61  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 1542.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 10.99  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.578  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
APARTMENTS	B	4.40	0.30	0.200	56
COMMERCIAL	B	18.20	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.119  
 SUBAREA AREA(ACRES) = 22.60 SUBAREA RUNOFF(CFS) = 72.05  
 EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.13  
 TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 105.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 10.99  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.578  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
APARTMENTS	B	6.20	0.30	0.200	56
COMMERCIAL	B	0.10	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198  
 SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 19.95  
 EFFECTIVE AREA(ACRES) = 39.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA(ACRES) = 39.3 PEAK FLOW RATE(CFS) = 125.03

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 530.50 DOWNSTREAM(FEET) = 522.00  
 FLOW LENGTH(FEET) = 837.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.38  
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 125.03  
 PIPE TRAVEL TIME(MIN.) = 1.13 Tc(MIN.) = 12.12  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 2379.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 12.12  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.389  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 15.30 0.30 0.100 56  
 PUBLIC PARK B 0.70 0.30 0.850 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.133  
 SUBAREA AREA(ACRES) = 16.00 SUBAREA RUNOFF(CFS) = 48.23  
 EFFECTIVE AREA(ACRES) = 55.30 AREA-AVERAGED Fm(INCH/HR) = 0.04  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14  
 TOTAL AREA(ACRES) = 55.3 PEAK FLOW RATE(CFS) = 166.55

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 522.00 DOWNSTREAM(FEET) = 473.00  
 FLOW LENGTH(FEET) = 568.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 29.74  
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 166.55  
 PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 12.44  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 2947.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 104.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.44  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.335  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	2.10	0.30	0.850	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
COMMERCIAL	B	0.50	0.30	0.100	56
PUBLIC PARK	B	13.00	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.820  
 SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 44.21  
 EFFECTIVE AREA(ACRES) = 71.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 71.2 PEAK FLOW RATE(CFS) = 208.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 104.00 TO NODE 127.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 435.00  
 FLOW LENGTH(FEET) = 588.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 28.35

ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 208.10  
 PIPE TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 12.78  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 100.00 TO NODE 121.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 577.00 DOWNSTREAM(FEET) = 574.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.382  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56	8.44

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 2.33  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 2.33

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 574.00 DOWNSTREAM ELEVATION(FEET) = 557.00  
 STREET LENGTH(FEET) = 221.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 28.72  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.42  
 HALFSTREET FLOOD WIDTH(FEET) = 14.18  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.22  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.00



STREET FLOW TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 8.95  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.174  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 7.90 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.10 0.30 0.400 56  
 APARTMENTS B 2.20 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.257  
 SUBAREA AREA(ACRES) = 14.30 SUBAREA RUNOFF(CFS) = 52.73  
 EFFECTIVE AREA(ACRES) = 14.90 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.26  
 TOTAL AREA(ACRES) = 14.9 PEAK FLOW RATE(CFS) = 54.95

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 18.48  
 FLOW VELOCITY(FEET/SEC.) = 8.47 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.17  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 122.00 = 551.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 557.00 DOWNSTREAM ELEVATION(FEET) = 527.00  
 STREET LENGTH(FEET) = 317.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 71.05  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.51  
 HALFSTREET FLOOD WIDTH(FEET) = 19.65  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 9.76  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 5.01  
 STREET FLOW TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 9.49  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.953  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.50 0.30 0.400 56  
 APARTMENTS B 0.70 0.30 0.200 56

COMMERCIAL B 0.40 0.30 0.100 56  
 CONDOMINIUMS B 3.50 0.30 0.350 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.352  
 SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 32.20  
 EFFECTIVE AREA(ACRES) = 24.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29  
 TOTAL AREA(ACRES) = 24.2 PEAK FLOW RATE(CFS) = 84.19

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 21.05  
 FLOW VELOCITY(FEET/SEC.) = 10.14 DEPTH\*VELOCITY(FT\*FT/SEC.) = 5.46  
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 123.00 = 868.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 527.00 DOWNSTREAM ELEVATION(FEET) = 496.00  
 STREET LENGTH(FEET) = 315.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 102.86  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.57  
 HALFSTREET FLOOD WIDTH(FEET) = 22.62  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.80  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.12  
 STREET FLOW TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 9.98  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.755

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 2.90 0.30 0.400 56  
 CONDOMINIUMS B 1.40 0.30 0.350 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 4.00 0.30 0.400 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 CONDOMINIUMS B 2.70 0.30 0.350 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387  
 SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 37.33  
 EFFECTIVE AREA(ACRES) = 35.60 AREA-AVERAGED Fm(INCH/HR) = 0.10  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32

TOTAL AREA (ACRES) = 35.6 PEAK FLOW RATE (CFS) = 117.21

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.59 HALFSTREET FLOOD WIDTH (FEET) = 23.79
FLOW VELOCITY (FEET/SEC.) = 11.17 DEPTH\*VELOCITY (FT\*FT/SEC.) = 6.56
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 124.00 = 1183.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 9.98

RAINFALL INTENSITY (INCH/HR) = 3.75

AREA-AVERAGED Fm (INCH/HR) = 0.10

AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.32

EFFECTIVE STREAM AREA (ACRES) = 35.60

TOTAL STREAM AREA (ACRES) = 35.60

PEAK FLOW RATE (CFS) AT CONFLUENCE = 117.21

\*\*\*\*\*

FLOW PROCESS FROM NODE 130.00 TO NODE 131.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 317.00

ELEVATION DATA: UPSTREAM (FEET) = 699.00 DOWNSTREAM (FEET) = 610.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.111

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.108

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER

"OPEN BRUSH" B 1.50 0.30 1.000 66 9.11

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 5.14

TOTAL AREA (ACRES) = 1.50 PEAK FLOW RATE (CFS) = 5.14

\*\*\*\*\*

FLOW PROCESS FROM NODE 131.00 TO NODE 132.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 610.00 DOWNSTREAM (FEET) = 575.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 206.00 CHANNEL SLOPE = 0.1699

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.911

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 2.80 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.69

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.11

AVERAGE FLOW DEPTH (FEET) = 0.67 TRAVEL TIME (MIN.) = 0.48

Tc (MIN.) = 9.59

SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 9.10

EFFECTIVE AREA (ACRES) = 4.30 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 4.3 PEAK FLOW RATE (CFS) = 13.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.77 FLOW VELOCITY (FEET/SEC.) = 7.79

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 132.00 = 523.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 132.00 TO NODE 133.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 575.00 DOWNSTREAM (FEET) = 548.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.1350

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.741

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

NATURAL FAIR COVER

"OPEN BRUSH" B 3.30 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 19.08

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.77

AVERAGE FLOW DEPTH (FEET) = 0.91 TRAVEL TIME (MIN.) = 0.43

Tc (MIN.) = 10.02

SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 10.22

EFFECTIVE AREA (ACRES) = 7.60 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 7.6 PEAK FLOW RATE (CFS) = 23.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.98 FLOW VELOCITY (FEET/SEC.) = 8.18

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 133.00 = 723.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 133.00 TO NODE 134.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 548.00 DOWNSTREAM (FEET) = 524.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 318.00 CHANNEL SLOPE = 0.0755

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.610  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	2.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 26.96  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.81  
 AVERAGE FLOW DEPTH (FEET) = 1.15 TRAVEL TIME (MIN.) = 0.78  
 Tc (MIN.) = 10.80  
 SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 6.85  
 EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 29.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.19 FLOW VELOCITY (FEET/SEC.) = 6.97  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 134.00 = 1041.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 134.00 TO NODE 135.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	3.70	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 34.95  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.95  
 AVERAGE FLOW DEPTH (FEET) = 1.21 TRAVEL TIME (MIN.) = 0.20  
 Tc (MIN.) = 11.00  
 SUBAREA AREA (ACRES) = 3.70 SUBAREA RUNOFF (CFS) = 10.91  
 EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 40.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.28 FLOW VELOCITY (FEET/SEC.) = 8.20  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 135.00 = 1135.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 135.00 TO NODE 136.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	8.30	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 52.00  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.25  
 AVERAGE FLOW DEPTH (FEET) = 1.67 TRAVEL TIME (MIN.) = 0.55  
 Tc (MIN.) = 11.55  
 SUBAREA AREA (ACRES) = 8.30 SUBAREA RUNOFF (CFS) = 23.79  
 EFFECTIVE AREA (ACRES) = 21.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 21.9 PEAK FLOW RATE (CFS) = 62.76

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 1.79 FLOW VELOCITY (FEET/SEC.) = 6.54  
 LONGEST FLOWPATH FROM NODE 130.00 TO NODE 136.00 = 1342.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 136.00 TO NODE 137.00 IS CODE = 51

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	0.60	0.30	1.000	66
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
NATURAL FAIR COVER "OPEN BRUSH"	B	13.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 81.90  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.52  
 AVERAGE FLOW DEPTH (FEET) = 2.22 TRAVEL TIME (MIN.) = 1.02  
 Tc (MIN.) = 12.57  
 SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 38.28  
 EFFECTIVE AREA (ACRES) = 36.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 36.0 PEAK FLOW RATE (CFS) = 97.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.37 FLOW VELOCITY(FEET/SEC.) = 5.80  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 137.00 = 1680.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 137.00 TO NODE 124.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 496.00  
FLOW LENGTH(FEET) = 726.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.17  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 97.66  
PIPE TRAVEL TIME(MIN.) = 1.32 Tc(MIN.) = 13.89  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 13.89  
RAINFALL INTENSITY(INCH/HR) = 3.09  
AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA(ACRES) = 36.00  
TOTAL STREAM AREA(ACRES) = 36.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 97.66

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	117.21	9.98	3.755	0.30( 0.10)	0.32	35.6	100.00
2	97.66	13.89	3.091	0.30( 0.30)	1.00	36.0	130.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	204.03	9.98	3.755	0.30( 0.18)	0.61	61.5	100.00
2	193.58	13.89	3.091	0.30( 0.20)	0.66	71.6	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 204.03 Tc(MIN.) = 9.98  
EFFECTIVE AREA(ACRES) = 61.45 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 71.6  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 124.00 = 2406.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 444.00  
FLOW LENGTH(FEET) = 888.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.10  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 204.03  
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 10.52  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 125.00 = 3294.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.52  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.657  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCs SOIL AREA Fp Ap SCs  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
RESIDENTIAL  
"8-10 DWELLINGS/ACRE" B 7.50 0.30 0.400 56  
NATURAL FAIR COVER  
"OPEN BRUSH" B 0.10 0.30 1.000 66  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.407  
SUBAREA AREA(ACRES) = 8.60 SUBAREA RUNOFF(CFS) = 27.36  
EFFECTIVE AREA(ACRES) = 70.05 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA(ACRES) = 80.2 PEAK FLOW RATE(CFS) = 219.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 444.00 DOWNSTREAM(FEET) = 438.00  
FLOW LENGTH(FEET) = 660.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 60.0 INCH PIPE IS 45.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.63  
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 219.59  
PIPE TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 11.33  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.33

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.522  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 4.30 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56  
 COMMERCIAL B 0.90 0.30 0.100 56  
 CONDOMINIUMS B 0.60 0.30 0.350 56  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 0.40 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 7.10 SUBAREA RUNOFF (CFS) = 22.07  
 EFFECTIVE AREA (ACRES) = 77.15 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 87.3 PEAK FLOW RATE (CFS) = 233.10

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 -----

MAINLINE Tc (MIN.) = 11.33  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.522  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.10 0.30 0.100 56  
 CONDOMINIUMS B 0.10 0.30 0.350 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.225  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.62  
 EFFECTIVE AREA (ACRES) = 77.35 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
 TOTAL AREA (ACRES) = 87.5 PEAK FLOW RATE (CFS) = 233.72

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 -----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 11.33  
 RAINFALL INTENSITY (INCH/HR) = 3.52  
 AREA-AVERAGED Fm (INCH/HR) = 0.16  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.55  
 EFFECTIVE STREAM AREA (ACRES) = 77.35  
 TOTAL STREAM AREA (ACRES) = 87.50  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 233.72

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 110.00 TO NODE 111.00 IS CODE = 21  
 -----

-----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 -----

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
 ELEVATION DATA: UPSTREAM (FEET) = 557.00 DOWNSTREAM (FEET) = 546.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.105  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 5.334  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 COMMERCIAL B 0.50 0.30 0.100 56 6.11  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 2.39  
 TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 2.39

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 111.00 TO NODE 112.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 -----

UPSTREAM ELEVATION (FEET) = 546.00 DOWNSTREAM ELEVATION (FEET) = 488.00  
 STREET LENGTH (FEET) = 671.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 13.23  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.34  
 HALfstREET FLOOD WIDTH (FEET) = 9.72  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.38  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.14  
 STREET FLOW TRAVEL TIME (MIN.) = 1.75 Tc (MIN.) = 7.86  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.619

SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 APARTMENTS B 0.50 0.30 0.200 56  
 COMMERCIAL B 0.90 0.30 0.100 56  
 CONDOMINIUMS B 3.90 0.30 0.350 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293  
 SUBAREA AREA (ACRES) = 5.30 SUBAREA RUNOFF (CFS) = 21.61  
 EFFECTIVE AREA (ACRES) = 5.80 AREA-AVERAGED Fm (INCH/HR) = 0.08  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
 TOTAL AREA (ACRES) = 5.8 PEAK FLOW RATE (CFS) = 23.68

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 12.70  
 FLOW VELOCITY(FEET/SEC.) = 7.25 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.82  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 1001.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 112.00 IS CODE = 81

-----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 7.86  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.619  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	14.60	0.30	0.200	56
COMMERCIAL	B	1.10	0.30	0.100	56
CONDOMINIUMS	B	4.30	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.227  
 SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 81.91  
 EFFECTIVE AREA(ACRES) = 25.80 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 25.8 PEAK FLOW RATE(CFS) = 105.59

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

-----  
 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 488.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
 STREET LENGTH(FEET) = 371.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 132.19  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.63  
 HALFSTREET FLOOD WIDTH(FEET) = 26.29  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.38  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.56  
 STREET FLOW TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 8.45  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.376

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.50	0.30	0.200	56

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 10.00 0.30 0.200 56  
 APARTMENTS B 1.70 0.30 0.200 56  
 COMMERCIAL B 0.50 0.30 0.100 56  
 CONDOMINIUMS B 1.00 0.30 0.350 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.207  
 SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 53.19  
 EFFECTIVE AREA(ACRES) = 39.50 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA(ACRES) = 39.5 PEAK FLOW RATE(CFS) = 153.13

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 27.85  
 FLOW VELOCITY(FEET/SEC.) = 10.75 DEPTH\*VELOCITY(FT\*FT/SEC.) = 7.10  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1372.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 113.00 TO NODE 126.00 IS CODE = 31

-----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 438.00  
 FLOW LENGTH(FEET) = 500.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.8 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.50  
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 153.13  
 PIPE TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 8.82  
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 126.00 = 1872.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 1

-----  
 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 8.82  
 RAINFALL INTENSITY(INCH/HR) = 4.22  
 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.23  
 EFFECTIVE STREAM AREA(ACRES) = 39.50  
 TOTAL STREAM AREA(ACRES) = 39.50  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 153.13

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	233.72	11.33	3.522	0.30( 0.16)	0.55	77.4	100.00
1	212.36	15.27	2.877	0.30( 0.18)	0.60	87.5	130.00
2	153.13	8.82	4.225	0.30( 0.07)	0.23	39.5	110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	373.32	8.82	4.225	0.30 ( 0.13)	0.42	99.8	110.00
2	360.95	11.33	3.522	0.30 ( 0.13)	0.44	116.9	100.00
3	315.83	15.27	2.877	0.30 ( 0.15)	0.48	127.0	130.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 373.32 Tc(MIN.) = 8.82  
EFFECTIVE AREA(ACRES) = 99.75 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 127.0  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 126.00 = 3954.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 438.00 DOWNSTREAM(FEET) = 435.00  
FLOW LENGTH(FEET) = 296.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.24  
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 373.32  
PIPE TRAVEL TIME(MIN.) = 0.30 Tc(MIN.) = 9.13  
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.13

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.101

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	5.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.366

SUBAREA AREA(ACRES) = 7.80 SUBAREA RUNOFF(CFS) = 28.02

EFFECTIVE AREA(ACRES) = 107.55 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 134.8 PEAK FLOW RATE(CFS) = 384.84

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.13

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.101

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.10	0.30	0.400	56
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	1.50	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.519

SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 17.40

EFFECTIVE AREA(ACRES) = 112.45 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 139.7 PEAK FLOW RATE(CFS) = 402.23

\*\*\*\*\*

FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	402.23	9.13	4.101	0.30 ( 0.13)	0.42	112.5	110.00
2	389.18	11.64	3.469	0.30 ( 0.13)	0.44	129.6	100.00
3	339.56	15.59	2.844	0.30 ( 0.14)	0.48	139.7	130.00

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	208.10	12.78	3.277	0.30 ( 0.09)	0.29	71.2	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 127.00 = 3535.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	589.23	9.13	4.101	0.30 ( 0.11)	0.38	163.3	110.00
2	590.10	11.64	3.469	0.30 ( 0.12)	0.39	194.4	100.00
3	582.95	12.78	3.277	0.30 ( 0.12)	0.39	203.7	100.00
4	519.41	15.59	2.844	0.30 ( 0.12)	0.42	210.9	130.00

TOTAL AREA(ACRES) = 210.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 590.10 Tc(MIN.) = 11.640

EFFECTIVE AREA(ACRES) = 194.39 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39

TOTAL AREA(ACRES) = 210.9

LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.00 = 4250.00 FEET.

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FLOW PROCESS FROM NODE 127.00 TO NODE 127.10 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 500.20 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 47.69
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 590.10
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 11.81
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.10 = 4750.20 FEET.

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FLOW PROCESS FROM NODE 127.10 TO NODE 127.20 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 353.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 595.30 CHANNEL SLOPE = 0.0218
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.243
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         3.50   0.30  0.100  56
COMMERCIAL          B         0.10   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 595.31
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.50
AVERAGE FLOW DEPTH(FEET) = 1.33 TRAVEL TIME(MIN.) = 1.17
Tc(MIN.) = 12.98
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 10.41
EFFECTIVE AREA(ACRES) = 197.99 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 214.5 PEAK FLOW RATE(CFS) = 590.10
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.32 FLOW VELOCITY(FEET/SEC.) = 8.47
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.20 = 5345.50 FEET.

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FLOW PROCESS FROM NODE 127.20 TO NODE 127.30 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 340.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 476.00 CHANNEL SLOPE = 0.0273
CHANNEL BASE(FEET) = 50.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.097
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS

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LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         3.10   0.30  0.100  56
COMMERCIAL          B         0.10   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 594.52
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.13
AVERAGE FLOW DEPTH(FEET) = 1.24 TRAVEL TIME(MIN.) = 0.87
Tc(MIN.) = 13.85
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 8.83
EFFECTIVE AREA(ACRES) = 201.19 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 217.7 PEAK FLOW RATE(CFS) = 590.10
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.24 FLOW VELOCITY(FEET/SEC.) = 9.08
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 127.30 = 5821.50 FEET.

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FLOW PROCESS FROM NODE 127.30 TO NODE 13569.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 338.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 506.00 CHANNEL SLOPE = 0.0040
CHANNEL BASE(FEET) = 150.00 "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 1.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.768
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         2.80   0.30  0.100  56
COMMERCIAL          B         0.60   0.30  0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 594.29
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.38
AVERAGE FLOW DEPTH(FEET) = 1.15 TRAVEL TIME(MIN.) = 2.50
Tc(MIN.) = 16.35
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 8.38
EFFECTIVE AREA(ACRES) = 204.59 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 221.1 PEAK FLOW RATE(CFS) = 590.10
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.15 FLOW VELOCITY(FEET/SEC.) = 3.37
LONGEST FLOWPATH FROM NODE 130.00 TO NODE 13569.00 = 6327.50 FEET.

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FLOW PROCESS FROM NODE 127.00 TO NODE 127.00 IS CODE = 12
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>>>>CLEAR MEMORY BANK # 1 <<<<
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END OF STUDY SUMMARY:

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TOTAL AREA (ACRES) = 221.1 TC (MIN.) = 16.35  
 EFFECTIVE AREA (ACRES) = 204.59 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.375  
 PEAK FLOW RATE (CFS) = 590.10

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	589.23	13.84	3.099	0.30 ( 0.11)	0.36	173.5	110.00
2	590.10	16.35	2.768	0.30 ( 0.11)	0.38	204.6	100.00
3	582.95	17.51	2.651	0.30 ( 0.11)	0.38	213.9	100.00
4	519.41	20.54	2.367	0.30 ( 0.12)	0.40	221.1	130.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2012 Advanced Engineering Software (aes)  
Ver. 18.2 Release Date: 05/08/2012 License ID 1264

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PLANNING AREA 2 (PA-2) \*  
\* RATIONAL METHOD HYDROLOGY MODEL (INCLUDING CCR PHASE 1B) \*  
\* 100-YR ULTIMATE EV DECEMBER 2013 MCHANDOO/TMULI \*  
\*\*\*\*\*

FILE NAME: 2P00EVBB.DAT  
TIME/DATE OF STUDY: 16:36 12/18/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.847
- 2) 10.00; 3.775
- 3) 15.00; 2.924
- 4) 20.00; 2.413
- 5) 25.00; 2.092
- 6) 30.00; 1.869
- 7) 40.00; 1.613
- 8) 50.00; 1.397
- 9) 60.00; 1.287
- 10) 90.00; 1.084
- 11) 120.00; 0.947
- 12) 180.00; 0.791
- 13) 360.00; 0.584
- 14) 1200.00; 0.255

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0313 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0313 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00  
ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 543.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.596  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.771  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP (ACRES)	Area (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.80	0.30	0.100	56	7.60

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 3.41  
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 3.41

\*\*\*\*\*  
FLOW PROCESS FROM NODE 201.00 TO NODE 202.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 2 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 543.00 DOWNSTREAM ELEVATION(FEET) = 523.00  
STREET LENGTH(FEET) = 502.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.56  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.71  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.18  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.31  
STREET FLOW TRAVEL TIME(MIN.) = 2.00 Tc(MIN.) = 9.60  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.942

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP (ACRES)	Area (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.20	0.30	0.200	56
COMMERCIAL	B	1.30	0.30	0.100	56

NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.261  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 6.26  
 EFFECTIVE AREA(ACRES) = 2.60 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 9.08

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 9.12  
 FLOW VELOCITY(FEET/SEC.) = 4.44 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.51  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 202.00 = 810.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 202.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.60  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.942  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 1.40 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 4.93  
 EFFECTIVE AREA(ACRES) = 4.00 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.17  
 TOTAL AREA(ACRES) = 4.0 PEAK FLOW RATE(CFS) = 14.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 202.00 TO NODE 203.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 2 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 523.00 DOWNSTREAM ELEVATION(FEET) = 468.00  
 STREET LENGTH(FEET) = 987.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 32.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 27.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.16  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.40  
 HALFSTREET FLOOD WIDTH(FEET) = 12.11  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.09  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.44  
 STREET FLOW TRAVEL TIME(MIN.) = 2.70 Tc(MIN.) = 12.30  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.384  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56  
 COMMERCIAL B 2.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.30 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.426  
 SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 12.31  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 24.30

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 13.16  
 FLOW VELOCITY(FEET/SEC.) = 6.32 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.66  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 203.00 = 1797.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 468.00 DOWNSTREAM ELEVATION(FEET) = 410.00  
 STREET LENGTH(FEET) = 977.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 28.34  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.43  
 HALFSTREET FLOOD WIDTH(FEET) = 14.88  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.52  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.79  
 STREET FLOW TRAVEL TIME(MIN.) = 2.50 Tc(MIN.) = 14.79  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.959  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.10 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 COMMERCIAL B 1.90 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.232  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 8.06  
EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28  
TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 29.23

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 15.04  
FLOW VELOCITY(FEET/SEC.) = 6.60 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.85  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 204.00 = 2774.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 204.00 TO NODE 204.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 14.79  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.959  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
NATURAL FAIR COVER  
"OPEN BRUSH" B 1.30 0.30 1.000 66  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 3.11  
EFFECTIVE AREA(ACRES) = 12.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 12.6 PEAK FLOW RATE(CFS) = 32.34

\*\*\*\*\*  
FLOW PROCESS FROM NODE 204.00 TO NODE 218.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

-----  
UPSTREAM ELEVATION(FEET) = 410.00 DOWNSTREAM ELEVATION(FEET) = 343.00  
STREET LENGTH(FEET) = 1228.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 36.84  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.46  
HALFSTREET FLOOD WIDTH(FEET) = 16.84  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.76  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.13  
STREET FLOW TRAVEL TIME(MIN.) = 3.03 Tc(MIN.) = 17.82  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.636

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
COMMERCIAL B 0.50 0.30 0.100 56  
NATURAL FAIR COVER  
"OPEN BRUSH" B 0.40 0.30 1.000 66  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.70 0.30 0.500 56  
COMMERCIAL B 1.50 0.30 0.100 56  
NATURAL FAIR COVER  
"OPEN BRUSH" B 0.80 0.30 1.000 66  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.450  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 9.00  
EFFECTIVE AREA(ACRES) = 16.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA(ACRES) = 16.6 PEAK FLOW RATE(CFS) = 37.67

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 16.99  
FLOW VELOCITY(FEET/SEC.) = 6.80 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.17  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 17.82  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.636  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 1.20 0.30 0.500 56  
COMMERCIAL B 0.10 0.30 0.100 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
COMMERCIAL B 0.10 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.450  
SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 3.60  
EFFECTIVE AREA(ACRES) = 18.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
TOTAL AREA(ACRES) = 18.2 PEAK FLOW RATE(CFS) = 41.28

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 17.82  
RAINFALL INTENSITY(INCH/HR) = 2.64  
AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.39  
 EFFECTIVE STREAM AREA (ACRES) = 18.20  
 TOTAL STREAM AREA (ACRES) = 18.20  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 41.28

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 268.00  
 ELEVATION DATA: UPSTREAM (FEET) = 514.00 DOWNSTREAM (FEET) = 511.50

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.724  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.718

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"5-7 DWELLINGS/ACRE"	B	2.30	0.30	0.500	56	9.27
APARTMENTS	B	0.40	0.30	0.200	56	7.72

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.456

SUBAREA RUNOFF (CFS) = 11.13

TOTAL AREA (ACRES) = 2.70 PEAK FLOW RATE (CFS) = 11.13

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION (FEET) = 511.50 DOWNSTREAM ELEVATION (FEET) = 503.00  
 STREET LENGTH (FEET) = 503.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.13  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.48  
 HALFSTREET FLOOD WIDTH (FEET) = 17.70  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.87  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.85  
 STREET FLOW TRAVEL TIME (MIN.) = 2.17 Tc (MIN.) = 9.89  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.820

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.20	0.30	0.500	56

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.20	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.475  
 SUBAREA AREA (ACRES) = 7.20 SUBAREA RUNOFF (CFS) = 23.83  
 EFFECTIVE AREA (ACRES) = 9.90 AREA-AVERAGED Fm (INCH/HR) = 0.14  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47  
 TOTAL AREA (ACRES) = 9.9 PEAK FLOW RATE (CFS) = 32.78

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.53 HALFSTREET FLOOD WIDTH (FEET) = 20.35  
 FLOW VELOCITY (FEET/SEC.) = 4.21 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.21  
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 771.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.89

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.820

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
CONDOMINIUMS	B	0.10	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.281

SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 4.37

EFFECTIVE AREA (ACRES) = 11.20 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45

TOTAL AREA (ACRES) = 11.2 PEAK FLOW RATE (CFS) = 37.15

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION (FEET) = 503.00 DOWNSTREAM ELEVATION (FEET) = 476.00  
 STREET LENGTH (FEET) = 423.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 39.04  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.46  
HALFSTREET FLOOD WIDTH(FEET) = 16.68  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.29  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.36  
STREET FLOW TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 10.86  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.629

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 1.00 0.30 0.500 56  
COMMERCIAL B 0.10 0.30 0.100 56  
CONDOMINIUMS B 0.10 0.30 0.350 56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.454  
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 3.77  
EFFECTIVE AREA(ACRES) = 12.40 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 12.4 PEAK FLOW RATE(CFS) = 39.00

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.68  
FLOW VELOCITY(FEET/SEC.) = 7.28 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.35  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1194.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 10.86  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.629  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.50 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
COMMERCIAL B 0.30 0.30 0.100 56  
CONDOMINIUMS B 3.30 0.30 0.350 56  
RESIDENTIAL  
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.332  
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 15.56  
EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.12  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 54.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 10.86  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.629  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 3.40 0.30 0.100 56  
CONDOMINIUMS B 8.10 0.30 0.350 56  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.276  
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 36.70  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 91.26

\*\*\*\*\*  
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 62  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 476.00 DOWNSTREAM ELEVATION(FEET) = 460.00  
STREET LENGTH(FEET) = 789.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 91.26  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.69  
HALFSTREET FLOOD WIDTH(FEET) = 30.33  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.78  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.97  
STREET FLOW TRAVEL TIME(MIN.) = 2.27 Tc(MIN.) = 13.13  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.242  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 28.80 AREA-AVERAGED Fm(INCH/HR) = 0.11  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36  
TOTAL AREA(ACRES) = 28.8 PEAK FLOW RATE(CFS) = 91.26  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.69 HALFSTREET FLOOD WIDTH(FEET) = 30.33  
FLOW VELOCITY(FEET/SEC.) = 5.78 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.97  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 1983.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.13  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.242  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	8.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.40	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 40.07  
 EFFECTIVE AREA(ACRES) = 43.20 AREA-AVERAGED Fm(INCH/HR) = 0.12  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
 TOTAL AREA(ACRES) = 43.2 PEAK FLOW RATE(CFS) = 121.30

\*\*\*\*\*  
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 460.00 DOWNSTREAM ELEVATION(FEET) = 419.00  
STREET LENGTH(FEET) = 529.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 126.61  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.62  
 HALFSTREET FLOOD WIDTH(FEET) = 25.74  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 10.36  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 6.45  
 STREET FLOW TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 13.98  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.097  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 10.61  
 EFFECTIVE AREA(ACRES) = 47.20 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41  
TOTAL AREA(ACRES) = 47.2 PEAK FLOW RATE(CFS) = 126.28

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 25.66  
FLOW VELOCITY(FEET/SEC.) = 10.39 DEPTH\*VELOCITY(FT\*FT/SEC.) = 6.45  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 2512.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.98  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.097  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.80	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.70	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 14.85  
 EFFECTIVE AREA(ACRES) = 52.80 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42  
 TOTAL AREA(ACRES) = 52.8 PEAK FLOW RATE(CFS) = 141.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.98  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.097  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.90	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.50	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 19.89  
 EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 161.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 215.00 TO NODE 216.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 419.00 DOWNSTREAM ELEVATION(FEET) = 405.00  
STREET LENGTH(FEET) = 174.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 161.02  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.66  
HALFSTREET FLOOD WIDTH(FEET) = 28.01  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 11.18  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 7.41  
STREET FLOW TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 14.24  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.053  
SUBAREA AREA(ACRES) = 0.00 SUBAREA RUNOFF(CFS) = 0.00  
EFFECTIVE AREA(ACRES) = 60.30 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 60.3 PEAK FLOW RATE(CFS) = 161.02  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.66 HALFSTREET FLOOD WIDTH(FEET) = 28.01  
FLOW VELOCITY(FEET/SEC.) = 11.18 DEPTH\*VELOCITY(FT\*FT/SEC.) = 7.41  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 216.00 = 2686.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 216.00 TO NODE 217.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 372.00  
FLOW LENGTH(FEET) = 395.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.20  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 161.02  
PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 14.47  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 217.00 = 3081.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.47  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.014  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.00	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500					
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 5.67					
EFFECTIVE AREA(ACRES) = 62.50 AREA-AVERAGED Fm(INCH/HR) = 0.13					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44					
TOTAL AREA(ACRES) = 62.5 PEAK FLOW RATE(CFS) = 162.22					

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 217.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.47  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.014  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 3.50 0.30 0.500 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 6.90 0.30 0.500 56  
RESIDENTIAL  
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 10.60 SUBAREA RUNOFF(CFS) = 27.33  
EFFECTIVE AREA(ACRES) = 73.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 73.1 PEAK FLOW RATE(CFS) = 189.54

\*\*\*\*\*  
FLOW PROCESS FROM NODE 217.00 TO NODE 218.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 343.00  
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.57  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 189.54  
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 14.88  
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 3688.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.88



\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.944  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.40 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.443  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.77  
 EFFECTIVE AREA (ACRES) = 73.80 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 73.8 PEAK FLOW RATE (CFS) = 189.54  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<  
 -----

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 14.88  
 RAINFALL INTENSITY (INCH/HR) = 2.94  
 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.44  
 EFFECTIVE STREAM AREA (ACRES) = 73.80  
 TOTAL STREAM AREA (ACRES) = 73.80  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 189.54

\*\* CONFLUENCE DATA \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	41.28	17.82	2.636	0.30 ( 0.12)	0.39	18.2	200.00
2	189.54	14.88	2.944	0.30 ( 0.13)	0.44	73.8	210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	228.23	14.88	2.944	0.30 ( 0.13)	0.43	89.0	210.00
2	210.00	17.82	2.636	0.30 ( 0.13)	0.43	92.0	200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 228.23 Tc (MIN.) = 14.88  
 EFFECTIVE AREA (ACRES) = 89.00 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
 TOTAL AREA (ACRES) = 92.0  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 218.00 = 4002.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 343.00 DOWNSTREAM (FEET) = 326.50  
 FLOW LENGTH (FEET) = 734.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 39.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 19.26  
 ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 228.23  
 PIPE TRAVEL TIME (MIN.) = 0.64 Tc (MIN.) = 15.52  
 LONGEST FLOWPATH FROM NODE 200.00 TO NODE 219.00 = 4736.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----

MAINLINE Tc (MIN.) = 15.52  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.871  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56  
 COMMERCIAL  
 B 0.60 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.70 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.30 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.90 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 7.06  
 EFFECTIVE AREA (ACRES) = 91.90 AREA-AVERAGED Fm (INCH/HR) = 0.13  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
 TOTAL AREA (ACRES) = 94.9 PEAK FLOW RATE (CFS) = 228.23  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----

MAINLINE Tc (MIN.) = 15.52  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.871  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL  
 B 0.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 1.49  
 EFFECTIVE AREA (ACRES) = 92.50 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA (ACRES) = 95.5 PEAK FLOW RATE (CFS) = 228.23  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 219.00 TO NODE 220.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 326.50 DOWNSTREAM(FEET) = 325.00  
FLOW LENGTH(FEET) = 161.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 60.0 INCH PIPE IS 47.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.83  
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 228.23  
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 15.71  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 220.00 = 4897.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 220.00 TO NODE 220.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.71  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.852  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.90	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.60	0.30	0.400	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	18.40	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	4.30	0.30	0.400	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.50	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	6.90	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.462  
SUBAREA AREA(ACRES) = 38.60 SUBAREA RUNOFF(CFS) = 94.25  
EFFECTIVE AREA(ACRES) = 131.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 134.1 PEAK FLOW RATE(CFS) = 320.69

\*\*\*\*\*  
FLOW PROCESS FROM NODE 220.00 TO NODE 245.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 315.00  
FLOW LENGTH(FEET) = 1019.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 69.0 INCH PIPE IS 51.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.49

ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 320.69  
PIPE TRAVEL TIME(MIN.) = 1.10 Tc(MIN.) = 16.81  
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.81  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.739  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.30	0.30	1.000	66
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.40	0.30	0.100	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.00	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.379  
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 6.85  
EFFECTIVE AREA(ACRES) = 134.00 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 137.0 PEAK FLOW RATE(CFS) = 320.69  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.81  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.739  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.90	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.264  
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 2.63  
EFFECTIVE AREA(ACRES) = 135.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44  
TOTAL AREA(ACRES) = 138.1 PEAK FLOW RATE(CFS) = 320.69  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN.) = 16.81
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.739
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"    B        1.10     0.30     0.500     56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"   B        0.30     0.30     0.400     56
COMMERCIAL               B        0.10     0.30     0.100     56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"    B        0.30     0.30     0.500     56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"   B        1.40     0.30     0.400     56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.434
SUBAREA AREA(ACRES) = 3.20      SUBAREA RUNOFF(CFS) = 7.51
EFFECTIVE AREA(ACRES) = 138.30  AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 141.3      PEAK FLOW RATE(CFS) = 324.47

*****
FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<
=====
*****
FLOW PROCESS FROM NODE 220.50 TO NODE 221.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 251.00
ELEVATION DATA: UPSTREAM(FEET) = 551.00  DOWNSTREAM(FEET) = 547.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.785
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.864
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS  Tc
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE"      B        3.10     0.30     0.800     56   9.79
RESIDENTIAL
"1 DWELLING/ACRE"      B        3.10     0.30     0.800     56   9.79
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800
SUBAREA RUNOFF(CFS) = 20.22
TOTAL AREA(ACRES) = 6.20      PEAK FLOW RATE(CFS) = 20.22

*****
FLOW PROCESS FROM NODE 221.00 TO NODE 222.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 547.00  DOWNSTREAM(FEET) = 542.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 386.00  CHANNEL SLOPE = 0.0130
CHANNEL BASE(FEET) = 10.00  "Z" FACTOR = 2.000
MANNING'S FACTOR = 0.015  MAXIMUM DEPTH(FEET) = 5.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.630
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"   B        0.60     0.30     0.200     56
APARTMENTS              B        0.10     0.30     0.200     56
COMMERCIAL              B        3.70     0.30     0.100     56
PUBLIC PARK             B        0.30     0.30     0.850     56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.163
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 27.79
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.04
AVERAGE FLOW DEPTH(FEET) = 0.42  TRAVEL TIME(MIN.) = 1.07
Tc(MIN.) = 10.85
SUBAREA AREA(ACRES) = 4.70      SUBAREA RUNOFF(CFS) = 15.15
EFFECTIVE AREA(ACRES) = 10.90  AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 10.9      PEAK FLOW RATE(CFS) = 34.07

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.48  FLOW VELOCITY(FEET/SEC.) = 6.42
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 222.00 = 637.00 FEET.

*****
FLOW PROCESS FROM NODE 222.00 TO NODE 223.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 542.00  DOWNSTREAM ELEVATION(FEET) = 531.00
STREET LENGTH(FEET) = 1146.00  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 56.11
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.66
HALFSTREET FLOOD WIDTH(FEET) = 28.09
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.88
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.57
STREET FLOW TRAVEL TIME(MIN.) = 4.93  Tc(MIN.) = 15.78
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.844
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN

```

RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 11.50 0.30 0.200 56  
 APARTMENTS B 2.90 0.30 0.200 56  
 COMMERCIAL B 0.70 0.30 0.100 56  
 PUBLIC PARK B 2.60 0.30 0.850 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.292  
 SUBAREA AREA(ACRES) = 17.70 SUBAREA RUNOFF(CFS) = 43.92  
 EFFECTIVE AREA(ACRES) = 28.60 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 28.6 PEAK FLOW RATE(CFS) = 70.28

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.71 HALFSTREET FLOOD WIDTH(FEET) = 32.04  
 FLOW VELOCITY(FEET/SEC.) = 4.11 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.91  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 223.00 = 1783.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 223.00 TO NODE 224.00 IS CODE = 62  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 531.00 DOWNSTREAM ELEVATION(FEET) = 520.00  
 STREET LENGTH(FEET) = 702.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 84.09  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.70  
 HALFSTREET FLOOD WIDTH(FEET) = 31.36  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.13  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.57  
 STREET FLOW TRAVEL TIME(MIN.) = 2.28 Tc(MIN.) = 18.06  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.611

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.40	0.30	0.200	56
COMMERCIAL	B	3.70	0.30	0.100	56
CONDOMINIUMS	B	0.70	0.30	0.350	56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175					
SUBAREA AREA(ACRES) = 12.00 SUBAREA RUNOFF(CFS) = 27.64					
EFFECTIVE AREA(ACRES) = 40.60 AREA-AVERAGED Fm(INCH/HR) = 0.10					

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32  
 TOTAL AREA(ACRES) = 40.6 PEAK FLOW RATE(CFS) = 91.92

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.71 HALFSTREET FLOOD WIDTH(FEET) = 32.22  
 FLOW VELOCITY(FEET/SEC.) = 5.30 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.77  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 224.00 = 2485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 224.00 TO NODE 225.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 463.00  
 FLOW LENGTH(FEET) = 1760.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.93  
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 91.92  
 PIPE TRAVEL TIME(MIN.) = 1.64 Tc(MIN.) = 19.69  
 LONGEST FLOWPATH FROM NODE 220.50 TO NODE 225.00 = 4245.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 19.69  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.444  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.20	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	0.30	0.30	0.350	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.80	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
CONDOMINIUMS	B	2.00	0.30	0.350	56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.235					
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 24.57					
EFFECTIVE AREA(ACRES) = 52.10 AREA-AVERAGED Fm(INCH/HR) = 0.09					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30					
TOTAL AREA(ACRES) = 52.1 PEAK FLOW RATE(CFS) = 110.37					

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 225.00 TO NODE 225.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 19.69  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.444  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.40	0.30	0.500	56
CONDOMINIUMS	B	0.90	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	5.20	0.30	0.500	56
CONDOMINIUMS	B	0.80	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.481  
SUBAREA AREA (ACRES) = 13.30 SUBAREA RUNOFF (CFS) = 27.53  
EFFECTIVE AREA (ACRES) = 65.40 AREA-AVERAGED Fm (INCH/HR) = 0.10  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34  
TOTAL AREA (ACRES) = 65.4 PEAK FLOW RATE (CFS) = 137.90

\*\*\*\*\*  
FLOW PROCESS FROM NODE 225.00 TO NODE 226.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 463.00 DOWNSTREAM(FEET) = 425.00  
FLOW LENGTH(FEET) = 639.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.68  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 137.90  
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 20.13  
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 226.00 = 4884.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 226.00 TO NODE 226.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 20.13  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.405  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.90	0.30	0.500	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.30	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.00	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
SUBAREA AREA (ACRES) = 18.10 SUBAREA RUNOFF (CFS) = 37.48  
EFFECTIVE AREA (ACRES) = 83.50 AREA-AVERAGED Fm (INCH/HR) = 0.10  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34  
TOTAL AREA (ACRES) = 83.5 PEAK FLOW RATE (CFS) = 173.07

\*\*\*\*\*  
FLOW PROCESS FROM NODE 226.00 TO NODE 243.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 425.00 DOWNSTREAM(FEET) = 394.00  
FLOW LENGTH(FEET) = 653.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.18  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 173.07  
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 20.58  
LONGEST FLOWPATH FROM NODE 220.50 TO NODE 243.00 = 5537.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 20.58  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.376  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.90	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.60	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
SUBAREA AREA (ACRES) = 4.50 SUBAREA RUNOFF (CFS) = 9.25  
EFFECTIVE AREA (ACRES) = 88.00 AREA-AVERAGED Fm (INCH/HR) = 0.10  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34  
TOTAL AREA (ACRES) = 88.0 PEAK FLOW RATE (CFS) = 180.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 20.58  
RAINFALL INTENSITY(INCH/HR) = 2.38  
AREA-AVERAGED Fm (INCH/HR) = 0.10  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.34  
EFFECTIVE STREAM AREA (ACRES) = 88.00  
TOTAL STREAM AREA (ACRES) = 88.00  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 180.15

\*\*\*\*\*  
FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 547.50

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.751  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.293  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
APARTMENTS	B	0.60	0.30	0.200	56	8.75

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA RUNOFF(CFS) = 2.29  
 TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 2.29

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 231.00 TO NODE 232.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 547.50 DOWNSTREAM(FEET) = 541.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 802.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 3.00  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.566  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.20	0.30	0.200	56
COMMERCIAL	B	5.90	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.103  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.04  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.40  
 AVERAGE FLOW DEPTH(FEET) = 1.06 TRAVEL TIME(MIN.) = 2.48  
 Tc(MIN.) = 11.23  
 SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 19.41  
 EFFECTIVE AREA(ACRES) = 6.70 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 6.7 PEAK FLOW RATE(CFS) = 21.30

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.31 FLOW VELOCITY(FEET/SEC.) = 6.23  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 232.00 = 1132.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 232.00 TO NODE 233.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 541.00 DOWNSTREAM(FEET) = 533.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 849.00 CHANNEL SLOPE = 0.0094  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 2.000  
 MANNING'S FACTOR = 0.015 MAXIMUM DEPTH(FEET) = 5.00  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	14.90	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.98  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.87  
 AVERAGE FLOW DEPTH(FEET) = 1.65 TRAVEL TIME(MIN.) = 1.80  
 Tc(MIN.) = 13.02  
 SUBAREA AREA(ACRES) = 14.90 SUBAREA RUNOFF(CFS) = 43.32  
 EFFECTIVE AREA(ACRES) = 21.60 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
 TOTAL AREA(ACRES) = 21.6 PEAK FLOW RATE(CFS) = 62.77

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 1.90 FLOW VELOCITY(FEET/SEC.) = 8.65  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 233.00 = 1981.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 13.02  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.10	0.30	0.400	56
APARTMENTS	B	0.20	0.30	0.200	56
COMMERCIAL	B	1.80	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124  
 SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 6.09  
 EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 68.86

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 233.00 TO NODE 233.00 IS CODE = 81  
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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MAINLINE Tc(MIN.) = 13.02  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.10	0.30	0.400	56
COMMERCIAL	B	1.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.117  
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.22  
 EFFECTIVE AREA(ACRES) = 25.50 AREA-AVERAGED Fm(INCH/HR) = 0.03  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.11  
 TOTAL AREA(ACRES) = 25.5 PEAK FLOW RATE(CFS) = 74.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 233.00 TO NODE 234.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 537.00 DOWNSTREAM(FEET) = 510.00
FLOW LENGTH(FEET) = 513.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.33
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 74.09
PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 13.45
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 234.00 = 2494.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.45
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.189
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 9.40 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 25.96
EFFECTIVE AREA(ACRES) = 34.90 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.19
TOTAL AREA(ACRES) = 34.9 PEAK FLOW RATE(CFS) = 98.41

\*\*\*\*\*
FLOW PROCESS FROM NODE 234.00 TO NODE 234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.45
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.189
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.70 0.30 0.200 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 2.50 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 8.88
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 107.28

\*\*\*\*\*
FLOW PROCESS FROM NODE 234.00 TO NODE 235.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 478.00
FLOW LENGTH(FEET) = 474.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.51
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 107.28
PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 13.77
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 235.00 = 2968.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 235.00 TO NODE 235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.77
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.134
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.70 0.30 0.200 -
USER-DEFINED - 1.60 0.30 0.400 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.297
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 9.04
EFFECTIVE AREA(ACRES) = 41.40 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21
TOTAL AREA(ACRES) = 41.4 PEAK FLOW RATE(CFS) = 114.44

\*\*\*\*\*
FLOW PROCESS FROM NODE 235.00 TO NODE 236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 478.00 DOWNSTREAM(FEET) = 471.00
FLOW LENGTH(FEET) = 473.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.76
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 114.44
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 14.34
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 236.00 = 3441.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.34
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.036
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.40 0.30 0.200 56
RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 7.10 0.30 0.400 56  
 APARTMENTS B 2.70 0.30 0.200 56  
 COMMERCIAL B 1.10 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.307  
 SUBAREA AREA (ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 32.59  
 EFFECTIVE AREA(ACRES) = 53.70 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23  
 TOTAL AREA(ACRES) = 53.7 PEAK FLOW RATE(CFS) = 143.40

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.34  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.036  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.90 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 5.40 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.00 0.30 0.400 56  
 COMMERCIAL B 0.60 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.378  
 SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 26.04  
 EFFECTIVE AREA(ACRES) = 63.60 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 63.6 PEAK FLOW RATE(CFS) = 169.45

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 236.00 TO NODE 237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 471.00 DOWNSTREAM(FEET) = 468.00  
 FLOW LENGTH(FEET) = 283.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.4 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.63  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 169.45  
 PIPE TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 14.69  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 237.00 = 3724.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.69  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.977  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 6.10 0.30 0.200 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.60 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.218  
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 17.56  
 EFFECTIVE AREA(ACRES) = 70.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 70.3 PEAK FLOW RATE(CFS) = 183.63

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 237.00 TO NODE 238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 468.00 DOWNSTREAM(FEET) = 461.00  
 FLOW LENGTH(FEET) = 698.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.39  
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 183.63  
 PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 15.56  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 238.00 = 4422.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.56  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.867  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 8.40 0.30 0.200 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.60 0.30 0.500 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.220  
 SUBAREA AREA(ACRES) = 9.00 SUBAREA RUNOFF(CFS) = 22.69  
 EFFECTIVE AREA(ACRES) = 79.30 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA(ACRES) = 79.3 PEAK FLOW RATE(CFS) = 199.36

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.56  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.867  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN



RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 2.10 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 5.31  
 EFFECTIVE AREA(ACRES) = 81.40 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25  
 TOTAL AREA (ACRES) = 81.4 PEAK FLOW RATE (CFS) = 204.66

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 238.00 TO NODE 239.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 461.00 DOWNSTREAM(FEET) = 440.00  
 FLOW LENGTH(FEET) = 582.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.6 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.43  
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 204.66  
 PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 15.99  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 239.00 = 5004.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 239.00 TO NODE 239.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.99  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.823  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 5.00 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 12.43  
 EFFECTIVE AREA(ACRES) = 86.40 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 86.4 PEAK FLOW RATE (CFS) = 213.86

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 239.00 TO NODE 240.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 440.00 DOWNSTREAM(FEET) = 418.00  
 FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.41  
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 213.86  
 PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 16.47  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 240.00 = 5654.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.47  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.774  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 5.30 0.30 0.200 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
 SUBAREA AREA (ACRES) = 5.30 SUBAREA RUNOFF(CFS) = 12.94  
 EFFECTIVE AREA(ACRES) = 91.70 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 222.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.47  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.774  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 1.20 0.30 0.200 56  
 COMMERCIAL B 0.20 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.186  
 SUBAREA AREA (ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 3.42  
 EFFECTIVE AREA(ACRES) = 93.10 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 93.1 PEAK FLOW RATE (CFS) = 226.39

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 240.00 TO NODE 240.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.47  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.774  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "11+ DWELLINGS/ACRE" B 1.20 0.30 0.200 56  
 SCHOOL B 0.70 0.30 0.600 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347  
 SUBAREA AREA (ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 4.56  
 EFFECTIVE AREA(ACRES) = 95.00 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA (ACRES) = 95.0 PEAK FLOW RATE (CFS) = 230.95

\*\*\*\*\*

FLOW PROCESS FROM NODE 240.00 TO NODE 241.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 418.00 DOWNSTREAM(FEET) = 404.00
FLOW LENGTH(FEET) = 1279.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 44.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.88
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 230.95
PIPE TRAVEL TIME(MIN.) = 1.43 Tc(MIN.) = 17.90
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 241.00 = 6933.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.90

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.627

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Residential, Commercial, Public Park, School, and another Residential entry.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.488

SUBAREA AREA(ACRES) = 18.80 SUBAREA RUNOFF(CFS) = 41.98

EFFECTIVE AREA(ACRES) = 113.80 AREA-AVERAGED Fm(INCH/HR) = 0.08

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.28

TOTAL AREA(ACRES) = 113.8 PEAK FLOW RATE(CFS) = 260.41

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 241.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.90

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.627

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Public Park and School.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.666

SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 32.11

EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.10

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33

TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 292.53

\*\*\*\*\*

FLOW PROCESS FROM NODE 241.00 TO NODE 242.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 404.00 DOWNSTREAM(FEET) = 403.00
FLOW LENGTH(FEET) = 66.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 47.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.64
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 292.53
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 17.97
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 242.00 = 6999.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 242.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.97

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.621

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Residential, Commercial, and another Residential entry.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.193

SUBAREA AREA(ACRES) = 19.10 SUBAREA RUNOFF(CFS) = 44.06

EFFECTIVE AREA(ACRES) = 147.60 AREA-AVERAGED Fm(INCH/HR) = 0.09

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31

TOTAL AREA(ACRES) = 147.6 PEAK FLOW RATE(CFS) = 335.85

\*\*\*\*\*

FLOW PROCESS FROM NODE 242.00 TO NODE 243.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 394.00
FLOW LENGTH(FEET) = 1270.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 72.0 INCH PIPE IS 58.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.64
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 335.85
PIPE TRAVEL TIME(MIN.) = 1.55 Tc(MIN.) = 19.52
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 19.52
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.462
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap        SCS
LAND USE                GROUP   (ACRES)  (INCH/HR) (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"    B        1.00    0.30    0.200    56
PUBLIC PARK              B        2.00    0.30    0.850    56
RESIDENTIAL
"11+ DWELLINGS/ACRE"    B        2.80    0.30    0.200    56
COMMERCIAL               B        1.50    0.30    0.100    56
CONDOMINIUMS            B        0.10    0.30    0.350    56
PUBLIC PARK              B        1.10    0.30    0.850    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.421
SUBAREA AREA(ACRES) = 8.50      SUBAREA RUNOFF(CFS) = 17.87
EFFECTIVE AREA(ACRES) = 156.10  AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 156.1      PEAK FLOW RATE(CFS) = 335.85
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 243.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 19.52
RAINFALL INTENSITY(INCH/HR) = 2.46
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.32
EFFECTIVE STREAM AREA(ACRES) = 156.10
TOTAL STREAM AREA(ACRES) = 156.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 335.85

```

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	180.15	20.58	2.376	0.30( 0.10)	0.34	88.0	220.50
2	335.85	19.52	2.462	0.30( 0.09)	0.32	156.1	230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	513.21	19.52	2.462	0.30( 0.10)	0.32	239.6	230.00
2	503.76	20.58	2.376	0.30( 0.10)	0.32	244.1	220.50

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

```

PEAK FLOW RATE(CFS) = 513.21      Tc(MIN.) = 19.52
EFFECTIVE AREA(ACRES) = 239.58    AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.32

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TOTAL AREA(ACRES) = 244.1
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 243.00 = 8269.00 FEET.

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*****
FLOW PROCESS FROM NODE 243.00 TO NODE 244.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 394.00  DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 849.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 44.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 34.88
ESTIMATED PIPE DIAMETER(INCH) = 57.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 513.21
PIPE TRAVEL TIME(MIN.) = 0.41  Tc(MIN.) = 19.92
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 244.00 = 9118.00 FEET.

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*****
FLOW PROCESS FROM NODE 244.00 TO NODE 244.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 19.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.421
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap        SCS
LAND USE                GROUP   (ACRES)  (INCH/HR) (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"    B        0.10    0.30    0.200    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"    B        1.70    0.30    0.500    56
PUBLIC PARK              B        0.30    0.30    0.850    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"    B        0.80    0.30    0.500    56
PUBLIC PARK              B        0.10    0.30    0.850    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.537
SUBAREA AREA(ACRES) = 3.00      SUBAREA RUNOFF(CFS) = 6.10
EFFECTIVE AREA(ACRES) = 242.58  AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.33
TOTAL AREA(ACRES) = 247.1      PEAK FLOW RATE(CFS) = 513.21
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 244.00 TO NODE 245.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 340.00  DOWNSTREAM(FEET) = 315.00
FLOW LENGTH(FEET) = 777.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 48.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.21
ESTIMATED PIPE DIAMETER(INCH) = 66.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 513.21
PIPE TRAVEL TIME(MIN.) = 0.48  Tc(MIN.) = 20.40
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

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FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.40

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.387

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
PUBLIC PARK	B	0.20	0.30	0.850	56

RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
PUBLIC PARK	B	0.10	0.30	0.850	56

RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56
PUBLIC PARK	B	0.10	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.631

SUBAREA AREA (ACRES) = 0.80 SUBAREA RUNOFF (CFS) = 1.58

EFFECTIVE AREA (ACRES) = 243.38 AREA-AVERAGED Fm (INCH/HR) = 0.10

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.33

TOTAL AREA (ACRES) = 247.9 PEAK FLOW RATE (CFS) = 513.21

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	513.21	20.40	2.387	0.30( 0.10)	0.33	243.4	230.00
2	503.76	21.47	2.319	0.30( 0.10)	0.33	247.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\* MEMORY BANK # 3 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
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1	324.47	16.81	2.739	0.30( 0.13)	0.44	138.3	210.00
2	292.84	19.79	2.435	0.30( 0.13)	0.44	141.3	200.00

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 245.00 = 5916.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
------------------	------------	--------------	------------------------	---------------------	----	---------------	-------------------

1	812.29	16.81	2.739	0.30( 0.11)	0.37	338.8	210.00
2	800.94	19.79	2.435	0.30( 0.11)	0.37	377.3	200.00
3	800.00	20.40	2.387	0.30( 0.11)	0.37	384.7	230.00
4	781.81	21.47	2.319	0.30( 0.11)	0.37	389.2	220.50

TOTAL AREA (ACRES) = 389.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 812.29 Tc(MIN.) = 16.806

EFFECTIVE AREA (ACRES) = 338.80 AREA-AVERAGED Fm (INCH/HR) = 0.11

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA (ACRES) = 389.2

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 245.00 = 9895.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 245.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 3 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 245.00 TO NODE 246.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 315.00 DOWNSTREAM (FEET) = 306.00

FLOW LENGTH (FEET) = 619.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 90.0 INCH PIPE IS 68.3 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 22.57

ESTIMATED PIPE DIAMETER (INCH) = 90.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 812.29

PIPE TRAVEL TIME (MIN.) = 0.46 Tc(MIN.) = 17.26

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 246.00 = 10514.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.26

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.693

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.90	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56

RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.50	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.70	0.30	0.400	56

CONDOMINIUMS	B	9.10	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	2.80	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.410

SUBAREA AREA (ACRES) = 16.30 SUBAREA RUNOFF (CFS) = 37.70

EFFECTIVE AREA (ACRES) = 355.10 AREA-AVERAGED Fm (INCH/HR) = 0.11

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38

TOTAL AREA (ACRES) = 405.5 PEAK FLOW RATE (CFS) = 824.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 246.00 TO NODE 246.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.26

\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.693  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.60 0.30 0.400 56  
 CONDOMINIUMS B 7.40 0.30 0.350 56  
 PUBLIC PARK B 0.30 0.30 0.850 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.375  
 SUBAREA AREA (ACRES) = 9.30 SUBAREA RUNOFF (CFS) = 21.60  
 EFFECTIVE AREA (ACRES) = 364.40 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 414.8 PEAK FLOW RATE (CFS) = 846.16

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 246.00 TO NODE 247.00 IS CODE = 31  
 -----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 306.00 DOWNSTREAM (FEET) = 300.00  
 FLOW LENGTH (FEET) = 185.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 78.0 INCH PIPE IS 60.4 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 30.70  
 ESTIMATED PIPE DIAMETER (INCH) = 78.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 846.16  
 PIPE TRAVEL TIME (MIN.) = 0.10 Tc (MIN.) = 17.36  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 247.00 = 10699.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81  
 -----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 17.36  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.682  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56  
 COMMERCIAL B 0.30 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 PUBLIC PARK B 0.10 0.30 0.850 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.30 0.30 0.400 56  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.413  
 SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 4.61  
 EFFECTIVE AREA (ACRES) = 366.40 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 416.8 PEAK FLOW RATE (CFS) = 847.40  
 \*\*\*\*\*

FLOW PROCESS FROM NODE 247.00 TO NODE 247.00 IS CODE = 81  
 -----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 17.36  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.682  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 COMMERCIAL B 0.90 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.40 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.80 0.30 0.400 56  
 COMMERCIAL B 0.40 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.365  
 SUBAREA AREA (ACRES) = 2.60 SUBAREA RUNOFF (CFS) = 6.02  
 EFFECTIVE AREA (ACRES) = 369.00 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 419.4 PEAK FLOW RATE (CFS) = 853.43

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 247.00 TO NODE 248.00 IS CODE = 31  
 -----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 300.00 DOWNSTREAM (FEET) = 271.00  
 FLOW LENGTH (FEET) = 859.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 78.0 INCH PIPE IS 59.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 31.29  
 ESTIMATED PIPE DIAMETER (INCH) = 78.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 853.43  
 PIPE TRAVEL TIME (MIN.) = 0.46 Tc (MIN.) = 17.82  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81  
 -----  
 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 17.82  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.636  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.60 0.30 0.400 56  
 COMMERCIAL B 0.30 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 2.60 0.30 0.400 56  
 COMMERCIAL B 1.00 0.30 0.100 56  
 NATURAL FAIR COVER

"OPEN BRUSH" B 0.20 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.356  
 SUBAREA AREA (ACRES) = 4.80 SUBAREA RUNOFF (CFS) = 10.92  
 EFFECTIVE AREA (ACRES) = 373.80 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 424.2 PEAK FLOW RATE (CFS) = 853.43  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.82  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.636  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.50 0.30 0.400 56  
 COMMERCIAL B 0.30 0.30 0.100 56  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.10 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.367  
 SUBAREA AREA (ACRES) = 0.90 SUBAREA RUNOFF (CFS) = 2.05  
 EFFECTIVE AREA (ACRES) = 374.70 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 425.1 PEAK FLOW RATE (CFS) = 853.43  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.82  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.636  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 2.20 0.30 0.500 56  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 1.80 0.30 0.400 56  
 CONDOMINIUMS B 0.20 0.30 0.350 56  
 RESIDENTIAL  
 "5-7 DWELLINGS/ACRE" B 3.20 0.30 0.500 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.466  
 SUBAREA AREA (ACRES) = 8.20 SUBAREA RUNOFF (CFS) = 18.42  
 EFFECTIVE AREA (ACRES) = 382.90 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38

TOTAL AREA (ACRES) = 433.3 PEAK FLOW RATE (CFS) = 869.29

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.82  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.636  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" B 5.70 0.30 0.400 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 SUBAREA AREA (ACRES) = 5.70 SUBAREA RUNOFF (CFS) = 12.91  
 EFFECTIVE AREA (ACRES) = 388.60 AREA-AVERAGED Fm (INCH/HR) = 0.11  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA (ACRES) = 439.0 PEAK FLOW RATE (CFS) = 882.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.82  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.636  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 6.40 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 1.40 0.30 1.000 66  
 NATURAL FAIR COVER  
 "OPEN BRUSH" B 0.60 0.30 1.000 66  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 17.66  
 EFFECTIVE AREA (ACRES) = 397.00 AREA-AVERAGED Fm (INCH/HR) = 0.12  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39  
 TOTAL AREA (ACRES) = 447.4 PEAK FLOW RATE (CFS) = 899.85

\*\*\*\*\*

FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00

ELEVATION DATA: UPSTREAM (FEET) = 413.04 DOWNSTREAM (FEET) = 405.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.928  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 5.048  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
CONDOMINIUMS RESIDENTIAL	B	0.20	0.30	0.350	56	7.70
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56	6.93
CONDOMINIUMS	B	0.10	0.30	0.350	56	7.70

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.312  
 SUBAREA RUNOFF(CFS) = 1.78  
 TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.78

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 405.00 DOWNSTREAM ELEVATION(FEET) = 385.00  
 STREET LENGTH(FEET) = 587.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.59  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.32  
 HALFSTREET FLOOD WIDTH(FEET) = 8.66  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.82  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.21  
 STREET FLOW TRAVEL TIME(MIN.) = 2.56 Tc(MIN.) = 9.49  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.987

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.20	0.30	0.100	56
CONDOMINIUMS	B	0.60	0.30	0.350	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
COMMERCIAL	B	0.30	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.224  
 SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 9.52  
 EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24

TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 10.93

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.05  
 FLOW VELOCITY(FEET/SEC.) = 4.25 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.53  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 917.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 385.00 DOWNSTREAM(FEET) = 378.50  
 FLOW LENGTH(FEET) = 162.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.5 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.55  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 10.93  
 PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 9.72  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1079.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 9.72  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.890  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56
COMMERCIAL	B	1.30	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 8.34  
 EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.05  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18  
 TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 18.99

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM(FEET) = 378.50 DOWNSTREAM(FEET) = 348.50  
 FLOW LENGTH(FEET) = 637.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.81  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 18.99  
 PIPE TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 10.49  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 1716.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.49  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.691  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.60	0.30	0.500	56
COMMERCIAL	B	1.70	0.30	0.100	56
CONDOMINIUMS	B	1.00	0.30	0.350	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
COMMERCIAL	B	0.70	0.30	0.100	56
CONDOMINIUMS	B	0.40	0.30	0.350	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.240  
 SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 14.66  
 EFFECTIVE AREA(ACRES) = 10.00 AREA-AVERAGED Fm(INCH/HR) = 0.06  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.21  
 TOTAL AREA(ACRES) = 10.0 PEAK FLOW RATE(CFS) = 32.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 304.00 TO NODE 421.10 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 348.50 DOWNSTREAM(FEET) = 306.00  
 FLOW LENGTH(FEET) = 944.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.76  
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 32.67  
 PIPE TRAVEL TIME(MIN.) = 1.00 Tc(MIN.) = 11.49  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.49  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.521  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.40	0.30	0.400	56
COMMERCIAL	B	0.20	0.30	0.100	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.50	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.90	0.30	0.400	56

COMMERCIAL B 2.00 0.30 0.100 56  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.348  
 SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 22.45  
 EFFECTIVE AREA(ACRES) = 17.30 AREA-AVERAGED Fm(INCH/HR) = 0.08  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.27  
 TOTAL AREA(ACRES) = 17.3 PEAK FLOW RATE(CFS) = 53.59

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.49  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.521  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	4.40	0.30	0.200	56
COMMERCIAL	B	0.10	0.30	0.100	56
APARTMENTS	B	6.70	0.30	0.200	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.199  
 SUBAREA AREA(ACRES) = 11.20 SUBAREA RUNOFF(CFS) = 34.89  
 EFFECTIVE AREA(ACRES) = 28.50 AREA-AVERAGED Fm(INCH/HR) = 0.07  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.24  
 TOTAL AREA(ACRES) = 28.5 PEAK FLOW RATE(CFS) = 88.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.49  
 \* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.521  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 8.99  
 EFFECTIVE AREA(ACRES) = 31.60 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 31.6 PEAK FLOW RATE(CFS) = 97.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION(MIN.) = 11.49  
 RAINFALL INTENSITY(INCH/HR) = 3.52  
 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30



AREA-AVERAGED Ap = 0.31  
EFFECTIVE STREAM AREA (ACRES) = 31.60  
TOTAL STREAM AREA (ACRES) = 31.60  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 97.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 400.00 TO NODE 420.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 300.40  
ELEVATION DATA: UPSTREAM (FEET) = 312.80 DOWNSTREAM (FEET) = 310.80

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.115  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.556  
SUBAREA Tc AND LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL B 0.50 0.30 0.100 56 8.11  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF (CFS) = 2.04  
TOTAL AREA (ACRES) = 0.50 PEAK FLOW RATE (CFS) = 2.04

\*\*\*\*\*  
FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION (FEET) = 310.80 DOWNSTREAM ELEVATION (FEET) = 307.00  
STREET LENGTH (FEET) = 266.50 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 67.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 62.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.07  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.35  
HALFSTREET FLOOD WIDTH (FEET) = 10.66  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.65  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.91  
STREET FLOW TRAVEL TIME (MIN.) = 1.68 Tc (MIN.) = 9.79  
\* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.860

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.60 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA (ACRES) = 0.60 SUBAREA RUNOFF (CFS) = 2.07  
EFFECTIVE AREA (ACRES) = 1.10 AREA-AVERAGED Fm (INCH/HR) = 0.03  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA (ACRES) = 1.1 PEAK FLOW RATE (CFS) = 3.79

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.36 HALFSTREET FLOOD WIDTH (FEET) = 11.75  
FLOW VELOCITY (FEET/SEC.) = 2.77 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.01  
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.00 = 566.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.00 TO NODE 421.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM (FEET) = 307.00 DOWNSTREAM (FEET) = 305.50  
FLOW LENGTH (FEET) = 105.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.0 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.99  
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 3.79  
PIPE TRAVEL TIME (MIN.) = 0.29 Tc (MIN.) = 10.09  
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 421.10 = 671.90 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 421.10 TO NODE 421.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION (MIN.) = 10.09  
RAINFALL INTENSITY (INCH/HR) = 3.76  
AREA-AVERAGED Fm (INCH/HR) = 0.03  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA (ACRES) = 1.10  
TOTAL STREAM AREA (ACRES) = 1.10  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 3.79

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	97.47	11.49	3.521	0.30 ( 0.09)	0.31	31.6	300.00
2	3.79	10.09	3.760	0.30 ( 0.03)	0.10	1.1	400.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	95.32	10.09	3.760	0.30 ( 0.09)	0.31	28.8	400.00
2	101.02	11.49	3.521	0.30 ( 0.09)	0.31	32.7	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 101.02 Tc(MIN.) = 11.49
EFFECTIVE AREA(ACRES) = 32.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.7
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 421.10 = 2660.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 421.10 TO NODE 426.10 IS CODE = 31
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 305.50 DOWNSTREAM(FEET) = 301.00
FLOW LENGTH(FEET) = 261.40 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.12
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 101.02
PIPE TRAVEL TIME(MIN.) = 0.31 Tc(MIN.) = 11.80
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.10 = 2921.40 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 426.10 TO NODE 426.10 IS CODE = 81
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.80
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.469
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.60
EFFECTIVE AREA(ACRES) = 32.90 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 32.9 PEAK FLOW RATE(CFS) = 101.02
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 426.10 TO NODE 426.20 IS CODE = 31
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 289.00
FLOW LENGTH(FEET) = 448.56 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.69
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 101.02
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 12.25
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.20 = 3369.96 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 426.20 TO NODE 426.20 IS CODE = 81
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.25
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.393
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.20 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.47
EFFECTIVE AREA(ACRES) = 33.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 33.4 PEAK FLOW RATE(CFS) = 101.02
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*
FLOW PROCESS FROM NODE 426.20 TO NODE 426.30 IS CODE = 31
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 289.00 DOWNSTREAM(FEET) = 282.00
FLOW LENGTH(FEET) = 260.45 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.72
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 101.02
PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 12.51
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 426.30 = 3630.41 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 426.30 TO NODE 426.30 IS CODE = 81
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.51
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.349
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.80 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 3.20
EFFECTIVE AREA(ACRES) = 34.50 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 34.5 PEAK FLOW RATE(CFS) = 101.07

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*****
FLOW PROCESS FROM NODE 426.30 TO NODE 248.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 282.00 DOWNSTREAM(FEET) = 271.00
FLOW LENGTH(FEET) = 411.44 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.68
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 101.07
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 12.92
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.
*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.92
RAINFALL INTENSITY(INCH/HR) = 3.28
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 34.50
TOTAL STREAM AREA(ACRES) = 34.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 101.07
*****
FLOW PROCESS FROM NODE 425.00 TO NODE 426.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 233.60
ELEVATION DATA: UPSTREAM(FEET) = 306.50 DOWNSTREAM(FEET) = 301.80

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.882
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 5.481
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.20 0.30 0.100 56 5.88
COMMERCIAL B 0.20 0.30 0.100 56 5.88
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA RUNOFF(CFS) = 1.96
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.96
*****
FLOW PROCESS FROM NODE 426.00 TO NODE 427.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
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UPSTREAM ELEVATION(FEET) = 301.80 DOWNSTREAM ELEVATION(FEET) = 294.00
STREET LENGTH(FEET) = 478.70 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.32
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.35
HALFSTREET FLOOD WIDTH(FEET) = 10.73
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.83
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.98
STREET FLOW TRAVEL TIME(MIN.) = 2.82 Tc(MIN.) = 8.70
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.313
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.20 0.30 0.100 56
COMMERCIAL B 0.50 0.30 0.100 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 2.70
EFFECTIVE AREA(ACRES) = 1.10 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.1 PEAK FLOW RATE(CFS) = 4.24

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 12.02
FLOW VELOCITY(FEET/SEC.) = 2.98 DEPTH*VELOCITY(FT*FT/SEC.) = 1.10
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 427.00 = 712.30 FEET.
*****
FLOW PROCESS FROM NODE 427.00 TO NODE 428.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 294.00 DOWNSTREAM ELEVATION(FEET) = 286.00
STREET LENGTH(FEET) = 300.80 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      5.08
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.36
HALFSTREET FLOOD WIDTH(FEET) = 11.71
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.73
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.36
STREET FLOW TRAVEL TIME(MIN.) = 1.34  Tc(MIN.) = 10.05
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.767
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap      SCS
LAND USE           GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
COMMERCIAL         B      0.10    0.30    0.100   56
COMMERCIAL         B      0.40    0.30    0.100   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.50  SUBAREA RUNOFF(CFS) = 1.68
EFFECTIVE AREA(ACRES) = 1.60  AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 1.6  PEAK FLOW RATE(CFS) = 5.38

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37  HALFSTREET FLOOD WIDTH(FEET) = 11.93
FLOW VELOCITY(FEET/SEC.) = 3.83  DEPTH*VELOCITY(FT*FT/SEC.) = 1.41
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 428.00 = 1013.10 FEET.

*****
FLOW PROCESS FROM NODE 428.00 TO NODE 429.00 IS CODE = 61
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STANDARD CURB SECTION USED)<<<<
-----
UPSTREAM ELEVATION(FEET) = 286.00  DOWNSTREAM ELEVATION(FEET) = 276.00
STREET LENGTH(FEET) = 242.40  CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      6.03
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.36
HALFSTREET FLOOD WIDTH(FEET) = 11.39
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.64
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.66
STREET FLOW TRAVEL TIME(MIN.) = 0.87  Tc(MIN.) = 10.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.619
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap      SCS
LAND USE           GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
COMMERCIAL         B      0.40    0.30    0.100   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

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SUBAREA AREA(ACRES) = 0.40  SUBAREA RUNOFF(CFS) = 1.29
EFFECTIVE AREA(ACRES) = 2.00  AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 2.0  PEAK FLOW RATE(CFS) = 6.46

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.37  HALFSTREET FLOOD WIDTH(FEET) = 11.82
FLOW VELOCITY(FEET/SEC.) = 4.67  DEPTH*VELOCITY(FT*FT/SEC.) = 1.71
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 429.00 = 1255.50 FEET.

*****
FLOW PROCESS FROM NODE 429.00 TO NODE 429.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 10.92
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.619
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA      Fp        Ap      SCS
LAND USE           GROUP  (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B      0.50    0.30    0.400   56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B      1.50    0.30    0.400   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 2.00  SUBAREA RUNOFF(CFS) = 6.30
EFFECTIVE AREA(ACRES) = 4.00  AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 4.0  PEAK FLOW RATE(CFS) = 12.76

*****
FLOW PROCESS FROM NODE 429.00 TO NODE 248.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 276.00  DOWNSTREAM(FEET) = 273.00
FLOW LENGTH(FEET) = 100.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.69
ESTIMATED PIPE DIAMETER(INCH) = 18.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 12.76
PIPE TRAVEL TIME(MIN.) = 0.16  Tc(MIN.) = 11.07
LONGEST FLOWPATH FROM NODE 425.00 TO NODE 248.00 = 1355.50 FEET.

*****
FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 11.07
RAINFALL INTENSITY(INCH/HR) = 3.59
AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30

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AREA-AVERAGED Ap = 0.25  
 EFFECTIVE STREAM AREA(ACRES) = 4.00  
 TOTAL STREAM AREA(ACRES) = 4.00  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.76

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	96.33	11.52	3.516	0.30( 0.09)	0.31	30.6	400.00
1	101.07	12.92	3.279	0.30( 0.09)	0.31	34.5	300.00
2	12.76	11.07	3.593	0.30( 0.08)	0.25	4.0	425.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	107.41	11.07	3.593	0.30( 0.09)	0.30	33.4	425.00
2	108.81	11.52	3.516	0.30( 0.09)	0.30	34.6	400.00
3	112.69	12.92	3.279	0.30( 0.09)	0.31	38.5	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 112.69 Tc(MIN.) = 12.92  
 EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 38.5  
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 11  
 -----  
 >>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
 =====

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	107.41	11.07	3.593	0.30( 0.09)	0.30	33.4	425.00
2	108.81	11.52	3.516	0.30( 0.09)	0.30	34.6	400.00
3	112.69	12.92	3.279	0.30( 0.09)	0.31	38.5	300.00

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 248.00 = 4041.85 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	899.85	17.82	2.636	0.30( 0.12)	0.39	397.0	210.00
2	880.16	20.81	2.361	0.30( 0.12)	0.39	435.5	200.00
3	879.37	21.42	2.322	0.30( 0.12)	0.38	442.9	230.00
4	860.50	22.50	2.252	0.30( 0.12)	0.38	447.4	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	878.87	11.07	3.593	0.30( 0.11)	0.38	280.1	425.00
2	893.87	11.52	3.516	0.30( 0.11)	0.38	291.2	400.00
3	931.40	12.92	3.279	0.30( 0.11)	0.38	326.3	300.00

4	989.81	17.82	2.636	0.30( 0.11)	0.38	435.5	210.00
5	960.41	20.81	2.361	0.30( 0.11)	0.38	474.0	200.00
6	958.22	21.42	2.322	0.30( 0.11)	0.38	481.4	230.00
7	936.90	22.50	2.252	0.30( 0.11)	0.38	485.9	220.50

TOTAL AREA(ACRES) = 485.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 989.81 Tc(MIN.) = 17.821  
 EFFECTIVE AREA(ACRES) = 435.50 AREA-AVERAGED Fm(INCH/HR) = 0.11  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
 TOTAL AREA(ACRES) = 485.9  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 248.00 = 11558.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 248.00 IS CODE = 12  
 -----  
 >>>>CLEAR MEMORY BANK # 1<<<<<  
 =====

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 248.00 TO NODE 249.00 IS CODE = 31  
 -----  
 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 261.00  
 FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 66.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 30.53  
 ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 989.81  
 PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 18.01  
 LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 10  
 -----  
 >>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<  
 =====

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 429.00 TO NODE 430.00 IS CODE = 21  
 -----  
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
 ELEVATION DATA: UPSTREAM(FEET) = 271.00 DOWNSTREAM(FEET) = 262.70

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.459  
 \* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 5.242  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.20	0.30	0.100	56	6.46
COMMERCIAL	B	0.40	0.30	0.100	56	6.46

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 2.81  
TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 2.81

\*\*\*\*\*  
FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 262.70 DOWNSTREAM ELEVATION(FEET) = 258.98  
STREET LENGTH(FEET) = 345.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.97

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 12.82  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.49  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.95  
STREET FLOW TRAVEL TIME(MIN.) = 2.31 Tc(MIN.) = 8.77

\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.285

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 2.30  
EFFECTIVE AREA(ACRES) = 1.20 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.2 PEAK FLOW RATE(CFS) = 4.60

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 13.62  
FLOW VELOCITY(FEET/SEC.) = 2.59 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.03  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.00 = 675.60 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.00 TO NODE 431.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 258.98 DOWNSTREAM(FEET) = 258.00  
FLOW LENGTH(FEET) = 91.03 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 5.68  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 4.60  
PIPE TRAVEL TIME(MIN.) = 0.27 Tc(MIN.) = 9.04  
LONGEST FLOWPATH FROM NODE 429.00 TO NODE 431.10 = 766.63 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 9.04  
RAINFALL INTENSITY(INCH/HR) = 4.17  
AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 1.20  
TOTAL STREAM AREA(ACRES) = 1.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.60

\*\*\*\*\*  
FLOW PROCESS FROM NODE 410.00 TO NODE 440.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 299.70  
ELEVATION DATA: UPSTREAM(FEET) = 312.69 DOWNSTREAM(FEET) = 310.80

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.196  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.523

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.40	0.30	0.100	56	8.20

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA RUNOFF(CFS) = 1.62  
TOTAL AREA(ACRES) = 0.40 PEAK FLOW RATE(CFS) = 1.62

\*\*\*\*\*  
FLOW PROCESS FROM NODE 440.00 TO NODE 441.00 IS CODE = 61  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 310.80 DOWNSTREAM ELEVATION(FEET) = 306.50  
STREET LENGTH(FEET) = 299.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.29  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.32  
HALFSTREET FLOOD WIDTH(FEET) = 9.24  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.48  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.80  
STREET FLOW TRAVEL TIME(MIN.) = 2.01 Tc(MIN.) = 10.20  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.740

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.10 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.34  
EFFECTIVE AREA(ACRES) = 0.80 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 2.67

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 10.00  
FLOW VELOCITY(FEET/SEC.) = 2.56 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.85  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 441.00 = 598.70 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 441.00 TO NODE 442.00 IS CODE = 61  
-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 306.50 DOWNSTREAM ELEVATION(FEET) = 299.00  
STREET LENGTH(FEET) = 341.60 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.59  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.34  
HALFSTREET FLOOD WIDTH(FEET) = 10.43  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.21  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.10  
STREET FLOW TRAVEL TIME(MIN.) = 1.78 Tc(MIN.) = 11.98  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.438  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.20 0.30 0.100 56  
COMMERCIAL B 0.40 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.84  
EFFECTIVE AREA(ACRES) = 1.40 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 1.4 PEAK FLOW RATE(CFS) = 4.29

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 11.33  
FLOW VELOCITY(FEET/SEC.) = 3.34 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.19  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 442.00 = 940.30 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 442.00 TO NODE 443.00 IS CODE = 61  
-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STANDARD CURB SECTION USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 299.00 DOWNSTREAM ELEVATION(FEET) = 288.50  
STREET LENGTH(FEET) = 390.10 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.017  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.14  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 11.72  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.77  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.37  
STREET FLOW TRAVEL TIME(MIN.) = 1.73 Tc(MIN.) = 13.71  
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.144  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
COMMERCIAL B 0.30 0.30 0.100 56  
COMMERCIAL B 0.30 0.30 0.100 56  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.68  
EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 5.61

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.37 HALFSTREET FLOOD WIDTH(FEET) = 12.12  
FLOW VELOCITY(FEET/SEC.) = 3.88 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.44  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 443.00 = 1330.40 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 443.00 TO NODE 444.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 288.50 DOWNSTREAM ELEVATION(FEET) = 281.00
STREET LENGTH(FEET) = 272.60 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.13

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.38
HALFSTREET FLOOD WIDTH(FEET) = 12.62
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.96
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.50
STREET FLOW TRAVEL TIME(MIN.) = 1.15 Tc(MIN.) = 14.85
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.949

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.40 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 1.05
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 6.30

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 HALFSTREET FLOOD WIDTH(FEET) = 12.72
FLOW VELOCITY(FEET/SEC.) = 4.01 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.53
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 444.00 = 1603.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 444.00 TO NODE 445.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 281.00 DOWNSTREAM ELEVATION(FEET) = 268.10
STREET LENGTH(FEET) = 462.90 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 56.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 51.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.017
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.16

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.39
HALFSTREET FLOOD WIDTH(FEET) = 13.42
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.15
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.63
STREET FLOW TRAVEL TIME(MIN.) = 1.86 Tc(MIN.) = 16.71
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.749

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.70 0.30 0.100 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.71
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.03
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 7.59

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 13.82
FLOW VELOCITY(FEET/SEC.) = 4.17 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.67
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 445.00 = 2065.90 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 445.00 TO NODE 446.00 IS CODE = 61

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STANDARD CURB SECTION USED)<<<<<

UPSTREAM ELEVATION(FEET) = 268.10 DOWNSTREAM ELEVATION(FEET) = 257.00
STREET LENGTH(FEET) = 532.90 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 55.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.017

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.017

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 1

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.70

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.43
HALFSTREET FLOOD WIDTH(FEET) = 15.58
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.85
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.65
STREET FLOW TRAVEL TIME(MIN.) = 2.31 Tc(MIN.) = 19.02
\* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.513

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS



LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.60	0.30	0.100	56
COMMERCIAL	B	0.30	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 2.23  
EFFECTIVE AREA(ACRES) = 4.10 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 4.1 PEAK FLOW RATE(CFS) = 9.16

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 15.90  
FLOW VELOCITY(FEET/SEC.) = 3.91 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.70  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 446.00 = 2598.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 446.00 TO NODE 431.10 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 257.00 DOWNSTREAM(FEET) = 256.50  
FLOW LENGTH(FEET) = 100.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.97  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 9.16  
PIPE TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 19.35  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 431.10 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 19.35  
RAINFALL INTENSITY(INCH/HR) = 2.48  
AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.10  
EFFECTIVE STREAM AREA(ACRES) = 4.10  
TOTAL STREAM AREA(ACRES) = 4.10  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.16

\*\* CONFLUENCE DATA \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	4.60	9.04	4.174	0.30( 0.03)	0.10	1.2	429.00
2	9.16	19.35	2.479	0.30( 0.03)	0.10	4.1	410.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	11.84	9.04	4.174	0.30( 0.03)	0.10	3.1	429.00
2	11.88	19.35	2.479	0.30( 0.03)	0.10	5.3	410.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 11.88 Tc(MIN.) = 19.35  
EFFECTIVE AREA(ACRES) = 5.30 AREA-AVERAGED Fm(INCH/HR) = 0.03  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.10  
TOTAL AREA(ACRES) = 5.3  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 431.10 = 2698.80 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 431.10 TO NODE 249.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 258.00 DOWNSTREAM(FEET) = 257.00  
FLOW LENGTH(FEET) = 230.42 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.04  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 11.88  
PIPE TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 20.12  
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
=====

\*\* MAIN STREAM CONFLUENCE DATA \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	11.84	9.80	3.858	0.30( 0.03)	0.10	3.1	429.00
2	11.88	20.12	2.406	0.30( 0.03)	0.10	5.3	410.00

LONGEST FLOWPATH FROM NODE 410.00 TO NODE 249.00 = 2929.22 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	878.87	11.26	3.560	0.30( 0.11)	0.38	280.1	425.00
2	893.87	11.71	3.484	0.30( 0.11)	0.38	291.2	400.00
3	931.40	13.11	3.246	0.30( 0.11)	0.38	326.3	300.00
4	989.81	18.01	2.616	0.30( 0.11)	0.38	435.5	210.00
5	960.41	21.00	2.349	0.30( 0.11)	0.38	474.0	200.00
6	958.22	21.61	2.309	0.30( 0.11)	0.38	481.4	230.00
7	936.90	22.69	2.240	0.30( 0.11)	0.38	485.9	220.50

LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	842.59	9.80	3.858	0.30( 0.11)	0.38	246.8	429.00
2	890.71	11.26	3.560	0.30( 0.11)	0.38	283.5	425.00
3	905.71	11.71	3.484	0.30( 0.11)	0.38	294.8	400.00

4	943.25	13.11	3.246	0.30 ( 0.11)	0.38	330.1	300.00
5	1001.68	18.01	2.616	0.30 ( 0.11)	0.38	440.3	210.00
6	980.97	20.12	2.406	0.30 ( 0.11)	0.38	468.0	410.00
7	972.01	21.00	2.349	0.30 ( 0.11)	0.38	479.3	200.00
8	969.62	21.61	2.309	0.30 ( 0.11)	0.38	486.7	230.00
9	947.95	22.69	2.240	0.30 ( 0.11)	0.37	491.2	220.50
TOTAL AREA (ACRES) =							491.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1001.68 Tc (MIN.) = 18.009  
EFFECTIVE AREA (ACRES) = 440.35 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38  
TOTAL AREA (ACRES) = 491.2  
LONGEST FLOWPATH FROM NODE 230.00 TO NODE 249.00 = 11903.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 249.00 TO NODE 249.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 491.2 TC (MIN.) = 18.01  
EFFECTIVE AREA (ACRES) = 440.35 AREA-AVERAGED Fm (INCH/HR) = 0.11  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.380  
PEAK FLOW RATE (CFS) = 1001.68

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	842.59	9.80	3.858	0.30 ( 0.11)	0.38	246.8	429.00
2	890.71	11.26	3.560	0.30 ( 0.11)	0.38	283.5	425.00
3	905.71	11.71	3.484	0.30 ( 0.11)	0.38	294.8	400.00
4	943.25	13.11	3.246	0.30 ( 0.11)	0.38	330.1	300.00
5	1001.68	18.01	2.616	0.30 ( 0.11)	0.38	440.3	210.00
6	980.97	20.12	2.406	0.30 ( 0.11)	0.38	468.0	410.00
7	972.01	21.00	2.349	0.30 ( 0.11)	0.38	479.3	200.00
8	969.62	21.61	2.309	0.30 ( 0.11)	0.38	486.7	230.00
9	947.95	22.69	2.240	0.30 ( 0.11)	0.37	491.2	220.50

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

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FILE NAME: 0506101B.DAT  
TIME/DATE OF STUDY: 12:41 04/15/2013  
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--\*TIME-OF-CONCENTRATION MODEL\*--  
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\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)	
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10100.00 TO NODE 10101.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 327.00

ELEVATION DATA: UPSTREAM (FEET) = 895.00 DOWNSTREAM (FEET) = 820.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.606

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.339

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
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NATURAL FAIR COVER						
"GRASS"	-	0.10	0.30	1.000	98	9.61

NATURAL FAIR COVER						
"OPEN BRUSH"	-	0.30	0.30	1.000	98	9.61

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 1.09

TOTAL AREA (ACRES) = 0.40 PEAK FLOW RATE (CFS) = 1.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 10101.00 TO NODE 10102.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

=====

ELEVATION DATA: UPSTREAM (FEET) = 820.00 DOWNSTREAM (FEET) = 790.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 152.00 CHANNEL SLOPE = 0.1974

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00

CHANNEL FLOW THRU SUBAREA (CFS) = 1.09

FLOW VELOCITY (FEET/SEC.) = 4.43 FLOW DEPTH (FEET) = 0.29

TRAVEL TIME (MIN.) = 0.57 Tc (MIN.) = 10.18

LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10102.00 = 479.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10102.00 TO NODE 10102.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

=====

MAINLINE Tc (MIN.) = 10.18

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.230

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL	AREA	Fp	Ap	SCS
-------------------------------	------	----	----	-----

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.50 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.80 SUBAREA RUNOFF (CFS) = 2.11  
 EFFECTIVE AREA (ACRES) = 1.20 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 1.2 PEAK FLOW RATE (CFS) = 3.16

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10102.00 TO NODE 10103.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 790.00 DOWNSTREAM(FEET) = 762.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 200.00 CHANNEL SLOPE = 0.1400  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 3.16  
 FLOW VELOCITY(FEET/SEC.) = 4.97 FLOW DEPTH(FEET) = 0.46  
 TRAVEL TIME(MIN.) = 0.67 Tc(MIN.) = 10.85  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10103.00 = 679.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10103.00 TO NODE 10103.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 10.85  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.116  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.20 SUBAREA RUNOFF (CFS) = 3.04  
 EFFECTIVE AREA (ACRES) = 2.40 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.4 PEAK FLOW RATE (CFS) = 6.08

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10103.00 TO NODE 10104.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 762.00 DOWNSTREAM(FEET) = 754.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 124.00 CHANNEL SLOPE = 0.0645  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 6.08  
 FLOW VELOCITY(FEET/SEC.) = 4.43 FLOW DEPTH(FEET) = 0.68  
 TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 11.31  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10104.00 = 803.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10104.00 TO NODE 10104.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 11.31  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.043  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.70 0.30 1.000 -  
 USER-DEFINED - 1.10 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.30 SUBAREA RUNOFF (CFS) = 5.68  
 EFFECTIVE AREA (ACRES) = 4.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 4.7 PEAK FLOW RATE (CFS) = 11.60

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10104.00 TO NODE 10105.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 754.00 DOWNSTREAM(FEET) = 740.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 550.00 CHANNEL SLOPE = 0.0255  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 11.60  
 FLOW VELOCITY(FEET/SEC.) = 3.67 FLOW DEPTH(FEET) = 1.03  
 TRAVEL TIME(MIN.) = 2.50 Tc(MIN.) = 13.81  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10105.00 = 1353.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10105.00 TO NODE 10105.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.81  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.712  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.40 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 6.00 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 10.60 SUBAREA RUNOFF (CFS) = 23.01  
 EFFECTIVE AREA (ACRES) = 15.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 15.3 PEAK FLOW RATE (CFS) = 33.22

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*****
FLOW PROCESS FROM NODE 10105.00 TO NODE 10106.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 740.00 DOWNSTREAM(FEET) = 623.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 929.00 CHANNEL SLOPE = 0.1259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 33.22
FLOW VELOCITY(FEET/SEC.) = 8.73 FLOW DEPTH(FEET) = 1.13
TRAVEL TIME(MIN.) = 1.77 Tc(MIN.) = 15.59
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10106.00 = 2282.00 FEET.
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10106.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.59
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.544
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 10.40 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 4.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.50 SUBAREA RUNOFF(CFS) = 31.31
EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 62.21
*****
FLOW PROCESS FROM NODE 10106.00 TO NODE 10107.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 592.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 417.00 CHANNEL SLOPE = 0.0743
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 62.21
FLOW VELOCITY(FEET/SEC.) = 8.34 FLOW DEPTH(FEET) = 1.58
TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 16.42
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10107.00 = 2699.00 FEET.
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10107.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.42

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* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.479
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 5.10 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 2.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 18.63
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 79.04
*****
FLOW PROCESS FROM NODE 10107.00 TO NODE 10108.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 592.00 DOWNSTREAM(FEET) = 590.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 60.00 CHANNEL SLOPE = 0.0333
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.000
CHANNEL FLOW THRU SUBAREA(CFS) = 79.04
FLOW VELOCITY(FEET/SEC.) = 6.56 FLOW DEPTH(FEET) = 2.00
TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 16.57
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10108.00 = 2759.00 FEET.
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.57
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.467
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
USER-DEFINED - 7.00 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
USER-DEFINED - 7.50 0.30 1.000 -
USER-DEFINED - 1.80 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 18.10 SUBAREA RUNOFF(CFS) = 35.31
EFFECTIVE AREA(ACRES) = 58.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.4 PEAK FLOW RATE(CFS) = 113.91
*****
FLOW PROCESS FROM NODE 10108.00 TO NODE 10108.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.57
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.467
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.39
EFFECTIVE AREA(ACRES) = 58.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 58.6 PEAK FLOW RATE(CFS) = 114.30

\*\*\*\*\*
FLOW PROCESS FROM NODE 10108.00 TO NODE 10109.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 526.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 973.00 CHANNEL SLOPE = 0.0658
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 114.30
FLOW VELOCITY(FEET/SEC.) = 9.28 FLOW DEPTH(FEET) = 2.03
TRAVEL TIME(MIN.) = 1.75 Tc(MIN.) = 18.32
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10109.00 = 3732.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10109.00 TO NODE 10109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.32
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.331
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 16.40 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 3.00 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 36.56
EFFECTIVE AREA(ACRES) = 78.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.6 PEAK FLOW RATE(CFS) = 143.67

\*\*\*\*\*
FLOW PROCESS FROM NODE 10109.00 TO NODE 10110.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 526.00 DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1045.00 CHANNEL SLOPE = 0.0679

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 143.67
FLOW VELOCITY(FEET/SEC.) = 9.95 FLOW DEPTH(FEET) = 2.19
TRAVEL TIME(MIN.) = 1.75 Tc(MIN.) = 20.07
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10110.00 = 4777.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10110.00 TO NODE 10110.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.07
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.196
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.30 1.000 -
USER-DEFINED - 0.50 0.30 1.000 -
USER-DEFINED - 31.60 0.30 1.000 -
USER-DEFINED - 1.60 0.30 1.000 -
USER-DEFINED - 0.40 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.10 SUBAREA RUNOFF(CFS) = 59.90
EFFECTIVE AREA(ACRES) = 113.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 113.7 PEAK FLOW RATE(CFS) = 194.04

\*\*\*\*\*
FLOW PROCESS FROM NODE 10110.00 TO NODE 10111.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 675.00 CHANNEL SLOPE = 0.0667
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 194.04
FLOW VELOCITY(FEET/SEC.) = 10.63 FLOW DEPTH(FEET) = 2.47
TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 21.13
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10111.00 = 5452.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10111.00 TO NODE 10111.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 21.13
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.141
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.40 0.30 1.000 -
USER-DEFINED - 6.00 0.30 1.000 -
USER-DEFINED - 24.80 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -

USER-DEFINED - 4.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 43.20 SUBAREA RUNOFF (CFS) = 71.59  
EFFECTIVE AREA (ACRES) = 156.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 156.9 PEAK FLOW RATE (CFS) = 260.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10111.00 TO NODE 10112.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	410.00	DOWNSTREAM (FEET) =	405.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	143.00	CHANNEL SLOPE =	0.0350
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	4.00
CHANNEL FLOW THRU SUBAREA (CFS) =	260.00		
FLOW VELOCITY (FEET/SEC.) =	9.00	FLOW DEPTH (FEET) =	3.10
TRAVEL TIME (MIN.) =	0.26	Tc (MIN.) =	21.40
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10112.00 =	5595.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10112.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 21.40  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.127

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	7.90	0.30	1.000	-
USER-DEFINED	-	25.90	0.30	1.000	-
USER-DEFINED	-	19.30	0.30	1.000	-
USER-DEFINED	-	2.10	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 56.20 SUBAREA RUNOFF (CFS) = 92.43  
EFFECTIVE AREA (ACRES) = 213.10 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 213.1 PEAK FLOW RATE (CFS) = 350.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10112.00 TO NODE 10113.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	405.00	DOWNSTREAM (FEET) =	363.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	1642.00	CHANNEL SLOPE =	0.0256
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	350.48		
FLOW VELOCITY (FEET/SEC.) =	8.62	FLOW DEPTH (FEET) =	3.68

TRAVEL TIME (MIN.) = 3.18 Tc (MIN.) = 24.57  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10113.00 = 7237.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10113.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 24.57  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.962

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	33.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 35.40 SUBAREA RUNOFF (CFS) = 52.96  
EFFECTIVE AREA (ACRES) = 248.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 248.5 PEAK FLOW RATE (CFS) = 371.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10113.00 TO NODE 10114.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	363.00	DOWNSTREAM (FEET) =	340.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	918.00	CHANNEL SLOPE =	0.0251
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	5.00
CHANNEL FLOW THRU SUBAREA (CFS) =	371.77		
FLOW VELOCITY (FEET/SEC.) =	8.68	FLOW DEPTH (FEET) =	3.78
TRAVEL TIME (MIN.) =	1.76	Tc (MIN.) =	26.34
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10114.00 =	8155.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 26.34  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.889

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	10.10	0.30	1.000	-
USER-DEFINED	-	17.70	0.30	1.000	-
USER-DEFINED	-	52.90	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 83.10 SUBAREA RUNOFF (CFS) = 118.86

EFFECTIVE AREA(ACRES) = 331.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 331.6 PEAK FLOW RATE(CFS) = 474.31

\*\*\*\*\*

FLOW PROCESS FROM NODE 10114.00 TO NODE 10114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 26.34  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.889  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 2.15  
EFFECTIVE AREA(ACRES) = 333.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 333.1 PEAK FLOW RATE(CFS) = 476.45

\*\*\*\*\*

FLOW PROCESS FROM NODE 10114.00 TO NODE 10115.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 301.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1467.00 CHANNEL SLOPE = 0.0266  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 476.45  
FLOW VELOCITY(FEET/SEC.) = 9.44 FLOW DEPTH(FEET) = 4.10  
TRAVEL TIME(MIN.) = 2.59 Tc(MIN.) = 28.93  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10115.00 = 9622.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10115.00 TO NODE 10115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 28.93  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.791  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 10.60 0.30 1.000 -  
USER-DEFINED - 24.30 0.30 1.000 -  
USER-DEFINED - 47.70 0.30 1.000 -  
USER-DEFINED - 9.80 0.30 1.000 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 94.00 SUBAREA RUNOFF(CFS) = 126.13  
EFFECTIVE AREA(ACRES) = 427.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 427.1 PEAK FLOW RATE(CFS) = 573.07

\*\*\*\*\*

FLOW PROCESS FROM NODE 10115.00 TO NODE 10116.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 301.00 DOWNSTREAM(FEET) = 272.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1696.00 CHANNEL SLOPE = 0.0171  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 573.07  
FLOW VELOCITY(FEET/SEC.) = 8.38 FLOW DEPTH(FEET) = 4.77  
TRAVEL TIME(MIN.) = 3.37 Tc(MIN.) = 32.30  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10116.00 = 11318.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 32.30  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.690  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.90 0.30 1.000 -  
USER-DEFINED - 4.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 32.00 0.30 1.000 -  
USER-DEFINED - 3.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 45.60 SUBAREA RUNOFF(CFS) = 57.06  
EFFECTIVE AREA(ACRES) = 472.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 472.7 PEAK FLOW RATE(CFS) = 591.49

\*\*\*\*\*

FLOW PROCESS FROM NODE 10116.00 TO NODE 10116.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 32.30  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.690  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 1.000 -  
USER-DEFINED - 7.70 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 9.70 SUBAREA RUNOFF(CFS) = 12.14  
EFFECTIVE AREA(ACRES) = 482.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 482.4 PEAK FLOW RATE(CFS) = 603.62



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*****
FLOW PROCESS FROM NODE 10116.00 TO NODE 10117.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 272.00 DOWNSTREAM(FEET) = 252.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 878.00 CHANNEL SLOPE = 0.0228
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 603.62
FLOW VELOCITY(FEET/SEC.) = 9.46 FLOW DEPTH(FEET) = 4.61
TRAVEL TIME(MIN.) = 1.55 Tc(MIN.) = 33.85
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10117.00 = 12196.00 FEET.
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 33.85
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.650
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 0.60 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 8.20 0.30 1.000 -
USER-DEFINED - 1.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.993
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 14.97
EFFECTIVE AREA(ACRES) = 494.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 494.7 PEAK FLOW RATE(CFS) = 603.62
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10117.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 33.85
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.650
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.850 -
USER-DEFINED - 14.60 0.30 1.000 -
USER-DEFINED - 6.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 3.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996
SUBAREA AREA(ACRES) = 25.00 SUBAREA RUNOFF(CFS) = 30.40
EFFECTIVE AREA(ACRES) = 519.70 AREA-AVERAGED Fm(INCH/HR) = 0.30

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AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 519.7 PEAK FLOW RATE(CFS) = 631.53
*****
FLOW PROCESS FROM NODE 10117.00 TO NODE 10118.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 252.00 DOWNSTREAM(FEET) = 249.00
FLOW LENGTH(FEET) = 280.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 87.0 INCH PIPE IS 65.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.92
ESTIMATED PIPE DIAMETER(INCH) = 87.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 631.53
PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 34.09
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10118.00 = 12476.00 FEET.
*****
FLOW PROCESS FROM NODE 10118.00 TO NODE 10119.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 249.00 DOWNSTREAM(FEET) = 240.00
FLOW LENGTH(FEET) = 892.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 87.0 INCH PIPE IS 67.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.42
ESTIMATED PIPE DIAMETER(INCH) = 87.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 631.53
PIPE TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 34.90
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10119.00 = 13368.00 FEET.
*****
FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 34.90
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.623
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.100 -
USER-DEFINED - 1.00 0.30 0.600 -
USER-DEFINED - 0.80 0.30 0.850 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.706
SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 4.57
EFFECTIVE AREA(ACRES) = 523.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 523.3 PEAK FLOW RATE(CFS) = 631.53
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
*****

```

FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 34.90  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.623  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	9.60	0.30	0.600	-
USER-DEFINED	-	1.00	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.627  
 SUBAREA AREA (ACRES) = 13.60 SUBAREA RUNOFF (CFS) = 17.56  
 EFFECTIVE AREA (ACRES) = 536.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 536.9 PEAK FLOW RATE (CFS) = 640.84

FLOW PROCESS FROM NODE 10119.00 TO NODE 10119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 34.90  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.623  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.12  
 EFFECTIVE AREA (ACRES) = 537.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA (ACRES) = 537.0 PEAK FLOW RATE (CFS) = 640.96

FLOW PROCESS FROM NODE 10119.00 TO NODE 10120.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 240.00 DOWNSTREAM(FEET) = 239.00  
 FLOW LENGTH(FEET) = 120.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 90.0 INCH PIPE IS 71.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.14  
 ESTIMATED PIPE DIAMETER(INCH) = 90.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 640.96  
 PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 35.02  
 LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10120.00 = 13488.00 FEET.

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 35.02  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.620  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.657  
 SUBAREA AREA (ACRES) = 5.60 SUBAREA RUNOFF (CFS) = 7.17  
 EFFECTIVE AREA (ACRES) = 542.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA (ACRES) = 542.6 PEAK FLOW RATE (CFS) = 646.66

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 35.02  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.620  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	2.90	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.717  
 SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 6.45  
 EFFECTIVE AREA (ACRES) = 547.70 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
 TOTAL AREA (ACRES) = 547.7 PEAK FLOW RATE (CFS) = 653.11

FLOW PROCESS FROM NODE 10120.00 TO NODE 10120.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 35.02  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.620  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	2.70	0.30	1.000	-
USER-DEFINED	-	11.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 18.77  
EFFECTIVE AREA(ACRES) = 563.50 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 563.5 PEAK FLOW RATE(CFS) = 671.88

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10120.00 TO NODE 10121.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 239.00 DOWNSTREAM(FEET) = 213.00  
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 48.95  
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 671.88  
PIPE TRAVEL TIME(MIN.) = 0.07 Tc(MIN.) = 35.08  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10121.00 = 13682.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10121.00 TO NODE 10122.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 213.00 DOWNSTREAM(FEET) = 176.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 995.00 CHANNEL SLOPE = 0.0372  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 671.88  
FLOW VELOCITY(FEET/SEC.) = 11.66 FLOW DEPTH(FEET) = 4.38  
TRAVEL TIME(MIN.) = 1.42 Tc(MIN.) = 36.50  
LONGEST FLOWPATH FROM NODE 10100.00 TO NODE 10122.00 = 14677.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 36.50  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.581  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.80 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 8.42  
EFFECTIVE AREA(ACRES) = 570.80 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98

TOTAL AREA(ACRES) = 570.8 PEAK FLOW RATE(CFS) = 671.88  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 36.50  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.581  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 3.30 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 3.00 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 10.50 SUBAREA RUNOFF(CFS) = 12.11  
EFFECTIVE AREA(ACRES) = 581.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 581.3 PEAK FLOW RATE(CFS) = 672.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 36.50  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.581  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 3.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 3.50 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 9.11  
EFFECTIVE AREA(ACRES) = 589.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 589.2 PEAK FLOW RATE(CFS) = 681.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10122.00 TO NODE 10122.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 36.50  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.581  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.80 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$  (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 2.08  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.98  
TOTAL AREA (ACRES) = 591.0 PEAK FLOW RATE (CFS) = 683.96

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 591.0 TC (MIN.) = 36.50  
EFFECTIVE AREA (ACRES) = 591.00 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.30  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.984  
PEAK FLOW RATE (CFS) = 683.96

=====

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* Rancho Mission Viejo ROMP Study \*  
\* Storm Event: 100 Yr \*  
\* From Node: 10200 To Node: 10256 \*  
\*\*\*\*\*

FILE NAME: 0506102B.DAT  
TIME/DATE OF STUDY: 16:39 10/18/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.800
- 2) 10.00; 3.258
- 3) 15.00; 2.590
- 4) 20.00; 2.201
- 5) 25.00; 1.940
- 6) 30.00; 1.740
- 7) 40.00; 1.487
- 8) 50.00; 1.310
- 9) 60.00; 1.150
- 10) 90.00; 0.940
- 11) 120.00; 0.798
- 12) 180.00; 0.647
- 13) 360.00; 0.452
- 14) 1440.00; 0.187

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  - 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)
- \*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10200.00 TO NODE 10201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 293.00  
ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 617.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.991  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.261  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "3-4 DWELLINGS/ACRE"	-	0.73	0.30	0.600	0	9.99

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA RUNOFF(CFS) = 2.03  
TOTAL AREA(ACRES) = 0.73 PEAK FLOW RATE(CFS) = 2.03

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10201.00 TO NODE 10202.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 1 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 617.00 DOWNSTREAM ELEVATION(FEET) = 613.00  
STREET LENGTH(FEET) = 323.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 30.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.15  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.36  
HALFSTREET FLOOD WIDTH(FEET) = 10.07  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.62  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.94  
STREET FLOW TRAVEL TIME(MIN.) = 2.06 Tc(MIN.) = 12.05

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.984  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.88 0.30 0.600 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600  
 SUBAREA AREA (ACRES) = 0.88 SUBAREA RUNOFF (CFS) = 2.23  
 EFFECTIVE AREA (ACRES) = 1.62 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA (ACRES) = 1.6 PEAK FLOW RATE (CFS) = 4.08

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.38 HALFSTREET FLOOD WIDTH (FEET) = 11.32  
 FLOW VELOCITY (FEET/SEC.) = 2.77 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.07  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10202.00 = 616.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10202.00 TO NODE 10203.00 IS CODE = 63  
 -----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<

=====

UPSTREAM ELEVATION (FEET) = 613.00 DOWNSTREAM ELEVATION (FEET) = 594.00  
 STREET LENGTH (FEET) = 613.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 30.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.12  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.38  
 HALFSTREET FLOOD WIDTH (FEET) = 11.05  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.34  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.64  
 STREET FLOW TRAVEL TIME (MIN.) = 2.36 Tc (MIN.) = 14.40

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.670  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.82 0.30 0.614 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.614  
 SUBAREA AREA (ACRES) = 1.82 SUBAREA RUNOFF (CFS) = 4.08  
 EFFECTIVE AREA (ACRES) = 3.44 AREA-AVERAGED Fm (INCH/HR) = 0.18  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
 TOTAL AREA (ACRES) = 3.4 PEAK FLOW RATE (CFS) = 7.70

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.40 HALFSTREET FLOOD WIDTH (FEET) = 12.25

FLOW VELOCITY (FEET/SEC.) = 4.55 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.84  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10203.00 = 1229.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10203.00 TO NODE 10204.00 IS CODE = 63  
 -----

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<

=====

UPSTREAM ELEVATION (FEET) = 594.00 DOWNSTREAM ELEVATION (FEET) = 578.00  
 STREET LENGTH (FEET) = 433.00 CURB HEIGHT (INCHES) = 8.0  
 STREET HALFWIDTH (FEET) = 60.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 30.00  
 INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1  
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.96

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH (FEET) = 0.41  
 HALFSTREET FLOOD WIDTH (FEET) = 12.58  
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.06  
 PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.07  
 STREET FLOW TRAVEL TIME (MIN.) = 1.43 Tc (MIN.) = 15.83  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.525

SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.21 0.30 0.655 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.655  
 SUBAREA AREA (ACRES) = 1.21 SUBAREA RUNOFF (CFS) = 2.53  
 EFFECTIVE AREA (ACRES) = 4.64 AREA-AVERAGED Fm (INCH/HR) = 0.19  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
 TOTAL AREA (ACRES) = 4.6 PEAK FLOW RATE (CFS) = 9.78

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 13.07  
 FLOW VELOCITY (FEET/SEC.) = 5.15 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.16  
 LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10204.00 = 1662.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 31  
 -----

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<  
 >>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 578.00 DOWNSTREAM (FEET) = 575.00  
 FLOW LENGTH (FEET) = 147.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.0 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.68  
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 9.78  
PIPE TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 16.11  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10205.00 = 1809.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10204.00 TO NODE 10205.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.11  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.503

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.61	0.30	0.917	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 3.61 SUBAREA RUNOFF(CFS) = 7.23  
EFFECTIVE AREA(ACRES) = 8.25 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 16.92

\*\*\*\*\*

FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 563.00  
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.05  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 16.92  
PIPE TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 17.05  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10206.00 = 2374.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10205.00 TO NODE 10206.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.05  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.430

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.75	0.30	0.669	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.669  
SUBAREA AREA(ACRES) = 4.75 SUBAREA RUNOFF(CFS) = 9.53  
EFFECTIVE AREA(ACRES) = 13.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA(ACRES) = 13.0 PEAK FLOW RATE(CFS) = 25.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 10206.00 TO NODE 10207.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 563.00 DOWNSTREAM(FEET) = 547.00  
FLOW LENGTH(FEET) = 599.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.22  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 25.90  
PIPE TRAVEL TIME(MIN.) = 0.82 Tc(MIN.) = 17.87  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10207.00 = 2973.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10206.10 TO NODE 10207.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.87  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.367

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.59	0.30	0.664	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.664  
SUBAREA AREA(ACRES) = 4.59 SUBAREA RUNOFF(CFS) = 8.95  
EFFECTIVE AREA(ACRES) = 17.58 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71  
TOTAL AREA(ACRES) = 17.6 PEAK FLOW RATE(CFS) = 34.11

\*\*\*\*\*

FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 547.00 DOWNSTREAM(FEET) = 516.00  
FLOW LENGTH(FEET) = 600.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 17.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.20  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 34.11  
PIPE TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 18.49  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10208.00 = 3573.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10207.00 TO NODE 10208.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.49  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.319

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.60	0.30	0.697	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.697

SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 6.84  
EFFECTIVE AREA (ACRES) = 21.18 AREA-AVERAGED Fm (INCH/HR) = 0.21  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA (ACRES) = 21.2 PEAK FLOW RATE (CFS) = 40.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 516.00 DOWNSTREAM (FEET) = 480.00  
FLOW LENGTH (FEET) = 604.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 18.38  
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 40.18  
PIPE TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 19.03  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10209.00 = 4177.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10208.00 TO NODE 10209.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 19.03  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.276  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.21	0.30	0.645	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645  
SUBAREA AREA (ACRES) = 8.21 SUBAREA RUNOFF (CFS) = 15.40  
EFFECTIVE AREA (ACRES) = 29.40 AREA-AVERAGED Fm (INCH/HR) = 0.21  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA (ACRES) = 29.4 PEAK FLOW RATE (CFS) = 54.77

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 480.00 DOWNSTREAM (FEET) = 438.00  
FLOW LENGTH (FEET) = 678.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 20.18  
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 54.77  
PIPE TRAVEL TIME (MIN.) = 0.56 Tc (MIN.) = 19.59  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10210.00 = 4855.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10209.00 TO NODE 10210.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 19.59  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.233  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.49	0.30	0.986	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 10.49 SUBAREA RUNOFF (CFS) = 18.29  
EFFECTIVE AREA (ACRES) = 39.89 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
TOTAL AREA (ACRES) = 39.9 PEAK FLOW RATE (CFS) = 71.91

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 438.00 DOWNSTREAM (FEET) = 280.00  
FLOW LENGTH (FEET) = 2662.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.5 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 21.24  
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 71.91  
PIPE TRAVEL TIME (MIN.) = 2.09 Tc (MIN.) = 21.68  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10211.00 = 7517.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10210.00 TO NODE 10211.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 21.68  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.113  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 10.00 SUBAREA RUNOFF (CFS) = 16.32  
EFFECTIVE AREA (ACRES) = 49.89 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA (ACRES) = 49.9 PEAK FLOW RATE (CFS) = 83.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 280.00 DOWNSTREAM (FEET) = 176.00  
FLOW LENGTH (FEET) = 935.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 27.70  
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 83.94



PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 22.24  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10212.00 = 8452.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10211.00 TO NODE 10212.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.24  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.084  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 18.37 0.30 0.926 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.926  
SUBAREA AREA(ACRES) = 18.37 SUBAREA RUNOFF(CFS) = 29.86  
EFFECTIVE AREA(ACRES) = 68.26 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 68.3 PEAK FLOW RATE(CFS) = 112.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10212.00 TO NODE 10242.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 176.00 DOWNSTREAM(FEET) = 169.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00 CHANNEL SLOPE = 0.0211  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.97 0.30 0.970 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.970  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 114.03  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.06  
AVERAGE FLOW DEPTH(FEET) = 2.51 TRAVEL TIME(MIN.) = 0.91  
Tc(MIN.) = 23.16  
SUBAREA AREA(ACRES) = 1.97 SUBAREA RUNOFF(CFS) = 3.09  
EFFECTIVE AREA(ACRES) = 70.23 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 70.2 PEAK FLOW RATE(CFS) = 112.65

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 2.49 FLOW VELOCITY(FEET/SEC.) = 6.05  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10220.00 TO NODE 10221.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 308.00 DOWNSTREAM(FEET) = 300.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 15.111  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.581  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"GRASS" - 1.03 0.30 1.000 0 15.11  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.12  
TOTAL AREA(ACRES) = 1.03 PEAK FLOW RATE(CFS) = 2.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10221.10 TO NODE 10222.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION(FEET) = 300.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
STREET LENGTH(FEET) = 434.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.72  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.23  
HALFSTREET FLOOD WIDTH(FEET) = 3.80  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.57  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.31  
STREET FLOW TRAVEL TIME(MIN.) = 1.30 Tc(MIN.) = 16.41  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.480

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.64 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.64 SUBAREA RUNOFF(CFS) = 3.21  
EFFECTIVE AREA(ACRES) = 2.67 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 2.7 PEAK FLOW RATE (CFS) = 5.24

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.26 HALFSTREET FLOOD WIDTH (FEET) = 5.22  
FLOW VELOCITY (FEET/SEC.) = 5.66 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.49  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10222.00 = 764.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10221.20 TO NODE 10222.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 16.41

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.480

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.12	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 3.12 SUBAREA RUNOFF (CFS) = 6.11

EFFECTIVE AREA (ACRES) = 5.78 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 5.8 PEAK FLOW RATE (CFS) = 11.35

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.10 TO NODE 10223.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION (FEET) = 261.00 DOWNSTREAM ELEVATION (FEET) = 208.00

STREET LENGTH (FEET) = 622.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.58

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.97

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.34

HALFSTREET FLOOD WIDTH (FEET) = 8.98

AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.51

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.20

STREET FLOW TRAVEL TIME (MIN.) = 1.59 Tc (MIN.) = 18.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.357

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.75	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 1.75 SUBAREA RUNOFF (CFS) = 3.25

EFFECTIVE AREA (ACRES) = 7.54 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 7.5 PEAK FLOW RATE (CFS) = 13.95

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.35 HALFSTREET FLOOD WIDTH (FEET) = 9.34

FLOW VELOCITY (FEET/SEC.) = 6.57 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.27

LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10223.00 = 1386.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10222.20 TO NODE 10223.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 18.00

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.357

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.91	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 7.91 SUBAREA RUNOFF (CFS) = 14.64

EFFECTIVE AREA (ACRES) = 15.45 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 15.4 PEAK FLOW RATE (CFS) = 28.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 10223.10 TO NODE 10224.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<

UPSTREAM ELEVATION (FEET) = 208.00 DOWNSTREAM ELEVATION (FEET) = 204.00

STREET LENGTH (FEET) = 758.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 15.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 32.33

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.63

HALFSTREET FLOOD WIDTH (FEET) = 23.76

AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.77

PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.76

STREET FLOW TRAVEL TIME (MIN.) = 4.56 Tc (MIN.) = 22.56

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.067

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.70	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.70 SUBAREA RUNOFF (CFS) = 7.47  
EFFECTIVE AREA (ACRES) = 20.15 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 20.1 PEAK FLOW RATE (CFS) = 32.05

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.63 HALFSTREET FLOOD WIDTH (FEET) = 23.70  
FLOW VELOCITY (FEET/SEC.) = 2.76 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.74  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10224.00 = 2144.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10223.20 TO NODE 10224.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 22.56  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.067  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.21	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 1.21 SUBAREA RUNOFF (CFS) = 1.92  
EFFECTIVE AREA (ACRES) = 21.35 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 21.4 PEAK FLOW RATE (CFS) = 33.97

\*\*\*\*\*

FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 204.00 DOWNSTREAM (FEET) = 201.00  
FLOW LENGTH (FEET) = 422.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 7.92  
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 33.97  
PIPE TRAVEL TIME (MIN.) = 0.89 Tc (MIN.) = 23.45  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10225.00 = 2566.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10224.00 TO NODE 10225.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 23.45  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.021  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.81	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.81 SUBAREA RUNOFF (CFS) = 7.46  
EFFECTIVE AREA (ACRES) = 26.17 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 26.2 PEAK FLOW RATE (CFS) = 40.53

\*\*\*\*\*

FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 201.00 DOWNSTREAM (FEET) = 197.00  
FLOW LENGTH (FEET) = 799.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 7.17  
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 40.53  
PIPE TRAVEL TIME (MIN.) = 1.86 Tc (MIN.) = 25.31  
LONGEST FLOWPATH FROM NODE 10220.00 TO NODE 10238.00 = 3365.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10225.00 TO NODE 10238.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 25.31  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.928  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.24	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 4.24 SUBAREA RUNOFF (CFS) = 6.21  
EFFECTIVE AREA (ACRES) = 30.41 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 30.4 PEAK FLOW RATE (CFS) = 44.55

\*\*\*\*\*

FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 25.31  
RAINFALL INTENSITY (INCH/HR) = 1.93  
AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 1.00  
EFFECTIVE STREAM AREA (ACRES) = 30.41  
TOTAL STREAM AREA (ACRES) = 30.41  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 44.55

\*\*\*\*\*

FLOW PROCESS FROM NODE 10230.00 TO NODE 10231.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 276.00
ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 390.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.944
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.509

SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
AGRICULTURAL POOR COVER
"FALLOW" - 0.95 0.30 1.000 0 5.94
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 3.60
TOTAL AREA(ACRES) = 0.95 PEAK FLOW RATE(CFS) = 3.60

\*\*\*\*\*
FLOW PROCESS FROM NODE 10231.10 TO NODE 10232.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 390.00 DOWNSTREAM(FEET) = 301.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 394.00 CHANNEL SLOPE = 0.2259
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.281

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.68 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.62
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.87
AVERAGE FLOW DEPTH(FEET) = 0.50 TRAVEL TIME(MIN.) = 0.74
Tc(MIN.) = 6.68
SUBAREA AREA(ACRES) = 1.68 SUBAREA RUNOFF(CFS) = 6.03
EFFECTIVE AREA(ACRES) = 2.63 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.6 PEAK FLOW RATE(CFS) = 9.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.57 FLOW VELOCITY(FEET/SEC.) = 9.77
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10232.00 = 670.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10231.20 TO NODE 10232.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 6.68
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.281

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.38 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.38 SUBAREA RUNOFF(CFS) = 22.85
EFFECTIVE AREA(ACRES) = 9.01 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 9.0 PEAK FLOW RATE(CFS) = 32.29

\*\*\*\*\*
FLOW PROCESS FROM NODE 10232.00 TO NODE 10233.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 301.00 DOWNSTREAM ELEVATION(FEET) = 277.00
STREET LENGTH(FEET) = 341.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.61

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.20
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.46
HALFSTREET FLOOD WIDTH(FEET) = 15.15
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.69
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.55
STREET FLOW TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 7.42
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.053

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 11.83
EFFECTIVE AREA(ACRES) = 12.52 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 12.5 PEAK FLOW RATE(CFS) = 42.27

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 15.79
FLOW VELOCITY(FEET/SEC.) = 7.88 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.73
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10233.00 = 1011.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 10233.10 TO NODE 10234.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 277.00 DOWNSTREAM ELEVATION(FEET) = 226.00
STREET LENGTH(FEET) = 682.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 48.68

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.49
HALFSTREET FLOOD WIDTH(FEET) = 16.49
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.36
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.08
STREET FLOW TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 8.78
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.634

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.27 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 4.27 SUBAREA RUNOFF(CFS) = 12.81
EFFECTIVE AREA(ACRES) = 16.78 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 16.8 PEAK FLOW RATE(CFS) = 50.36

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 16.73
FLOW VELOCITY(FEET/SEC.) = 8.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.15
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10234.00 = 1693.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10233.20 TO NODE 10234.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 8.78
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.634
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 15.60 0.30 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.60 SUBAREA RUNOFF(CFS) = 46.80
EFFECTIVE AREA(ACRES) = 32.38 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 97.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 10234.10 TO NODE 10235.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 3 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 226.00 DOWNSTREAM ELEVATION(FEET) = 205.00
STREET LENGTH(FEET) = 759.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 40.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 103.30

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.70
HALFSTREET FLOOD WIDTH(FEET) = 28.56
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.89
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.81
STREET FLOW TRAVEL TIME(MIN.) = 1.84 Tc(MIN.) = 10.62
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.175

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.74 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 12.28
EFFECTIVE AREA(ACRES) = 37.13 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 97.16

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.69 HALFSTREET FLOOD WIDTH(FEET) = 27.31
FLOW VELOCITY(FEET/SEC.) = 6.79 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.66

\*NOTE: ESTIMATED STREET FLOW DEPTH IS GREATER THAN
THE MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67
SIZE PIPE(S) TO SATISFY THE STREET CONSTRAINT AS FOLLOWS:
\*\* PIPE SIZED TO MAXIMIZE STREETFLOW AT DOWNSTREAM NODE \*\*
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
ASSUME FULL-FLOWING PIPELINE
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.37
PIPE-FLOW(CFS) = 16.57
PIPEFLOW TRAVEL TIME(MIN.) = 1.35 Tc(MIN.) = 10.13
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.240
SUBAREA AREA(ACRES) = 4.74 SUBAREA RUNOFF(CFS) = 12.56
TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 98.25
STREETFLOW HYDRAULICS BASED ON MAINLINE Tc :

STREET HYDRAULICS COMPUTED USING ESTIMATED FLOW(CFS) = 81.68  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.65  
HALFSTREET FLOOD WIDTH(FEET) = 24.73  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.48  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.23  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10235.00 = 2452.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10234.20 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.13  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.240  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.02 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.02 SUBAREA RUNOFF(CFS) = 21.22  
EFFECTIVE AREA(ACRES) = 45.15 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 45.1 PEAK FLOW RATE(CFS) = 119.47

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10234.30 TO NODE 10235.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.13  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.240  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.62 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.62 SUBAREA RUNOFF(CFS) = 6.92  
EFFECTIVE AREA(ACRES) = 47.76 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 47.8 PEAK FLOW RATE(CFS) = 126.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10235.00 TO NODE 10236.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 205.00 DOWNSTREAM(FEET) = 201.00  
FLOW LENGTH(FEET) = 489.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 36.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.51  
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 126.39  
PIPE TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 10.84  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10236.00 = 2941.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10235.10 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.84  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.146  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.89 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 2.89 SUBAREA RUNOFF(CFS) = 7.41  
EFFECTIVE AREA(ACRES) = 50.65 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 50.7 PEAK FLOW RATE(CFS) = 129.73

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10235.20 TO NODE 10236.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.84  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.146  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.84 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.84 SUBAREA RUNOFF(CFS) = 12.39  
EFFECTIVE AREA(ACRES) = 55.49 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 55.5 PEAK FLOW RATE(CFS) = 142.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 201.00 DOWNSTREAM(FEET) = 199.00  
FLOW LENGTH(FEET) = 278.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.26  
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 142.13  
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 11.25  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10237.00 = 3219.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10236.00 TO NODE 10237.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.25

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.091  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.62 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.62 SUBAREA RUNOFF (CFS) = 4.07  
 EFFECTIVE AREA (ACRES) = 57.11 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 57.1 PEAK FLOW RATE (CFS) = 143.45

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 199.00 DOWNSTREAM (FEET) = 197.00  
 FLOW LENGTH (FEET) = 345.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.44  
 ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 143.45  
 PIPE TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 11.80  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10237.00 TO NODE 10238.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 11.80  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.017  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.38 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.38 SUBAREA RUNOFF (CFS) = 3.37  
 EFFECTIVE AREA (ACRES) = 58.49 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 58.5 PEAK FLOW RATE (CFS) = 143.45  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.00 TO NODE 10238.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
 =====  
 TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION (MIN.) = 11.80  
 RAINFALL INTENSITY (INCH/HR) = 3.02  
 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA (ACRES) = 58.49  
 TOTAL STREAM AREA (ACRES) = 58.49  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 143.45

\*\* CONFLUENCE DATA \*\*  
 STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 44.55 25.31 1.928 0.30 ( 0.30) 1.00 30.4 10220.00  
 2 143.45 11.80 3.017 0.30 ( 0.30) 1.00 58.5 10230.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 178.13 11.80 3.017 0.30 ( 0.30) 1.00 72.7 10230.00  
 2 130.49 25.31 1.928 0.30 ( 0.30) 1.00 88.9 10220.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE (CFS) = 178.13 Tc (MIN.) = 11.80  
 EFFECTIVE AREA (ACRES) = 72.67 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 88.9  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10238.00 = 3564.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.00 TO NODE 10239.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 197.00 DOWNSTREAM (FEET) = 193.00  
 FLOW LENGTH (FEET) = 753.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 60.0 INCH PIPE IS 48.6 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 10.45  
 ESTIMATED PIPE DIAMETER (INCH) = 60.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 178.13  
 PIPE TRAVEL TIME (MIN.) = 1.20 Tc (MIN.) = 13.00  
 LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10239.00 = 4317.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10238.10 TO NODE 10239.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN.) = 13.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.857  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.72 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.72 SUBAREA RUNOFF (CFS) = 6.26  
 EFFECTIVE AREA (ACRES) = 75.39 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 91.6 PEAK FLOW RATE (CFS) = 178.13  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10238.20 TO NODE 10239.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 13.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.857  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 34.37 0.30 0.991 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.991  
SUBAREA AREA (ACRES) = 34.37 SUBAREA RUNOFF (CFS) = 79.17  
EFFECTIVE AREA (ACRES) = 109.76 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 126.0 PEAK FLOW RATE (CFS) = 252.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 193.00 DOWNSTREAM (FEET) = 191.00  
FLOW LENGTH (FEET) = 301.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 66.0 INCH PIPE IS 52.6 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 12.46  
ESTIMATED PIPE DIAMETER (INCH) = 66.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 252.66  
PIPE TRAVEL TIME (MIN.) = 0.40 Tc (MIN.) = 13.41  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10240.00 = 4618.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10239.00 TO NODE 10240.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc (MIN.) = 13.41  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.803  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.22 0.30 0.916 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.916  
SUBAREA AREA (ACRES) = 2.22 SUBAREA RUNOFF (CFS) = 5.06  
EFFECTIVE AREA (ACRES) = 111.99 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA (ACRES) = 128.2 PEAK FLOW RATE (CFS) = 252.66  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10240.00 TO NODE 10241.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 191.00 DOWNSTREAM (FEET) = 180.00  
FLOW LENGTH (FEET) = 150.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.6 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 30.62  
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 252.66  
PIPE TRAVEL TIME (MIN.) = 0.08 Tc (MIN.) = 13.49  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10241.00 = 4768.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10241.00 TO NODE 10242.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 180.00 DOWNSTREAM (FEET) = 169.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 267.00 CHANNEL SLOPE = 0.0412  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.742  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.16 0.30 0.958 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.958  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 255.05  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.81  
AVERAGE FLOW DEPTH (FEET) = 2.68 TRAVEL TIME (MIN.) = 0.38  
Tc (MIN.) = 13.86  
SUBAREA AREA (ACRES) = 2.16 SUBAREA RUNOFF (CFS) = 4.77  
EFFECTIVE AREA (ACRES) = 114.15 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 130.4 PEAK FLOW RATE (CFS) = 252.66  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH (FEET) = 2.67 FLOW VELOCITY (FEET/SEC.) = 11.79  
LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 11  
-----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\*\*\*\*  
\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	252.66	13.86	2.742	0.30 (0.30)	0.99	114.1	10230.00
2	180.75	27.52	1.839	0.30 (0.30)	1.00	130.4	10220.00

LONGEST FLOWPATH FROM NODE 10230.00 TO NODE 10242.00 = 5035.00 FEET.

\*\*\*\*\*  
\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM	Q	Tc	Intensity	Fp (Fm)	Ap	Ae	HEADWATER
--------	---	----	-----------	---------	----	----	-----------



NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 112.65 23.16 2.036 0.30( 0.25) 0.85 70.2 10200.00  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	346.80	13.86	2.742	0.30( 0.29)	0.96	156.2	10230.00
2	316.38	23.16	2.036	0.30( 0.28)	0.94	195.4	10200.00
3	280.93	27.52	1.839	0.30( 0.28)	0.94	200.6	10220.00
TOTAL AREA (ACRES) =		200.6					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 346.80 Tc(MIN.) = 13.865  
EFFECTIVE AREA(ACRES) = 156.19 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
TOTAL AREA(ACRES) = 200.6  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10242.00 = 8784.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10242.00 IS CODE = 12  
-----  
>>>>CLEAR MEMORY BANK # 1 <<<<<<  
-----  
\*\*\*\*\*

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10242.00 TO NODE 10256.00 IS CODE = 51  
-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
-----  
ELEVATION DATA: UPSTREAM(FEET) = 169.00 DOWNSTREAM(FEET) = 163.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 315.00 CHANNEL SLOPE = 0.0190  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.669  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.10 0.30 0.995 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 356.51  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.62  
AVERAGE FLOW DEPTH(FEET) = 3.51 TRAVEL TIME(MIN.) = 0.55  
Tc(MIN.) = 14.41  
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 19.42  
EFFECTIVE AREA(ACRES) = 165.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
TOTAL AREA(ACRES) = 209.7 PEAK FLOW RATE(CFS) = 354.32  
  
END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.51 FLOW VELOCITY(FEET/SEC.) = 9.60  
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.  
  
\*\*\*\*\*  
FLOW PROCESS FROM NODE 10243.00 TO NODE 10256.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
-----  
MAINLINE Tc(MIN.) = 14.41  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.669  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.01 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 7.01 SUBAREA RUNOFF(CFS) = 14.93  
EFFECTIVE AREA(ACRES) = 172.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
TOTAL AREA(ACRES) = 216.7 PEAK FLOW RATE(CFS) = 369.26  
  
\*\*\*\*\*  
FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1  
-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.41  
RAINFALL INTENSITY(INCH/HR) = 2.67  
AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.96  
EFFECTIVE STREAM AREA(ACRES) = 172.30  
TOTAL STREAM AREA(ACRES) = 216.71  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 369.26  
  
\*\*\*\*\*  
FLOW PROCESS FROM NODE 10250.00 TO NODE 10251.00 IS CODE = 21  
-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 284.00  
ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 243.00  
  
Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 16.802  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.450  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"WOODLAND,GRASS" - 1.04 0.30 1.000 0 16.80  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.01  
TOTAL AREA(ACRES) = 1.04 PEAK FLOW RATE(CFS) = 2.01  
  
\*\*\*\*\*  
FLOW PROCESS FROM NODE 10251.00 TO NODE 10252.00 IS CODE = 63  
-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 243.00 DOWNSTREAM ELEVATION(FEET) = 240.00  
STREET LENGTH(FEET) = 301.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.31  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.78  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.08  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.65  
STREET FLOW TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 19.21  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.263

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.47 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.47 SUBAREA RUNOFF(CFS) = 2.60  
EFFECTIVE AREA(ACRES) = 2.51 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 2.5 PEAK FLOW RATE(CFS) = 4.44

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 8.97  
FLOW VELOCITY(FEET/SEC.) = 2.23 DEPTH\*VELOCITY(FT\*FT/SEC.) = 0.75  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10252.00 = 585.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10252.00 TO NODE 10253.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 240.00 DOWNSTREAM ELEVATION(FEET) = 234.00  
STREET LENGTH(FEET) = 544.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.09  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.60  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.64  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.03  
STREET FLOW TRAVEL TIME(MIN.) = 3.44 Tc(MIN.) = 22.65  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.063

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.60 SUBAREA RUNOFF(CFS) = 7.30  
EFFECTIVE AREA(ACRES) = 7.12 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 11.29

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 13.40  
FLOW VELOCITY(FEET/SEC.) = 2.84 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.21  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10253.00 = 1129.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 234.00 DOWNSTREAM(FEET) = 219.00  
FLOW LENGTH(FEET) = 362.00 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.6 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.78  
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 11.29  
PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 23.16  
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10254.00 = 1491.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10253.00 TO NODE 10254.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
-----

MAINLINE Tc(MIN.) = 23.16  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.036  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.55 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 8.55 SUBAREA RUNOFF(CFS) = 13.35  
EFFECTIVE AREA(ACRES) = 15.66 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 15.7 PEAK FLOW RATE(CFS) = 24.47

\*\*\*\*\*

FLOW PROCESS FROM NODE 10254.00 TO NODE 10255.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 219.00 DOWNSTREAM(FEET) = 182.00
FLOW LENGTH(FEET) = 716.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.45
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 24.47
PIPE TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 23.93
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10255.00 = 2207.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10255.00 TO NODE 10256.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 182.00 DOWNSTREAM(FEET) = 163.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.0833
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 20.00
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.974
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 13.88 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 34.93
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.34
AVERAGE FLOW DEPTH(FEET) = 1.12 TRAVEL TIME(MIN.) = 0.41
Tc(MIN.) = 24.34
SUBAREA AREA(ACRES) = 13.88 SUBAREA RUNOFF(CFS) = 20.92
EFFECTIVE AREA(ACRES) = 29.54 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 29.5 PEAK FLOW RATE(CFS) = 44.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.22 FLOW VELOCITY(FEET/SEC.) = 9.91
LONGEST FLOWPATH FROM NODE 10250.00 TO NODE 10256.00 = 2435.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10256.00 TO NODE 10256.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 24.34
RAINFALL INTENSITY(INCH/HR) = 1.97
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00

EFFECTIVE STREAM AREA(ACRES) = 29.54

TOTAL STREAM AREA(ACRES) = 29.54

PEAK FLOW RATE(CFS) AT CONFLUENCE = 44.52

\*\* CONFLUENCE DATA \*\*

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 6 rows of data.

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 4 rows of data.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 406.54 Tc(MIN.) = 14.41
EFFECTIVE AREA(ACRES) = 189.79 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 246.3
LONGEST FLOWPATH FROM NODE 10200.00 TO NODE 10256.00 = 9099.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 246.3 TC(MIN.) = 14.41
EFFECTIVE AREA(ACRES) = 189.79 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.963
PEAK FLOW RATE(CFS) = 406.54

\*\* PEAK FLOW RATE TABLE \*\*

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 4 rows of data.

END OF RATIONAL METHOD ANALYSIS



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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506103B.DAT  
TIME/DATE OF STUDY: 12:44 04/15/2013  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.820
- 2) 6.00; 4.350
- 3) 7.00; 3.990
- 4) 8.00; 3.700
- 5) 9.00; 3.460
- 6) 10.00; 3.260
- 7) 11.00; 3.090
- 8) 12.00; 2.940
- 9) 13.00; 2.810
- 10) 14.00; 2.690
- 11) 15.00; 2.590
- 12) 20.00; 2.200
- 13) 25.00; 1.940
- 14) 30.00; 1.750
- 15) 40.00; 1.490
- 16) 50.00; 1.310
- 17) 60.00; 1.180
- 18) 90.00; 0.940
- 19) 120.00; 0.800
- 20) 180.00; 0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00 0.0313 0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10300.00 TO NODE 10301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00  
ELEVATION DATA: UPSTREAM(FEET) = 627.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 5.147  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.751  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "5-7 DWELLINGS/ACRE"	-	1.20	0.30	0.500	95	5.15

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.500  
 SUBAREA RUNOFF(CFS) = 4.97  
 TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 4.97

\*\*\*\*\*

FLOW PROCESS FROM NODE 10301.00 TO NODE 10302.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 510.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.2609  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 4.97  
 FLOW VELOCITY(FEET/SEC.) = 7.08 FLOW DEPTH(FEET) = 0.48  
 TRAVEL TIME(MIN.) = 0.27  $T_c$ (MIN.) = 5.42  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10302.00 = 443.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10302.00 TO NODE 10302.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 5.42  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.624  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 6.04  
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 10.87

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10302.00 TO NODE 10303.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 510.00 DOWNSTREAM(FEET) = 467.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 167.00 CHANNEL SLOPE = 0.2575  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 10.87  
FLOW VELOCITY(FEET/SEC.) = 8.54 FLOW DEPTH(FEET) = 0.65  
TRAVEL TIME(MIN.) = 0.33 Tc(MIN.) = 5.74  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10303.00 = 610.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10303.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.74  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.471  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 8.55  
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 19.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10303.00 TO NODE 10304.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 467.00 DOWNSTREAM(FEET) = 446.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.1826  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 19.05  
FLOW VELOCITY(FEET/SEC.) = 8.64 FLOW DEPTH(FEET) = 0.86  
TRAVEL TIME(MIN.) = 0.22 Tc(MIN.) = 5.97  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10304.00 = 725.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10304.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 5.97  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.366  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.500 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 9.05  
EFFECTIVE AREA(ACRES) = 7.30 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
TOTAL AREA(ACRES) = 7.3 PEAK FLOW RATE(CFS) = 27.65

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10304.00 TO NODE 10305.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 446.00 DOWNSTREAM(FEET) = 366.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 423.00 CHANNEL SLOPE = 0.1891  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 27.65  
FLOW VELOCITY(FEET/SEC.) = 9.72 FLOW DEPTH(FEET) = 0.97  
TRAVEL TIME(MIN.) = 0.73 Tc(MIN.) = 6.69  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10305.00 = 1148.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10305.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 6.69  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.101  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 1.50 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.912  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 11.71  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.65  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 37.62

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10305.00 TO NODE 10306.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 366.00 DOWNSTREAM(FEET) = 300.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 574.00 CHANNEL SLOPE = 0.1150  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 37.62  
FLOW VELOCITY (FEET/SEC.) = 8.67 FLOW DEPTH (FEET) = 1.20  
TRAVEL TIME (MIN.) = 1.10 Tc (MIN.) = 7.79  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10306.00 = 1722.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10306.00 TO NODE 10306.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

MAINLINE Tc (MIN.) = 7.79  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.760  
SUBAREA LOSS RATE DATA (AMC II):  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986  
SUBAREA AREA (ACRES) = 3.60 SUBAREA RUNOFF (CFS) = 11.22  
EFFECTIVE AREA (ACRES) = 14.30 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA (ACRES) = 14.3 PEAK FLOW RATE (CFS) = 45.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10306.00 TO NODE 10307.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET)	DOWNSTREAM (FEET)
300.00	293.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0350  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 45.55  
FLOW VELOCITY (FEET/SEC.) = 5.82 FLOW DEPTH (FEET) = 1.61  
TRAVEL TIME (MIN.) = 0.57 Tc (MIN.) = 8.37  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10307.00 = 1922.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10307.00 TO NODE 10307.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

MAINLINE Tc (MIN.) = 8.37  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.612  
SUBAREA LOSS RATE DATA (AMC II):  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 2.09  
EFFECTIVE AREA (ACRES) = 15.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 15.0 PEAK FLOW RATE (CFS) = 45.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10307.00 TO NODE 10308.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET)	DOWNSTREAM (FEET)
293.00	276.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 200.00 CHANNEL SLOPE = 0.0850  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 45.74  
FLOW VELOCITY (FEET/SEC.) = 10.06 FLOW DEPTH (FEET) = 1.23  
TRAVEL TIME (MIN.) = 0.33 Tc (MIN.) = 8.70  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10308.00 = 2122.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10308.00 TO NODE 10308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	8.50	0.30	0.500	-
USER-DEFINED	-	3.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-

MAINLINE Tc (MIN.) = 8.70  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.533  
SUBAREA LOSS RATE DATA (AMC II):  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.696  
SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 41.88  
EFFECTIVE AREA (ACRES) = 29.00 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA (ACRES) = 29.0 PEAK FLOW RATE (CFS) = 86.54

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10308.00 TO NODE 10309.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET)	DOWNSTREAM (FEET)
276.00	250.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 600.00 CHANNEL SLOPE = 0.0433  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 86.54  
FLOW VELOCITY (FEET/SEC.) = 9.18 FLOW DEPTH (FEET) = 1.77  
TRAVEL TIME (MIN.) = 1.09 Tc (MIN.) = 9.79  
LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10309.00 = 2722.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.79  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.303  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.00	0.30	0.600	-
USER-DEFINED	-	1.80	0.30	0.850	-
USER-DEFINED	-	1.40	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	0.500	-
USER-DEFINED	-	2.10	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.662  
 SUBAREA AREA (ACRES) = 15.40 SUBAREA RUNOFF (CFS) = 43.02  
 EFFECTIVE AREA (ACRES) = 44.40 AREA-AVERAGED Fm (INCH/HR) = 0.21  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
 TOTAL AREA (ACRES) = 44.4 PEAK FLOW RATE (CFS) = 123.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10309.00 TO NODE 10309.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.79  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.303  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.30	0.850	-
USER-DEFINED	-	8.80	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.967  
 SUBAREA AREA (ACRES) = 15.80 SUBAREA RUNOFF (CFS) = 42.84  
 EFFECTIVE AREA (ACRES) = 60.20 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA (ACRES) = 60.2 PEAK FLOW RATE (CFS) = 166.40

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10309.00 TO NODE 10310.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 250.00 DOWNSTREAM(FEET) = 208.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1021.00 CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 166.40  
 FLOW VELOCITY(FEET/SEC.) = 10.61 FLOW DEPTH(FEET) = 2.29  
 TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 11.39  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10310.00 = 3743.00 FEET.

FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.39  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.031  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	1.80	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.668  
 SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 16.82  
 EFFECTIVE AREA (ACRES) = 66.80 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA (ACRES) = 66.8 PEAK FLOW RATE (CFS) = 168.53

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10310.00 TO NODE 10310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.39  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.031  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	8.00	0.30	0.600	-
USER-DEFINED	-	7.10	0.30	0.850	-
USER-DEFINED	-	8.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814  
 SUBAREA AREA (ACRES) = 23.50 SUBAREA RUNOFF (CFS) = 58.95  
 EFFECTIVE AREA (ACRES) = 90.30 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
 TOTAL AREA (ACRES) = 90.3 PEAK FLOW RATE (CFS) = 227.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10310.00 TO NODE 10335.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 208.00 DOWNSTREAM(FEET) = 189.00  
 FLOW LENGTH(FEET) = 1595.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.12  
 ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 227.48  
 PIPE TRAVEL TIME(MIN.) = 1.76 Tc(MIN.) = 13.15  
 LONGEST FLOWPATH FROM NODE 10300.00 TO NODE 10335.00 = 5338.00 FEET.



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*****
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.15
RAINFALL INTENSITY(INCH/HR) = 2.79
AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.77
EFFECTIVE STREAM AREA(ACRES) = 90.30
TOTAL STREAM AREA(ACRES) = 90.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 227.48

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*****
FLOW PROCESS FROM NODE 10320.00 TO NODE 10321.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH( FEET) = 330.00
ELEVATION DATA: UPSTREAM( FEET) = 671.00 DOWNSTREAM( FEET) = 622.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.795
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.447
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE" - 1.00 0.30 0.500 95 5.79
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA RUNOFF(CFS) = 3.87
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 3.87

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*****
FLOW PROCESS FROM NODE 10321.00 TO NODE 10322.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM( FEET) = 622.00 DOWNSTREAM( FEET) = 599.00
CHANNEL LENGTH THRU SUBAREA( FEET) = 227.00 CHANNEL SLOPE = 0.1013
CHANNEL BASE( FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH( FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.87
FLOW VELOCITY( FEET/SEC.) = 5.83 FLOW DEPTH( FEET) = 0.47
TRAVEL TIME(MIN.) = 0.65 Tc(MIN.) = 6.44
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10322.00 = 557.00 FEET.

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*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10322.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 6.44
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.190
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.30 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 5.09
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 8.73

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*****
FLOW PROCESS FROM NODE 10322.00 TO NODE 10323.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM( FEET) = 599.00 DOWNSTREAM( FEET) = 539.00
FLOW LENGTH( FEET) = 162.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.6 INCHES
PIPE-FLOW VELOCITY( FEET/SEC.) = 24.39
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.73
PIPE TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 6.55
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10323.00 = 719.00 FEET.

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*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10323.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 6.55
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.151
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.30 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.80
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 10.44

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*****
FLOW PROCESS FROM NODE 10323.00 TO NODE 10324.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM( FEET) = 539.00 DOWNSTREAM( FEET) = 530.00
CHANNEL LENGTH THRU SUBAREA( FEET) = 97.00 CHANNEL SLOPE = 0.0928
CHANNEL BASE( FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH( FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.44

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FLOW VELOCITY(FEET/SEC.) = 5.79 FLOW DEPTH(FEET) = 0.78  
TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 6.83  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10324.00 = 816.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10324.00 TO NODE 10324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 6.83  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.050

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 6.32  
EFFECTIVE AREA(ACRES) = 4.70 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 4.7 PEAK FLOW RATE(CFS) = 16.50

\*\*\*\*\*

FLOW PROCESS FROM NODE 10324.00 TO NODE 10325.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 530.00 DOWNSTREAM(FEET) = 500.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 210.00 CHANNEL SLOPE = 0.1429  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 16.50  
FLOW VELOCITY(FEET/SEC.) = 7.62 FLOW DEPTH(FEET) = 0.85  
TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 7.29  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10325.00 = 1026.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.29  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.905

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 5.75  
EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 21.63

\*\*\*\*\*

FLOW PROCESS FROM NODE 10325.00 TO NODE 10326.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 460.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 345.00 CHANNEL SLOPE = 0.1159  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 21.63  
FLOW VELOCITY(FEET/SEC.) = 7.60 FLOW DEPTH(FEET) = 0.97  
TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 8.05  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10326.00 = 1371.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10326.00 TO NODE 10326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.05  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.688

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 6.05  
EFFECTIVE AREA(ACRES) = 8.30 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA(ACRES) = 8.3 PEAK FLOW RATE(CFS) = 26.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10326.00 TO NODE 10327.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 430.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 263.00 CHANNEL SLOPE = 0.1141  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 26.43  
FLOW VELOCITY(FEET/SEC.) = 7.90 FLOW DEPTH(FEET) = 1.06  
TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 8.60  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10327.00 = 1634.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10327.00 TO NODE 10327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.60  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.555

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.10	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500

SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 12.57  
EFFECTIVE AREA (ACRES) = 12.40 AREA-AVERAGED Fm (INCH/HR) = 0.15  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50  
TOTAL AREA (ACRES) = 12.4 PEAK FLOW RATE (CFS) = 38.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 10327.00 TO NODE 10328.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 430.00 DOWNSTREAM (FEET) = 375.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 437.00 CHANNEL SLOPE = 0.1259  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 38.00  
FLOW VELOCITY (FEET/SEC.) = 11.16 FLOW DEPTH (FEET) = 1.07  
TRAVEL TIME (MIN.) = 0.65 Tc (MIN.) = 9.26  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10328.00 = 2071.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10328.00 TO NODE 10328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.26  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.409  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.500 -  
USER-DEFINED - 1.20 0.30 0.850 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.772  
SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 9.15  
EFFECTIVE AREA (ACRES) = 15.60 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 15.6 PEAK FLOW RATE (CFS) = 45.52

\*\*\*\*\*

FLOW PROCESS FROM NODE 10328.00 TO NODE 10329.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 375.00 DOWNSTREAM (FEET) = 372.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 224.00 CHANNEL SLOPE = 0.0134  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 45.52  
FLOW VELOCITY (FEET/SEC.) = 5.03 FLOW DEPTH (FEET) = 1.74  
TRAVEL TIME (MIN.) = 0.74 Tc (MIN.) = 10.00  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10329.00 = 2295.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10329.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.260  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.20 0.30 0.500 -  
USER-DEFINED - 1.40 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.571  
SUBAREA AREA (ACRES) = 11.20 SUBAREA RUNOFF (CFS) = 31.14  
EFFECTIVE AREA (ACRES) = 26.80 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 26.8 PEAK FLOW RATE (CFS) = 74.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 10329.00 TO NODE 10330.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 372.00 DOWNSTREAM (FEET) = 300.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 452.00 CHANNEL SLOPE = 0.1593  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 74.58  
FLOW VELOCITY (FEET/SEC.) = 14.37 FLOW DEPTH (FEET) = 1.32  
TRAVEL TIME (MIN.) = 0.52 Tc (MIN.) = 10.52  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10330.00 = 2747.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10330.00 TO NODE 10330.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.52  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.171  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 4.20 0.30 0.500 -  
USER-DEFINED - 2.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.673  
SUBAREA AREA (ACRES) = 7.80 SUBAREA RUNOFF (CFS) = 20.84  
EFFECTIVE AREA (ACRES) = 34.60 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA (ACRES) = 34.6 PEAK FLOW RATE (CFS) = 93.27

\*\*\*\*\*

FLOW PROCESS FROM NODE 10330.00 TO NODE 10331.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 300.00 DOWNSTREAM(FEET) = 295.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 182.00 CHANNEL SLOPE = 0.0275  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 93.27  
FLOW VELOCITY(FEET/SEC.) = 7.88 FLOW DEPTH(FEET) = 1.99  
TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 10.91  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10331.00 = 2929.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10331.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 10.91  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.106  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 11.30 0.30 0.500 -  
USER-DEFINED - 0.20 0.30 0.600 -  
USER-DEFINED - 4.20 0.30 0.850 -  
USER-DEFINED - 1.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.652  
SUBAREA AREA(ACRES) = 19.00 SUBAREA RUNOFF(CFS) = 49.77  
EFFECTIVE AREA(ACRES) = 53.60 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 53.6 PEAK FLOW RATE(CFS) = 141.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10331.00 TO NODE 10332.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 295.00 DOWNSTREAM(FEET) = 245.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.00 CHANNEL SLOPE = 0.0542  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 141.00  
FLOW VELOCITY(FEET/SEC.) = 11.29 FLOW DEPTH(FEET) = 2.04  
TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 12.27  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10332.00 = 3851.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10332.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 12.27  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.905  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.850 -

USER-DEFINED - 1.40 0.30 0.500 -  
USER-DEFINED - 15.40 0.30 0.850 -  
USER-DEFINED - 8.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.881  
SUBAREA AREA(ACRES) = 25.60 SUBAREA RUNOFF(CFS) = 60.85  
EFFECTIVE AREA(ACRES) = 79.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 79.2 PEAK FLOW RATE(CFS) = 192.17

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10332.00 TO NODE 10333.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 245.00 DOWNSTREAM(FEET) = 199.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 564.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 192.17  
FLOW VELOCITY(FEET/SEC.) = 14.20 FLOW DEPTH(FEET) = 2.12  
TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 12.93  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10333.00 = 4415.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10333.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

\*\*\*\*\*  
MAINLINE Tc(MIN.) = 12.93  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.819  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.50 0.30 0.500 -  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.60 0.30 0.500 -  
USER-DEFINED - 5.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.761  
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 19.35  
EFFECTIVE AREA(ACRES) = 87.50 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.70  
TOTAL AREA(ACRES) = 87.5 PEAK FLOW RATE(CFS) = 205.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10333.00 TO NODE 10334.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

\*\*\*\*\*  
ELEVATION DATA: UPSTREAM(FEET) = 199.00 DOWNSTREAM(FEET) = 195.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 454.00 CHANNEL SLOPE = 0.0088  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 205.39  
FLOW VELOCITY(FEET/SEC.) = 6.26 FLOW DEPTH(FEET) = 3.31

TRAVEL TIME(MIN.) = 1.21 Tc(MIN.) = 14.14  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10334.00 = 4869.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10334.00 TO NODE 10334.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 14.14  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.676  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.800 -  
USER-DEFINED - 2.60 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.835  
SUBAREA AREA(ACRES) = 3.70 SUBAREA RUNOFF(CFS) = 8.08  
EFFECTIVE AREA(ACRES) = 91.20 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71  
TOTAL AREA(ACRES) = 91.2 PEAK FLOW RATE(CFS) = 205.39  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10334.00 TO NODE 10335.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 195.00 DOWNSTREAM(FEET) = 189.00  
FLOW LENGTH(FEET) = 1291.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 66.0 INCH PIPE IS 51.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.40  
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 205.39  
PIPE TRAVEL TIME(MIN.) = 2.07 Tc(MIN.) = 16.21  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10335.00 TO NODE 10335.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 16.21  
RAINFALL INTENSITY(INCH/HR) = 2.50  
AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.71  
EFFECTIVE STREAM AREA(ACRES) = 91.20  
TOTAL STREAM AREA(ACRES) = 91.20  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 205.39

\*\*\*\*\*  
\*\* CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE

1	227.48	13.15	2.792	0.30( 0.23)	0.77	90.3	10300.00
2	205.39	16.21	2.496	0.30( 0.21)	0.71	91.2	10320.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	415.73	13.15	2.792	0.30( 0.22)	0.75	164.3	10300.00
2	406.53	16.21	2.496	0.30( 0.22)	0.74	181.5	10320.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
PEAK FLOW RATE(CFS) = 415.73 Tc(MIN.) = 13.15  
EFFECTIVE AREA(ACRES) = 164.29 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA(ACRES) = 181.5  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10335.00 = 6160.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10335.00 TO NODE 10336.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 189.00 DOWNSTREAM(FEET) = 188.00  
FLOW LENGTH(FEET) = 103.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 75.0 INCH PIPE IS 57.9 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.36  
ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 415.73  
PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 13.25  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10336.00 = 6263.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10336.00 TO NODE 10337.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 188.00 DOWNSTREAM(FEET) = 180.00  
FLOW LENGTH(FEET) = 212.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 57.0 INCH PIPE IS 46.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.93  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 415.73  
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 13.38  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10337.00 = 6475.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10337.00 TO NODE 10338.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 161.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0218  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 415.73  
FLOW VELOCITY (FEET/SEC.) = 10.49 FLOW DEPTH (FEET) = 3.63  
TRAVEL TIME (MIN.) = 1.39 Tc (MIN.) = 14.77  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10338.00 = 7347.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 14.77  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.613  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 0.850 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.943  
SUBAREA AREA (ACRES) = 4.20 SUBAREA RUNOFF (CFS) = 8.81  
EFFECTIVE AREA (ACRES) = 168.49 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.75  
TOTAL AREA (ACRES) = 185.7 PEAK FLOW RATE (CFS) = 415.73  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10338.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 14.77  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.613  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 4.60 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 10.41  
EFFECTIVE AREA (ACRES) = 173.49 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 190.7 PEAK FLOW RATE (CFS) = 415.73  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10338.00 TO NODE 10339.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 161.00 DOWNSTREAM (FEET) = 159.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 328.00 CHANNEL SLOPE = 0.0061

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 6.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 415.73  
FLOW VELOCITY (FEET/SEC.) = 6.52 FLOW DEPTH (FEET) = 4.61  
TRAVEL TIME (MIN.) = 0.84 Tc (MIN.) = 15.61  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10339.00 = 7675.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.61  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.543  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.50 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 2.30 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.767  
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 14.36  
EFFECTIVE AREA (ACRES) = 180.39 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 415.73  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10339.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.61  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.543  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 6.30 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 2.20 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.876  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 18.88  
EFFECTIVE AREA (ACRES) = 189.59 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 206.8 PEAK FLOW RATE (CFS) = 415.73  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10339.00 TO NODE 10390.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

```
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 159.00 DOWNSTREAM(FEET) = 155.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 782.00 CHANNEL SLOPE = 0.0051
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 6.00
CHANNEL FLOW THRU SUBAREA(CFS) = 415.73
FLOW VELOCITY(FEET/SEC.) = 6.10 FLOW DEPTH(FEET) = 4.77
TRAVEL TIME(MIN.) = 2.14 Tc(MIN.) = 17.74
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
```

```
MAINLINE Tc(MIN.) = 17.74
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.376
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.30 0.800 -
USER-DEFINED - 3.70 0.30 0.850 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 2.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.901
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 11.75
EFFECTIVE AREA(ACRES) = 195.79 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 213.0 PEAK FLOW RATE(CFS) = 415.73
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

```
*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10
-----
```

```
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
=====
```

```
*****
FLOW PROCESS FROM NODE 10340.00 TO NODE 10341.00 IS CODE = 21
-----
```

```
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
```

```
INITIAL SUBAREA FLOW-LENGTH(FEET) = 308.00
ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 585.00
```

```
Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 10.581
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.161
```

```
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"1 DWELLING/ACRE" - 0.10 0.30 0.800 95 10.58
PUBLIC PARK - 0.50 0.30 0.850 95 10.90
AGRICULTURAL GOOD COVER
```

```
"ROW CROPS, STRAIGHT ROW" - 0.40 0.30 1.000 95 21.09
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA RUNOFF(CFS) = 2.60
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.60
```

```
*****
FLOW PROCESS FROM NODE 10341.00 TO NODE 10342.00 IS CODE = 63
-----
```

```
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====
```

```
UPSTREAM ELEVATION(FEET) = 585.00 DOWNSTREAM ELEVATION(FEET) = 570.00
STREET LENGTH(FEET) = 250.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00
```

```
DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020
```

```
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64
```

```
**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.19
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.28
HALFSTREET FLOOD WIDTH(FEET) = 5.99
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.74
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.32
STREET FLOW TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 11.46
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.021
```

```
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.70 0.30 0.800 -
USER-DEFINED - 1.40 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.933
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 5.18
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 7.66
```

```
END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 7.51
FLOW VELOCITY(FEET/SEC.) = 5.08 DEPTH*VELOCITY(FT*FT/SEC.) = 1.57
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10342.00 = 558.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 10342.00 TO NODE 10343.00 IS CODE = 63
-----
```

```
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 4 USED)<<<<
=====
```

```
UPSTREAM ELEVATION(FEET) = 570.00 DOWNSTREAM ELEVATION(FEET) = 560.00
```

STREET LENGTH(FEET) = 415.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.39  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 10.91  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.76  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.42  
STREET FLOW TRAVEL TIME(MIN.) = 1.84 Tc(MIN.) = 13.30

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.774  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.20 0.30 0.800 -  
USER-DEFINED - 1.20 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.825  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 5.46  
EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 12.42

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.78  
FLOW VELOCITY(FEET/SEC.) = 3.94 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.55  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10343.00 = 973.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10343.00 TO NODE 10344.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 560.00 DOWNSTREAM ELEVATION(FEET) = 550.00  
STREET LENGTH(FEET) = 616.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.37  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.44  
HALFSTREET FLOOD WIDTH(FEET) = 14.06  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.55  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.56  
STREET FLOW TRAVEL TIME(MIN.) = 2.89 Tc(MIN.) = 16.19  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.497

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.800 -  
USER-DEFINED - 0.80 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814  
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 5.88  
EFFECTIVE AREA(ACRES) = 8.40 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA(ACRES) = 8.4 PEAK FLOW RATE(CFS) = 16.93

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.45 HALFSTREET FLOOD WIDTH(FEET) = 14.62  
FLOW VELOCITY(FEET/SEC.) = 3.64 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.64  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10344.00 = 1589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10344.00 TO NODE 10345.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<<

=====

UPSTREAM ELEVATION(FEET) = 550.00 DOWNSTREAM ELEVATION(FEET) = 510.00  
STREET LENGTH(FEET) = 474.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.86  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 11.01  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 7.08  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.68  
STREET FLOW TRAVEL TIME(MIN.) = 1.12 Tc(MIN.) = 17.31  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.410

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.80 0.30 0.800 -  
USER-DEFINED - 0.20 0.30 0.850 -



SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803  
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 5.86  
EFFECTIVE AREA(ACRES) = 11.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 11.4 PEAK FLOW RATE(CFS) = 22.13

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.52  
FLOW VELOCITY(FEET/SEC.) = 7.29 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.84  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10345.00 = 2063.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10345.00 TO NODE 10346.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 510.00 DOWNSTREAM ELEVATION(FEET) = 484.00  
STREET LENGTH(FEET) = 231.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.54

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.43  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.38  
HALFSTREET FLOOD WIDTH(FEET) = 11.32  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.31  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.20  
STREET FLOW TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 17.77  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.374

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.40 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 4.61  
EFFECTIVE AREA(ACRES) = 13.80 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 13.8 PEAK FLOW RATE(CFS) = 26.37

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 11.72  
FLOW VELOCITY(FEET/SEC.) = 8.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.31  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10346.00 = 2294.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10346.00 TO NODE 10347.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 484.00 DOWNSTREAM ELEVATION(FEET) = 378.00  
STREET LENGTH(FEET) = 995.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.55

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.03  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.41  
HALFSTREET FLOOD WIDTH(FEET) = 12.54  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.52  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.49  
STREET FLOW TRAVEL TIME(MIN.) = 1.95 Tc(MIN.) = 19.72  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.222

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.10 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 7.31  
EFFECTIVE AREA(ACRES) = 17.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA(ACRES) = 17.9 PEAK FLOW RATE(CFS) = 31.80

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 12.84  
FLOW VELOCITY(FEET/SEC.) = 8.65 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.59  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10347.00 = 3289.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10347.00 TO NODE 10348.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 378.00 DOWNSTREAM ELEVATION(FEET) = 303.00  
STREET LENGTH(FEET) = 751.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 15.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH( FEET) = 0.56

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 38.81  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH( FEET) = 0.44  
HALFSTREET FLOOD WIDTH( FEET) = 14.16  
AVERAGE FLOW VELOCITY( FEET/SEC.) = 8.84  
PRODUCT OF DEPTH&VELOCITY( FT\*FT/SEC.) = 3.90  
STREET FLOW TRAVEL TIME( MIN.) = 1.42 Tc( MIN.) = 21.13

\* 100 YEAR RAINFALL INTENSITY( INCH/HR) = 2.141  
SUBAREA LOSS RATE DATA( AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.20 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp( INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA( ACRES) = 8.20 SUBAREA RUNOFF( CFS) = 14.03  
EFFECTIVE AREA( ACRES) = 26.10 AREA-AVERAGED Fm( INCH/HR) = 0.25  
AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA( ACRES) = 26.1 PEAK FLOW RATE( CFS) = 44.52

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH( FEET) = 0.46 HALFSTREET FLOOD WIDTH( FEET) = 14.97  
FLOW VELOCITY( FEET/SEC.) = 9.15 DEPTH\*VELOCITY( FT\*FT/SEC.) = 4.19  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10348.00 = 4040.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10348.00 TO NODE 10349.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION( FEET) = 303.00 DOWNSTREAM ELEVATION( FEET) = 252.00  
STREET LENGTH( FEET) = 607.00 CURB HEIGHT( INCHES) = 8.0  
STREET HALFWIDTH( FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK( FEET) = 15.00  
INSIDE STREET CROSSFALL( DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL( DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL( DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH( FEET) = 0.59

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 53.04  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH( FEET) = 0.49  
HALFSTREET FLOOD WIDTH( FEET) = 16.67  
AVERAGE FLOW VELOCITY( FEET/SEC.) = 8.93  
PRODUCT OF DEPTH&VELOCITY( FT\*FT/SEC.) = 4.39  
STREET FLOW TRAVEL TIME( MIN.) = 1.13 Tc( MIN.) = 22.27  
\* 100 YEAR RAINFALL INTENSITY( INCH/HR) = 2.082  
SUBAREA LOSS RATE DATA( AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.30 0.30 0.800 -  
USER-DEFINED - 3.00 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp( INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.815  
SUBAREA AREA( ACRES) = 10.30 SUBAREA RUNOFF( CFS) = 17.04  
EFFECTIVE AREA( ACRES) = 36.40 AREA-AVERAGED Fm( INCH/HR) = 0.25  
AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA( ACRES) = 36.4 PEAK FLOW RATE( CFS) = 60.18

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH( FEET) = 0.51 HALFSTREET FLOOD WIDTH( FEET) = 17.55  
FLOW VELOCITY( FEET/SEC.) = 9.20 DEPTH\*VELOCITY( FT\*FT/SEC.) = 4.69  
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10349.00 = 4647.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10349.00 TO NODE 10350.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 4 USED)<<<<<

UPSTREAM ELEVATION( FEET) = 252.00 DOWNSTREAM ELEVATION( FEET) = 246.00  
STREET LENGTH( FEET) = 224.00 CURB HEIGHT( INCHES) = 8.0  
STREET HALFWIDTH( FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK( FEET) = 15.00  
INSIDE STREET CROSSFALL( DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL( DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL( DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbed-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH( FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 70.85  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH( FEET) = 0.63  
HALFSTREET FLOOD WIDTH( FEET) = 23.53  
AVERAGE FLOW VELOCITY( FEET/SEC.) = 6.19  
PRODUCT OF DEPTH&VELOCITY( FT\*FT/SEC.) = 3.89  
STREET FLOW TRAVEL TIME( MIN.) = 0.60 Tc( MIN.) = 22.87  
\* 100 YEAR RAINFALL INTENSITY( INCH/HR) = 2.051  
SUBAREA LOSS RATE DATA( AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 12.60 0.30 0.800 -  
USER-DEFINED - 0.50 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp( INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.802  
SUBAREA AREA( ACRES) = 13.10 SUBAREA RUNOFF( CFS) = 21.34  
EFFECTIVE AREA( ACRES) = 49.50 AREA-AVERAGED Fm( INCH/HR) = 0.24  
AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA( ACRES) = 49.5 PEAK FLOW RATE( CFS) = 80.49

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH( FEET) = 0.65 HALFSTREET FLOOD WIDTH( FEET) = 24.70  
FLOW VELOCITY( FEET/SEC.) = 6.40 DEPTH\*VELOCITY( FT\*FT/SEC.) = 4.17

LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10350.00 = 4871.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10350.00 TO NODE 10351.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 246.00 DOWNSTREAM(FEET) = 237.00
FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.43
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 80.49
PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 23.51
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10351.00 = 5390.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10351.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 23.51
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.017
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.30 0.100 -
USER-DEFINED - 5.60 0.30 0.800 -
USER-DEFINED - 0.70 0.30 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.784
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 10.43
EFFECTIVE AREA(ACRES) = 56.00 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81
TOTAL AREA(ACRES) = 56.0 PEAK FLOW RATE(CFS) = 89.43

\*\*\*\*\*

FLOW PROCESS FROM NODE 10351.00 TO NODE 10352.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 237.00 DOWNSTREAM(FEET) = 230.00
FLOW LENGTH(FEET) = 675.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.46
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 89.43
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 24.50
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10352.00 = 6065.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.50

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.966

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.30 0.100 -
USER-DEFINED - 0.40 0.30 0.800 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.300
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.36
EFFECTIVE AREA(ACRES) = 57.40 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 57.4 PEAK FLOW RATE(CFS) = 89.43
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10352.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.50
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.966
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.80 0.30 0.100 -
USER-DEFINED - 9.40 0.30 0.800 -
USER-DEFINED - 1.10 0.30 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755
SUBAREA AREA(ACRES) = 11.30 SUBAREA RUNOFF(CFS) = 17.69
EFFECTIVE AREA(ACRES) = 68.70 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79
TOTAL AREA(ACRES) = 68.7 PEAK FLOW RATE(CFS) = 106.91

\*\*\*\*\*

FLOW PROCESS FROM NODE 10352.00 TO NODE 10353.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 230.00 DOWNSTREAM(FEET) = 180.00
FLOW LENGTH(FEET) = 301.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 34.05
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 106.91
PIPE TRAVEL TIME(MIN.) = 0.15 Tc(MIN.) = 24.64
LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10353.00 = 6366.00 FEET.

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FLOW PROCESS FROM NODE 10353.00 TO NODE 10353.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 24.64
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.959
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 6.00 0.30 0.800 -  
 USER-DEFINED - 1.30 0.30 0.850 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.799  
 SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 11.45  
 EFFECTIVE AREA(ACRES) = 76.10 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 76.1 PEAK FLOW RATE(CFS) = 117.88

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10353.00 TO NODE 10354.00 IS CODE = 31  
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 180.00 DOWNSTREAM(FEET) = 172.00  
 FLOW LENGTH(FEET) = 458.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.90  
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 117.88  
 PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 25.16  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10354.00 = 6824.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10354.00 TO NODE 10390.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM(FEET) = 172.00 DOWNSTREAM(FEET) = 155.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 414.00 CHANNEL SLOPE = 0.0411  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 117.88  
 FLOW VELOCITY(FEET/SEC.) = 9.73 FLOW DEPTH(FEET) = 2.01  
 TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 25.86  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 25.86  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.907  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 0.100 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.100 -  
 USER-DEFINED - 0.90 0.30 0.850 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 3.15  
 EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
 TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 117.88  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 25.86  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.907  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 2.10 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.964  
 SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 5.53  
 EFFECTIVE AREA(ACRES) = 81.90 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
 TOTAL AREA(ACRES) = 81.9 PEAK FLOW RATE(CFS) = 123.05

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc(MIN.) = 25.86  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.907  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.50 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 3.62  
 EFFECTIVE AREA(ACRES) = 84.40 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 84.4 PEAK FLOW RATE(CFS) = 126.66

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<  
 =====  
 \*\* MAIN STREAM CONFLUENCE DATA \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 126.66 25.86 1.907 0.30( 0.24) 0.80 84.4 10340.00  
 LONGEST FLOWPATH FROM NODE 10340.00 TO NODE 10390.00 = 7238.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	415.73	17.74	2.376	0.30 ( 0.23)	0.77	195.8	10300.00
2	406.53	20.83	2.157	0.30 ( 0.23)	0.76	213.0	10320.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	527.06	17.74	2.376	0.30 ( 0.23)	0.77	253.7	10300.00
2	523.81	20.83	2.157	0.30 ( 0.23)	0.77	281.0	10320.00
3	480.53	25.86	1.907	0.30 ( 0.23)	0.77	297.4	10340.00

TOTAL AREA (ACRES) = 297.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 527.06 Tc (MIN.) = 17.745  
EFFECTIVE AREA (ACRES) = 253.69 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.77  
TOTAL AREA (ACRES) = 297.4  
LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 10360.00 TO NODE 10361.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00  
ELEVATION DATA: UPSTREAM (FEET) = 337.00 DOWNSTREAM (FEET) = 292.00

Tc = K \* [(LENGTH \*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 10.697

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.141

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.30	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"GRASS"	-	0.50	0.30	1.000	95	10.70
NATURAL FAIR COVER						
"WOODLAND, GRASS"	-	0.10	0.30	1.000	95	10.70

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 2.30  
TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 2.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 10361.00 TO NODE 10362.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 292.00 DOWNSTREAM (FEET) = 290.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 199.00 CHANNEL SLOPE = 0.0101  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 2.30  
FLOW VELOCITY (FEET/SEC.) = 2.15 FLOW DEPTH (FEET) = 0.60  
TRAVEL TIME (MIN.) = 1.55 Tc (MIN.) = 12.24  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10362.00 = 529.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10362.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.24

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.908

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986

SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.59

EFFECTIVE AREA (ACRES) = 2.00 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 2.0 PEAK FLOW RATE (CFS) = 4.70

\*\*\*\*\*

FLOW PROCESS FROM NODE 10362.00 TO NODE 10363.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 290.00 DOWNSTREAM (FEET) = 288.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 147.00 CHANNEL SLOPE = 0.0136  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 4.70  
FLOW VELOCITY (FEET/SEC.) = 2.88 FLOW DEPTH (FEET) = 0.74  
TRAVEL TIME (MIN.) = 0.85 Tc (MIN.) = 13.09  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10363.00 = 676.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10363.00 TO NODE 10363.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.09  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.799  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.40 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 0.850 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988  
 SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 5.41  
 EFFECTIVE AREA(ACRES) = 4.40 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 4.4 PEAK FLOW RATE(CFS) = 9.91

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10363.00 TO NODE 10364.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 288.00 DOWNSTREAM(FEET) = 286.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 147.00 CHANNEL SLOPE = 0.0136  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 9.91  
 FLOW VELOCITY(FEET/SEC.) = 3.44 FLOW DEPTH(FEET) = 0.98  
 TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 13.80  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10364.00 = 823.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10364.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.80  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.713  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 1.40 0.30 1.000 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.984  
 SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 4.14  
 EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 13.70

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10364.00 TO NODE 10365.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 286.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 13.70  
 FLOW VELOCITY(FEET/SEC.) = 3.08 FLOW DEPTH(FEET) = 1.22  
 TRAVEL TIME(MIN.) = 1.34 Tc(MIN.) = 15.15  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10365.00 = 1071.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10365.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.15  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.579  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.90 0.30 1.000 -  
 USER-DEFINED - 1.80 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.850 -  
 USER-DEFINED - 0.50 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.987  
 SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 7.19  
 EFFECTIVE AREA(ACRES) = 9.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 20.13

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10365.00 TO NODE 10366.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 282.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 248.00 CHANNEL SLOPE = 0.0081  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 20.13  
 FLOW VELOCITY(FEET/SEC.) = 3.39 FLOW DEPTH(FEET) = 1.41  
 TRAVEL TIME(MIN.) = 1.22 Tc(MIN.) = 16.37  
 LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10366.00 = 1319.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10366.00 TO NODE 10366.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.37  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.484  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.20 0.30 1.000 -  
 USER-DEFINED - 2.30 0.30 1.000 -

USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 2.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.995  
SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 16.72  
EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 36.01

\*\*\*\*\*

FLOW PROCESS FROM NODE 10366.00 TO NODE 10367.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 282.00 DOWNSTREAM (FEET) = 279.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 292.00 CHANNEL SLOPE = 0.0103  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 36.01  
FLOW VELOCITY (FEET/SEC.) = 4.31 FLOW DEPTH (FEET) = 1.67  
TRAVEL TIME (MIN.) = 1.13 Tc (MIN.) = 17.49  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10367.00 = 1611.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10367.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.49

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.396

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.972

SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 3.03

EFFECTIVE AREA (ACRES) = 19.90 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 19.9 PEAK FLOW RATE (CFS) = 37.59

\*\*\*\*\*

FLOW PROCESS FROM NODE 10367.00 TO NODE 10368.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 279.00 DOWNSTREAM (FEET) = 276.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 378.00 CHANNEL SLOPE = 0.0079  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 37.59  
FLOW VELOCITY (FEET/SEC.) = 3.94 FLOW DEPTH (FEET) = 1.78

TRAVEL TIME (MIN.) = 1.60 Tc (MIN.) = 19.09  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10368.00 = 1989.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10368.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 19.09

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.271

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.973

SUBAREA AREA (ACRES) = 2.20 SUBAREA RUNOFF (CFS) = 3.92

EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 39.28

\*\*\*\*\*

FLOW PROCESS FROM NODE 10368.00 TO NODE 10369.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 276.00 DOWNSTREAM (FEET) = 247.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 229.00 CHANNEL SLOPE = 0.1266  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 39.28  
FLOW VELOCITY (FEET/SEC.) = 11.25 FLOW DEPTH (FEET) = 1.08  
TRAVEL TIME (MIN.) = 0.34 Tc (MIN.) = 19.43  
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10369.00 = 2218.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10369.00 TO NODE 10369.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 19.43

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.244

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	9.70	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.996

SUBAREA AREA (ACRES) = 11.60 SUBAREA RUNOFF (CFS) = 20.31

EFFECTIVE AREA (ACRES) = 33.70 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 33.7 PEAK FLOW RATE (CFS) = 59.06

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10369.00 TO NODE 10370.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	247.00	DOWNSTREAM(FEET) =	226.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	179.00	CHANNEL SLOPE =	0.1173
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH(FEET) =	2.00
CHANNEL FLOW THRU SUBAREA(CFS) =	59.06		
FLOW VELOCITY(FEET/SEC.) =	12.07	FLOW DEPTH(FEET) =	1.28
TRAVEL TIME(MIN.) =	0.25	Tc(MIN.) =	19.68
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10370.00 =	2397.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10370.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) =	19.68				
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =	2.225				
SUBAREA LOSS RATE DATA(AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	3.60	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	5.60	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.997				
SUBAREA AREA(ACRES) =	11.10	SUBAREA RUNOFF(CFS) =	19.24		
EFFECTIVE AREA(ACRES) =	44.80	AREA-AVERAGED Fm(INCH/HR) =	0.30		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.99		
TOTAL AREA(ACRES) =	44.8	PEAK FLOW RATE(CFS) =	77.72		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10370.00 TO NODE 10371.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	226.00	DOWNSTREAM(FEET) =	188.00
CHANNEL LENGTH THRU SUBAREA(FEET) =	434.00	CHANNEL SLOPE =	0.0876
CHANNEL BASE(FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH(FEET) =	2.00
CHANNEL FLOW THRU SUBAREA(CFS) =	77.72		
FLOW VELOCITY(FEET/SEC.) =	11.63	FLOW DEPTH(FEET) =	1.49
TRAVEL TIME(MIN.) =	0.62	Tc(MIN.) =	20.30
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10371.00 =	2831.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10371.00 TO NODE 10371.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.30  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.184  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.20	0.30	0.850	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	7.20	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =	0.30				
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =	0.958				
SUBAREA AREA(ACRES) =	10.70	SUBAREA RUNOFF(CFS) =	18.27		
EFFECTIVE AREA(ACRES) =	55.50	AREA-AVERAGED Fm(INCH/HR) =	0.30		
AREA-AVERAGED Fp(INCH/HR) =	0.30	AREA-AVERAGED Ap =	0.99		
TOTAL AREA(ACRES) =	55.5	PEAK FLOW RATE(CFS) =	94.35		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10371.00 TO NODE 10389.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	188.00	DOWNSTREAM(FEET) =	157.00
FLOW LENGTH(FEET) =	1918.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	39.0 INCH PIPE IS	30.3 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) =	13.66		
ESTIMATED PIPE DIAMETER(INCH) =	39.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	94.35		
PIPE TRAVEL TIME(MIN.) =	2.34	Tc(MIN.) =	22.64
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 =	4749.00 FEET.		

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS =	2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:	
TIME OF CONCENTRATION(MIN.) =	22.64
RAINFALL INTENSITY(INCH/HR) =	2.06
AREA-AVERAGED Fm(INCH/HR) =	0.30
AREA-AVERAGED Fp(INCH/HR) =	0.30
AREA-AVERAGED Ap =	0.99
EFFECTIVE STREAM AREA(ACRES) =	55.50
TOTAL STREAM AREA(ACRES) =	55.50
PEAK FLOW RATE(CFS) AT CONFLUENCE =	94.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10380.00 TO NODE 10381.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) =	241.00		
ELEVATION DATA: UPSTREAM(FEET) =	275.00	DOWNSTREAM(FEET) =	273.00



Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.110  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.958  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.20	0.30	0.100	95	7.11
PUBLIC PARK	-	1.10	0.30	0.850	95	11.30

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.735  
 SUBAREA RUNOFF(CFS) = 4.37  
 TOTAL AREA(ACRES) = 1.30 PEAK FLOW RATE(CFS) = 4.37

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10381.00 TO NODE 10382.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 273.00 DOWNSTREAM ELEVATION(FEET) = 271.00  
 STREET LENGTH(FEET) = 238.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.89  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.39  
 HALfstREET FLOOD WIDTH(FEET) = 11.45  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.30  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 0.89  
 STREET FLOW TRAVEL TIME(MIN.) = 1.73 Tc(MIN.) = 8.84  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.499

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	1.40	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.718  
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 5.02  
 EFFECTIVE AREA(ACRES) = 3.00 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 3.0 PEAK FLOW RATE(CFS) = 8.86

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.41 HALfstREET FLOOD WIDTH(FEET) = 12.77  
 FLOW VELOCITY(FEET/SEC.) = 2.43 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.01  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10382.00 = 479.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10382.00 TO NODE 10383.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 271.00 DOWNSTREAM ELEVATION(FEET) = 268.00  
 STREET LENGTH(FEET) = 357.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.83  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.46  
 HALfstREET FLOOD WIDTH(FEET) = 14.96  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.64  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.21  
 STREET FLOW TRAVEL TIME(MIN.) = 2.25 Tc(MIN.) = 11.09  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.077

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	1.30	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.452  
 SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 7.94  
 EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
 TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 15.66

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.48 HALfstREET FLOOD WIDTH(FEET) = 16.21  
 FLOW VELOCITY(FEET/SEC.) = 2.78 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.34  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10383.00 = 836.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10383.00 TO NODE 10384.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 268.00 DOWNSTREAM ELEVATION(FEET) = 264.00  
 STREET LENGTH(FEET) = 473.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.61  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.52  
 HALFSTREET FLOOD WIDTH(FEET) = 18.09  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.98  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.55  
 STREET FLOW TRAVEL TIME(MIN.) = 2.65 Tc(MIN.) = 13.74  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.722

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.60	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.548  
 SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 9.90  
 EFFECTIVE AREA(ACRES) = 10.30 AREA-AVERAGED Fm(INCH/HR) = 0.17  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.57  
 TOTAL AREA(ACRES) = 10.3 PEAK FLOW RATE(CFS) = 23.64

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.54 HALFSTREET FLOOD WIDTH(FEET) = 19.18  
 FLOW VELOCITY(FEET/SEC.) = 3.06 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.66  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10384.00 = 1309.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10384.00 TO NODE 10385.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 264.00 DOWNSTREAM ELEVATION(FEET) = 261.00  
 STREET LENGTH(FEET) = 463.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.26  
 \*\*\*STREET FLOWING FULL\*\*\*

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.60  
 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.07  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.83  
 STREET FLOW TRAVEL TIME(MIN.) = 2.52 Tc(MIN.) = 16.25  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.492

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.600	-
USER-DEFINED	-	0.60	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.500	-
USER-DEFINED	-	4.00	0.30	0.600	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.650  
 SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 13.23  
 EFFECTIVE AREA(ACRES) = 16.70 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.7 PEAK FLOW RATE(CFS) = 34.75

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
 FLOW VELOCITY(FEET/SEC.) = 3.25 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.00  
 LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10385.00 = 1772.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10385.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====

MAINLINE Tc(MIN.) = 16.25  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.492  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.42  
 EFFECTIVE AREA(ACRES) = 16.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60  
 TOTAL AREA(ACRES) = 16.9 PEAK FLOW RATE(CFS) = 35.17

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10385.00 TO NODE 10386.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
 =====

ELEVATION DATA: UPSTREAM(FEET) = 261.00 DOWNSTREAM(FEET) = 200.00  
 FLOW LENGTH(FEET) = 712.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.2 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.32  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 35.17

PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 16.84  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10386.00 = 2484.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.84

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.447

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.561

SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 2.87

EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60

TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 37.35

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.84

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.447

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	1.70	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.544

SUBAREA AREA(ACRES) = 4.10 SUBAREA RUNOFF(CFS) = 8.43

EFFECTIVE AREA(ACRES) = 22.40 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59

TOTAL AREA(ACRES) = 22.4 PEAK FLOW RATE(CFS) = 45.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.84

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.447

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	2.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223

SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 7.50

EFFECTIVE AREA(ACRES) = 25.90 AREA-AVERAGED Fm(INCH/HR) = 0.16

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54

TOTAL AREA(ACRES) = 25.9 PEAK FLOW RATE(CFS) = 53.27

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.84

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.447

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	1.70	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.228

SUBAREA AREA(ACRES) = 2.00 SUBAREA RUNOFF(CFS) = 4.28

EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52

TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 57.55

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.84

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.447

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	0.850	-
USER-DEFINED	-	2.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.225

SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 6.42

EFFECTIVE AREA(ACRES) = 30.90 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49

TOTAL AREA(ACRES) = 30.9 PEAK FLOW RATE(CFS) = 63.98

\*\*\*\*\*

FLOW PROCESS FROM NODE 10386.00 TO NODE 10386.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 16.84  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.447  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.100 -  
USER-DEFINED - 1.50 0.30 0.600 -  
USER-DEFINED - 1.70 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.204  
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 15.46  
EFFECTIVE AREA(ACRES) = 38.10 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43  
TOTAL AREA(ACRES) = 38.1 PEAK FLOW RATE(CFS) = 79.44

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10386.00 TO NODE 10387.00 IS CODE = 31  
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 200.00 DOWNSTREAM(FEET) = 163.00  
FLOW LENGTH(FEET) = 1145.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.14  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 79.44  
PIPE TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 17.95  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10387.00 = 3629.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.95  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.100 -  
USER-DEFINED - 23.80 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 0.100 -  
USER-DEFINED - 6.90 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.830  
SUBAREA AREA(ACRES) = 32.90 SUBAREA RUNOFF(CFS) = 62.51  
EFFECTIVE AREA(ACRES) = 71.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 71.0 PEAK FLOW RATE(CFS) = 138.96

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10387.00 IS CODE = 81  
=====

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.95  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 1.20 0.30 0.100 -  
USER-DEFINED - 1.70 0.30 0.850 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.641  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 7.41  
EFFECTIVE AREA(ACRES) = 74.80 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA(ACRES) = 74.8 PEAK FLOW RATE(CFS) = 146.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10387.00 TO NODE 10388.00 IS CODE = 31  
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 163.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 150.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.5 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.29  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 146.38  
PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 18.07  
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10388.00 = 3779.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81  
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 18.07  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.350  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.80 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.400 -  
USER-DEFINED - 0.60 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223  
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 12.54  
EFFECTIVE AREA(ACRES) = 80.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 80.9 PEAK FLOW RATE(CFS) = 158.27

```

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.07
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.350
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.30     0.100    -
USER-DEFINED        -        10.70     0.30     0.400    -
USER-DEFINED        -         2.30     0.30     0.850    -
USER-DEFINED        -         0.50     0.30     1.000    -
USER-DEFINED        -         0.30     0.30     1.000    -
USER-DEFINED        -         0.70     0.30     0.400    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.502
SUBAREA AREA(ACRES) = 14.60   SUBAREA RUNOFF(CFS) = 28.91
EFFECTIVE AREA(ACRES) = 95.50   AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 95.5     PEAK FLOW RATE(CFS) = 187.17

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10388.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.07
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.350
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70     0.30     0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.70   SUBAREA RUNOFF(CFS) = 1.32
EFFECTIVE AREA(ACRES) = 96.20   AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 96.2     PEAK FLOW RATE(CFS) = 188.49

*****
FLOW PROCESS FROM NODE 10388.00 TO NODE 10389.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 158.00   DOWNSTREAM(FEET) = 157.00
FLOW LENGTH(FEET) = 51.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.31
ESTIMATED PIPE DIAMETER(INCH) = 48.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 188.49
PIPE TRAVEL TIME(MIN.) = 0.05   Tc(MIN.) = 18.12
LONGEST FLOWPATH FROM NODE 10380.00 TO NODE 10389.00 = 3830.00 FEET.

*****

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FLOW PROCESS FROM NODE 10389.00 TO NODE 10389.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 18.12
RAINFALL INTENSITY(INCH/HR) = 2.35
AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.58
EFFECTIVE STREAM AREA(ACRES) = 96.20
TOTAL STREAM AREA(ACRES) = 96.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 188.49

** CONFLUENCE DATA **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1          94.35 22.64 2.063 0.30( 0.30) 0.99 55.5 10360.00
2         188.49 18.12 2.346 0.30( 0.17) 0.58 96.2 10380.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc  Intensity  Fp(Fm)  Ap  Ae  HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1          276.14 18.12 2.346 0.30( 0.21) 0.71 140.6 10380.00
2          258.23 22.64 2.063 0.30( 0.22) 0.73 151.7 10360.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 276.14   Tc(MIN.) = 18.12
EFFECTIVE AREA(ACRES) = 140.63   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.71
TOTAL AREA(ACRES) = 151.7
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10389.00 = 4749.00 FEET.

*****
FLOW PROCESS FROM NODE 10389.00 TO NODE 10390.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 157.00   DOWNSTREAM(FEET) = 155.00
FLOW LENGTH(FEET) = 312.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.59
ESTIMATED PIPE DIAMETER(INCH) = 69.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 276.14
PIPE TRAVEL TIME(MIN.) = 0.41   Tc(MIN.) = 18.53
LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

*****
FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

```

MAINLINE Tc(MIN.) = 18.53  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.314  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 3.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.850 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 5.70 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997  
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 17.23  
 EFFECTIVE AREA(ACRES) = 150.13 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA(ACRES) = 161.2 PEAK FLOW RATE(CFS) = 283.31

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.53  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.314  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 3.99  
 EFFECTIVE AREA(ACRES) = 152.33 AREA-AVERAGED Fm(INCH/HR) = 0.22  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA(ACRES) = 163.4 PEAK FLOW RATE(CFS) = 287.30

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 11  
 -----

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	287.30	18.53	2.314	0.30( 0.22)	0.73	152.3	10380.00
2	267.25	23.06	2.041	0.30( 0.22)	0.75	163.4	10360.00

LONGEST FLOWPATH FROM NODE 10360.00 TO NODE 10390.00 = 5061.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	527.06	17.74	2.376	0.30( 0.23)	0.77	253.7	10300.00
2	523.81	20.83	2.157	0.30( 0.23)	0.77	281.0	10320.00
3	480.53	25.86	1.907	0.30( 0.23)	0.77	297.4	10340.00

LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	810.21	17.74	2.376	0.30( 0.23)	0.76	399.5	10300.00
2	813.53	18.53	2.314	0.30( 0.23)	0.76	413.0	10380.00
3	800.95	20.83	2.157	0.30( 0.23)	0.76	438.9	10320.00
4	771.92	23.06	2.041	0.30( 0.23)	0.76	451.6	10360.00
5	728.08	25.86	1.907	0.30( 0.23)	0.76	460.8	10340.00

TOTAL AREA(ACRES) = 460.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 813.53 Tc(MIN.) = 18.535  
 EFFECTIVE AREA(ACRES) = 413.01 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
 TOTAL AREA(ACRES) = 460.8  
 LONGEST FLOWPATH FROM NODE 10320.00 TO NODE 10390.00 = 8457.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10390.00 TO NODE 10390.00 IS CODE = 12  
 -----

>>>>CLEAR MEMORY BANK # 1 <<<<<

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 460.8 TC(MIN.) = 18.53  
 EFFECTIVE AREA(ACRES) = 413.01 AREA-AVERAGED Fm(INCH/HR) = 0.23  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.757  
 PEAK FLOW RATE(CFS) = 813.53

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	810.21	17.74	2.376	0.30( 0.23)	0.76	399.5	10300.00
2	813.53	18.53	2.314	0.30( 0.23)	0.76	413.0	10380.00
3	800.95	20.83	2.157	0.30( 0.23)	0.76	438.9	10320.00
4	771.92	23.06	2.041	0.30( 0.23)	0.76	451.6	10360.00
5	728.08	25.86	1.907	0.30( 0.23)	0.76	460.8	10340.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506104B.DAT  
TIME/DATE OF STUDY: 12:46 04/15/2013  
=====

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-----  
--\*TIME-OF-CONCENTRATION MODEL\*--  
=====

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.820
- 2) 6.00; 4.350
- 3) 7.00; 3.990
- 4) 8.00; 3.700
- 5) 9.00; 3.460
- 6) 10.00; 3.260
- 7) 11.00; 3.090
- 8) 12.00; 2.940
- 9) 13.00; 2.810
- 10) 14.00; 2.690
- 11) 15.00; 2.590
- 12) 20.00; 2.200
- 13) 25.00; 1.940
- 14) 30.00; 1.750
- 15) 40.00; 1.490
- 16) 50.00; 1.310
- 17) 60.00; 1.180
- 18) 90.00; 0.940
- 19) 120.00; 0.800
- 20) 180.00; 0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB	GUTTER-GEOMETRIES:			MANNING
	WIDTH	CROSSFALL	IN-	OUT-/PARK-		HEIGHT	WIDTH	LIP	
====	(FT)	(FT)	SIDE /	SIDE/ WAY	(FT)	(FT)	(FT)	(FT)	(n)
1	60.0	30.0	0.020/0.020/0.020		0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020		0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020		0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020		0.67	2.00	0.0313	0.167	0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10400.00 TO NODE 10401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00  
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 540.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.434  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.194  
 SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
PUBLIC PARK	-	0.50	0.30	0.850	95	6.43

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.850  
 SUBAREA RUNOFF(CFS) = 1.77  
 TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 10401.00 TO NODE 10402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 540.00 DOWNSTREAM(FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 117.00 CHANNEL SLOPE = 0.3419  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 1.77  
 FLOW VELOCITY(FEET/SEC.) = 6.15 FLOW DEPTH(FEET) = 0.31  
 TRAVEL TIME(MIN.) = 0.32  $T_c$ (MIN.) = 6.75  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10402.00 = 424.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10402.00 TO NODE 10402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 6.75  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.080  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-



SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.940  
SUBAREA AREA(ACRES) = 0.50 SUBAREA RUNOFF(CFS) = 1.71  
EFFECTIVE AREA(ACRES) = 1.00 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 3.43

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10402.00 TO NODE 10403.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 470.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 123.00 CHANNEL SLOPE = 0.2439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.43  
FLOW VELOCITY(FEET/SEC.) = 6.35 FLOW DEPTH(FEET) = 0.42  
TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 7.07  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10403.00 = 547.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10403.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 7.07  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.969  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.917  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 2.99  
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91  
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 6.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10403.00 TO NODE 10404.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 420.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 266.00 CHANNEL SLOPE = 0.1880  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 6.32  
FLOW VELOCITY(FEET/SEC.) = 6.68 FLOW DEPTH(FEET) = 0.56  
TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 7.74  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10404.00 = 813.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10404.00 IS CODE = 81  
-----

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
-----

MAINLINE Tc(MIN.) = 7.74  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.776  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.863  
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 7.28  
EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 13.27

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10404.00 TO NODE 10405.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 420.00 DOWNSTREAM(FEET) = 370.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 289.00 CHANNEL SLOPE = 0.1730  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 13.27  
FLOW VELOCITY(FEET/SEC.) = 7.81 FLOW DEPTH(FEET) = 0.75  
TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 8.35  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10405.00 = 1102.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10405.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 8.35  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.615  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 12.10  
EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 24.76

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10405.00 TO NODE 10406.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 367.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 23.00 CHANNEL SLOPE = 0.1304

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 24.76  
FLOW VELOCITY (FEET/SEC.) = 8.18 FLOW DEPTH (FEET) = 1.00  
TRAVEL TIME (MIN.) = 0.05 Tc (MIN.) = 8.40  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10406.00 = 1125.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.40  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.604  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.10 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 6.33  
EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 31.01

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10406.00 TO NODE 10407.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 367.00 DOWNSTREAM (FEET) = 344.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 214.00 CHANNEL SLOPE = 0.1075  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 31.01  
FLOW VELOCITY (FEET/SEC.) = 8.04 FLOW DEPTH (FEET) = 1.13  
TRAVEL TIME (MIN.) = 0.44 Tc (MIN.) = 8.84  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10407.00 = 1339.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 8.84  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.497  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.00 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 5.84  
EFFECTIVE AREA (ACRES) = 12.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 12.3 PEAK FLOW RATE (CFS) = 35.86

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10407.00 TO NODE 10408.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 344.00 DOWNSTREAM (FEET) = 327.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 919.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 35.86  
FLOW VELOCITY (FEET/SEC.) = 5.37 FLOW DEPTH (FEET) = 1.49  
TRAVEL TIME (MIN.) = 2.85 Tc (MIN.) = 11.70  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10408.00 = 2258.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10408.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 11.70  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.985  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.800 -  
USER-DEFINED - 7.90 0.30 0.850 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.849  
SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 19.66  
EFFECTIVE AREA (ACRES) = 20.30 AREA-AVERAGED Fm (INCH/HR) = 0.26  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA (ACRES) = 20.3 PEAK FLOW RATE (CFS) = 49.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10408.00 TO NODE 10409.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 327.00 DOWNSTREAM (FEET) = 314.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 807.00 CHANNEL SLOPE = 0.0161  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 49.85  
FLOW VELOCITY (FEET/SEC.) = 5.52 FLOW DEPTH (FEET) = 1.73  
TRAVEL TIME (MIN.) = 2.44 Tc (MIN.) = 14.13  
LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10409.00 = 3065.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10409.00 TO NODE 10409.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 14.13  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.677  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.90 0.30 0.800 -  
 USER-DEFINED - 5.70 0.30 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.823  
 SUBAREA AREA (ACRES) = 12.60 SUBAREA RUNOFF (CFS) = 27.55  
 EFFECTIVE AREA (ACRES) = 32.90 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA (ACRES) = 32.9 PEAK FLOW RATE (CFS) = 71.76

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10409.00 TO NODE 10410.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 314.00 DOWNSTREAM(FEET) = 266.00  
 FLOW LENGTH(FEET) = 213.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 14.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 35.13  
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 71.76  
 PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 14.24  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10410.00 = 3278.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10410.00 TO NODE 10411.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 266.00 DOWNSTREAM(FEET) = 170.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1470.00 CHANNEL SLOPE = 0.0653  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 71.76  
 FLOW VELOCITY(FEET/SEC.) = 10.21 FLOW DEPTH(FEET) = 1.53  
 TRAVEL TIME(MIN.) = 2.40 Tc(MIN.) = 16.64  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10411.00 = 4748.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10411.00 TO NODE 10411.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 16.64  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.462  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	6.60	0.30	0.800	-
USER-DEFINED	-	0.80	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.723  
 SUBAREA AREA (ACRES) = 8.50 SUBAREA RUNOFF (CFS) = 17.18

EFFECTIVE AREA (ACRES) = 41.40 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 41.4 PEAK FLOW RATE (CFS) = 82.60

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10411.00 TO NODE 10412.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 170.00 DOWNSTREAM(FEET) = 161.00  
 FLOW LENGTH(FEET) = 1129.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.09  
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 82.60  
 PIPE TRAVEL TIME(MIN.) = 1.86 Tc(MIN.) = 18.50  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10412.00 = 5877.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10412.00 TO NODE 10413.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 161.00 DOWNSTREAM(FEET) = 141.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 360.00 CHANNEL SLOPE = 0.0556  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 82.60  
 FLOW VELOCITY(FEET/SEC.) = 9.99 FLOW DEPTH(FEET) = 1.66  
 TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 19.10  
 LONGEST FLOWPATH FROM NODE 10400.00 TO NODE 10413.00 = 6237.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10413.00 TO NODE 10413.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 19.10  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.270  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.509  
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 5.53  
 EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA (ACRES) = 44.3 PEAK FLOW RATE (CFS) = 82.60  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 44.3 TC (MIN.) = 19.10  
EFFECTIVE AREA (ACRES) = 44.30 AREA-AVERAGED  $F_m$  (INCH/HR) = 0.24  
AREA-AVERAGED  $F_p$  (INCH/HR) = 0.30 AREA-AVERAGED  $A_p$  = 0.798  
PEAK FLOW RATE (CFS) = 82.60

=====  
=====

END OF RATIONAL METHOD ANALYSIS

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

-----  
FILE NAME: 0506105I.DAT  
TIME/DATE OF STUDY: 12:49 04/15/2013  
=====

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*

NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

- 1) 5.00; 4.820
- 2) 6.00; 4.350
- 3) 7.00; 3.990
- 4) 8.00; 3.700
- 5) 9.00; 3.460
- 6) 10.00; 3.260
- 7) 11.00; 3.090
- 8) 12.00; 2.940
- 9) 13.00; 2.810
- 10) 14.00; 2.690
- 11) 15.00; 2.590
- 12) 20.00; 2.200
- 13) 25.00; 1.940
- 14) 30.00; 1.750
- 15) 40.00; 1.490
- 16) 50.00; 1.310
- 17) 60.00; 1.180
- 18) 90.00; 0.940
- 19) 120.00; 0.800
- 20) 180.00; 0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/ SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	HIKE (FT)	MANNING FACTOR (n)
1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167 0.0150

5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- 2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10500.00 TO NODE 10501.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 326.00  
ELEVATION DATA: UPSTREAM(FEET) = 1123.00 DOWNSTREAM(FEET) = 1085.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.984  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.093  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.20	0.30	1.000	95	10.98
NATURAL FAIR COVER "GRASS"	-	0.30	0.30	1.000	95	10.98

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.26  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.26

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FLOW PROCESS FROM NODE 10501.00 TO NODE 10502.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 1085.00 DOWNSTREAM(FEET) = 1050.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 181.00 CHANNEL SLOPE = 0.1934  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.26  
FLOW VELOCITY(FEET/SEC.) = 4.58 FLOW DEPTH(FEET) = 0.30  
TRAVEL TIME(MIN.) = 0.66  $T_c$ (MIN.) = 11.64  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10502.00 = 507.00 FEET.

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FLOW PROCESS FROM NODE 10502.00 TO NODE 10502.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<  
=====

MAINLINE  $T_c$ (MIN.) = 11.64  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.994  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -        0.10     0.30      1.000     -
USER-DEFINED  -        0.80     0.30      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 2.18
EFFECTIVE AREA (ACRES) = 1.40  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 1.4    PEAK FLOW RATE (CFS) = 3.39

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*****
FLOW PROCESS FROM NODE 10502.00 TO NODE 10503.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1050.00  DOWNSTREAM(FEET) = 1025.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 193.00  CHANNEL SLOPE = 0.1295
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 3.39
FLOW VELOCITY(FEET/SEC.) = 4.96  FLOW DEPTH(FEET) = 0.48
TRAVEL TIME(MIN.) = 0.65  Tc(MIN.) = 12.29
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10503.00 = 700.00 FEET.

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10503.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.29
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.902
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.50   0.30  1.000  -
USER-DEFINED      -        1.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 2.30  SUBAREA RUNOFF (CFS) = 5.39
EFFECTIVE AREA (ACRES) = 3.70  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 3.7    PEAK FLOW RATE (CFS) = 8.67

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*****
FLOW PROCESS FROM NODE 10503.00 TO NODE 10504.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1025.00  DOWNSTREAM(FEET) = 1020.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 332.00  CHANNEL SLOPE = 0.0151
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 8.67
FLOW VELOCITY(FEET/SEC.) = 3.48  FLOW DEPTH(FEET) = 0.91
TRAVEL TIME(MIN.) = 1.59  Tc(MIN.) = 13.88
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10504.00 = 1032.00 FEET.

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10504.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.88
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.704
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.10   0.30  1.000  -
USER-DEFINED      -        0.80   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.90  SUBAREA RUNOFF (CFS) = 1.95
EFFECTIVE AREA (ACRES) = 4.60  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 4.6    PEAK FLOW RATE (CFS) = 9.95

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*****
FLOW PROCESS FROM NODE 10504.00 TO NODE 10505.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 1020.00  DOWNSTREAM(FEET) = 975.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 397.00  CHANNEL SLOPE = 0.1134
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 9.95
FLOW VELOCITY(FEET/SEC.) = 7.64  FLOW DEPTH(FEET) = 0.66
TRAVEL TIME(MIN.) = 0.87  Tc(MIN.) = 14.75
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10505.00 = 1429.00 FEET.

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10505.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.75
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.615
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -        0.20   0.30  1.000  -
USER-DEFINED      -        1.20   0.30  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 1.40  SUBAREA RUNOFF (CFS) = 2.92
EFFECTIVE AREA (ACRES) = 6.00  AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.0    PEAK FLOW RATE (CFS) = 12.50

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*****
FLOW PROCESS FROM NODE 10505.00 TO NODE 10506.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 975.00 DOWNSTREAM(FEET) = 905.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 334.00 CHANNEL SLOPE = 0.2096
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 12.50
FLOW VELOCITY(FEET/SEC.) = 10.24 FLOW DEPTH(FEET) = 0.64
TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 15.29
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10506.00 = 1763.00 FEET.

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10506.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.29
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.567
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        6.10   0.30   1.000  -
USER-DEFINED        -        3.70   0.30   1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 20.00
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 32.24

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*****
FLOW PROCESS FROM NODE 10506.00 TO NODE 10507.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 875.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 790.00 CHANNEL SLOPE = 0.0380
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 32.24
FLOW VELOCITY(FEET/SEC.) = 5.49 FLOW DEPTH(FEET) = 1.40
TRAVEL TIME(MIN.) = 2.40 Tc(MIN.) = 17.69
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10507.00 = 2553.00 FEET.

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10507.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.69
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.380
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        2.70   0.30   1.000  -
USER-DEFINED        -        6.30   0.30   1.000  -
USER-DEFINED        -        0.30   0.30   1.000  -

```

```

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 17.41
EFFECTIVE AREA(ACRES) = 25.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 25.1 PEAK FLOW RATE(CFS) = 47.00

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*****
FLOW PROCESS FROM NODE 10507.00 TO NODE 10508.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 875.00 DOWNSTREAM(FEET) = 755.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1120.00 CHANNEL SLOPE = 0.1071
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 47.00
FLOW VELOCITY(FEET/SEC.) = 8.93 FLOW DEPTH(FEET) = 1.32
TRAVEL TIME(MIN.) = 2.09 Tc(MIN.) = 19.78
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10508.00 = 3673.00 FEET.

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10508.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.78
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.217
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        0.80   0.30   1.000  -
USER-DEFINED        -       11.10   0.30   1.000  -
USER-DEFINED        -        3.10   0.30   1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 25.88
EFFECTIVE AREA(ACRES) = 40.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 40.1 PEAK FLOW RATE(CFS) = 69.20

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*****
FLOW PROCESS FROM NODE 10508.00 TO NODE 10509.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 755.00 DOWNSTREAM(FEET) = 533.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1578.00 CHANNEL SLOPE = 0.1407
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 69.20
FLOW VELOCITY(FEET/SEC.) = 10.90 FLOW DEPTH(FEET) = 1.45
TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 22.19
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10509.00 = 5251.00 FEET.

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FLOW PROCESS FROM NODE 10509.00 TO NODE 10509.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 22.19

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.086

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.80	0.30	1.000	-
USER-DEFINED	-	11.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	8.30	0.30	1.000	-
USER-DEFINED	-	38.10	0.30	1.000	-
USER-DEFINED	-	8.70	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 77.40 SUBAREA RUNOFF (CFS) = 124.42

EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 188.88

\*\*\*\*\*

FLOW PROCESS FROM NODE 10509.00 TO NODE 10510.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 533.00 DOWNSTREAM (FEET) = 415.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1236.00 CHANNEL SLOPE = 0.0955  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 188.88  
 FLOW VELOCITY (FEET/SEC.) = 12.07 FLOW DEPTH (FEET) = 2.28  
 TRAVEL TIME (MIN.) = 1.71 Tc (MIN.) = 23.90  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10510.00 = 6487.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10510.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 23.90

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.997

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	30.10	0.30	1.000	-
USER-DEFINED	-	15.30	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	11.30	0.30	1.000	-
USER-DEFINED	-	5.10	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 64.90 SUBAREA RUNOFF (CFS) = 99.14

EFFECTIVE AREA (ACRES) = 182.40 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 182.4 PEAK FLOW RATE (CFS) = 278.64

\*\*\*\*\*

FLOW PROCESS FROM NODE 10510.00 TO NODE 10511.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 302.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1161.00 CHANNEL SLOPE = 0.0973  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 278.64  
 FLOW VELOCITY (FEET/SEC.) = 13.44 FLOW DEPTH (FEET) = 2.63  
 TRAVEL TIME (MIN.) = 1.44 Tc (MIN.) = 25.34  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10511.00 = 7648.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10511.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 25.34

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.927

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.50	0.30	1.000	-
USER-DEFINED	-	10.80	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	22.10	0.30	1.000	-
USER-DEFINED	-	4.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 54.80 SUBAREA RUNOFF (CFS) = 80.25

EFFECTIVE AREA (ACRES) = 237.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 237.2 PEAK FLOW RATE (CFS) = 347.38

\*\*\*\*\*

FLOW PROCESS FROM NODE 10511.00 TO NODE 10512.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 302.00 DOWNSTREAM (FEET) = 190.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1644.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 347.38  
 FLOW VELOCITY (FEET/SEC.) = 12.41 FLOW DEPTH (FEET) = 3.05  
 TRAVEL TIME (MIN.) = 2.21 Tc (MIN.) = 27.55  
 LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10512.00 = 9292.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 10512.00 TO NODE 10512.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<



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=====
MAINLINE Tc(MIN.) = 27.55
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.843
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.50     0.30     1.000     -
USER-DEFINED            -        0.20     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     1.000     -
USER-DEFINED            -        0.10     0.30     1.000     -
USER-DEFINED            -       14.20     0.30     1.000     -
USER-DEFINED            -        2.80     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 19.50      SUBAREA RUNOFF(CFS) = 27.09
EFFECTIVE AREA(ACRES) = 256.70   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 256.7        PEAK FLOW RATE(CFS) = 356.55

*****
FLOW PROCESS FROM NODE 10512.00 TO NODE 10513.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 190.00  DOWNSTREAM(FEET) = 183.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 86.00  CHANNEL SLOPE = 0.0814
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 4.00
CHANNEL FLOW THRU SUBAREA(CFS) = 356.55
FLOW VELOCITY(FEET/SEC.) = 13.38  FLOW DEPTH(FEET) = 2.98
TRAVEL TIME(MIN.) = 0.11  Tc(MIN.) = 27.65
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10513.00 = 9378.00 FEET.

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 27.65
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.839
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.10     0.30     0.100     -
USER-DEFINED            -        1.30     0.30     1.000     -
USER-DEFINED            -       29.90     0.30     1.000     -
USER-DEFINED            -       11.90     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     1.000     -
USER-DEFINED            -        0.60     0.30     0.100     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
SUBAREA AREA(ACRES) = 45.50      SUBAREA RUNOFF(CFS) = 63.20
EFFECTIVE AREA(ACRES) = 302.20   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 302.2        PEAK FLOW RATE(CFS) = 418.82

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FLOW PROCESS FROM NODE 10513.00 TO NODE 10513.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 27.65
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.839
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        9.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 9.30      SUBAREA RUNOFF(CFS) = 12.88
EFFECTIVE AREA(ACRES) = 311.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 311.5        PEAK FLOW RATE(CFS) = 431.70

*****
FLOW PROCESS FROM NODE 10513.00 TO NODE 10514.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 183.00  DOWNSTREAM(FEET) = 171.00
FLOW LENGTH(FEET) = 1209.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 75.0 INCH PIPE IS 59.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.57
ESTIMATED PIPE DIAMETER(INCH) = 75.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 431.70
PIPE TRAVEL TIME(MIN.) = 1.22  Tc(MIN.) = 28.87
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10514.00 = 10587.00 FEET.

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10514.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 28.87
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.793
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.20     0.30     0.100     -
USER-DEFINED            -        0.40     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     0.100     -
USER-DEFINED            -       31.30     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.949
SUBAREA AREA(ACRES) = 33.60      SUBAREA RUNOFF(CFS) = 45.61
EFFECTIVE AREA(ACRES) = 345.10   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 345.1        PEAK FLOW RATE(CFS) = 464.36

*****
FLOW PROCESS FROM NODE 10514.00 TO NODE 10515.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

```

ELEVATION DATA: UPSTREAM(FEET) = 171.00 DOWNSTREAM(FEET) = 165.00  
FLOW LENGTH(FEET) = 565.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 78.0 INCH PIPE IS 58.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.49  
ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 464.36  
PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 29.41  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10515.00 = 11152.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10515.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN.) = 29.41  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.773  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.850 -  
USER-DEFINED - 1.30 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
USER-DEFINED - 15.30 0.30 0.100 -  
USER-DEFINED - 1.10 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.202  
SUBAREA AREA(ACRES) = 19.20 SUBAREA RUNOFF(CFS) = 29.58  
EFFECTIVE AREA(ACRES) = 364.30 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 364.3 PEAK FLOW RATE(CFS) = 487.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10515.00 TO NODE 10525.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 709.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 78.0 INCH PIPE IS 63.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.98  
ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 487.58  
PIPE TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 30.10  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 30.10  
RAINFALL INTENSITY(INCH/HR) = 1.75  
AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.95  
EFFECTIVE STREAM AREA(ACRES) = 364.30  
TOTAL STREAM AREA(ACRES) = 364.30  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 487.58

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10520.00 TO NODE 10521.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH(FEET) = 289.00  
ELEVATION DATA: UPSTREAM(FEET) = 183.00 DOWNSTREAM(FEET) = 180.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.311  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.900  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
COMMERCIAL - 0.30 0.30 0.100 95 7.31  
PUBLIC PARK - 1.20 0.30 0.850 95 11.62  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.700  
SUBAREA RUNOFF(CFS) = 4.98  
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 4.98

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10521.00 TO NODE 10522.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 180.00 DOWNSTREAM ELEVATION(FEET) = 176.00  
STREET LENGTH(FEET) = 408.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.49  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.40  
HALFSTREET FLOOD WIDTH(FEET) = 12.15  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.55  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.02  
STREET FLOW TRAVEL TIME(MIN.) = 2.67 Tc(MIN.) = 9.98  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.264  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -           0.50       0.30       0.100       -  
 USER-DEFINED       -           0.60       0.30       0.850       -  
 USER-DEFINED       -           0.60       0.30       0.100       -  
 USER-DEFINED       -           0.80       0.30       0.850       -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.520  
 SUBAREA AREA(ACRES) = 2.50       SUBAREA RUNOFF(CFS) = 6.99  
 EFFECTIVE AREA(ACRES) = 4.00       AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.59  
 TOTAL AREA(ACRES) = 4.0            PEAK FLOW RATE(CFS) = 11.12

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.43    HALFSTREET FLOOD WIDTH(FEET) = 13.63  
 FLOW VELOCITY(FEET/SEC.) = 2.71    DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.17  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10522.00 = 697.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10522.00 TO NODE 10523.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 176.00    DOWNSTREAM ELEVATION(FEET) = 173.00  
 STREET LENGTH(FEET) = 333.00    CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.24  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.50  
 HALFSTREET FLOOD WIDTH(FEET) = 16.99  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.96  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.48  
 STREET FLOW TRAVEL TIME(MIN.) = 1.87    Tc(MIN.) = 11.85  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.962

SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS  
 LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -           0.50       0.30       0.100       -  
 USER-DEFINED       -           4.70       0.30       0.100       -  
 USER-DEFINED       -           0.10       0.30       0.600       -  
 USER-DEFINED       -           0.10       0.30       0.100       -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.109  
 SUBAREA AREA(ACRES) = 5.40       SUBAREA RUNOFF(CFS) = 14.24  
 EFFECTIVE AREA(ACRES) = 9.40       AREA-AVERAGED Fm(INCH/HR) = 0.09  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.31  
 TOTAL AREA(ACRES) = 9.4            PEAK FLOW RATE(CFS) = 24.27

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.54    HALFSTREET FLOOD WIDTH(FEET) = 19.10  
 FLOW VELOCITY(FEET/SEC.) = 3.16    DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.71  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10523.00 = 1030.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10523.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 11.85  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.962  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS  
 LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN

USER-DEFINED       -           0.10       0.30       0.100       -  
 USER-DEFINED       -           1.90       0.30       0.850       -  
 USER-DEFINED       -           0.80       0.30       0.100       -  
 USER-DEFINED       -           4.80       0.30       0.850       -  
 USER-DEFINED       -           0.20       0.30       0.100       -  
 USER-DEFINED       -           4.90       0.30       0.850       -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.785  
 SUBAREA AREA(ACRES) = 12.70       SUBAREA RUNOFF(CFS) = 31.17  
 EFFECTIVE AREA(ACRES) = 22.10       AREA-AVERAGED Fm(INCH/HR) = 0.18  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.58  
 TOTAL AREA(ACRES) = 22.1            PEAK FLOW RATE(CFS) = 55.43

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10523.00 TO NODE 10524.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 173.00    DOWNSTREAM(FEET) = 165.00  
 FLOW LENGTH(FEET) = 736.00    MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.3 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.46  
 ESTIMATED PIPE DIAMETER(INCH) = 36.00    NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 55.43  
 PIPE TRAVEL TIME(MIN.) = 1.17    Tc(MIN.) = 13.03  
 LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10524.00 = 1766.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10524.00 TO NODE 10524.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.03  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.807  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS  
 LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN

USER-DEFINED       -           0.40       0.30       0.100       -  
 USER-DEFINED       -           0.10       0.30       0.850       -  
 USER-DEFINED       -           0.90       0.30       0.100       -  
 USER-DEFINED       -           0.40       0.30       0.850       -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.308  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.40  
EFFECTIVE AREA(ACRES) = 23.90 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 23.9 PEAK FLOW RATE(CFS) = 56.74

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10524.00 TO NODE 10525.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 165.00 DOWNSTREAM(FEET) = 158.00  
FLOW LENGTH(FEET) = 623.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.64  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 56.74  
PIPE TRAVEL TIME(MIN.) = 0.98 Tc(MIN.) = 14.00  
LONGEST FLOWPATH FROM NODE 10520.00 TO NODE 10525.00 = 2389.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.00  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.690  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	6.80	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.853  
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 19.93  
EFFECTIVE AREA(ACRES) = 33.00 AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64  
TOTAL AREA(ACRES) = 33.0 PEAK FLOW RATE(CFS) = 74.16

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10525.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
TIME OF CONCENTRATION(MIN.) = 14.00  
RAINFALL INTENSITY(INCH/HR) = 2.69  
AREA-AVERAGED Fm(INCH/HR) = 0.19  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.64  
EFFECTIVE STREAM AREA(ACRES) = 33.00

TOTAL STREAM AREA(ACRES) = 33.00  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 74.16

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	487.58	30.10	1.747	0.30( 0.29)	0.95	364.3	10500.00
2	74.16	14.00	2.690	0.30( 0.19)	0.64	33.0	10520.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	447.15	14.00	2.690	0.30( 0.27)	0.90	202.4	10520.00
2	533.75	30.10	1.747	0.30( 0.28)	0.93	397.3	10500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 533.75 Tc(MIN.) = 30.10  
EFFECTIVE AREA(ACRES) = 397.30 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
TOTAL AREA(ACRES) = 397.3  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10525.00 = 11861.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10525.00 TO NODE 10526.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 158.00 DOWNSTREAM(FEET) = 148.00  
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 65.25  
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 533.75  
PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 30.11  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10526.00 = 11891.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10526.00 TO NODE 10527.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 148.00 DOWNSTREAM(FEET) = 135.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 296.00 CHANNEL SLOPE = 0.0439  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 533.75  
FLOW VELOCITY(FEET/SEC.) = 14.55 FLOW DEPTH(FEET) = 3.50  
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 30.45  
LONGEST FLOWPATH FROM NODE 10500.00 TO NODE 10527.00 = 12187.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 30.45  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.738  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 1.81  
 EFFECTIVE AREA(ACRES) = 398.70 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 398.7 PEAK FLOW RATE(CFS) = 533.75  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 10527.00 TO NODE 10527.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 30.45  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.738  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	2.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982  
 SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 6.37  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
 TOTAL AREA(ACRES) = 403.6 PEAK FLOW RATE(CFS) = 533.75  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 403.6 TC(MIN.) = 30.45  
 EFFECTIVE AREA(ACRES) = 403.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.927  
 PEAK FLOW RATE(CFS) = 533.75

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	447.60	14.36	2.654	0.30( 0.27)	0.90	208.7	10520.00
2	533.75	30.45	1.738	0.30( 0.28)	0.93	403.6	10500.00

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2010 Advanced Engineering Software (aes)  
Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

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FILE NAME: 0506106B.DAT  
TIME/DATE OF STUDY: 12:51 04/15/2013  
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--\*TIME-OF-CONCENTRATION MODEL\*--  
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GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN

OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*

FLOW PROCESS FROM NODE 10600.00 TO NODE 10601.00 IS CODE = 21

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.53

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.36

HALFSTREET FLOOD WIDTH(FEET) = 10.20

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.25

\*\*\*\*\*

FLOW PROCESS FROM NODE 10601.00 TO NODE 10602.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 5 USED)<<<<<

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PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 0.81  
STREET FLOW TRAVEL TIME (MIN.) = 1.63 Tc (MIN.) = 12.23  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.910  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.80	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.517  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 5.21  
EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58  
TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 7.88

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.40 HALFSTREET FLOOD WIDTH (FEET) = 11.99  
FLOW VELOCITY (FEET/SEC.) = 2.42 DEPTH\*VELOCITY (FT\*FT/SEC.) = 0.96  
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10602.00 = 531.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10602.00 TO NODE 10603.00 IS CODE = 63  
-----  
>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
>>>> (STREET TABLE SECTION # 5 USED) <<<<<<  
-----  
UPSTREAM ELEVATION (FEET) = 162.00 DOWNSTREAM ELEVATION (FEET) = 159.00  
STREET LENGTH (FEET) = 328.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.28  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.45  
HALFSTREET FLOOD WIDTH (FEET) = 14.41  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.71  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.21  
STREET FLOW TRAVEL TIME (MIN.) = 2.02 Tc (MIN.) = 14.25  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.665  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.30	0.500	-
USER-DEFINED	-	0.30	0.30	0.850	-
USER-DEFINED	-	2.40	0.30	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527  
SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 8.80

EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.16  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 15.98

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.48 HALFSTREET FLOOD WIDTH (FEET) = 16.05  
FLOW VELOCITY (FEET/SEC.) = 2.89 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.38  
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10603.00 = 859.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 10603.00 TO NODE 10604.00 IS CODE = 63  
-----  
>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<  
>>>> (STREET TABLE SECTION # 5 USED) <<<<<<  
-----  
UPSTREAM ELEVATION (FEET) = 159.00 DOWNSTREAM ELEVATION (FEET) = 155.00  
STREET LENGTH (FEET) = 465.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.74  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.54  
HALFSTREET FLOOD WIDTH (FEET) = 19.10  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.09  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 1.67  
STREET FLOW TRAVEL TIME (MIN.) = 2.51 Tc (MIN.) = 16.76  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.453  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.30	0.500	-
USER-DEFINED	-	0.40	0.30	0.850	-
USER-DEFINED	-	3.00	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.513  
SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 15.52  
EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.16  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53  
TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 30.14

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.57 HALFSTREET FLOOD WIDTH (FEET) = 20.00  
FLOW VELOCITY (FEET/SEC.) = 3.33 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.92  
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10604.00 = 1324.00 FEET.

```

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10604.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.76
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.453
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.30     0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 0.10     SUBAREA RUNOFF(CFS) = 0.20
EFFECTIVE AREA(ACRES) = 14.70   AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.53
TOTAL AREA(ACRES) = 14.7       PEAK FLOW RATE(CFS) = 30.34

*****
FLOW PROCESS FROM NODE 10604.00 TO NODE 10605.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 155.00 DOWNSTREAM(FEET) = 140.00
FLOW LENGTH(FEET) = 214.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.22
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 30.34
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 16.95
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10605.00 = 1538.00 FEET.

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10605.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.95
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.438
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20     0.30     0.100    -
USER-DEFINED        -         1.70     0.30     0.100    -
USER-DEFINED        -        10.20     0.30     0.800    -
USER-DEFINED        -         2.90     0.30     0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.682
SUBAREA AREA(ACRES) = 16.00     SUBAREA RUNOFF(CFS) = 32.16
EFFECTIVE AREA(ACRES) = 30.70   AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 30.7       PEAK FLOW RATE(CFS) = 62.29

*****
FLOW PROCESS FROM NODE 10605.00 TO NODE 10606.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

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>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 140.00 DOWNSTREAM(FEET) = 133.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 175.00 CHANNEL SLOPE = 0.0400
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 62.29
FLOW VELOCITY(FEET/SEC.) = 8.22 FLOW DEPTH(FEET) = 1.59
TRAVEL TIME(MIN.) = 0.36 Tc(MIN.) = 17.31
LONGEST FLOWPATH FROM NODE 10600.00 TO NODE 10606.00 = 1713.00 FEET.

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.31
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.410
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     0.500    -
USER-DEFINED        -         0.30     0.30     0.850    -
USER-DEFINED        -         0.10     0.30     1.000    -
USER-DEFINED        -         1.10     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 1.80     SUBAREA RUNOFF(CFS) = 3.46
EFFECTIVE AREA(ACRES) = 32.50   AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 32.5       PEAK FLOW RATE(CFS) = 64.98

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.31
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.410
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.40     0.30     0.850    -
USER-DEFINED        -         1.20     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     1.000    -
USER-DEFINED        -         1.80     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     0.850    -
USER-DEFINED        -         0.20     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980
SUBAREA AREA(ACRES) = 3.80     SUBAREA RUNOFF(CFS) = 7.24
EFFECTIVE AREA(ACRES) = 36.30   AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.66
TOTAL AREA(ACRES) = 36.3       PEAK FLOW RATE(CFS) = 72.22

*****
FLOW PROCESS FROM NODE 10606.00 TO NODE 10606.00 IS CODE = 81

```



-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 17.31

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.410

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.14

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.67

TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 73.36  
=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 36.9 TC(MIN.) = 17.31

EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.670

PEAK FLOW RATE(CFS) = 73.36  
=====

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2006 Advanced Engineering Software (aes)  
Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 2 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 100-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P201XXCE.DAT  
TIME/DATE OF STUDY: 10:20 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.000; 4.820  
2) 6.000; 4.350  
3) 7.000; 3.990  
4) 8.000; 3.700  
5) 9.000; 3.460  
6) 10.000; 3.260  
7) 11.000; 3.090  
8) 12.000; 2.940  
9) 13.000; 2.810  
10) 14.000; 2.690  
11) 15.000; 2.590  
12) 20.000; 2.200  
13) 25.000; 1.940  
14) 30.000; 1.750  
15) 40.000; 1.490  
16) 50.000; 1.310  
17) 60.000; 1.180  
18) 90.000; 0.940  
19) 120.000; 0.800  
20) 180.000; 0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

```

=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

```

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20100.00 TO NODE 20101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 830.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.230  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.414  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.30	0.30	1.000	95	9.23
NATURAL FAIR COVER "WOODLAND,GRASS"	-	0.30	0.30	1.000	95	9.23

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.68  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.68

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20101.00 TO NODE 20102.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 830.00 DOWNSTREAM(FEET) = 750.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 276.00 CHANNEL SLOPE = 0.2899  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.68  
FLOW VELOCITY(FEET/SEC.) = 5.63 FLOW DEPTH(FEET) = 0.32  
TRAVEL TIME(MIN.) = 0.82  $T_c$ (MIN.) = 10.05  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20102.00 = 595.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20102.00 TO NODE 20102.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN) = 10.05
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.252
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
    LAND USE         GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.80    0.30    1.000   -
USER-DEFINED         -         0.20    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.00    SUBAREA RUNOFF(CFS) = 2.66
EFFECTIVE AREA(ACRES) = 1.60    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 1.6    PEAK FLOW RATE(CFS) = 4.25

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*****
FLOW PROCESS FROM NODE 20102.00 TO NODE 20103.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 720.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 161.00 CHANNEL SLOPE = 0.1863
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 4.25
FLOW VELOCITY(FEET/SEC.) = 6.01 FLOW DEPTH(FEET) = 0.49
TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 10.49
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20103.00 = 756.00 FEET.

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20103.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.49
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.176
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
    LAND USE         GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.50    0.30    1.000   -
USER-DEFINED         -         0.10    0.30    1.000   -
USER-DEFINED         -         0.30    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90    SUBAREA RUNOFF(CFS) = 2.33
EFFECTIVE AREA(ACRES) = 2.50    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 2.5    PEAK FLOW RATE(CFS) = 6.47

```

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*****
FLOW PROCESS FROM NODE 20103.00 TO NODE 20104.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 720.00 DOWNSTREAM(FEET) = 690.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 64.00 CHANNEL SLOPE = 0.4688

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CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 6.47
FLOW VELOCITY(FEET/SEC.) = 9.45 FLOW DEPTH(FEET) = 0.48
TRAVEL TIME(MIN.) = 0.11 Tc(MIN.) = 10.61
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20104.00 = 820.00 FEET.

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20104.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.61
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.157
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
    LAND USE         GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.40    0.30    1.000   -
USER-DEFINED         -         3.30    0.30    1.000   -
USER-DEFINED         -         0.10    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.80    SUBAREA RUNOFF(CFS) = 9.77
EFFECTIVE AREA(ACRES) = 6.30    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 6.3    PEAK FLOW RATE(CFS) = 16.20

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*****
FLOW PROCESS FROM NODE 20104.00 TO NODE 20105.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 690.00 DOWNSTREAM(FEET) = 670.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 159.00 CHANNEL SLOPE = 0.1258
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 16.20
FLOW VELOCITY(FEET/SEC.) = 7.22 FLOW DEPTH(FEET) = 0.86
TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 10.97
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20105.00 = 979.00 FEET.

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*****
FLOW PROCESS FROM NODE 20105.00 TO NODE 20105.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN) = 10.97
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.094
SUBAREA LOSS RATE DATA(AMC II):
  DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap     SCS
    LAND USE         GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.20    0.30    1.000   -
USER-DEFINED         -         1.50    0.30    1.000   -
USER-DEFINED         -         2.20    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90    SUBAREA RUNOFF(CFS) = 9.81

```

EFFECTIVE AREA(ACRES) = 10.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 10.2 PEAK FLOW RATE(CFS) = 25.65

\*\*\*\*\*

FLOW PROCESS FROM NODE 20105.00 TO NODE 20106.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 670.00 DOWNSTREAM(FEET) = 650.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 192.00 CHANNEL SLOPE = 0.1042  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 25.65  
FLOW VELOCITY(FEET/SEC.) = 7.56 FLOW DEPTH(FEET) = 1.06  
TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 11.40  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20106.00 = 1171.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 11.40  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.030  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 1.000 -  
USER-DEFINED - 2.10 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 9.34  
EFFECTIVE AREA(ACRES) = 14.00 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 34.40

\*\*\*\*\*

FLOW PROCESS FROM NODE 20106.00 TO NODE 20107.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 650.00 DOWNSTREAM(FEET) = 640.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 156.00 CHANNEL SLOPE = 0.0641  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 34.40  
FLOW VELOCITY(FEET/SEC.) = 6.79 FLOW DEPTH(FEET) = 1.30  
TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 11.78  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20107.00 = 1327.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20107.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 11.78  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.973

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.20 0.30 1.000 -  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 9.62  
EFFECTIVE AREA(ACRES) = 18.00 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 18.0 PEAK FLOW RATE(CFS) = 43.30

\*\*\*\*\*

FLOW PROCESS FROM NODE 20107.00 TO NODE 20108.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 640.00 DOWNSTREAM(FEET) = 609.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 512.00 CHANNEL SLOPE = 0.0605  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 43.30  
FLOW VELOCITY(FEET/SEC.) = 7.06 FLOW DEPTH(FEET) = 1.43  
TRAVEL TIME(MIN.) = 1.21 Tc(MIN.) = 12.99  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20108.00 = 1839.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20108.00 TO NODE 20108.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 12.99  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.812  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.200 -  
USER-DEFINED - 1.50 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.970  
SUBAREA AREA(ACRES) = 2.70 SUBAREA RUNOFF(CFS) = 6.12  
EFFECTIVE AREA(ACRES) = 20.70 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 20.7 PEAK FLOW RATE(CFS) = 46.81

\*\*\*\*\*

FLOW PROCESS FROM NODE 20108.00 TO NODE 20109.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 609.00 DOWNSTREAM(FEET) = 600.00
FLOW LENGTH(FEET) = 194.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.42
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 46.81
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 13.17
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20109.00 = 2033.00 FEET.

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*****
FLOW PROCESS FROM NODE 20109.00 TO NODE 20109.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 13.17
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.789
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -      0.70    0.30    0.200  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.72
EFFECTIVE AREA(ACRES) = 21.40 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 21.4 PEAK FLOW RATE(CFS) = 48.11

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FLOW PROCESS FROM NODE 20109.00 TO NODE 20110.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 594.00
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.65
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 48.11
PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 13.69
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20110.00 = 2393.00 FEET.

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*****
FLOW PROCESS FROM NODE 20110.00 TO NODE 20110.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 13.69
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.727
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -      0.30    0.30    0.100  -
USER-DEFINED         -      3.50    0.30    0.200  -
USER-DEFINED         -      2.70    0.30    1.000  -
USER-DEFINED         -      0.20    0.30    1.000  -
USER-DEFINED         -      1.20    0.30    1.000  -

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USER-DEFINED         -      0.30    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626
SUBAREA AREA(ACRES) = 8.20 SUBAREA RUNOFF(CFS) = 18.74
EFFECTIVE AREA(ACRES) = 29.60 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 29.6 PEAK FLOW RATE(CFS) = 65.67

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*****
FLOW PROCESS FROM NODE 20110.00 TO NODE 20111.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 594.00 DOWNSTREAM(FEET) = 590.00
FLOW LENGTH(FEET) = 246.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.72
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 65.67
PIPE TRAVEL TIME(MIN.) = 0.32 Tc(MIN.) = 14.01
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20111.00 = 2639.00 FEET.

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*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20111.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 14.01
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.689
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
LAND USE             GROUP  (ACRES) (INCH/HR) (DECIMAL) CN

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USER-DEFINED         -      0.70    0.30    0.100  -
USER-DEFINED         -      2.10    0.30    0.200  -
USER-DEFINED         -      2.10    0.30    1.000  -
USER-DEFINED         -      0.60    0.30    1.000  -
USER-DEFINED         -      4.70    0.30    1.000  -
USER-DEFINED         -      0.90    0.30    1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.792
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 24.49
EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 89.13

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*****
FLOW PROCESS FROM NODE 20111.00 TO NODE 20112.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 590.00 DOWNSTREAM(FEET) = 580.00
FLOW LENGTH(FEET) = 628.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.49
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 89.13

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PIPE TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 14.79  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20112.00 = 3267.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 14.79

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.611

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.200	-
USER-DEFINED	-	4.40	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	7.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.797

SUBAREA AREA(ACRES) = 15.20 SUBAREA RUNOFF(CFS) = 32.45

EFFECTIVE AREA(ACRES) = 55.90 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 55.9 PEAK FLOW RATE(CFS) = 118.74

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20112.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 14.79

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.611

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.950

SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 5.02

EFFECTIVE AREA(ACRES) = 58.30 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84

TOTAL AREA(ACRES) = 58.3 PEAK FLOW RATE(CFS) = 123.77

\*\*\*\*\*

FLOW PROCESS FROM NODE 20112.00 TO NODE 20113.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 580.00 DOWNSTREAM(FEET) = 570.00

FLOW LENGTH(FEET) = 519.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.65

ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 123.77  
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 15.34  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20113.00 = 3786.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.34

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.563

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.100	-
USER-DEFINED	-	4.30	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	4.60	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.877

SUBAREA AREA(ACRES) = 12.60 SUBAREA RUNOFF(CFS) = 26.09

EFFECTIVE AREA(ACRES) = 70.90 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 70.9 PEAK FLOW RATE(CFS) = 147.35

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20113.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 15.34

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.563

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.100	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	1.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.787

SUBAREA AREA(ACRES) = 3.60 SUBAREA RUNOFF(CFS) = 7.54

EFFECTIVE AREA(ACRES) = 74.50 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85

TOTAL AREA(ACRES) = 74.5 PEAK FLOW RATE(CFS) = 154.89

\*\*\*\*\*

FLOW PROCESS FROM NODE 20113.00 TO NODE 20114.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00

FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 12.07

ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 154.89  
PIPE TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 16.18  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20114.00 = 4393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.18  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.498  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.90 0.30 0.100 -  
USER-DEFINED - 4.00 0.30 0.850 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 1.000 -  
USER-DEFINED - 0.50 0.30 0.100 -  
USER-DEFINED - 0.90 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.747  
SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 16.17  
EFFECTIVE AREA(ACRES) = 82.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 82.4 PEAK FLOW RATE(CFS) = 166.67

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.18  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.498  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.70 0.30 1.000 -  
USER-DEFINED - 8.20 0.30 1.000 -  
USER-DEFINED - 3.20 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 0.100 -  
USER-DEFINED - 3.70 0.30 0.850 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.932  
SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 34.94  
EFFECTIVE AREA(ACRES) = 99.90 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 99.9 PEAK FLOW RATE(CFS) = 201.61

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20114.00 TO NODE 20115.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 560.00  
FLOW LENGTH(FEET) = 461.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 57.0 INCH PIPE IS 42.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.33  
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 201.61  
PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 16.71  
LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20115.00 = 4854.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.71  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.456  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.60 0.30 0.850 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.40 0.30 0.100 -  
USER-DEFINED - 6.20 0.30 0.850 -  
USER-DEFINED - 2.20 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798  
SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 25.54  
EFFECTIVE AREA(ACRES) = 112.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 112.7 PEAK FLOW RATE(CFS) = 223.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20115.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 16.71  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.456  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.70 SUBAREA RUNOFF(CFS) = 1.36  
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 224.75

\*\*\*\*\*  
FLOW PROCESS FROM NODE 20115.00 TO NODE 20116.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 560.00 DOWNSTREAM(FEET) = 528.00  
FLOW LENGTH(FEET) = 219.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 38.86

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 224.75  
 PIPE TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 16.81  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20116.00 = 5073.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20116.00 TO NODE 20117.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 489.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 174.00 CHANNEL SLOPE = 0.2241  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 224.75  
 FLOW VELOCITY(FEET/SEC.) = 21.55 FLOW DEPTH(FEET) = 1.86  
 TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 16.94  
 LONGEST FLOWPATH FROM NODE 20100.00 TO NODE 20117.00 = 5247.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 16.94  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.438  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.850	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.910  
 SUBAREA AREA(ACRES) = 2.50 SUBAREA RUNOFF(CFS) = 4.87  
 EFFECTIVE AREA(ACRES) = 115.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 115.9 PEAK FLOW RATE(CFS) = 227.80

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 16.94  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.438  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.30	0.200	-
USER-DEFINED	-	3.30	0.30	0.850	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	6.50	0.30	1.000	-

USER-DEFINED - 0.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.855  
 SUBAREA AREA(ACRES) = 12.80 SUBAREA RUNOFF(CFS) = 25.14  
 EFFECTIVE AREA(ACRES) = 128.70 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 128.7 PEAK FLOW RATE(CFS) = 252.94

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 20117.00 TO NODE 20117.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN) = 16.94  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.438  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	2.80	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.979  
 SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 9.84  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 133.8 PEAK FLOW RATE(CFS) = 262.78

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 133.8 TC(MIN.) = 16.94  
 EFFECTIVE AREA(ACRES) = 133.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.854  
 PEAK FLOW RATE(CFS) = 262.78

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END OF RATIONAL METHOD ANALYSIS





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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 1 \*  
\* HYDROLOGIC ANALYSIS - 100-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P501XXCE.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20  
1) 5.000; 4.820  
2) 6.000; 4.350  
3) 7.000; 3.990  
4) 8.000; 3.700  
5) 9.000; 3.460  
6) 10.000; 3.260  
7) 11.000; 3.090  
8) 12.000; 2.940  
9) 13.000; 2.810  
10) 14.000; 2.690  
11) 15.000; 2.590  
12) 20.000; 2.200  
13) 25.000; 1.940  
14) 30.000; 1.750  
15) 40.000; 1.490  
16) 50.000; 1.310  
17) 60.000; 1.180  
18) 90.000; 0.940  
19) 120.000; 0.800  
20) 180.000; 0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

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=== =====
1 60.0 30.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
2 50.0 25.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
3 40.0 20.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
4 30.0 15.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150
5 20.0 10.0 0.020/0.020/0.020 0.67 2.00 0.0313 0.167 0.0150

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GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*

\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50100.00 TO NODE 50101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 424.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.479  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.585  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "8-10 DWELLINGS/ACRE"	-	0.10	0.30	0.400	95	8.48
RESIDENTIAL "8-10 DWELLINGS/ACRE"	-	0.90	0.30	0.400	95	8.48

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 0.400  
SUBAREA RUNOFF(CFS) = 3.12  
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 3.12

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50101.00 TO NODE 50102.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 424.00 DOWNSTREAM ELEVATION(FEET) = 420.00  
STREET LENGTH(FEET) = 115.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.50
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.29
HALFSTREET FLOOD WIDTH(FEET) = 6.47
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.70
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.06
STREET FLOW TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 9.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.461
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.30   0.30   0.100   -
USER-DEFINED        -         0.10   0.30   0.400   -
USER-DEFINED        -         0.40   0.30   0.100   -
USER-DEFINED        -         0.10   0.30   0.500   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.178
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 2.76
EFFECTIVE AREA(ACRES) = 1.90 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.29
TOTAL AREA(ACRES) = 1.9 PEAK FLOW RATE(CFS) = 5.77

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 7.47
FLOW VELOCITY(FEET/SEC.) = 3.86 DEPTH*VELOCITY(FT*FT/SEC.) = 1.19
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50102.00 = 445.00 FEET.

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FLOW PROCESS FROM NODE 50102.00 TO NODE 50103.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 420.00 DOWNSTREAM ELEVATION(FEET) = 418.00
STREET LENGTH(FEET) = 84.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      7.52
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.35
HALFSTREET FLOOD WIDTH(FEET) = 9.41
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.50
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.21
STREET FLOW TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 9.40
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.381
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.90   0.30   0.500   -
USER-DEFINED        -         0.50   0.30   0.500   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 3.98
EFFECTIVE AREA(ACRES) = 4.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 4.5 PEAK FLOW RATE(CFS) = 12.91

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LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10   0.30   0.100   -
USER-DEFINED        -         0.10   0.30   0.100   -
USER-DEFINED        -         0.90   0.30   0.500   -
USER-DEFINED        -         0.10   0.30   0.500   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.433
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 3.51
EFFECTIVE AREA(ACRES) = 3.10 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 3.1 PEAK FLOW RATE(CFS) = 9.14

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36 HALFSTREET FLOOD WIDTH(FEET) = 10.27
FLOW VELOCITY(FEET/SEC.) = 3.67 DEPTH*VELOCITY(FT*FT/SEC.) = 1.34
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50103.00 = 529.00 FEET.

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FLOW PROCESS FROM NODE 50103.00 TO NODE 50104.00 IS CODE = 63
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 418.00 DOWNSTREAM ELEVATION(FEET) = 416.00
STREET LENGTH(FEET) = 84.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

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DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

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**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     11.13
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.38
HALFSTREET FLOOD WIDTH(FEET) = 11.29
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.80
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.46
STREET FLOW TRAVEL TIME(MIN.) = 0.37 Tc(MIN.) = 9.77
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.307
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.90   0.30   0.500   -
USER-DEFINED        -         0.50   0.30   0.500   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 3.98
EFFECTIVE AREA(ACRES) = 4.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 4.5 PEAK FLOW RATE(CFS) = 12.91

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END OF SUBAREA STREET FLOW HYDRAULICS:

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DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 11.99  
FLOW VELOCITY(FEET/SEC.) = 3.97 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.58  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50104.00 = 613.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50104.00 TO NODE 50105.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 416.00 DOWNSTREAM ELEVATION(FEET) = 400.00  
STREET LENGTH(FEET) = 513.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.27

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.42  
HALFSTREET FLOOD WIDTH(FEET) = 12.85  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.69  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.95  
STREET FLOW TRAVEL TIME(MIN.) = 1.82 Tc(MIN.) = 11.59  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.002

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	0.500	-
USER-DEFINED	-	0.40	0.30	0.600	-
USER-DEFINED	-	2.40	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.512  
SUBAREA AREA(ACRES) = 3.40 SUBAREA RUNOFF(CFS) = 8.72  
EFFECTIVE AREA(ACRES) = 7.90 AREA-AVERAGED Fm(INCH/HR) = 0.13  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45  
TOTAL AREA(ACRES) = 7.9 PEAK FLOW RATE(CFS) = 20.39

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 13.79  
FLOW VELOCITY(FEET/SEC.) = 4.88 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.12  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50105.00 = 1126.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50105.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc(MIN) = 11.59  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.002  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	2.50	0.30	0.600	-
USER-DEFINED	-	1.00	0.30	0.500	-
USER-DEFINED	-	3.00	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.583  
SUBAREA AREA(ACRES) = 6.60 SUBAREA RUNOFF(CFS) = 16.79  
EFFECTIVE AREA(ACRES) = 14.50 AREA-AVERAGED Fm(INCH/HR) = 0.15  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.51  
TOTAL AREA(ACRES) = 14.5 PEAK FLOW RATE(CFS) = 37.18

\*\*\*\*\*

FLOW PROCESS FROM NODE 50105.00 TO NODE 50106.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

-----  
UPSTREAM ELEVATION(FEET) = 400.00 DOWNSTREAM ELEVATION(FEET) = 390.00  
STREET LENGTH(FEET) = 562.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 48.92

\*\*\*STREET FLOWING FULL\*\*\*

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.59  
HALFSTREET FLOOD WIDTH(FEET) = 20.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.03  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.98  
STREET FLOW TRAVEL TIME(MIN.) = 1.86 Tc(MIN.) = 13.45  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.756

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.500	-
USER-DEFINED	-	3.70	0.30	0.600	-
USER-DEFINED	-	1.10	0.30	0.500	-
USER-DEFINED	-	5.20	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.588  
SUBAREA AREA(ACRES) = 10.10 SUBAREA RUNOFF(CFS) = 23.45  
EFFECTIVE AREA(ACRES) = 24.60 AREA-AVERAGED Fm(INCH/HR) = 0.16  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54  
TOTAL AREA(ACRES) = 24.6 PEAK FLOW RATE(CFS) = 57.43

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.62 HALFSTREET FLOOD WIDTH(FEET) = 20.00

FLOW VELOCITY(FEET/SEC.) = 5.37 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.31  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50106.00 = 1688.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50106.00 TO NODE 50107.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 390.00 DOWNSTREAM ELEVATION(FEET) = 381.00  
STREET LENGTH(FEET) = 252.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 65.20

\*\*\*STREET FLOWING FULL\*\*\*

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.58  
HALFSTREET FLOOD WIDTH(FEET) = 20.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.95  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.05  
STREET FLOW TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 14.05  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.685

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.600	-
USER-DEFINED	-	6.80	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 6.90 SUBAREA RUNOFF(CFS) = 15.55  
EFFECTIVE AREA(ACRES) = 31.50 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55  
TOTAL AREA(ACRES) = 31.5 PEAK FLOW RATE(CFS) = 71.40

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.60 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
FLOW VELOCITY(FEET/SEC.) = 7.24 DEPTH\*VELOCITY(FT\*FT/SEC.) = 4.31  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50107.00 = 1940.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50107.00 TO NODE 50108.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 381.00 DOWNSTREAM(FEET) = 345.00  
FLOW LENGTH(FEET) = 109.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 40.13  
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 71.40  
PIPE TRAVEL TIME(MIN.) = 0.05 Tc(MIN.) = 14.10  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50108.00 = 2049.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50108.00 TO NODE 50109.00 IS CODE = 51

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 315.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 220.00 CHANNEL SLOPE = 0.1364  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 71.40  
FLOW VELOCITY(FEET/SEC.) = 10.82 FLOW DEPTH(FEET) = 1.48  
TRAVEL TIME(MIN.) = 0.34 Tc(MIN.) = 14.44  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50109.00 = 2269.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 14.44  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.646  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.667  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.32  
EFFECTIVE AREA(ACRES) = 32.10 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA(ACRES) = 32.1 PEAK FLOW RATE(CFS) = 71.63

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 14.44  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.646  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	2.30	0.30	0.600	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	8.30	0.30	1.000	-
USER-DEFINED	-	6.90	0.30	1.000	-
USER-DEFINED	-	13.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965  
SUBAREA AREA (ACRES) = 31.60 SUBAREA RUNOFF (CFS) = 67.03  
EFFECTIVE AREA (ACRES) = 63.70 AREA-AVERAGED Fm (INCH/HR) = 0.23  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA (ACRES) = 63.7 PEAK FLOW RATE (CFS) = 138.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 14.44  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.646  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.90 0.30 0.600 -  
USER-DEFINED - 4.30 0.30 1.000 -  
USER-DEFINED - 4.10 0.30 1.000 -  
USER-DEFINED - 37.30 0.30 1.000 -  
USER-DEFINED - 37.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 0.100 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.990  
SUBAREA AREA (ACRES) = 84.90 SUBAREA RUNOFF (CFS) = 179.51  
EFFECTIVE AREA (ACRES) = 148.60 AREA-AVERAGED Fm (INCH/HR) = 0.27  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
TOTAL AREA (ACRES) = 148.6 PEAK FLOW RATE (CFS) = 318.17

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50109.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 14.44  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.646  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.600 -  
USER-DEFINED - 1.20 0.30 1.000 -  
USER-DEFINED - 4.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.985  
SUBAREA AREA (ACRES) = 5.50 SUBAREA RUNOFF (CFS) = 11.64  
EFFECTIVE AREA (ACRES) = 154.10 AREA-AVERAGED Fm (INCH/HR) = 0.27  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
TOTAL AREA (ACRES) = 154.1 PEAK FLOW RATE (CFS) = 329.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50109.00 TO NODE 50119.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 315.00 DOWNSTREAM (FEET) = 284.00  
CHANNEL LENGTH THRU SUBAREA (FEET) = 893.00 CHANNEL SLOPE = 0.0347  
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 4.00  
CHANNEL FLOW THRU SUBAREA (CFS) = 329.80  
FLOW VELOCITY (FEET/SEC.) = 9.52 FLOW DEPTH (FEET) = 3.40  
TRAVEL TIME (MIN.) = 1.56 Tc (MIN.) = 16.00  
LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50119.00 = 3162.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 16.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.512  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.600 -  
USER-DEFINED - 0.20 0.30 0.850 -  
USER-DEFINED - 5.30 0.30 1.000 -  
USER-DEFINED - 2.70 0.30 1.000 -  
USER-DEFINED - 2.50 0.30 1.000 -  
USER-DEFINED - 2.80 0.30 0.600 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.904  
SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 28.24  
EFFECTIVE AREA (ACRES) = 168.10 AREA-AVERAGED Fm (INCH/HR) = 0.27  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA (ACRES) = 168.1 PEAK FLOW RATE (CFS) = 339.41

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 16.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.512  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.80 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 1.50 0.30 1.000 -  
USER-DEFINED - 1.10 0.30 0.850 -  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.980  
SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 16.77  
EFFECTIVE AREA (ACRES) = 176.50 AREA-AVERAGED Fm (INCH/HR) = 0.27  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA (ACRES) = 176.5 PEAK FLOW RATE (CFS) = 356.18

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 16.00
RAINFALL INTENSITY(INCH/HR) = 2.51
AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.90
EFFECTIVE STREAM AREA(ACRES) = 176.50
TOTAL STREAM AREA(ACRES) = 176.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 356.18

\*\*\*\*\*
FLOW PROCESS FROM NODE 50110.00 TO NODE 50111.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 435.00 DOWNSTREAM(FEET) = 420.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.342
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.891

SUBAREA Tc AND LOSS RATE DATA(AMC II):

Table with 7 columns: DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.). Rows include Residential with 5-7 dwellings/acre and 3-4 dwellings/acre.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.513
SUBAREA RUNOFF(CFS) = 5.04
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 5.04

\*\*\*\*\*
FLOW PROCESS FROM NODE 50111.00 TO NODE 50112.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 420.00 DOWNSTREAM ELEVATION(FEET) = 415.00
STREET LENGTH(FEET) = 122.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.30
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.32
HALFSTREET FLOOD WIDTH(FEET) = 8.09
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.32
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.38
STREET FLOW TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 7.81
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.754

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include User-Defined with various soil groups.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.571
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 4.51
EFFECTIVE AREA(ACRES) = 2.90 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54
TOTAL AREA(ACRES) = 2.9 PEAK FLOW RATE(CFS) = 9.37

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 9.16
FLOW VELOCITY(FEET/SEC.) = 4.56 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.56
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50112.00 = 452.00 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 50112.00 TO NODE 50113.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 415.00 DOWNSTREAM ELEVATION(FEET) = 410.00
STREET LENGTH(FEET) = 122.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.87

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.36
HALFSTREET FLOOD WIDTH(FEET) = 10.27
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.77
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.73
STREET FLOW TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 8.24
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.643

SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include User-Defined with various soil groups.

USER-DEFINED - 1.00 0.30 0.600 -  
USER-DEFINED - 0.20 0.30 0.500 -  
USER-DEFINED - 0.10 0.30 0.600 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.581  
SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 4.99  
EFFECTIVE AREA (ACRES) = 4.50 AREA-AVERAGED Fm(INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 4.5 PEAK FLOW RATE (CFS) = 14.08

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.38 HALFSTREET FLOOD WIDTH (FEET) = 11.05  
FLOW VELOCITY (FEET/SEC.) = 4.99 DEPTH\*VELOCITY (FT\*FT/SEC.) = 1.89  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50113.00 = 574.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50113.00 TO NODE 50113.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc (MIN) = 8.24  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.643  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.50 0.30 0.500 -  
USER-DEFINED - 1.90 0.30 0.600 -  
USER-DEFINED - 0.20 0.30 0.500 -  
USER-DEFINED - 0.20 0.30 0.600 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.575  
SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 8.74  
EFFECTIVE AREA (ACRES) = 7.30 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.56  
TOTAL AREA (ACRES) = 7.3 PEAK FLOW RATE (CFS) = 22.82

\*\*\*\*\*

FLOW PROCESS FROM NODE 50113.00 TO NODE 50114.00 IS CODE = 63

=====  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<  
=====

UPSTREAM ELEVATION (FEET) = 410.00 DOWNSTREAM ELEVATION (FEET) = 400.00  
STREET LENGTH (FEET) = 238.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.28  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.45  
HALFSTREET FLOOD WIDTH (FEET) = 14.65  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.84  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 2.64  
STREET FLOW TRAVEL TIME (MIN.) = 0.68 Tc (MIN.) = 8.92  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.480  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.10 0.30 0.600 -  
USER-DEFINED - 1.90 0.30 0.600 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 8.91  
EFFECTIVE AREA (ACRES) = 10.30 AREA-AVERAGED Fm (INCH/HR) = 0.17  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.57  
TOTAL AREA (ACRES) = 10.3 PEAK FLOW RATE (CFS) = 30.66

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH (FEET) = 0.47 HALFSTREET FLOOD WIDTH (FEET) = 15.35  
FLOW VELOCITY (FEET/SEC.) = 6.02 DEPTH\*VELOCITY (FT\*FT/SEC.) = 2.80  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50114.00 = 812.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50114.00 TO NODE 50115.00 IS CODE = 63

=====  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<  
=====

UPSTREAM ELEVATION (FEET) = 400.00 DOWNSTREAM ELEVATION (FEET) = 390.00  
STREET LENGTH (FEET) = 241.00 CURB HEIGHT (INCHES) = 8.0  
STREET HALFWIDTH (FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 10.00  
INSIDE STREET CROSSFALL (DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH (FEET) = 0.66

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 38.64

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH (FEET) = 0.50  
HALFSTREET FLOOD WIDTH (FEET) = 16.91  
AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.33  
PRODUCT OF DEPTH&VELOCITY (FT\*FT/SEC.) = 3.15  
STREET FLOW TRAVEL TIME (MIN.) = 0.63 Tc (MIN.) = 9.55  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.349

SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.00 0.30 0.600 -  
USER-DEFINED - 1.50 0.30 0.600 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30



SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.607  
SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 15.96  
EFFECTIVE AREA(ACRES) = 15.90 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 15.9 PEAK FLOW RATE(CFS) = 45.42

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 18.09  
FLOW VELOCITY(FEET/SEC.) = 6.56 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.41  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50115.00 = 1053.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50115.00 TO NODE 50116.00 IS CODE = 63  
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 390.00 DOWNSTREAM ELEVATION(FEET) = 380.00  
STREET LENGTH(FEET) = 268.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 51.30  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.55  
HALFSTREET FLOOD WIDTH(FEET) = 19.41  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.48  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.54  
STREET FLOW TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 10.24  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.219

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.80 0.30 0.600 -  
USER-DEFINED - 3.50 0.30 0.600 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 11.76  
EFFECTIVE AREA(ACRES) = 20.20 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.59  
TOTAL AREA(ACRES) = 20.2 PEAK FLOW RATE(CFS) = 55.31

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.56 HALFSTREET FLOOD WIDTH(FEET) = 19.96  
FLOW VELOCITY(FEET/SEC.) = 6.63 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.69  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50116.00 = 1321.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50116.00 TO NODE 50117.00 IS CODE = 63

-----  
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
-----

UPSTREAM ELEVATION(FEET) = 380.00 DOWNSTREAM ELEVATION(FEET) = 355.00  
STREET LENGTH(FEET) = 507.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 73.94  
\*\*\*STREET FLOWING FULL\*\*\*

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.58  
HALFSTREET FLOOD WIDTH(FEET) = 20.00  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.05  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.66  
STREET FLOW TRAVEL TIME(MIN.) = 1.05 Tc(MIN.) = 11.29  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.046

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 6.80 0.30 0.600 -  
USER-DEFINED - 0.20 0.30 1.000 -  
USER-DEFINED - 6.10 0.30 0.600 -  
USER-DEFINED - 1.20 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.644  
SUBAREA AREA(ACRES) = 14.50 SUBAREA RUNOFF(CFS) = 37.23  
EFFECTIVE AREA(ACRES) = 34.70 AREA-AVERAGED Fm(INCH/HR) = 0.18  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA(ACRES) = 34.7 PEAK FLOW RATE(CFS) = 89.40

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.61 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
FLOW VELOCITY(FEET/SEC.) = 8.71 DEPTH\*VELOCITY(FT\*FT/SEC.) = 5.27  
LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50117.00 = 1828.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50117.00 TO NODE 50118.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
-----

ELEVATION DATA: UPSTREAM(FEET) = 355.00 DOWNSTREAM(FEET) = 315.00  
FLOW LENGTH(FEET) = 171.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 37.16

ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 89.40  
 PIPE TRAVEL TIME(MIN.) = 0.08 Tc(MIN.) = 11.37  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50118.00 = 1999.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50118.00 TO NODE 50119.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 315.00 DOWNSTREAM(FEET) = 284.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 180.00 CHANNEL SLOPE = 0.1722  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 89.40  
 FLOW VELOCITY(FEET/SEC.) = 12.50 FLOW DEPTH(FEET) = 1.54  
 TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 11.61  
 LONGEST FLOWPATH FROM NODE 50110.00 TO NODE 50119.00 = 2179.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 11.61  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.999  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	2.30	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.688  
 SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 8.04  
 EFFECTIVE AREA(ACRES) = 37.90 AREA-AVERAGED Fm(INCH/HR) = 0.19  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
 TOTAL AREA(ACRES) = 37.9 PEAK FLOW RATE(CFS) = 95.96

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN) = 11.61  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.999  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.46

EFFECTIVE AREA(ACRES) = 38.50 AREA-AVERAGED Fm(INCH/HR) = 0.19  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
 TOTAL AREA(ACRES) = 38.5 PEAK FLOW RATE(CFS) = 97.42

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50119.00 TO NODE 50119.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 11.61  
 RAINFALL INTENSITY(INCH/HR) = 3.00  
 AREA-AVERAGED Fm(INCH/HR) = 0.19  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.62  
 EFFECTIVE STREAM AREA(ACRES) = 38.50  
 TOTAL STREAM AREA(ACRES) = 38.50  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 97.42

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	356.18	16.00	2.512	0.30( 0.27)	0.90	176.5	50100.00
2	97.42	11.61	2.999	0.30( 0.19)	0.62	38.5	50110.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	411.92	11.61	2.999	0.30( 0.25)	0.84	166.5	50110.00
2	436.73	16.00	2.512	0.30( 0.25)	0.85	215.0	50100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 436.73 Tc(MIN.) = 16.00  
 EFFECTIVE AREA(ACRES) = 215.00 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA(ACRES) = 215.0  
 LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50119.00 = 3162.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50119.00 TO NODE 50120.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 284.00 DOWNSTREAM(FEET) = 240.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00 CHANNEL SLOPE = 0.0437  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 5.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 436.73  
 FLOW VELOCITY(FEET/SEC.) = 11.11 FLOW DEPTH(FEET) = 3.62  
 TRAVEL TIME(MIN.) = 1.51 Tc(MIN.) = 17.51  
 LONGEST FLOWPATH FROM NODE 50100.00 TO NODE 50120.00 = 4170.00 FEET.

```

*****
FLOW PROCESS FROM NODE 50120.00 TO NODE 50120.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 17.51
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.394
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.10     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     0.100    -
USER-DEFINED        -         0.30     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     1.000    -
USER-DEFINED        -         0.70     0.30     0.100    -
USER-DEFINED        -         0.70     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.640
SUBAREA AREA(ACRES) = 2.00      SUBAREA RUNOFF(CFS) = 3.96
EFFECTIVE AREA(ACRES) = 217.00  AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 217.0      PEAK FLOW RATE(CFS) = 436.73
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 50120.00 TO NODE 50120.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 17.51
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.394
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.50     0.30     1.000    -
USER-DEFINED        -         1.70     0.30     1.000    -
USER-DEFINED        -         0.40     0.30     0.100    -
USER-DEFINED        -         0.10     0.30     0.850    -
USER-DEFINED        -         0.50     0.30     1.000    -
USER-DEFINED        -         2.10     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.929
SUBAREA AREA(ACRES) = 5.30      SUBAREA RUNOFF(CFS) = 10.09
EFFECTIVE AREA(ACRES) = 222.30  AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 222.3      PEAK FLOW RATE(CFS) = 436.73
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 50120.00 TO NODE 50120.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 17.51
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.394
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN

```

```

USER-DEFINED        -         0.90     0.30     1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.90      SUBAREA RUNOFF(CFS) = 1.70
EFFECTIVE AREA(ACRES) = 223.20  AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 223.2      PEAK FLOW RATE(CFS) = 436.73
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
=====
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 223.2 TC(MIN.) = 17.51
EFFECTIVE AREA(ACRES) = 223.20  AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.851
PEAK FLOW RATE(CFS) = 436.73

** PEAK FLOW RATE TABLE **
STREAM      Q      Tc      Intensity  Fp(Fm)  Ap      Ae      HEADWATER
NUMBER      (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1          411.92 13.14   2.793 0.30( 0.25) 0.84   174.7  50110.00
2          436.73 17.51   2.394 0.30( 0.26) 0.85   223.2  50100.00
=====
END OF RATIONAL METHOD ANALYSIS

```



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

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92707

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PA3 & PA4 ROMP \*  
\* REGIONAL WATERSHED S29 - FREE DRAINING - ULTIMATE CONDITION \*  
\* 100-YR RM EV JULY 2018 ROKAMOTO \*  
\*\*\*\*\*

FILE NAME: P503XXCE.DAT  
TIME/DATE OF STUDY: 06:54 07/09/2018

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.00;	4.820
2)	6.00;	4.350
3)	7.00;	3.990
4)	8.00;	3.700
5)	9.00;	3.460
6)	10.00;	3.260
7)	11.00;	3.090
8)	12.00;	2.940
9)	13.00;	2.810
10)	14.00;	2.690
11)	15.00;	2.590
12)	20.00;	2.200
13)	25.00;	1.940
14)	30.00;	1.750
15)	40.00;	1.490
16)	50.00;	1.310
17)	60.00;	1.180
18)	90.00;	0.940
19)	120.00;	0.800
20)	180.00;	0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50300.00 TO NODE 50301.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 660.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 9.792  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.302  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.70	0.30	1.000	0	9.79
NATURAL FAIR COVER						
"GRASS"	-	0.40	0.30	1.000	0	9.79
NATURAL FAIR COVER						
"CHAPARRAL,BROADLEAF"	-	0.20	0.30	1.000	0	9.79
NATURAL FAIR COVER						
"GRASS"	-	0.10	0.30	1.000	0	9.79

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 3.78  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 3.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50301.00 TO NODE 50302.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 660.00 DOWNSTREAM ELEVATION(FEET) = 650.00  
STREET LENGTH(FEET) = 259.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.07  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.31  
HALFSTREET FLOOD WIDTH(FEET) = 7.47  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.06  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.25  
STREET FLOW TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 10.86  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.115

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 0.50 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.20 0.30 0.700 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.967  
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.58  
EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.29  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98  
TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 8.12

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.33 HALFSTREET FLOOD WIDTH(FEET) = 8.66  
FLOW VELOCITY(FEET/SEC.) = 4.33 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.43  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50302.00 = 589.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50302.00 TO NODE 50303.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 650.00 DOWNSTREAM ELEVATION(FEET) = 630.00  
STREET LENGTH(FEET) = 298.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.60

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.86  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.33  
HALFSTREET FLOOD WIDTH(FEET) = 8.34

AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.57  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.81  
STREET FLOW TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 11.75  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.978  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.30 0.30 0.700 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.721  
SUBAREA AREA(ACRES) = 1.40 SUBAREA RUNOFF(CFS) = 3.48  
EFFECTIVE AREA(ACRES) = 4.60 AREA-AVERAGED Fm(INCH/HR) = 0.27  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90  
TOTAL AREA(ACRES) = 4.6 PEAK FLOW RATE(CFS) = 11.21

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.34 HALFSTREET FLOOD WIDTH(FEET) = 8.91  
FLOW VELOCITY(FEET/SEC.) = 5.70 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.92  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50303.00 = 887.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50303.00 TO NODE 50304.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 630.00 DOWNSTREAM ELEVATION(FEET) = 590.00  
STREET LENGTH(FEET) = 724.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.62

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.97  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.39  
HALFSTREET FLOOD WIDTH(FEET) = 11.52  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.92  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.30  
STREET FLOW TRAVEL TIME(MIN.) = 2.04 Tc(MIN.) = 13.79  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.716

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.40 0.30 0.700 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 0.700 -  
USER-DEFINED - 0.50 0.30 1.000 -  
USER-DEFINED - 1.00 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.848  
SUBAREA AREA(ACRES) = 6.10 SUBAREA RUNOFF(CFS) = 13.51  
EFFECTIVE AREA(ACRES) = 10.70 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 10.7 PEAK FLOW RATE(CFS) = 23.64

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 13.01  
FLOW VELOCITY(FEET/SEC.) = 6.28 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.63  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50304.00 = 1611.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50304.00 TO NODE 50304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 13.79  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.716  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.22  
EFFECTIVE AREA(ACRES) = 10.80 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 10.8 PEAK FLOW RATE(CFS) = 23.85

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50304.00 TO NODE 50305.00 IS CODE = 63

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<

=====

UPSTREAM ELEVATION(FEET) = 590.00 DOWNSTREAM ELEVATION(FEET) = 550.00  
STREET LENGTH(FEET) = 788.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.63

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 36.08  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.47  
HALFSTREET FLOOD WIDTH(FEET) = 15.82  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.70  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 3.18  
STREET FLOW TRAVEL TIME(MIN.) = 1.96 Tc(MIN.) = 15.75  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.532

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.60	0.30	0.600	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	1.30	0.30	0.600	-
USER-DEFINED	-	2.20	0.30	1.000	-
USER-DEFINED	-	4.00	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.835  
SUBAREA AREA(ACRES) = 11.90 SUBAREA RUNOFF(CFS) = 24.43  
EFFECTIVE AREA(ACRES) = 22.70 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 22.7 PEAK FLOW RATE(CFS) = 46.50

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.51 HALFSTREET FLOOD WIDTH(FEET) = 17.54  
FLOW VELOCITY(FEET/SEC.) = 7.12 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.62  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50305.00 = 2399.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 15.75  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.532  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	0.700	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.950  
SUBAREA AREA(ACRES) = 0.60 SUBAREA RUNOFF(CFS) = 1.21  
EFFECTIVE AREA(ACRES) = 23.30 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA(ACRES) = 23.3 PEAK FLOW RATE(CFS) = 47.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50305.00 TO NODE 50305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 15.75  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.532  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.30	0.600	-
USER-DEFINED	-	1.20	0.30	0.700	-
USER-DEFINED	-	2.50	0.30	0.600	-
USER-DEFINED	-	7.60	0.30	0.700	-
USER-DEFINED	-	0.50	0.30	0.600	-
USER-DEFINED	-	1.30	0.30	0.700	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.666  
 SUBAREA AREA (ACRES) = 15.20 SUBAREA RUNOFF (CFS) = 31.90  
 EFFECTIVE AREA (ACRES) = 38.50 AREA-AVERAGED Fm (INCH/HR) = 0.23  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
 TOTAL AREA (ACRES) = 38.5 PEAK FLOW RATE (CFS) = 79.61

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50305.00 TO NODE 50306.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 510.00  
 FLOW LENGTH (FEET) = 813.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.7 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 19.95  
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 79.61  
 PIPE TRAVEL TIME (MIN.) = 0.68 Tc (MIN.) = 16.42  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50306.00 = 3212.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.42  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.479  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.100	-
USER-DEFINED	-	2.80	0.30	0.600	-
USER-DEFINED	-	2.00	0.30	0.100	-
USER-DEFINED	-	10.00	0.30	0.600	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.536  
 SUBAREA AREA (ACRES) = 15.90 SUBAREA RUNOFF (CFS) = 33.17  
 EFFECTIVE AREA (ACRES) = 54.40 AREA-AVERAGED Fm (INCH/HR) = 0.21  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.71  
 TOTAL AREA (ACRES) = 54.4 PEAK FLOW RATE (CFS) = 110.95

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50306.00 TO NODE 50306.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.42  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.479  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 3.53

EFFECTIVE AREA (ACRES) = 56.20 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 56.2 PEAK FLOW RATE (CFS) = 114.48

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50306.00 TO NODE 50307.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 510.00 DOWNSTREAM (FEET) = 470.00  
 FLOW LENGTH (FEET) = 919.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.9 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 21.03  
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 114.48  
 PIPE TRAVEL TIME (MIN.) = 0.73 Tc (MIN.) = 17.15  
 LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50307.00 = 4131.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.15  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.422  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.30	0.600	-
USER-DEFINED	-	2.20	0.30	0.100	-
USER-DEFINED	-	1.50	0.30	0.400	-
USER-DEFINED	-	10.50	0.30	0.600	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.533  
 SUBAREA AREA (ACRES) = 17.90 SUBAREA RUNOFF (CFS) = 36.44  
 EFFECTIVE AREA (ACRES) = 74.10 AREA-AVERAGED Fm (INCH/HR) = 0.20  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.67  
 TOTAL AREA (ACRES) = 74.1 PEAK FLOW RATE (CFS) = 148.05

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50307.00 TO NODE 50307.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.15  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.422  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.60	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 3.00 SUBAREA RUNOFF (CFS) = 5.73  
 EFFECTIVE AREA (ACRES) = 77.10 AREA-AVERAGED Fm (INCH/HR) = 0.21



AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA (ACRES) = 77.1 PEAK FLOW RATE (CFS) = 153.78

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50307.00 TO NODE 50308.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 425.00  
FLOW LENGTH (FEET) = 1006.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.7 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 22.68  
ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 153.78  
PIPE TRAVEL TIME (MIN.) = 0.74 Tc (MIN.) = 17.89  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50308.00 = 5137.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.89  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.364  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.100	-
USER-DEFINED	-	2.10	0.30	0.600	-
USER-DEFINED	-	0.20	0.30	0.850	-
USER-DEFINED	-	0.80	0.30	0.100	-
USER-DEFINED	-	2.50	0.30	0.400	-
USER-DEFINED	-	6.30	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.495  
SUBAREA AREA (ACRES) = 12.90 SUBAREA RUNOFF (CFS) = 25.73  
EFFECTIVE AREA (ACRES) = 90.00 AREA-AVERAGED Fm (INCH/HR) = 0.20  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.66  
TOTAL AREA (ACRES) = 90.0 PEAK FLOW RATE (CFS) = 175.50

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.89  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.364  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.893  
SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.32  
EFFECTIVE AREA (ACRES) = 90.70 AREA-AVERAGED Fm (INCH/HR) = 0.20  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.66

TOTAL AREA (ACRES) = 90.7 PEAK FLOW RATE (CFS) = 176.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.89  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.364  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	0.400	-
USER-DEFINED	-	0.90	0.30	0.850	-
USER-DEFINED	-	5.20	0.30	0.100	-
USER-DEFINED	-	11.00	0.30	0.400	-
USER-DEFINED	-	8.80	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.419  
SUBAREA AREA (ACRES) = 26.80 SUBAREA RUNOFF (CFS) = 54.00  
EFFECTIVE AREA (ACRES) = 117.50 AREA-AVERAGED Fm (INCH/HR) = 0.18  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.61  
TOTAL AREA (ACRES) = 117.5 PEAK FLOW RATE (CFS) = 230.82

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50308.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.89  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.364  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.60	0.30	0.850	-
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	2.80	0.30	0.400	-
USER-DEFINED	-	0.20	0.30	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.749  
SUBAREA AREA (ACRES) = 13.70 SUBAREA RUNOFF (CFS) = 26.38  
EFFECTIVE AREA (ACRES) = 131.20 AREA-AVERAGED Fm (INCH/HR) = 0.19  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.62  
TOTAL AREA (ACRES) = 131.2 PEAK FLOW RATE (CFS) = 257.20

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50308.00 TO NODE 50309.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 425.00 DOWNSTREAM (FEET) = 410.00  
FLOW LENGTH (FEET) = 296.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 45.0 INCH PIPE IS 36.7 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 26.66  
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 257.20

PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 18.08  
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 5433.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 15.1

>>>>DEFINE MEMORY BANK # 2 <<<<<

PEAK FLOWRATE TABLE FILE NAME: P502XXCE.DNA  
MEMORY BANK # 2 DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1067.67	12.96	0.30 ( 0.23)	0.76	454.7	50240.00
2	1116.97	16.89	0.30 ( 0.23)	0.76	560.0	50280.00
3	1110.13	19.21	0.30 ( 0.23)	0.76	603.7	50220.00
4	1050.67	22.69	0.30 ( 0.23)	0.76	637.5	50260.00
5	970.48	26.04	0.30 ( 0.23)	0.76	645.2	50200.00
TOTAL AREA(ACRES) =						645.2

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 14.0

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<<

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1067.67	12.96	0.30 ( 0.23)	0.76	454.7	50240.00
2	1116.97	16.89	0.30 ( 0.23)	0.76	560.0	50280.00
3	1110.13	19.21	0.30 ( 0.23)	0.76	603.7	50220.00
4	1050.67	22.69	0.30 ( 0.23)	0.76	637.5	50260.00
5	970.48	26.04	0.30 ( 0.23)	0.76	645.2	50200.00
TOTAL AREA(ACRES) =						645.2

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 2 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1067.67	12.96	2.815	0.30 ( 0.23)	0.76	454.7	50240.00
2	1116.97	16.89	2.442	0.30 ( 0.23)	0.76	560.0	50280.00

3 1110.13 19.21 2.262 0.30 ( 0.23) 0.76 603.7 50220.00  
4 1050.67 22.69 2.060 0.30 ( 0.23) 0.76 637.5 50260.00  
5 970.48 26.04 1.901 0.30 ( 0.23) 0.76 645.2 50200.00  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50309.00 = 11241.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	257.20	18.08	2.350	0.30 ( 0.19)	0.62	131.2	50300.00
LONGEST FLOWPATH FROM NODE 50300.00 TO NODE 50309.00 = 5433.00 FEET.							

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1291.74	12.96	2.815	0.30 ( 0.22)	0.74	548.8	50240.00
2	1367.57	16.89	2.442	0.30 ( 0.22)	0.74	682.6	50280.00
3	1370.67	18.08	2.350	0.30 ( 0.22)	0.74	713.5	50300.00
4	1356.84	19.21	2.262	0.30 ( 0.22)	0.74	734.9	50220.00
5	1273.44	22.69	2.060	0.30 ( 0.22)	0.74	768.7	50260.00
6	1174.27	26.04	1.901	0.30 ( 0.22)	0.74	776.4	50200.00
TOTAL AREA(ACRES) =						776.4	

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1370.67 Tc(MIN.) = 18.078  
EFFECTIVE AREA(ACRES) = 713.55 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
TOTAL AREA(ACRES) = 776.4  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50309.00 = 11241.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50309.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50309.00 TO NODE 50310.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 407.00  
FLOW LENGTH(FEET) = 898.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 144.0 INCH PIPE IS 109.8 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.81  
ESTIMATED PIPE DIAMETER(INCH) = 144.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 1370.67  
PIPE TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 19.09  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50310.00 = 12139.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.09  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.271  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.20 0.30 0.100 -  
 USER-DEFINED - 4.60 0.30 0.400 -  
 USER-DEFINED - 2.60 0.30 0.850 -  
 USER-DEFINED - 1.00 0.30 0.100 -  
 USER-DEFINED - 9.60 0.30 0.400 -  
 USER-DEFINED - 0.50 0.30 0.500 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.446  
 SUBAREA AREA (ACRES) = 18.50 SUBAREA RUNOFF (CFS) = 35.58  
 EFFECTIVE AREA (ACRES) = 732.05 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 794.9 PEAK FLOW RATE (CFS) = 1370.67  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50310.00 TO NODE 50310.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 19.09  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.271  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 0.600 -  
 USER-DEFINED - 10.70 0.30 0.850 -  
 USER-DEFINED - 3.20 0.30 0.400 -  
 USER-DEFINED - 0.50 0.30 0.850 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.749  
 SUBAREA AREA (ACRES) = 14.50 SUBAREA RUNOFF (CFS) = 26.71  
 EFFECTIVE AREA (ACRES) = 746.55 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 809.4 PEAK FLOW RATE (CFS) = 1378.65

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1293.95	14.00	2.690	0.30 ( 0.22)	0.73	581.8	50240.00
2	1380.97	17.90	2.364	0.30 ( 0.22)	0.73	715.6	50280.00
3	1378.65	19.09	2.271	0.30 ( 0.22)	0.73	746.5	50300.00
4	1360.78	20.22	2.189	0.30 ( 0.22)	0.73	767.9	50220.00
5	1289.10	23.72	2.006	0.30 ( 0.22)	0.73	801.7	50260.00
6	1195.29	27.08	1.861	0.30 ( 0.22)	0.73	809.4	50200.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 1380.97 Tc (MIN.) = 17.90  
 AREA-AVERAGED Fm (INCH/HR) = 0.22 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.73 EFFECTIVE AREA (ACRES) = 715.58

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50310.00 TO NODE 50345.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 407.00 DOWNSTREAM (FEET) = 403.00

FLOW LENGTH (FEET) = 1487.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 114.0 INCH PIPE IS 90.8 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.41  
 ESTIMATED PIPE DIAMETER (INCH) = 114.00 NUMBER OF PIPES = 2  
 PIPE-FLOW (CFS) = 1380.97  
 PIPE TRAVEL TIME (MIN.) = 2.17 Tc (MIN.) = 20.08  
 LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50345.00 = 13626.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 10  
 -----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50320.00 TO NODE 50321.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 322.00  
 ELEVATION DATA: UPSTREAM (FEET) = 1110.00 DOWNSTREAM (FEET) = 1035.00

Tc = K \* [(LENGTH\*\* 3.00) / (ELEVATION CHANGE)] \*\* 0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.517  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.357  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 NATURAL FAIR COVER  
 "GRASS" - 0.60 0.30 1.000 0 9.52  
 NATURAL FAIR COVER  
 "WOODLAND, GRASS" - 0.30 0.30 1.000 0 9.52  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 2.48  
 TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 2.48

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50321.00 TO NODE 50322.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1035.00 DOWNSTREAM (FEET) = 960.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 225.00 CHANNEL SLOPE = 0.3333  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 2.48  
 FLOW VELOCITY (FEET/SEC.) = 6.52 FLOW DEPTH (FEET) = 0.36  
 TRAVEL TIME (MIN.) = 0.57 Tc (MIN.) = 10.09  
 LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50322.00 = 547.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50322.00 TO NODE 50322.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.09  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.244  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 1.00 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 1.10 SUBAREA RUNOFF(CFS) = 2.91  
 EFFECTIVE AREA(ACRES) = 2.00 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 2.0 PEAK FLOW RATE(CFS) = 5.30

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50322.00 TO NODE 50323.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 960.00 DOWNSTREAM(FEET) = 955.00  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 33.00 CHANNEL SLOPE = 0.1515  
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA(CFS) = 5.30  
 FLOW VELOCITY(FEET/SEC.) = 5.92 FLOW DEPTH(FEET) = 0.55  
 TRAVEL TIME(MIN.) = 0.09 Tc(MIN.) = 10.19  
 LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50323.00 = 580.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50323.00 TO NODE 50323.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.19  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.229  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.70 0.30 1.000 -  
 USER-DEFINED - 1.50 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 8.43  
 EFFECTIVE AREA(ACRES) = 5.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 5.2 PEAK FLOW RATE(CFS) = 13.71

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50323.00 TO NODE 50324.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 955.00 DOWNSTREAM(FEET) = 915.00  
 FLOW LENGTH(FEET) = 254.00 MANNING'S N = 0.013  
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000  
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 20.34  
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 13.71  
 PIPE TRAVEL TIME(MIN.) = 0.21 Tc(MIN.) = 10.39  
 LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50324.00 = 834.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50324.00 TO NODE 50324.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.39  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.193  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.00 0.30 0.800 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.818  
 SUBAREA AREA(ACRES) = 2.20 SUBAREA RUNOFF(CFS) = 5.84  
 EFFECTIVE AREA(ACRES) = 7.40 AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
 TOTAL AREA(ACRES) = 7.4 PEAK FLOW RATE(CFS) = 19.38

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50324.00 TO NODE 50324.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.39  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.193  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 2.80 0.30 0.800 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 2.00 0.30 0.800 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.804  
 SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 13.02  
 EFFECTIVE AREA(ACRES) = 12.30 AREA-AVERAGED Fm(INCH/HR) = 0.27  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
 TOTAL AREA(ACRES) = 12.3 PEAK FLOW RATE(CFS) = 32.40

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50324.00 TO NODE 50325.00 IS CODE = 31  
 -----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 915.00 DOWNSTREAM(FEET) = 880.00  
 FLOW LENGTH(FEET) = 548.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.9 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.74  
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 32.40  
 PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 10.91

LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50325.00 = 1382.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50325.00 TO NODE 50325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 10.91  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.106  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.90 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 3.90 SUBAREA RUNOFF(CFS) = 10.06  
EFFECTIVE AREA(ACRES) = 16.20 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87  
TOTAL AREA(ACRES) = 16.2 PEAK FLOW RATE(CFS) = 41.48

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50325.00 TO NODE 50326.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 880.00 DOWNSTREAM(FEET) = 850.00  
FLOW LENGTH(FEET) = 441.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.4 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.51  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 41.48  
PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 11.28  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50326.00 = 1823.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50326.00 TO NODE 50326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 11.28  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.047  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.30 0.30 0.800 -  
USER-DEFINED - 1.20 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 4.50 SUBAREA RUNOFF(CFS) = 11.37  
EFFECTIVE AREA(ACRES) = 20.70 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 20.7 PEAK FLOW RATE(CFS) = 52.00

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50326.00 TO NODE 50327.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 850.00 DOWNSTREAM(FEET) = 810.00  
FLOW LENGTH(FEET) = 616.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.81  
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 52.00  
PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 11.80  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50327.00 = 2439.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50327.00 TO NODE 50327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 11.80  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.970  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.20 0.30 0.800 -  
USER-DEFINED - 5.00 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 7.20 SUBAREA RUNOFF(CFS) = 17.69  
EFFECTIVE AREA(ACRES) = 27.90 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
TOTAL AREA(ACRES) = 27.9 PEAK FLOW RATE(CFS) = 68.24

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50327.00 TO NODE 50328.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

-----  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 760.00  
FLOW LENGTH(FEET) = 724.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.7 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.92  
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 68.24  
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 12.35  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50328.00 = 3163.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50328.00 TO NODE 50328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

-----  
MAINLINE Tc(MIN.) = 12.35  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.894  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.90 0.30 0.800 -  
USER-DEFINED - 6.30 0.30 0.800 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 9.20 SUBAREA RUNOFF (CFS) = 21.98  
EFFECTIVE AREA (ACRES) = 37.10 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA (ACRES) = 37.1 PEAK FLOW RATE (CFS) = 88.32

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50328.00 TO NODE 50328.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 12.35  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.894  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 2.90 0.30 0.800 -  
USER-DEFINED - 3.10 0.30 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 6.00 SUBAREA RUNOFF (CFS) = 14.33  
EFFECTIVE AREA (ACRES) = 43.10 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
TOTAL AREA (ACRES) = 43.1 PEAK FLOW RATE (CFS) = 102.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50328.00 TO NODE 50329.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 760.00 DOWNSTREAM (FEET) = 700.00  
FLOW LENGTH (FEET) = 769.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.2 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 25.18  
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 102.66  
PIPE TRAVEL TIME (MIN.) = 0.51 Tc (MIN.) = 12.86  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50329.00 = 3932.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50329.00 TO NODE 50329.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 12.86  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.828  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 7.10 0.30 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 7.10 SUBAREA RUNOFF (CFS) = 16.54  
EFFECTIVE AREA (ACRES) = 50.20 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA (ACRES) = 50.2 PEAK FLOW RATE (CFS) = 116.63

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50329.00 TO NODE 50340.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

-----  
ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 660.00  
FLOW LENGTH (FEET) = 478.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.4 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 27.17  
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 116.63  
PIPE TRAVEL TIME (MIN.) = 0.29 Tc (MIN.) = 13.16  
LONGEST FLOWPATH FROM NODE 50320.00 TO NODE 50340.00 = 4410.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

-----  
MAINLINE Tc (MIN.) = 13.16  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.791  
SUBAREA LOSS RATE DATA (AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 8.70 0.30 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA (ACRES) = 8.70 SUBAREA RUNOFF (CFS) = 19.98  
EFFECTIVE AREA (ACRES) = 58.90 AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA (ACRES) = 58.9 PEAK FLOW RATE (CFS) = 134.95

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 1  
-----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

-----  
TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION (MIN.) = 13.16  
RAINFALL INTENSITY (INCH/HR) = 2.79  
AREA-AVERAGED Fm (INCH/HR) = 0.25  
AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.82  
EFFECTIVE STREAM AREA (ACRES) = 58.90  
TOTAL STREAM AREA (ACRES) = 58.90  
PEAK FLOW RATE (CFS) AT CONFLUENCE = 134.95

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50330.00 TO NODE 50331.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

-----  
INITIAL SUBAREA FLOW-LENGTH (FEET) = 294.00  
ELEVATION DATA: UPSTREAM (FEET) = 990.00 DOWNSTREAM (FEET) = 965.00

Tc = K\*(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.457  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.857  
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "1 DWELLING/ACRE"	-	1.60	0.30	0.800	0	7.46

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA RUNOFF(CFS) = 5.21  
 TOTAL AREA(ACRES) = 1.60 PEAK FLOW RATE(CFS) = 5.21

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50331.00 TO NODE 50332.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====  
 UPSTREAM ELEVATION(FEET) = 965.00 DOWNSTREAM ELEVATION(FEET) = 960.00  
 STREET LENGTH(FEET) = 285.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.67

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.00  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.38  
 HALfstREET FLOOD WIDTH(FEET) = 10.98  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.23  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 1.22  
 STREET FLOW TRAVEL TIME(MIN.) = 1.47 Tc(MIN.) = 8.93  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.477  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.60	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 7.57  
 EFFECTIVE AREA(ACRES) = 4.20 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 4.2 PEAK FLOW RATE(CFS) = 12.24

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.41 HALfstREET FLOOD WIDTH(FEET) = 12.54  
 FLOW VELOCITY(FEET/SEC.) = 3.47 DEPTH\*VELOCITY(FT\*FT/SEC.) = 1.42  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50332.00 = 579.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50332.00 TO NODE 50333.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 960.00 DOWNSTREAM ELEVATION(FEET) = 940.00  
 STREET LENGTH(FEET) = 364.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2  
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150  
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
 MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.62

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 17.68  
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
 STREET FLOW DEPTH(FEET) = 0.39  
 HALfstREET FLOOD WIDTH(FEET) = 11.52  
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.83  
 PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.27  
 STREET FLOW TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 9.97  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.266  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.90	0.30	0.800	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.805  
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 10.89  
 EFFECTIVE AREA(ACRES) = 8.20 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA(ACRES) = 8.2 PEAK FLOW RATE(CFS) = 22.33

END OF SUBAREA STREET FLOW HYDRAULICS:  
 DEPTH(FEET) = 0.41 HALfstREET FLOOD WIDTH(FEET) = 12.70  
 FLOW VELOCITY(FEET/SEC.) = 6.20 DEPTH\*VELOCITY(FT\*FT/SEC.) = 2.55  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50333.00 = 943.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50333.00 TO NODE 50334.00 IS CODE = 63  
 -----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
 >>>>(STREET TABLE SECTION # 5 USED)<<<<<  
 =====

UPSTREAM ELEVATION(FEET) = 940.00 DOWNSTREAM ELEVATION(FEET) = 920.00  
 STREET LENGTH(FEET) = 405.00 CURB HEIGHT(INCHES) = 8.0  
 STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
 INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.64

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.63  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.46  
HALFSTREET FLOOD WIDTH(FEET) = 14.88  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 6.37  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 2.90  
STREET FLOW TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 11.03  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.085

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 5.50 0.30 0.800 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.831  
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 16.59  
EFFECTIVE AREA(ACRES) = 14.70 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 14.7 PEAK FLOW RATE(CFS) = 37.59

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 16.13  
FLOW VELOCITY(FEET/SEC.) = 6.73 DEPTH\*VELOCITY(FT\*FT/SEC.) = 3.24  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50334.00 = 1348.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50334.00 TO NODE 50335.00 IS CODE = 63  
-----

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>(STREET TABLE SECTION # 5 USED)<<<<<  
=====

UPSTREAM ELEVATION(FEET) = 920.00 DOWNSTREAM ELEVATION(FEET) = 905.00  
STREET LENGTH(FEET) = 270.00 CURB HEIGHT(INCHES) = 8.0  
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 10.00  
INSIDE STREET CROSSFALL(DECIMAL) = 0.020  
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2  
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020  
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0150  
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200  
MAXIMUM ALLOWABLE STREET FLOW DEPTH(FEET) = 0.62

\*\*TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 65.53  
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:  
STREET FLOW DEPTH(FEET) = 0.55  
HALFSTREET FLOOD WIDTH(FEET) = 19.73  
AVERAGE FLOW VELOCITY(FEET/SEC.) = 8.03  
PRODUCT OF DEPTH&VELOCITY(FT\*FT/SEC.) = 4.44

STREET FLOW TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 11.59  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.001  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 12.90 0.30 0.800 -  
USER-DEFINED - 4.00 0.30 1.000 -  
USER-DEFINED - 5.40 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.886  
SUBAREA AREA(ACRES) = 22.70 SUBAREA RUNOFF(CFS) = 55.89  
EFFECTIVE AREA(ACRES) = 37.40 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
TOTAL AREA(ACRES) = 37.4 PEAK FLOW RATE(CFS) = 92.36

END OF SUBAREA STREET FLOW HYDRAULICS:  
DEPTH(FEET) = 0.60 HALFSTREET FLOOD WIDTH(FEET) = 20.00  
FLOW VELOCITY(FEET/SEC.) = 9.13 DEPTH\*VELOCITY(FT\*FT/SEC.) = 5.49  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50335.00 = 1618.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50335.00 TO NODE 50336.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 905.00 DOWNSTREAM(FEET) = 870.00  
FLOW LENGTH(FEET) = 898.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.2 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.95  
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 92.36  
PIPE TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 12.38  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50336.00 = 2516.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50336.00 TO NODE 50336.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
=====

MAINLINE Tc(MIN.) = 12.38  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.891  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 6.40 0.30 0.800 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 15.27  
EFFECTIVE AREA(ACRES) = 43.80 AREA-AVERAGED Fm(INCH/HR) = 0.25  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
TOTAL AREA(ACRES) = 43.8 PEAK FLOW RATE(CFS) = 103.90

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50336.00 TO NODE 50337.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<



```
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 870.00 DOWNSTREAM(FEET) = 820.00
FLOW LENGTH(FEET) = 799.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.62
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 103.90
PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 12.94
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50337.00 = 3315.00 FEET.
```

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*****
FLOW PROCESS FROM NODE 50337.00 TO NODE 50337.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.94
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.817
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.00 0.30 0.800 -
USER-DEFINED - 7.20 0.30 0.800 -
USER-DEFINED - 1.50 0.30 1.000 -
USER-DEFINED - 0.70 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.839
SUBAREA AREA(ACRES) = 11.40 SUBAREA RUNOFF(CFS) = 26.32
EFFECTIVE AREA(ACRES) = 55.20 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 55.2 PEAK FLOW RATE(CFS) = 127.33
```

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*****
FLOW PROCESS FROM NODE 50337.00 TO NODE 50338.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 820.00 DOWNSTREAM(FEET) = 750.00
FLOW LENGTH(FEET) = 1063.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.71
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 127.33
PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 13.66
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50338.00 = 4378.00 FEET.
```

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*****
FLOW PROCESS FROM NODE 50338.00 TO NODE 50338.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.66
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.731
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.70 0.30 0.800 -
```

```
USER-DEFINED - 4.20 0.30 0.800 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 19.95
EFFECTIVE AREA(ACRES) = 64.10 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 64.1 PEAK FLOW RATE(CFS) = 142.98
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*****
FLOW PROCESS FROM NODE 50338.00 TO NODE 50339.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 750.00 DOWNSTREAM(FEET) = 685.00
FLOW LENGTH(FEET) = 1107.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.64
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 142.98
PIPE TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 14.41
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50339.00 = 5485.00 FEET.
```

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*****
FLOW PROCESS FROM NODE 50339.00 TO NODE 50339.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 14.41
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.649
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.10 0.30 0.800 -
USER-DEFINED - 1.20 0.30 0.800 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 15.83
EFFECTIVE AREA(ACRES) = 71.40 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 71.4 PEAK FLOW RATE(CFS) = 154.10
```

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*****
FLOW PROCESS FROM NODE 50339.00 TO NODE 50340.00 IS CODE = 31
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```
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 685.00 DOWNSTREAM(FEET) = 660.00
FLOW LENGTH(FEET) = 592.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 30.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.09
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 154.10
PIPE TRAVEL TIME(MIN.) = 0.45 Tc(MIN.) = 14.86
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50340.00 = 6077.00 FEET.
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FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.86  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.604  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.00 0.30 0.800 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA(ACRES) = 5.00 SUBAREA RUNOFF(CFS) = 10.64  
 EFFECTIVE AREA(ACRES) = 76.40 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA(ACRES) = 76.4 PEAK FLOW RATE(CFS) = 161.87

FLOW PROCESS FROM NODE 50340.00 TO NODE 50340.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<  
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 14.86  
 RAINFALL INTENSITY(INCH/HR) = 2.60  
 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.83  
 EFFECTIVE STREAM AREA(ACRES) = 76.40  
 TOTAL STREAM AREA(ACRES) = 76.40  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 161.87

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	134.95	13.16	2.791	0.30( 0.25)	0.82	58.9	50320.00
2	161.87	14.86	2.604	0.30( 0.25)	0.83	76.4	50330.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	289.67	13.16	2.791	0.30( 0.25)	0.83	126.6	50320.00
2	286.91	14.86	2.604	0.30( 0.25)	0.83	135.3	50330.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 289.67 Tc(MIN.) = 13.16  
 EFFECTIVE AREA(ACRES) = 126.55 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA(ACRES) = 135.3  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50340.00 = 6077.00 FEET.

FLOW PROCESS FROM NODE 50340.00 TO NODE 50341.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 660.00 DOWNSTREAM(FEET) = 575.00  
 FLOW LENGTH(FEET) = 1133.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.1 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 32.29  
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 289.67  
 PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 13.74  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50341.00 = 7210.00 FEET.

FLOW PROCESS FROM NODE 50341.00 TO NODE 50341.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.74  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.721  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 4.30 0.30 0.600 -  
 USER-DEFINED - 3.10 0.30 0.800 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.684  
 SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 16.76  
 EFFECTIVE AREA(ACRES) = 133.95 AREA-AVERAGED Fm(INCH/HR) = 0.25  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA(ACRES) = 142.7 PEAK FLOW RATE(CFS) = 298.43

FLOW PROCESS FROM NODE 50341.00 TO NODE 50342.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 575.00 DOWNSTREAM(FEET) = 540.00  
 FLOW LENGTH(FEET) = 495.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 36.0 INCHES  
 PIPE-FLOW VELOCITY(FEET/SEC.) = 31.48  
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1  
 PIPE-FLOW(CFS) = 298.43  
 PIPE TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 14.00  
 LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50342.00 = 7705.00 FEET.

FLOW PROCESS FROM NODE 50342.00 TO NODE 50342.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.00  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.690  
 SUBAREA LOSS RATE DATA(AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.90 0.30 0.600 -

USER-DEFINED - 0.20 0.30 0.600 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600  
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 4.74  
EFFECTIVE AREA (ACRES) = 136.05 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
TOTAL AREA (ACRES) = 144.8 PEAK FLOW RATE (CFS) = 299.39

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50342.00 TO NODE 50342.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 14.00  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.690  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.10	0.30	0.600	-
USER-DEFINED	-	17.00	0.30	0.800	-
USER-DEFINED	-	0.90	0.30	0.600	-
USER-DEFINED	-	0.90	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.738  
SUBAREA AREA (ACRES) = 25.90 SUBAREA RUNOFF (CFS) = 57.54  
EFFECTIVE AREA (ACRES) = 161.95 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA (ACRES) = 170.7 PEAK FLOW RATE (CFS) = 356.93

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50342.00 TO NODE 50343.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 540.00 DOWNSTREAM (FEET) = 470.00  
FLOW LENGTH (FEET) = 894.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.8 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 34.49  
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 356.93  
PIPE TRAVEL TIME (MIN.) = 0.43 Tc (MIN.) = 14.43  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50343.00 = 8599.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50343.00 TO NODE 50343.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 14.43  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.647  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.60	0.30	0.600	-
USER-DEFINED	-	0.10	0.30	0.800	-
USER-DEFINED	-	0.20	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.603  
SUBAREA AREA (ACRES) = 6.90 SUBAREA RUNOFF (CFS) = 15.31  
EFFECTIVE AREA (ACRES) = 168.85 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA (ACRES) = 177.6 PEAK FLOW RATE (CFS) = 365.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50343.00 TO NODE 50343.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 14.43  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.647  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.500	-
USER-DEFINED	-	1.80	0.30	0.600	-
USER-DEFINED	-	17.90	0.30	0.800	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.777  
SUBAREA AREA (ACRES) = 20.00 SUBAREA RUNOFF (CFS) = 43.44  
EFFECTIVE AREA (ACRES) = 188.85 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79  
TOTAL AREA (ACRES) = 197.6 PEAK FLOW RATE (CFS) = 409.38

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50343.00 TO NODE 50344.00 IS CODE = 31  
-----

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 416.00  
FLOW LENGTH (FEET) = 780.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.5 INCHES  
PIPE-FLOW VELOCITY (FEET/SEC.) = 33.85  
ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1  
PIPE-FLOW (CFS) = 409.38  
PIPE TRAVEL TIME (MIN.) = 0.38 Tc (MIN.) = 14.82  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50344.00 = 9379.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50344.00 TO NODE 50344.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 14.82  
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.608  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.60	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	1.90	0.30	0.100	-
USER-DEFINED	-	0.10	0.30	0.400	-
USER-DEFINED	-	14.70	0.30	0.500	-
USER-DEFINED	-	33.20	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.548  
SUBAREA AREA(ACRES) = 53.70 SUBAREA RUNOFF(CFS) = 118.11  
EFFECTIVE AREA(ACRES) = 242.55 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
TOTAL AREA(ACRES) = 251.3 PEAK FLOW RATE(CFS) = 520.97

\*\*\*\*\*

FLOW PROCESS FROM NODE 50344.00 TO NODE 50344.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.82  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.608  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 4.60 0.30 0.800 -  
USER-DEFINED - 0.40 0.30 0.500 -  
USER-DEFINED - 0.10 0.30 0.600 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.773  
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 10.91  
EFFECTIVE AREA(ACRES) = 247.65 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
TOTAL AREA(ACRES) = 256.4 PEAK FLOW RATE(CFS) = 531.87

\*\*\*\*\*

FLOW PROCESS FROM NODE 50344.00 TO NODE 50345.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 416.00 DOWNSTREAM(FEET) = 403.00  
FLOW LENGTH(FEET) = 526.00 MANNING'S N = 0.013  
DEPTH OF FLOW IN 69.0 INCH PIPE IS 53.3 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.70  
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 531.87  
PIPE TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 15.17  
LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50345.00 = 9905.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	531.87	15.17	2.576	0.30( 0.22)	0.74	247.7	50320.00
2	518.87	16.88	2.444	0.30( 0.22)	0.74	256.4	50330.00

LONGEST FLOWPATH FROM NODE 50330.00 TO NODE 50345.00 = 9905.00 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1293.95	15.86	2.523	0.30( 0.22)	0.73	581.8	50240.00

2	1380.97	20.08	2.196	0.30( 0.22)	0.73	715.6	50280.00
3	1378.65	21.26	2.134	0.30( 0.22)	0.73	746.5	50300.00
4	1360.78	22.39	2.075	0.30( 0.22)	0.73	767.9	50220.00
5	1289.10	25.58	1.918	0.30( 0.22)	0.73	801.7	50260.00
6	1195.29	28.95	1.790	0.30( 0.22)	0.73	809.4	50200.00

LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50345.00 = 13626.00 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1798.61	15.17	2.576	0.30( 0.22)	0.73	804.3	50320.00
2	1820.59	15.86	2.523	0.30( 0.22)	0.73	832.9	50240.00
3	1833.83	16.88	2.444	0.30( 0.22)	0.73	870.5	50330.00
4	1842.01	20.08	2.196	0.30( 0.22)	0.73	972.0	50280.00
5	1825.29	21.26	2.134	0.30( 0.22)	0.73	1002.9	50300.00
6	1793.64	22.39	2.075	0.30( 0.22)	0.73	1024.3	50220.00
7	1685.15	25.58	1.918	0.30( 0.22)	0.74	1058.1	50260.00
8	1561.40	28.95	1.790	0.30( 0.22)	0.74	1065.8	50200.00

TOTAL AREA(ACRES) = 1065.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1842.01 Tc(MIN.) = 20.075  
EFFECTIVE AREA(ACRES) = 971.98 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1065.8  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50345.00 = 13626.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 12

>>>>CLEAR MEMORY BANK # 1 <<<<

\*\*\*\*\*

FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.08  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.196  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 0.100 -  
USER-DEFINED - 1.40 0.30 0.500 -  
USER-DEFINED - 0.10 0.30 0.850 -  
USER-DEFINED - 6.30 0.30 0.100 -  
USER-DEFINED - 8.70 0.30 0.400 -  
USER-DEFINED - 10.80 0.30 0.500 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.376  
SUBAREA AREA(ACRES) = 27.40 SUBAREA RUNOFF(CFS) = 51.37  
EFFECTIVE AREA(ACRES) = 999.38 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA(ACRES) = 1093.2 PEAK FLOW RATE(CFS) = 1842.01  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*

FLOW PROCESS FROM NODE 50345.00 TO NODE 50345.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.08  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.196  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.600	-
USER-DEFINED	-	1.60	0.30	0.850	-
USER-DEFINED	-	1.80	0.30	0.100	-
USER-DEFINED	-	6.20	0.30	0.400	-
USER-DEFINED	-	2.80	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.456  
 SUBAREA AREA (ACRES) = 13.70 SUBAREA RUNOFF (CFS) = 25.39  
 EFFECTIVE AREA (ACRES) = 1013.08 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 1106.9 PEAK FLOW RATE (CFS) = 1842.01  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50345.00 TO NODE 50346.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 403.00 DOWNSTREAM(FEET) = 350.00  
 FLOW LENGTH(FEET) = 1031.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 96.0 INCH PIPE IS 73.9 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 44.37  
 ESTIMATED PIPE DIAMETER (INCH) = 96.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 1842.01  
 PIPE TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 20.46  
 LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50346.00 = 14657.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50346.00 TO NODE 50346.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.46  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.176  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	1.10	0.30	0.500	-
USER-DEFINED	-	0.20	0.30	0.600	-
USER-DEFINED	-	1.40	0.30	0.100	-
USER-DEFINED	-	0.50	0.30	0.500	-
USER-DEFINED	-	2.40	0.30	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.423  
 SUBAREA AREA (ACRES) = 6.00 SUBAREA RUNOFF (CFS) = 11.06  
 EFFECTIVE AREA (ACRES) = 1019.08 AREA-AVERAGED Fm (INCH/HR) = 0.22

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 1112.9 PEAK FLOW RATE (CFS) = 1842.01  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50346.00 TO NODE 50347.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 313.00  
 FLOW LENGTH(FEET) = 240.00 MANNING'S N = 0.013  
 DEPTH OF FLOW IN 78.0 INCH PIPE IS 60.3 INCHES  
 PIPE-FLOW VELOCITY (FEET/SEC.) = 66.93  
 ESTIMATED PIPE DIAMETER (INCH) = 78.00 NUMBER OF PIPES = 1  
 PIPE-FLOW (CFS) = 1842.01  
 PIPE TRAVEL TIME (MIN.) = 0.06 Tc (MIN.) = 20.52  
 LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50347.00 = 14897.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50347.00 TO NODE 50347.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.52  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.173  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	0.500	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	0.500	-
USER-DEFINED	-	1.90	0.30	0.800	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.749  
 SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 8.94  
 EFFECTIVE AREA (ACRES) = 1024.18 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
 TOTAL AREA (ACRES) = 1118.0 PEAK FLOW RATE (CFS) = 1842.01  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50347.00 TO NODE 50347.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.52  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.173  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.40	0.30	0.500	-
USER-DEFINED	-	1.00	0.30	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
 SUBAREA AREA (ACRES) = 2.40 SUBAREA RUNOFF (CFS) = 4.37

EFFECTIVE AREA(ACRES) = 1026.58 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA(ACRES) = 1120.4 PEAK FLOW RATE(CFS) = 1842.01  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50347.00 TO NODE 50348.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 313.00 DOWNSTREAM(FEET) = 233.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1690.00 CHANNEL SLOPE = 0.0473  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 7.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1842.01  
FLOW VELOCITY(FEET/SEC.) = 16.43 FLOW DEPTH(FEET) = 6.11  
TRAVEL TIME(MIN.) = 1.71 Tc(MIN.) = 22.24  
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50348.00 = 16587.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 22.24  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.084  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.20 0.30 0.100 -  
USER-DEFINED - 0.30 0.30 0.500 -  
USER-DEFINED - 0.10 0.30 0.600 -  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 1.10 0.30 1.000 -  
USER-DEFINED - 5.50 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.949  
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 11.82  
EFFECTIVE AREA(ACRES) = 1033.88 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72  
TOTAL AREA(ACRES) = 1127.7 PEAK FLOW RATE(CFS) = 1842.01  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 22.24  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.084  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 3.70 0.30 1.000 -  
USER-DEFINED - 0.90 0.30 0.100 -  
USER-DEFINED - 0.40 0.30 0.600 -  
USER-DEFINED - 42.40 0.30 0.800 -

USER-DEFINED - 3.00 0.30 1.000 -  
USER-DEFINED - 4.20 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.827  
SUBAREA AREA(ACRES) = 54.60 SUBAREA RUNOFF(CFS) = 90.20  
EFFECTIVE AREA(ACRES) = 1088.48 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1182.3 PEAK FLOW RATE(CFS) = 1842.01  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 22.24  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.084  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 9.90 0.30 1.000 -  
USER-DEFINED - 3.70 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 0.100 -  
USER-DEFINED - 4.10 0.30 0.800 -  
USER-DEFINED - 2.30 0.30 1.000 -  
USER-DEFINED - 0.80 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.948  
SUBAREA AREA(ACRES) = 21.10 SUBAREA RUNOFF(CFS) = 34.17  
EFFECTIVE AREA(ACRES) = 1109.58 AREA-AVERAGED Fm(INCH/HR) = 0.22  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
TOTAL AREA(ACRES) = 1203.4 PEAK FLOW RATE(CFS) = 1862.19

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1854.93	17.35	2.406	0.30( 0.22)	0.73	941.9	50320.00
2	1865.50	18.03	2.354	0.30( 0.22)	0.73	970.5	50240.00
3	1865.66	19.04	2.275	0.30( 0.22)	0.73	1008.1	50330.00
4	1862.19	22.24	2.084	0.30( 0.22)	0.73	1109.6	50280.00
5	1850.75	23.43	2.022	0.30( 0.22)	0.73	1140.5	50300.00
6	1822.67	24.58	1.962	0.30( 0.22)	0.73	1161.9	50220.00
7	1737.56	27.79	1.834	0.30( 0.22)	0.73	1195.7	50260.00
8	1623.76	31.20	1.719	0.30( 0.22)	0.73	1203.4	50200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 1865.66 Tc(MIN.) = 19.04  
AREA-AVERAGED Fm(INCH/HR) = 0.22 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.73 EFFECTIVE AREA(ACRES) = 1008.07

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN.) = 19.04  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.275  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.20 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.36  
 EFFECTIVE AREA (ACRES) = 1008.27 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 1203.6 PEAK FLOW RATE (CFS) = 1866.02

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 19.04  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.275  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.30 0.100 -  
 USER-DEFINED - 1.40 0.30 1.000 -  
 USER-DEFINED - 1.70 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 0.90 0.30 0.850 -  
 USER-DEFINED - 4.50 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.944  
 SUBAREA AREA (ACRES) = 8.90 SUBAREA RUNOFF (CFS) = 15.95  
 EFFECTIVE AREA (ACRES) = 1017.17 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 1212.5 PEAK FLOW RATE (CFS) = 1881.97

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1872.32	17.35	2.406	0.30 ( 0.22)	0.73	951.0	50320.00
2	1882.46	18.03	2.354	0.30 ( 0.22)	0.73	979.6	50240.00
3	1881.97	19.04	2.275	0.30 ( 0.22)	0.73	1017.2	50330.00
4	1876.93	22.24	2.084	0.30 ( 0.22)	0.73	1118.7	50280.00
5	1864.98	23.43	2.022	0.30 ( 0.22)	0.73	1149.6	50300.00
6	1836.41	24.58	1.962	0.30 ( 0.22)	0.73	1171.0	50220.00
7	1750.26	27.79	1.834	0.30 ( 0.22)	0.73	1204.8	50260.00
8	1635.52	31.20	1.719	0.30 ( 0.22)	0.73	1212.5	50200.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 1882.46 Tc (MIN.) = 18.03  
 AREA-AVERAGED Fm (INCH/HR) = 0.22 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.73 EFFECTIVE AREA (ACRES) = 979.63

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 18.03  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.354  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 0.70 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.70 SUBAREA RUNOFF (CFS) = 1.29  
 EFFECTIVE AREA (ACRES) = 980.33 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 1213.2 PEAK FLOW RATE (CFS) = 1883.76

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 18.03  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.354  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.20 0.30 0.100 -  
 USER-DEFINED - 0.10 0.30 0.500 -  
 USER-DEFINED - 3.50 0.30 0.600 -  
 USER-DEFINED - 0.20 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 0.100 -  
 USER-DEFINED - 0.20 0.30 0.500 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.556  
 SUBAREA AREA (ACRES) = 4.50 SUBAREA RUNOFF (CFS) = 8.86  
 EFFECTIVE AREA (ACRES) = 984.83 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 1217.7 PEAK FLOW RATE (CFS) = 1892.61

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 18.03  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.354  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 8.80 0.30 0.600 -  
 USER-DEFINED - 1.50 0.30 1.000 -  
 USER-DEFINED - 2.50 0.30 1.000 -  
 USER-DEFINED - 0.60 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 0.100 -  
 USER-DEFINED - 0.10 0.30 0.600 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.732  
 SUBAREA AREA (ACRES) = 13.60 SUBAREA RUNOFF (CFS) = 26.13  
 EFFECTIVE AREA (ACRES) = 998.43 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73  
 TOTAL AREA (ACRES) = 1231.3 PEAK FLOW RATE (CFS) = 1918.74

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50348.00 TO NODE 50348.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

```

=====
MAINLINE Tc(MIN.) = 18.03
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.354
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.40    0.30    1.000    -
USER-DEFINED        -         0.30    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.70      SUBAREA RUNOFF(CFS) = 3.14
EFFECTIVE AREA(ACRES) = 1000.13  AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.73
TOTAL AREA(ACRES) = 1233.0      PEAK FLOW RATE(CFS) = 1921.88

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*****
FLOW PROCESS FROM NODE 50348.00 TO NODE 50349.00 IS CODE = 51
-----

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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

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=====
ELEVATION DATA: UPSTREAM(FEET) = 233.00 DOWNSTREAM(FEET) = 214.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1010.00 CHANNEL SLOPE = 0.0188
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 8.00
CHANNEL FLOW THRU SUBAREA(CFS) = 1921.88
FLOW VELOCITY(FEET/SEC.) = 14.59 FLOW DEPTH(FEET) = 6.63
TRAVEL TIME(MIN.) = 1.15 Tc(MIN.) = 19.18
LONGEST FLOWPATH FROM NODE 50220.00 TO NODE 50349.00 = 17597.00 FEET.

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*****
FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 19.18
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.264
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.40    0.30    0.100    -
USER-DEFINED        -         0.30    0.30    1.000    -
USER-DEFINED        -         0.40    0.30    1.000    -
USER-DEFINED        -         1.40    0.30    1.000    -
USER-DEFINED        -         2.30    0.30    1.000    -
USER-DEFINED        -         1.10    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.817
SUBAREA AREA(ACRES) = 6.90      SUBAREA RUNOFF(CFS) = 12.54
EFFECTIVE AREA(ACRES) = 1007.03  AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.73
TOTAL AREA(ACRES) = 1239.9      PEAK FLOW RATE(CFS) = 1921.88
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

```

```

=====
MAINLINE Tc(MIN.) = 19.18
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.264
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         3.20    0.30    1.000    -
USER-DEFINED        -         1.60    0.30    1.000    -
USER-DEFINED        -         5.10    0.30    0.850    -
USER-DEFINED        -         0.70    0.30    1.000    -
USER-DEFINED        -         0.60    0.30    1.000    -
USER-DEFINED        -         7.20    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.958
SUBAREA AREA(ACRES) = 18.40      SUBAREA RUNOFF(CFS) = 32.73
EFFECTIVE AREA(ACRES) = 1025.43  AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.73
TOTAL AREA(ACRES) = 1258.3      PEAK FLOW RATE(CFS) = 1921.88
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 19.18
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.264
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20    0.30    1.000    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20      SUBAREA RUNOFF(CFS) = 0.35
EFFECTIVE AREA(ACRES) = 1025.63  AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30  AREA-AVERAGED Ap = 0.73
TOTAL AREA(ACRES) = 1258.5      PEAK FLOW RATE(CFS) = 1921.88
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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```

=====
MAINLINE Tc(MIN.) = 19.18
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.264
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA     Fp       Ap       SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.70    0.30    0.100    -
USER-DEFINED        -         3.50    0.30    1.000    -
USER-DEFINED        -         0.80    0.30    1.000    -
USER-DEFINED        -         3.00    0.30    1.000    -
USER-DEFINED        -        11.70    0.30    1.000    -
USER-DEFINED        -        12.40    0.30    0.850    -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.874
SUBAREA AREA(ACRES) = 34.10      SUBAREA RUNOFF(CFS) = 61.44

```



EFFECTIVE AREA (ACRES) = 1059.73 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
 TOTAL AREA (ACRES) = 1292.6 PEAK FLOW RATE (CFS) = 1947.92

\*\*\*\*\*

FLOW PROCESS FROM NODE 50349.00 TO NODE 50349.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 19.18  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.264  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.00 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 6.00 SUBAREA RUNOFF (CFS) = 10.61  
 EFFECTIVE AREA (ACRES) = 1065.73 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.74  
 TOTAL AREA (ACRES) = 1298.6 PEAK FLOW RATE (CFS) = 1958.52

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1298.6 TC (MIN.) = 19.18  
 EFFECTIVE AREA (ACRES) = 1065.73 AREA-AVERAGED Fm (INCH/HR) = 0.22  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.740  
 PEAK FLOW RATE (CFS) = 1958.52

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1954.61	18.51	2.316	0.30 (0.22)	0.74	1037.1	50320.00
2	1958.52	19.18	2.264	0.30 (0.22)	0.74	1065.7	50240.00
3	1953.83	20.19	2.190	0.30 (0.22)	0.74	1103.3	50330.00
4	1953.14	23.39	2.023	0.30 (0.22)	0.74	1204.8	50280.00
5	1934.70	24.58	1.962	0.30 (0.22)	0.74	1235.7	50300.00
6	1911.74	25.74	1.912	0.30 (0.22)	0.74	1257.1	50220.00
7	1820.38	28.97	1.789	0.30 (0.22)	0.74	1290.9	50260.00
8	1712.34	32.40	1.688	0.30 (0.22)	0.74	1298.6	50200.00

=====

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
(c) Copyright 1983-2013 Advanced Engineering Software (aes)  
Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

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Santa Ana, CA  
92707

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RANCHO MISSION VIEJO - PA3 7 PA4 ROMP \*  
\* REGIONAL WATERSHED S29 - FREE DRAINING - ULTIMATE CONDITION \*  
\* 100 - YR RM EV JUNE 2018 ROKAMOTO \*  
\*\*\*\*\*

FILE NAME: P504XXCE.DAT  
TIME/DATE OF STUDY: 13:23 07/06/2018

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.00;	4.820
2)	6.00;	4.350
3)	7.00;	3.990
4)	8.00;	3.700
5)	9.00;	3.460
6)	10.00;	3.260
7)	11.00;	3.090
8)	12.00;	2.940
9)	13.00;	2.810
10)	14.00;	2.690
11)	15.00;	2.590
12)	20.00;	2.200
13)	25.00;	1.940
14)	30.00;	1.750
15)	40.00;	1.490
16)	50.00;	1.310
17)	60.00;	1.180
18)	90.00;	0.940
19)	120.00;	0.800
20)	180.00;	0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50400.00 TO NODE 50401.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 319.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 765.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.963  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.003  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "1 DWELLING/ACRE"	-	0.50	0.30	0.800	0	6.96

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.800  
SUBAREA RUNOFF(CFS) = 1.69  
TOTAL AREA(ACRES) = 0.50 PEAK FLOW RATE(CFS) = 1.69

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50401.00 TO NODE 50402.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 765.00 DOWNSTREAM(FEET) = 700.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 262.00 CHANNEL SLOPE = 0.2481  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.69  
FLOW VELOCITY(FEET/SEC.) = 5.34 FLOW DEPTH(FEET) = 0.33  
TRAVEL TIME(MIN.) = 0.82  $T_c$ (MIN.) = 7.78  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50402.00 = 581.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50402.00 TO NODE 50402.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN.) = 7.78

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.763  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.40 0.30 0.800 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.800  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 1.27  
 EFFECTIVE AREA (ACRES) = 0.90 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
 TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 2.85

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50402.00 TO NODE 50403.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 239.00 CHANNEL SLOPE = 0.4184  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 2.85  
 FLOW VELOCITY (FEET/SEC.) = 7.28 FLOW DEPTH (FEET) = 0.36  
 TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 8.33  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50403.00 = 820.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50403.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 8.33  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.621  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.30 0.30 0.800 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.850  
 SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 1.21  
 EFFECTIVE AREA (ACRES) = 1.30 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 1.3 PEAK FLOW RATE (CFS) = 3.95

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50403.00 TO NODE 50404.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 71.00 CHANNEL SLOPE = 0.7042  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 3.95  
 FLOW VELOCITY (FEET/SEC.) = 9.67 FLOW DEPTH (FEET) = 0.37

TRAVEL TIME (MIN.) = 0.12 Tc (MIN.) = 8.45  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50404.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50404.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 8.45  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.592  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.90 0.30 0.800 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.862  
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 3.90  
 EFFECTIVE AREA (ACRES) = 2.60 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA (ACRES) = 2.6 PEAK FLOW RATE (CFS) = 7.82

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50404.00 TO NODE 50405.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 =====

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 500.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 145.00 CHANNEL SLOPE = 0.3448  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 7.82  
 FLOW VELOCITY (FEET/SEC.) = 8.79 FLOW DEPTH (FEET) = 0.54  
 TRAVEL TIME (MIN.) = 0.28 Tc (MIN.) = 8.73  
 LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50405.00 = 1036.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50405.00 TO NODE 50405.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 =====

MAINLINE Tc (MIN.) = 8.73  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.526  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 0.20 0.30 0.800 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 USER-DEFINED - 0.80 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.964  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 3.20  
 EFFECTIVE AREA (ACRES) = 3.70 AREA-AVERAGED Fm (INCH/HR) = 0.26  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
 TOTAL AREA (ACRES) = 3.7 PEAK FLOW RATE (CFS) = 10.87

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*****
FLOW PROCESS FROM NODE 50405.00 TO NODE 50406.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 500.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 158.00 CHANNEL SLOPE = 0.3165
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 10.87
FLOW VELOCITY(FEET/SEC.) = 9.34 FLOW DEPTH(FEET) = 0.62
TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 9.01
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50406.00 = 1194.00 FEET.

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```

*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50406.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.01
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.458
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -          0.20    0.30    1.000  -
USER-DEFINED        -          0.20    0.30    1.000  -
USER-DEFINED        -          0.80    0.30    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 1.20 SUBAREA RUNOFF(CFS) = 3.41
EFFECTIVE AREA(ACRES) = 4.90 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91
TOTAL AREA(ACRES) = 4.9 PEAK FLOW RATE(CFS) = 14.05

```

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*****
FLOW PROCESS FROM NODE 50406.00 TO NODE 50407.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 228.00 CHANNEL SLOPE = 0.2193
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00
CHANNEL FLOW THRU SUBAREA(CFS) = 14.05
FLOW VELOCITY(FEET/SEC.) = 8.62 FLOW DEPTH(FEET) = 0.74
TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 9.45
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50407.00 = 1422.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50407.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.45
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.370
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -          3.70    0.30    0.800  -
USER-DEFINED        -          1.00    0.30    1.000  -
USER-DEFINED        -          1.60    0.30    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.883
SUBAREA AREA(ACRES) = 6.30 SUBAREA RUNOFF(CFS) = 17.61
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 31.27

```

```

*****
FLOW PROCESS FROM NODE 50407.00 TO NODE 50408.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 325.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 490.00 CHANNEL SLOPE = 0.1531
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 31.27
FLOW VELOCITY(FEET/SEC.) = 9.22 FLOW DEPTH(FEET) = 1.06
TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 10.33
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50408.00 = 1912.00 FEET.

```

```

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

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```

MAINLINE Tc(MIN.) = 10.33
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.203
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -          0.10    0.30    1.000  -
USER-DEFINED        -          0.10    0.30    1.000  -
USER-DEFINED        -          0.60    0.30    1.000  -
USER-DEFINED        -          1.40    0.30    1.000  -
USER-DEFINED        -          0.50    0.30    1.000  -
USER-DEFINED        -          1.20    0.30    1.000  -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.90 SUBAREA RUNOFF(CFS) = 10.19
EFFECTIVE AREA(ACRES) = 15.10 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92
TOTAL AREA(ACRES) = 15.1 PEAK FLOW RATE(CFS) = 39.78

```

```

*****
FLOW PROCESS FROM NODE 50408.00 TO NODE 50408.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.33
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.203
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 2.35  
EFFECTIVE AREA(ACRES) = 16.00 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
TOTAL AREA(ACRES) = 16.0 PEAK FLOW RATE(CFS) = 42.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50408.00 TO NODE 50409.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 325.00 DOWNSTREAM(FEET) = 320.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 73.00 CHANNEL SLOPE = 0.0685  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 42.13  
FLOW VELOCITY(FEET/SEC.) = 7.33 FLOW DEPTH(FEET) = 1.38  
TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 10.50  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50409.00 = 1985.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 10.50  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.175  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	4.30	0.30	0.800	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	3.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.910  
SUBAREA AREA(ACRES) = 9.60 SUBAREA RUNOFF(CFS) = 25.07  
EFFECTIVE AREA(ACRES) = 25.60 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
TOTAL AREA(ACRES) = 25.6 PEAK FLOW RATE(CFS) = 66.80

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50409.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 10.50  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.175  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.30	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 5.90 SUBAREA RUNOFF(CFS) = 15.27  
EFFECTIVE AREA(ACRES) = 31.50 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93  
TOTAL AREA(ACRES) = 31.5 PEAK FLOW RATE(CFS) = 82.06

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50409.00 TO NODE 50410.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 312.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 102.00 CHANNEL SLOPE = 0.0784  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 82.06  
FLOW VELOCITY(FEET/SEC.) = 9.15 FLOW DEPTH(FEET) = 1.73  
TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 10.69  
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50410.00 = 2087.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 10.69  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.143  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 16.38  
EFFECTIVE AREA(ACRES) = 37.90 AREA-AVERAGED Fm(INCH/HR) = 0.28  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95  
TOTAL AREA(ACRES) = 37.9 PEAK FLOW RATE(CFS) = 97.55

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50410.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 10.69  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.143  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA (ACRES) =		0.60	SUBAREA RUNOFF (CFS) =		1.54
EFFECTIVE AREA (ACRES) =		38.50	AREA-AVERAGED Fm (INCH/HR) =		0.28
AREA-AVERAGED Fp (INCH/HR) =		0.30	AREA-AVERAGED Ap =		0.95
TOTAL AREA (ACRES) =		38.5	PEAK FLOW RATE (CFS) =		99.08

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50410.00 TO NODE 50411.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	312.00	DOWNSTREAM (FEET) =	282.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	566.00	CHANNEL SLOPE =	0.0530
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.040	MAXIMUM DEPTH (FEET) =	3.00
CHANNEL FLOW THRU SUBAREA (CFS) =	99.08		
FLOW VELOCITY (FEET/SEC.) =	8.24	FLOW DEPTH (FEET) =	2.00
TRAVEL TIME (MIN.) =	1.14	Tc (MIN.) =	11.83
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50411.00 = 2653.00 FEET.			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 11.83					
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.965					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	0.100	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	1.50	0.30	0.100	-
USER-DEFINED	-	0.40	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.658					
SUBAREA AREA (ACRES) =		5.00	SUBAREA RUNOFF (CFS) =		12.46
EFFECTIVE AREA (ACRES) =		43.50	AREA-AVERAGED Fm (INCH/HR) =		0.27
AREA-AVERAGED Fp (INCH/HR) =		0.30	AREA-AVERAGED Ap =		0.91
TOTAL AREA (ACRES) =		43.5	PEAK FLOW RATE (CFS) =		105.37

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50411.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 11.83					
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.965					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	5.80	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	1.000	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA (ACRES) =		10.50	SUBAREA RUNOFF (CFS) =		25.19
EFFECTIVE AREA (ACRES) =		54.00	AREA-AVERAGED Fm (INCH/HR) =		0.28
AREA-AVERAGED Fp (INCH/HR) =		0.30	AREA-AVERAGED Ap =		0.93
TOTAL AREA (ACRES) =		54.0	PEAK FLOW RATE (CFS) =		130.56

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50411.00 TO NODE 50412.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	282.00	DOWNSTREAM (FEET) =	216.00
CHANNEL LENGTH THRU SUBAREA (FEET) =	954.00	CHANNEL SLOPE =	0.0692
CHANNEL BASE (FEET) =	0.00	"Z" FACTOR =	3.000
MANNING'S FACTOR =	0.030	MAXIMUM DEPTH (FEET) =	3.00
CHANNEL FLOW THRU SUBAREA (CFS) =	130.56		
FLOW VELOCITY (FEET/SEC.) =	12.12	FLOW DEPTH (FEET) =	1.89
TRAVEL TIME (MIN.) =	1.31	Tc (MIN.) =	13.14
LONGEST FLOWPATH FROM NODE 50400.00 TO NODE 50412.00 = 3607.00 FEET.			

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 13.14					
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.793					
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	1.10	0.30	1.000	-
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	0.100	-
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875					
SUBAREA AREA (ACRES) =		3.60	SUBAREA RUNOFF (CFS) =		8.20
EFFECTIVE AREA (ACRES) =		57.60	AREA-AVERAGED Fm (INCH/HR) =		0.28
AREA-AVERAGED Fp (INCH/HR) =		0.30	AREA-AVERAGED Ap =		0.93
TOTAL AREA (ACRES) =		57.6	PEAK FLOW RATE (CFS) =		130.56
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE					

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 13.14					
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.793					
SUBAREA LOSS RATE DATA (AMC II):					

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.850	-
USER-DEFINED	-	1.30	0.30	1.000	-
USER-DEFINED	-	9.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999  
 SUBAREA AREA (ACRES) = 10.60      SUBAREA RUNOFF (CFS) = 23.79  
 EFFECTIVE AREA (ACRES) = 68.20      AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.94  
 TOTAL AREA (ACRES) = 68.2      PEAK FLOW RATE (CFS) = 154.16

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50412.00 TO NODE 50412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 13.14  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.793  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	0.850	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	1.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.934  
 SUBAREA AREA (ACRES) = 2.50      SUBAREA RUNOFF (CFS) = 5.65  
 EFFECTIVE AREA (ACRES) = 70.70      AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.94  
 TOTAL AREA (ACRES) = 70.7      PEAK FLOW RATE (CFS) = 159.82

END OF STUDY SUMMARY:  
 TOTAL AREA (ACRES) = 70.7      TC (MIN.) = 13.14  
 EFFECTIVE AREA (ACRES) = 70.70      AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30      AREA-AVERAGED Ap = 0.938  
 PEAK FLOW RATE (CFS) = 159.82

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 5 \*  
\* HYDROLOGIC ANALYSIS - 100-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P505XXCE.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.820
2)	6.000;	4.350
3)	7.000;	3.990
4)	8.000;	3.700
5)	9.000;	3.460
6)	10.000;	3.260
7)	11.000;	3.090
8)	12.000;	2.940
9)	13.000;	2.810
10)	14.000;	2.690
11)	15.000;	2.590
12)	20.000;	2.200
13)	25.000;	1.940
14)	30.000;	1.750
15)	40.000;	1.490
16)	50.000;	1.310
17)	60.000;	1.180
18)	90.000;	0.940
19)	120.000;	0.800
20)	180.000;	0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50500.00 TO NODE 50501.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 254.00  
ELEVATION DATA: UPSTREAM(FEET) = 810.00 DOWNSTREAM(FEET) = 779.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 6.543  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.154  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
RESIDENTIAL "1 DWELLING/ACRE"	-	2.00	0.30	0.800	95	6.54

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 0.800  
SUBAREA RUNOFF(CFS) = 7.05  
TOTAL AREA(ACRES) = 2.00 PEAK FLOW RATE(CFS) = 7.05

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50501.00 TO NODE 50502.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 779.00 DOWNSTREAM(FEET) = 765.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 382.00 CHANNEL SLOPE = 0.0366  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 7.05  
FLOW VELOCITY(FEET/SEC.) = 3.70 FLOW DEPTH(FEET) = 0.80  
TRAVEL TIME(MIN.) = 1.72  $T_c$ (MIN.) = 8.26  
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50502.00 = 636.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50502.00 TO NODE 50502.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 8.26



\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.637  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.60 0.30 0.800 -  
 USER-DEFINED - 0.30 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.840  
 SUBAREA AREA (ACRES) = 2.00 SUBAREA RUNOFF (CFS) = 6.09  
 EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 12.21

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50502.00 TO NODE 50503.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 765.00 DOWNSTREAM (FEET) = 750.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 355.00 CHANNEL SLOPE = 0.0423  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 12.21  
 FLOW VELOCITY (FEET/SEC.) = 4.50 FLOW DEPTH (FEET) = 0.95  
 TRAVEL TIME (MIN.) = 1.31 Tc (MIN.) = 9.58  
 LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50503.00 = 991.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50503.00 TO NODE 50503.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 9.58  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.345  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.70 0.30 0.800 -  
 USER-DEFINED - 1.30 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.890  
 SUBAREA AREA (ACRES) = 3.10 SUBAREA RUNOFF (CFS) = 8.59  
 EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.26  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85  
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 19.74

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50503.00 TO NODE 50504.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 750.00 DOWNSTREAM (FEET) = 712.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 261.00 CHANNEL SLOPE = 0.1456  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 19.74  
 FLOW VELOCITY (FEET/SEC.) = 8.07 FLOW DEPTH (FEET) = 0.90  
 TRAVEL TIME (MIN.) = 0.54 Tc (MIN.) = 10.12  
 LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50504.00 = 1252.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50504.00 TO NODE 50504.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 10.12  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.240  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.90 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 6.30 SUBAREA RUNOFF (CFS) = 16.67  
 EFFECTIVE AREA (ACRES) = 13.40 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
 TOTAL AREA (ACRES) = 13.4 PEAK FLOW RATE (CFS) = 35.75

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50504.00 TO NODE 50505.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 464.00 CHANNEL SLOPE = 0.2414  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 35.75  
 FLOW VELOCITY (FEET/SEC.) = 11.29 FLOW DEPTH (FEET) = 1.03  
 TRAVEL TIME (MIN.) = 0.68 Tc (MIN.) = 10.80  
 LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50505.00 = 1716.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50505.00 TO NODE 50505.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN) = 10.80  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.124  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.50 0.30 1.000 -  
 USER-DEFINED - 0.70 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 2.60 SUBAREA RUNOFF (CFS) = 6.61  
 EFFECTIVE AREA (ACRES) = 16.00 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93

TOTAL AREA (ACRES) = 16.0 PEAK FLOW RATE (CFS) = 40.95

\*\*\*\*\*

FLOW PROCESS FROM NODE 50505.00 TO NODE 50506.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 535.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 310.00 CHANNEL SLOPE = 0.2097
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 40.95
FLOW VELOCITY (FEET/SEC.) = 11.10 FLOW DEPTH (FEET) = 1.11
TRAVEL TIME (MIN.) = 0.47 Tc (MIN.) = 11.27
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50506.00 = 2026.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50506.00 TO NODE 50506.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 11.27
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.050
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.80 0.30 0.800 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.70 0.30 1.000 -
USER-DEFINED - 2.70 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.941
SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 15.20
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.28
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 55.08

\*\*\*\*\*

FLOW PROCESS FROM NODE 50506.00 TO NODE 50507.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 405.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 489.00 CHANNEL SLOPE = 0.2658
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 55.08
FLOW VELOCITY (FEET/SEC.) = 13.07 FLOW DEPTH (FEET) = 1.19
TRAVEL TIME (MIN.) = 0.62 Tc (MIN.) = 11.89
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50507.00 = 2515.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50507.00 TO NODE 50507.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 11.89
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.957
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.30 0.800 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 1.30 0.30 1.000 -
USER-DEFINED - 2.80 0.30 1.000 -
USER-DEFINED - 5.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.988
SUBAREA AREA (ACRES) = 10.00 SUBAREA RUNOFF (CFS) = 23.94
EFFECTIVE AREA (ACRES) = 32.10 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 77.16

\*\*\*\*\*

FLOW PROCESS FROM NODE 50507.00 TO NODE 50508.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 285.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 706.00 CHANNEL SLOPE = 0.1700
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00
CHANNEL FLOW THRU SUBAREA (CFS) = 77.16
FLOW VELOCITY (FEET/SEC.) = 12.03 FLOW DEPTH (FEET) = 1.46
TRAVEL TIME (MIN.) = 0.98 Tc (MIN.) = 12.87
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50508.00 = 3221.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50508.00 TO NODE 50508.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN) = 12.87
\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.827
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.40 0.30 0.100 -
USER-DEFINED - 0.90 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
USER-DEFINED - 5.10 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.945
SUBAREA AREA (ACRES) = 6.60 SUBAREA RUNOFF (CFS) = 15.11
EFFECTIVE AREA (ACRES) = 38.70 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA (ACRES) = 38.7 PEAK FLOW RATE (CFS) = 88.54

\*\*\*\*\*

FLOW PROCESS FROM NODE 50508.00 TO NODE 50509.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 285.00 DOWNSTREAM(FEET) = 238.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1169.00 CHANNEL SLOPE = 0.0402
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 88.54
FLOW VELOCITY(FEET/SEC.) = 8.98 FLOW DEPTH(FEET) = 1.81
TRAVEL TIME(MIN.) = 2.17 Tc(MIN.) = 15.04
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50509.00 = 4390.00 FEET.

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*****
FLOW PROCESS FROM NODE 50509.00 TO NODE 50509.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 15.04
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.587
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
  LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.10    0.30    1.000   -
USER-DEFINED         -         1.30    0.30    1.000   -
USER-DEFINED         -         6.90    0.30    1.000   -
USER-DEFINED         -         1.10    0.30    0.100   -
USER-DEFINED         -         0.80    0.30    1.000   -
USER-DEFINED         -         2.10    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.920
SUBAREA AREA(ACRES) = 12.30 SUBAREA RUNOFF(CFS) = 25.59
EFFECTIVE AREA(ACRES) = 51.00 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 51.0 PEAK FLOW RATE(CFS) = 105.76

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*****
FLOW PROCESS FROM NODE 50509.00 TO NODE 50509.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN) = 15.04
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.587
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
  LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         9.40    0.30    1.000   -
USER-DEFINED         -         0.70    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.10 SUBAREA RUNOFF(CFS) = 20.79
EFFECTIVE AREA(ACRES) = 61.10 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 61.1 PEAK FLOW RATE(CFS) = 126.55

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*****
FLOW PROCESS FROM NODE 50509.00 TO NODE 50510.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 238.00 DOWNSTREAM(FEET) = 209.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1026.00 CHANNEL SLOPE = 0.0283
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 126.55
FLOW VELOCITY(FEET/SEC.) = 8.59 FLOW DEPTH(FEET) = 2.22
TRAVEL TIME(MIN.) = 1.99 Tc(MIN.) = 17.03
LONGEST FLOWPATH FROM NODE 50500.00 TO NODE 50510.00 = 5416.00 FEET.

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN) = 17.03
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.432
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
  LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         0.10    0.30    1.000   -
USER-DEFINED         -         1.40    0.30    1.000   -
USER-DEFINED         -         4.40    0.30    1.000   -
USER-DEFINED         -         0.20    0.30    1.000   -
USER-DEFINED         -         1.50    0.30    1.000   -
USER-DEFINED         -        10.00    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 17.60 SUBAREA RUNOFF(CFS) = 33.77
EFFECTIVE AREA(ACRES) = 78.70 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 78.7 PEAK FLOW RATE(CFS) = 151.79

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----

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```

MAINLINE Tc(MIN) = 17.03
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.432
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL  AREA    Fp      Ap    SCS
  LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED         -         1.70    0.30    0.100   -
USER-DEFINED         -        13.10    0.30    1.000   -
USER-DEFINED         -         1.60    0.30    1.000   -
USER-DEFINED         -        12.70    0.30    1.000   -
USER-DEFINED         -         0.60    0.30    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.948
SUBAREA AREA(ACRES) = 29.70 SUBAREA RUNOFF(CFS) = 57.40
EFFECTIVE AREA(ACRES) = 108.40 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 108.4 PEAK FLOW RATE(CFS) = 209.19

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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=====
MAINLINE Tc(MIN) = 17.03
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.432
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        1.90     0.30     1.000     -
USER-DEFINED            -        1.70     0.30     1.000     -
USER-DEFINED            -        0.40     0.30     0.850     -
USER-DEFINED            -        3.40     0.30     1.000     -
USER-DEFINED            -        2.10     0.30     1.000     -
USER-DEFINED            -        1.10     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.994
SUBAREA AREA(ACRES) = 10.60      SUBAREA RUNOFF(CFS) = 20.36
EFFECTIVE AREA(ACRES) = 119.00   AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 119.0       PEAK FLOW RATE(CFS) = 229.54

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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=====
MAINLINE Tc(MIN) = 17.03
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.432
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        0.50     0.30     0.100     -
USER-DEFINED            -        0.30     0.30     1.000     -
USER-DEFINED            -        4.80     0.30     1.000     -
USER-DEFINED            -        2.60     0.30     1.000     -
USER-DEFINED            -        0.90     0.30     1.000     -
USER-DEFINED            -        7.50     0.30     0.850     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905
SUBAREA AREA(ACRES) = 16.60      SUBAREA RUNOFF(CFS) = 32.28
EFFECTIVE AREA(ACRES) = 135.60   AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 135.6       PEAK FLOW RATE(CFS) = 261.82

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*****
FLOW PROCESS FROM NODE 50510.00 TO NODE 50510.00 IS CODE = 81
-----

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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----

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```

=====
MAINLINE Tc(MIN) = 17.03
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.432
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -        8.00     0.30     1.000     -
USER-DEFINED            -        2.80     0.30     1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.80      SUBAREA RUNOFF(CFS) = 20.72
EFFECTIVE AREA(ACRES) = 146.40   AREA-AVERAGED Fm(INCH/HR) = 0.29

```

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=====
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 146.4       PEAK FLOW RATE(CFS) = 282.54
=====

```

```

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 146.4 TC(MIN.) = 17.03
EFFECTIVE AREA(ACRES) = 146.40 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.959
PEAK FLOW RATE(CFS) = 282.54
=====

```

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END OF RATIONAL METHOD ANALYSIS

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\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

Analysis prepared by:

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 6 \*  
\* HYDROLOGIC ANALYSIS - 100-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P506XXCE.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.820
2)	6.000;	4.350
3)	7.000;	3.990
4)	8.000;	3.700
5)	9.000;	3.460
6)	10.000;	3.260
7)	11.000;	3.090
8)	12.000;	2.940
9)	13.000;	2.810
10)	14.000;	2.690
11)	15.000;	2.590
12)	20.000;	2.200
13)	25.000;	1.940
14)	30.000;	1.750
15)	40.000;	1.490
16)	50.000;	1.310
17)	60.000;	1.180
18)	90.000;	0.940
19)	120.000;	0.800
20)	180.000;	0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50600.00 TO NODE 50601.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00  
ELEVATION DATA: UPSTREAM(FEET) = 780.00 DOWNSTREAM(FEET) = 730.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.166  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.232  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	1.40	0.30	1.000	95	10.17

SUBAREA AVERAGE PVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 3.69  
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 3.69

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50601.00 TO NODE 50602.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 730.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.1541  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 3.69  
FLOW VELOCITY(FEET/SEC.) = 5.39 FLOW DEPTH(FEET) = 0.48  
TRAVEL TIME(MIN.) = 1.10  $T_c$ (MIN.) = 11.27  
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50602.00 = 671.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50602.00 TO NODE 50602.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.27

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.050  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.30 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 3.22  
 EFFECTIVE AREA (ACRES) = 2.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 2.7 PEAK FLOW RATE (CFS) = 6.68

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50602.00 TO NODE 50603.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 600.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 258.00 CHANNEL SLOPE = 0.2907  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 6.68  
 FLOW VELOCITY (FEET/SEC.) = 7.95 FLOW DEPTH (FEET) = 0.53  
 TRAVEL TIME (MIN.) = 0.54 Tc (MIN.) = 11.81  
 LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50603.00 = 929.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50603.00 TO NODE 50603.00 IS CODE = 81  
 -----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 11.81  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.968  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.30 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 3.12  
 EFFECTIVE AREA (ACRES) = 4.00 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 4.0 PEAK FLOW RATE (CFS) = 9.61

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50603.00 TO NODE 50604.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 585.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 116.00 CHANNEL SLOPE = 0.1293  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 9.61  
 FLOW VELOCITY (FEET/SEC.) = 6.45 FLOW DEPTH (FEET) = 0.70  
 TRAVEL TIME (MIN.) = 0.30 Tc (MIN.) = 12.11

LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50604.00 = 1045.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50604.00 TO NODE 50604.00 IS CODE = 81  
 -----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.11  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.926  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.60 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.60 SUBAREA RUNOFF (CFS) = 3.78  
 EFFECTIVE AREA (ACRES) = 5.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.6 PEAK FLOW RATE (CFS) = 13.23

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50604.00 TO NODE 50605.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 585.00 DOWNSTREAM (FEET) = 584.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 16.00 CHANNEL SLOPE = 0.0625  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 13.23  
 FLOW VELOCITY (FEET/SEC.) = 5.32 FLOW DEPTH (FEET) = 0.91  
 TRAVEL TIME (MIN.) = 0.05 Tc (MIN.) = 12.16  
 LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50605.00 = 1061.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50605.00 TO NODE 50605.00 IS CODE = 81  
 -----

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN) = 12.16  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.919  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 5.00 0.30 1.000 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 5.00 SUBAREA RUNOFF (CFS) = 11.79  
 EFFECTIVE AREA (ACRES) = 10.60 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 10.6 PEAK FLOW RATE (CFS) = 24.99

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50605.00 TO NODE 50606.00 IS CODE = 51  
 -----

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

```

=====
ELEVATION DATA: UPSTREAM(FEET) = 584.00 DOWNSTREAM(FEET) = 579.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 122.00 CHANNEL SLOPE = 0.0410
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 24.99
FLOW VELOCITY(FEET/SEC.) = 5.30 FLOW DEPTH(FEET) = 1.25
TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 12.54
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50606.00 = 1183.00 FEET.

*****
FLOW PROCESS FROM NODE 50606.00 TO NODE 50606.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 12.54
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.869
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 5.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 12.02
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 36.54

*****
FLOW PROCESS FROM NODE 50606.00 TO NODE 50607.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 579.00 DOWNSTREAM(FEET) = 528.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 637.00 CHANNEL SLOPE = 0.0801
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 36.54
FLOW VELOCITY(FEET/SEC.) = 7.54 FLOW DEPTH(FEET) = 1.27
TRAVEL TIME(MIN.) = 1.41 Tc(MIN.) = 13.95
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50607.00 = 1820.00 FEET.

*****
FLOW PROCESS FROM NODE 50607.00 TO NODE 50607.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 13.95
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.696
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 15.74
EFFECTIVE AREA(ACRES) = 23.10 AREA-AVERAGED Fm(INCH/HR) = 0.30

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AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 23.1 PEAK FLOW RATE(CFS) = 49.81

*****
FLOW PROCESS FROM NODE 50607.00 TO NODE 50608.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 422.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 529.00 CHANNEL SLOPE = 0.2004
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 49.81
FLOW VELOCITY(FEET/SEC.) = 11.48 FLOW DEPTH(FEET) = 1.20
TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 14.72
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50608.00 = 2349.00 FEET.

*****
FLOW PROCESS FROM NODE 50608.00 TO NODE 50608.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 14.72
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.618
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.30 0.30 1.000 -
USER-DEFINED - 0.70 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.00 SUBAREA RUNOFF(CFS) = 6.26
EFFECTIVE AREA(ACRES) = 26.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 26.1 PEAK FLOW RATE(CFS) = 54.45

*****
FLOW PROCESS FROM NODE 50608.00 TO NODE 50609.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 422.00 DOWNSTREAM(FEET) = 297.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 708.00 CHANNEL SLOPE = 0.1766
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 54.45
FLOW VELOCITY(FEET/SEC.) = 11.13 FLOW DEPTH(FEET) = 1.28
TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 15.78
LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50609.00 = 3057.00 FEET.

*****
FLOW PROCESS FROM NODE 50609.00 TO NODE 50609.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 15.78

```



\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.529  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.60	0.30	0.100	-
USER-DEFINED	-	7.90	0.30	1.000	-
USER-DEFINED	-	2.50	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.880  
 SUBAREA AREA (ACRES) = 12.00 SUBAREA RUNOFF (CFS) = 24.46  
 EFFECTIVE AREA (ACRES) = 38.10 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 38.1 PEAK FLOW RATE (CFS) = 76.83

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50609.00 TO NODE 50610.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 297.00 DOWNSTREAM (FEET) = 207.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1321.00 CHANNEL SLOPE = 0.0681  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.030 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 76.83  
 FLOW VELOCITY (FEET/SEC.) = 10.53 FLOW DEPTH (FEET) = 1.56  
 TRAVEL TIME (MIN.) = 2.09 Tc (MIN.) = 17.87  
 LONGEST FLOWPATH FROM NODE 50600.00 TO NODE 50610.00 = 4378.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN) = 17.87  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.366  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.70	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	0.30	0.30	0.100	-
USER-DEFINED	-	4.40	0.30	1.000	-
USER-DEFINED	-	3.60	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.974  
 SUBAREA AREA (ACRES) = 10.20 SUBAREA RUNOFF (CFS) = 19.04  
 EFFECTIVE AREA (ACRES) = 48.30 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 48.3 PEAK FLOW RATE (CFS) = 90.27

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN) = 17.87

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.366  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.19  
 EFFECTIVE AREA (ACRES) = 48.40 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA (ACRES) = 48.4 PEAK FLOW RATE (CFS) = 90.46

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50610.00 TO NODE 50610.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<  
 =====  
 MAINLINE Tc (MIN) = 17.87  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.366  
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.10 SUBAREA RUNOFF (CFS) = 2.05  
 EFFECTIVE AREA (ACRES) = 49.50 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 49.5 PEAK FLOW RATE (CFS) = 92.51

END OF STUDY SUMMARY:  
 TOTAL AREA (ACRES) = 49.5 TC (MIN.) = 17.87  
 EFFECTIVE AREA (ACRES) = 49.50 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.965  
 PEAK FLOW RATE (CFS) = 92.51  
 =====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 7 \*  
\* HYDROLOGIC ANALYSIS - 100-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P507XXCE.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.820
2)	6.000;	4.350
3)	7.000;	3.990
4)	8.000;	3.700
5)	9.000;	3.460
6)	10.000;	3.260
7)	11.000;	3.090
8)	12.000;	2.940
9)	13.000;	2.810
10)	14.000;	2.690
11)	15.000;	2.590
12)	20.000;	2.200
13)	25.000;	1.940
14)	30.000;	1.750
15)	40.000;	1.490
16)	50.000;	1.310
17)	60.000;	1.180
18)	90.000;	0.940
19)	120.000;	0.800
20)	180.000;	0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50700.00 TO NODE 50701.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00  
ELEVATION DATA: UPSTREAM(FEET) = 925.00 DOWNSTREAM(FEET) = 815.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 8.946  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.473  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.20	0.30	1.000	95	8.95
NATURAL FAIR COVER "GRASS"	-	0.20	0.30	1.000	95	8.95
NATURAL FAIR COVER "OPEN BRUSH"	-	0.20	0.30	1.000	95	8.95

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.71  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50701.00 TO NODE 50702.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 815.00 DOWNSTREAM(FEET) = 800.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 169.00 CHANNEL SLOPE = 0.0888  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.71  
FLOW VELOCITY(FEET/SEC.) = 3.68 FLOW DEPTH(FEET) = 0.39  
TRAVEL TIME(MIN.) = 0.77  $T_c$ (MIN.) = 9.71  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50702.00 = 499.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50702.00 IS CODE = 81

=====  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 9.71  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.318  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 0.30 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 2.72  
EFFECTIVE AREA(ACRES) = 1.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 1.6 PEAK FLOW RATE(CFS) = 4.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50702.00 TO NODE 50703.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 800.00 DOWNSTREAM(FEET) = 785.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 128.00 CHANNEL SLOPE = 0.1172  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 4.35  
FLOW VELOCITY(FEET/SEC.) = 5.13 FLOW DEPTH(FEET) = 0.53  
TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 10.13  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50703.00 = 627.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50703.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.13  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.238  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.10 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 1.60 SUBAREA RUNOFF(CFS) = 4.23  
EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 8.46

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50703.00 TO NODE 50704.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
=====

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 775.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 170.00 CHANNEL SLOPE = 0.0588  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 8.46  
FLOW VELOCITY(FEET/SEC.) = 4.62 FLOW DEPTH(FEET) = 0.78  
TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 10.74  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50704.00 = 797.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50704.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 10.74  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.134  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 0.70 0.30 1.000 -  
USER-DEFINED - 0.60 0.30 1.000 -  
USER-DEFINED - 1.80 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 7.91  
EFFECTIVE AREA(ACRES) = 6.30 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 6.3 PEAK FLOW RATE(CFS) = 16.07

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50704.00 TO NODE 50705.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
=====

ELEVATION DATA: UPSTREAM(FEET) = 775.00 DOWNSTREAM(FEET) = 772.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 162.00 CHANNEL SLOPE = 0.0185  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 16.07  
FLOW VELOCITY(FEET/SEC.) = 3.53 FLOW DEPTH(FEET) = 1.23  
TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 11.50  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50705.00 = 959.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50705.00 TO NODE 50705.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
=====

MAINLINE Tc(MIN) = 11.50  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.014  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 1.30 0.30 1.000 -  
USER-DEFINED - 0.40 0.30 1.000 -

USER-DEFINED - 2.50 0.30 1.000 -  
USER-DEFINED - 0.10 0.30 1.000 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 10.51  
EFFECTIVE AREA(ACRES) = 10.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 10.6 PEAK FLOW RATE(CFS) = 25.90

\*\*\*\*\*

FLOW PROCESS FROM NODE 50705.00 TO NODE 50706.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 772.00 DOWNSTREAM(FEET) = 745.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 357.00 CHANNEL SLOPE = 0.0756  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 25.90  
FLOW VELOCITY(FEET/SEC.) = 6.74 FLOW DEPTH(FEET) = 1.13  
TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 12.39  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50706.00 = 1316.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50706.00 TO NODE 50706.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 12.39  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.890

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.30	1.000	-
USER-DEFINED	-	0.60	0.30	1.000	-
USER-DEFINED	-	1.80	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 8.16  
EFFECTIVE AREA(ACRES) = 14.10 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.1 PEAK FLOW RATE(CFS) = 32.86

\*\*\*\*\*

FLOW PROCESS FROM NODE 50706.00 TO NODE 50707.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 733.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 444.00 CHANNEL SLOPE = 0.0270  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 32.86  
FLOW VELOCITY(FEET/SEC.) = 4.87 FLOW DEPTH(FEET) = 1.50  
TRAVEL TIME(MIN.) = 1.52 Tc(MIN.) = 13.91

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50707.00 = 1760.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50707.00 TO NODE 50707.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 13.91  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.701

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.40	0.30	1.000	-
USER-DEFINED	-	0.90	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 5.50 SUBAREA RUNOFF(CFS) = 11.89  
EFFECTIVE AREA(ACRES) = 19.60 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 19.6 PEAK FLOW RATE(CFS) = 42.36

\*\*\*\*\*

FLOW PROCESS FROM NODE 50707.00 TO NODE 50708.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 733.00 DOWNSTREAM(FEET) = 675.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 467.00 CHANNEL SLOPE = 0.1242  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 42.36  
FLOW VELOCITY(FEET/SEC.) = 9.20 FLOW DEPTH(FEET) = 1.24  
TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 14.75  
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50708.00 = 2227.00 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 50708.00 TO NODE 50708.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 14.75  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.615

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.30	1.000	-
USER-DEFINED	-	1.00	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 8.75  
EFFECTIVE AREA(ACRES) = 23.80 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 23.8 PEAK FLOW RATE(CFS) = 49.58

\*\*\*\*\*

FLOW PROCESS FROM NODE 50708.00 TO NODE 50709.00 IS CODE = 51

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-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 619.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 516.00 CHANNEL SLOPE = 0.1085
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 49.58
FLOW VELOCITY(FEET/SEC.) = 9.10 FLOW DEPTH(FEET) = 1.35
TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 15.70
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50709.00 = 2743.00 FEET.

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*****
FLOW PROCESS FROM NODE 50709.00 TO NODE 50709.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 15.70
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.536
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 17.70 0.30 1.000 -
USER-DEFINED - 2.00 0.30 1.000 -
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 0.20 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 20.20 SUBAREA RUNOFF(CFS) = 40.64
EFFECTIVE AREA(ACRES) = 44.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 44.0 PEAK FLOW RATE(CFS) = 88.53

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*****
FLOW PROCESS FROM NODE 50709.00 TO NODE 50710.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 619.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 650.00 CHANNEL SLOPE = 0.0292
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 88.53
FLOW VELOCITY(FEET/SEC.) = 7.96 FLOW DEPTH(FEET) = 1.93
TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 17.06
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50710.00 = 3393.00 FEET.

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*****
FLOW PROCESS FROM NODE 50710.00 TO NODE 50710.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 17.06
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.429
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.60 0.30 1.000 -
USER-DEFINED - 0.90 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 14.37
EFFECTIVE AREA(ACRES) = 51.50 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 51.5 PEAK FLOW RATE(CFS) = 98.70

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*****
FLOW PROCESS FROM NODE 50710.00 TO NODE 50711.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 528.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 794.00 CHANNEL SLOPE = 0.0907
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 98.70
FLOW VELOCITY(FEET/SEC.) = 12.53 FLOW DEPTH(FEET) = 1.62
TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 18.11
LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50711.00 = 4187.00 FEET.

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*****
FLOW PROCESS FROM NODE 50711.00 TO NODE 50711.00 IS CODE = 81
-----

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 18.11
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.347
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 33.10 0.30 1.000 -
USER-DEFINED - 0.30 0.30 1.000 -
USER-DEFINED - 1.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 34.90 SUBAREA RUNOFF(CFS) = 64.30
EFFECTIVE AREA(ACRES) = 86.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 86.4 PEAK FLOW RATE(CFS) = 159.18

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*****
FLOW PROCESS FROM NODE 50711.00 TO NODE 50712.00 IS CODE = 51
-----

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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 528.00 DOWNSTREAM(FEET) = 423.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1215.00 CHANNEL SLOPE = 0.0864
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 159.18
FLOW VELOCITY(FEET/SEC.) = 13.87 FLOW DEPTH(FEET) = 1.96
TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 19.57

```

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50712.00 = 5402.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50712.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 19.57

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.233

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	0.900	-
USER-DEFINED	-	18.20	0.30	1.000	-
USER-DEFINED	-	0.10	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.998

SUBAREA AREA(ACRES) = 18.60 SUBAREA RUNOFF(CFS) = 32.37

EFFECTIVE AREA(ACRES) = 105.00 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 105.0 PEAK FLOW RATE(CFS) = 182.70

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50712.00 TO NODE 50713.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 319.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 768.00 CHANNEL SLOPE = 0.1354

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00

CHANNEL FLOW THRU SUBAREA(CFS) = 182.70

FLOW VELOCITY(FEET/SEC.) = 16.96 FLOW DEPTH(FEET) = 1.89

TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 20.33

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50713.00 = 6170.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50713.00 TO NODE 50713.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 20.33

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.183

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.30	0.100	-
USER-DEFINED	-	4.60	0.30	1.000	-
USER-DEFINED	-	0.50	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.966

SUBAREA AREA(ACRES) = 5.30 SUBAREA RUNOFF(CFS) = 9.03

EFFECTIVE AREA(ACRES) = 110.30 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 110.3 PEAK FLOW RATE(CFS) = 186.98

\*\*\*\*\*

FLOW PROCESS FROM NODE 50713.00 TO NODE 50714.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 319.00 DOWNSTREAM(FEET) = 182.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 1513.00 CHANNEL SLOPE = 0.0905

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 3.00

CHANNEL FLOW THRU SUBAREA(CFS) = 186.98

FLOW VELOCITY(FEET/SEC.) = 14.65 FLOW DEPTH(FEET) = 2.06

TRAVEL TIME(MIN.) = 1.72 Tc(MIN.) = 22.05

LONGEST FLOWPATH FROM NODE 50700.00 TO NODE 50714.00 = 7683.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 22.05

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.093

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.30	1.000	-
USER-DEFINED	-	1.60	0.30	1.000	-
USER-DEFINED	-	5.20	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-
USER-DEFINED	-	7.70	0.30	1.000	-
USER-DEFINED	-	2.60	0.30	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.867

SUBAREA AREA(ACRES) = 17.60 SUBAREA RUNOFF(CFS) = 29.04

EFFECTIVE AREA(ACRES) = 127.90 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98

TOTAL AREA(ACRES) = 127.9 PEAK FLOW RATE(CFS) = 207.13

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN) = 22.05

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.093

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.30	0.900	-
USER-DEFINED	-	52.70	0.30	1.000	-
USER-DEFINED	-	7.00	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	0.20	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.999

SUBAREA AREA(ACRES) = 61.30 SUBAREA RUNOFF(CFS) = 98.96

EFFECTIVE AREA(ACRES) = 189.20 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 189.2 PEAK FLOW RATE(CFS) = 306.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.05

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.093

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-
USER-DEFINED	-	0.80	0.30	1.000	-
USER-DEFINED	-	6.20	0.30	1.000	-
USER-DEFINED	-	3.40	0.30	1.000	-
USER-DEFINED	-	2.00	0.30	1.000	-
USER-DEFINED	-	3.50	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 26.31

EFFECTIVE AREA(ACRES) = 205.50 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 205.5 PEAK FLOW RATE(CFS) = 332.40

\*\*\*\*\*

FLOW PROCESS FROM NODE 50714.00 TO NODE 50714.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN) = 22.05

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.093

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.30	0.100	-
USER-DEFINED	-	7.60	0.30	1.000	-
USER-DEFINED	-	10.40	0.30	1.000	-
USER-DEFINED	-	7.80	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997

SUBAREA AREA(ACRES) = 25.90 SUBAREA RUNOFF(CFS) = 41.83

EFFECTIVE AREA(ACRES) = 231.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 231.4 PEAK FLOW RATE(CFS) = 374.22

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 231.4 TC(MIN.) = 22.05

EFFECTIVE AREA(ACRES) = 231.40 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.988

PEAK FLOW RATE(CFS) = 374.22

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 13.1 Release Date: 06/15/2006 License ID 1202

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\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* RUNOFF MANAGEMENT PLAN - RANCHO MISSION VIEJO \*  
\* PROPOSED CONDITION - PLANNING AREA 5 - WATERSHED 8 \*  
\* HYDROLOGIC ANALYSIS - 100-YEAR - EXPECTED VALUE \*  
\*\*\*\*\*

FILE NAME: P508XXCE.DAT  
TIME/DATE OF STUDY: 10:50 10/16/2012

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90  
\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 20

1)	5.000;	4.820
2)	6.000;	4.350
3)	7.000;	3.990
4)	8.000;	3.700
5)	9.000;	3.460
6)	10.000;	3.260
7)	11.000;	3.090
8)	12.000;	2.940
9)	13.000;	2.810
10)	14.000;	2.690
11)	15.000;	2.590
12)	20.000;	2.200
13)	25.000;	1.940
14)	30.000;	1.750
15)	40.000;	1.490
16)	50.000;	1.310
17)	60.000;	1.180
18)	90.000;	0.940
19)	120.000;	0.800
20)	180.000;	0.630

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*  
HALF- CROWN TO STREET-CROSSFALL: CURB GUTTER-GEOMETRIES: MANNING  
WIDTH CROSSFALL IN- / OUT-/PARK- HEIGHT WIDTH LIP HIKE FACTOR  
NO. (FT) (FT) SIDE / SIDE/ WAY (FT) (FT) (FT) (FT) (n)

1	60.0	30.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
2	50.0	25.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
3	40.0	20.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
4	30.0	15.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150
5	20.0	10.0	0.020/0.020/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)  
2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50800.00 TO NODE 50801.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 321.00  
ELEVATION DATA: UPSTREAM(FEET) = 795.00 DOWNSTREAM(FEET) = 745.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$ (MIN.) = 10.302  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.209  
SUBAREA  $T_c$  AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	$F_p$ (INCH/HR)	$A_p$ (DECIMAL)	SCS CN	$T_c$ (MIN.)
NATURAL FAIR COVER "GRASS"	-	0.60	0.30	1.000	95	10.30

SUBAREA AVERAGE PERVIOUS LOSS RATE,  $F_p$ (INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION,  $A_p$  = 1.000  
SUBAREA RUNOFF(CFS) = 1.57  
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.57

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50801.00 TO NODE 50802.00 IS CODE = 51  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 745.00 DOWNSTREAM(FEET) = 725.00  
CHANNEL LENGTH THRU SUBAREA(FEET) = 245.00 CHANNEL SLOPE = 0.0816  
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000  
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 1.00  
CHANNEL FLOW THRU SUBAREA(CFS) = 1.57  
FLOW VELOCITY(FEET/SEC.) = 3.41 FLOW DEPTH(FEET) = 0.39  
TRAVEL TIME(MIN.) = 1.20  $T_c$ (MIN.) = 11.50  
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50802.00 = 566.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 50802.00 TO NODE 50802.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE  $T_c$ (MIN) = 11.50

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.015  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.20 0.30 1.000 -  
 USER-DEFINED - 0.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 8.06  
 EFFECTIVE AREA (ACRES) = 3.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 3.9 PEAK FLOW RATE (CFS) = 9.53

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50802.00 TO NODE 50803.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 725.00 DOWNSTREAM (FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 325.00 CHANNEL SLOPE = 0.0769  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 9.53  
 FLOW VELOCITY (FEET/SEC.) = 5.28 FLOW DEPTH (FEET) = 0.78  
 TRAVEL TIME (MIN.) = 1.03 Tc (MIN.) = 12.53  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50803.00 = 891.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50803.00 TO NODE 50803.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----  
 MAINLINE Tc (MIN) = 12.53  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.872  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 1.50 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 1.50 SUBAREA RUNOFF (CFS) = 3.47  
 EFFECTIVE AREA (ACRES) = 5.40 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 5.4 PEAK FLOW RATE (CFS) = 12.50

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50803.00 TO NODE 50804.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 700.00 DOWNSTREAM (FEET) = 652.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 594.00 CHANNEL SLOPE = 0.0808  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 1.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 12.50  
 FLOW VELOCITY (FEET/SEC.) = 5.77 FLOW DEPTH (FEET) = 0.85

TRAVEL TIME (MIN.) = 1.72 Tc (MIN.) = 14.24  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50804.00 = 1485.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50804.00 TO NODE 50804.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----  
 MAINLINE Tc (MIN) = 14.24  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.666  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 6.10 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 12.99  
 EFFECTIVE AREA (ACRES) = 11.50 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 11.5 PEAK FLOW RATE (CFS) = 24.49

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50804.00 TO NODE 50805.00 IS CODE = 51  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<  
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 652.00 DOWNSTREAM (FEET) = 542.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 499.00 CHANNEL SLOPE = 0.2204  
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000  
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 2.00  
 CHANNEL FLOW THRU SUBAREA (CFS) = 24.49  
 FLOW VELOCITY (FEET/SEC.) = 9.97 FLOW DEPTH (FEET) = 0.91  
 TRAVEL TIME (MIN.) = 0.83 Tc (MIN.) = 15.08  
 LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50805.00 = 1984.00 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50805.00 TO NODE 50805.00 IS CODE = 81  
 -----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<  
 -----  
 MAINLINE Tc (MIN) = 15.08  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.584  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 3.70 0.30 1.000 -  
 USER-DEFINED - 1.10 0.30 1.000 -  
 USER-DEFINED - 0.40 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA AREA (ACRES) = 5.20 SUBAREA RUNOFF (CFS) = 10.69  
 EFFECTIVE AREA (ACRES) = 16.70 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 16.7 PEAK FLOW RATE (CFS) = 34.33

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 50805.00 TO NODE 50806.00 IS CODE = 51

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-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 542.00 DOWNSTREAM(FEET) = 450.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 650.00 CHANNEL SLOPE = 0.1415
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 34.33
FLOW VELOCITY(FEET/SEC.) = 9.14 FLOW DEPTH(FEET) = 1.12
TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 16.26
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50806.00 = 2634.00 FEET.

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*****
FLOW PROCESS FROM NODE 50806.00 TO NODE 50806.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 16.26
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.492
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.20 0.30 1.000 -
USER-DEFINED - 1.50 0.30 1.000 -
USER-DEFINED - 0.50 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 5.20 SUBAREA RUNOFF(CFS) = 10.26
EFFECTIVE AREA(ACRES) = 21.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 21.9 PEAK FLOW RATE(CFS) = 43.20

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*****
FLOW PROCESS FROM NODE 50806.00 TO NODE 50807.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 400.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 639.00 CHANNEL SLOPE = 0.0782
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 43.20
FLOW VELOCITY(FEET/SEC.) = 7.78 FLOW DEPTH(FEET) = 1.36
TRAVEL TIME(MIN.) = 1.37 Tc(MIN.) = 17.63
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50807.00 = 3273.00 FEET.

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*****
FLOW PROCESS FROM NODE 50807.00 TO NODE 50807.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 17.63
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.385
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

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USER-DEFINED - 15.50 0.30 1.000 -
USER-DEFINED - 0.10 0.30 1.000 -
USER-DEFINED - 0.30 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 29.84
EFFECTIVE AREA(ACRES) = 37.80 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 37.8 PEAK FLOW RATE(CFS) = 70.93

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*****
FLOW PROCESS FROM NODE 50807.00 TO NODE 50808.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 400.00 DOWNSTREAM(FEET) = 350.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 448.00 CHANNEL SLOPE = 0.1116
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 70.93
FLOW VELOCITY(FEET/SEC.) = 10.02 FLOW DEPTH(FEET) = 1.54
TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 18.38
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50808.00 = 3721.00 FEET.

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*****
FLOW PROCESS FROM NODE 50808.00 TO NODE 50808.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 18.38
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.327
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.90 0.30 1.000 -
USER-DEFINED - 0.60 0.30 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 13.68
EFFECTIVE AREA(ACRES) = 45.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 45.3 PEAK FLOW RATE(CFS) = 82.63

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*****
FLOW PROCESS FROM NODE 50808.00 TO NODE 50809.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 350.00 DOWNSTREAM(FEET) = 283.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 438.00 CHANNEL SLOPE = 0.1530
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 82.63
FLOW VELOCITY(FEET/SEC.) = 11.76 FLOW DEPTH(FEET) = 1.53
TRAVEL TIME(MIN.) = 0.62 Tc(MIN.) = 19.00
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50809.00 = 4159.00 FEET.

```

```
*****
FLOW PROCESS FROM NODE 50809.00 TO NODE 50809.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 19.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.278
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     0.100    -
USER-DEFINED        -         5.70     0.30     1.000    -
USER-DEFINED        -         1.30     0.30     1.000    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.975
SUBAREA AREA(ACRES) = 7.20     SUBAREA RUNOFF(CFS) = 12.87
EFFECTIVE AREA(ACRES) = 52.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 52.5     PEAK FLOW RATE(CFS) = 93.53
```

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*****
FLOW PROCESS FROM NODE 50809.00 TO NODE 50810.00 IS CODE = 51
-----
```

```
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 283.00 DOWNSTREAM(FEET) = 243.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.00 CHANNEL SLOPE = 0.0602
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 2.00
CHANNEL FLOW THRU SUBAREA(CFS) = 93.53
FLOW VELOCITY(FEET/SEC.) = 10.62 FLOW DEPTH(FEET) = 1.71
TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 20.04
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50810.00 = 4824.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 50810.00 TO NODE 50810.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 20.04
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.198
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.20     0.30     0.100    -
USER-DEFINED        -        41.90     0.30     1.000    -
USER-DEFINED        -         4.90     0.30     1.000    -
USER-DEFINED        -         4.40     0.30     1.000    -
USER-DEFINED        -         9.90     0.30     1.000    -
USER-DEFINED        -         1.20     0.30     1.000    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.983
SUBAREA AREA(ACRES) = 63.50     SUBAREA RUNOFF(CFS) = 108.76
EFFECTIVE AREA(ACRES) = 116.00   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 116.0     PEAK FLOW RATE(CFS) = 198.49
```

```
*****
FLOW PROCESS FROM NODE 50810.00 TO NODE 50811.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 243.00 DOWNSTREAM(FEET) = 173.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1122.00 CHANNEL SLOPE = 0.0624
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 3.00
CHANNEL FLOW THRU SUBAREA(CFS) = 198.49
FLOW VELOCITY(FEET/SEC.) = 10.46 FLOW DEPTH(FEET) = 2.51
TRAVEL TIME(MIN.) = 1.79 Tc(MIN.) = 21.83
LONGEST FLOWPATH FROM NODE 50800.00 TO NODE 50811.00 = 5946.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 21.83
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.105
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         4.00     0.30     1.000    -
USER-DEFINED        -         0.40     0.30     1.000    -
USER-DEFINED        -         2.70     0.30     1.000    -
USER-DEFINED        -         0.30     0.30     0.100    -
USER-DEFINED        -         3.00     0.30     1.000    -
USER-DEFINED        -         1.10     0.30     1.000    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.977
SUBAREA AREA(ACRES) = 11.50     SUBAREA RUNOFF(CFS) = 18.76
EFFECTIVE AREA(ACRES) = 127.50   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 127.5     PEAK FLOW RATE(CFS) = 207.54
```

```
*****
FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN) = 21.83
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.105
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.20     0.30     1.000    -
USER-DEFINED        -         1.90     0.30     1.000    -
USER-DEFINED        -         0.20     0.30     1.000    -
USER-DEFINED        -         0.80     0.30     1.000    -
USER-DEFINED        -         0.20     0.30     1.000    -
USER-DEFINED        -         0.10     0.30     1.000    -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 3.40     SUBAREA RUNOFF(CFS) = 5.52
```

EFFECTIVE AREA (ACRES) = 130.90 AREA-AVERAGED Fm (INCH/HR) = 0.30  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
TOTAL AREA (ACRES) = 130.9 PEAK FLOW RATE (CFS) = 213.06

\*\*\*\*\*

FLOW PROCESS FROM NODE 50811.00 TO NODE 50811.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN) = 21.83

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.105

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 0.65

EFFECTIVE AREA (ACRES) = 131.30 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 131.3 PEAK FLOW RATE (CFS) = 213.71

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 131.3 TC (MIN.) = 21.83

EFFECTIVE AREA (ACRES) = 131.30 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.988

PEAK FLOW RATE (CFS) = 213.71

END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S31 \*  
\* Rational Method Hydrology Analysis - 100-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S31.DAT  
TIME/DATE OF STUDY: 15:40 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.800
- 2) 10.00; 3.258
- 3) 15.00; 2.590
- 4) 20.00; 2.201
- 5) 25.00; 1.940
- 6) 30.00; 1.740
- 7) 40.00; 1.487
- 8) 50.00; 1.310
- 9) 60.00; 1.150
- 10) 90.00; 0.940
- 11) 120.00; 0.798
- 12) 180.00; 0.647
- 13) 360.00; 0.452
- 14) 1440.00; 0.187

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13100.00 TO NODE 13101.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 282.58  
ELEVATION DATA: UPSTREAM(FEET) = 1069.66 DOWNSTREAM(FEET) = 969.92

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.312  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.779  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.94	0.30	1.000	0	8.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 2.94  
TOTAL AREA(ACRES) = 0.94 PEAK FLOW RATE(CFS) = 2.94

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13101.00 TO NODE 13102.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 969.92 DOWNSTREAM(FEET) = 807.20  
CHANNEL LENGTH THRU SUBAREA(FEET) = 665.89 CHANNEL SLOPE = 0.2444  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.28  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.174  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.67	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.92  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.79  
AVERAGE FLOW DEPTH(FEET) = 0.26 TRAVEL TIME(MIN.) = 2.32  
Tc(MIN.) = 10.63  
SUBAREA AREA(ACRES) = 7.67 SUBAREA RUNOFF(CFS) = 19.84  
EFFECTIVE AREA(ACRES) = 8.61 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.6 PEAK FLOW RATE(CFS) = 22.27  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.36

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.36 FLOW VELOCITY(FEET/SEC.) = 5.85  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13102.00 = 948.47 FEET.

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FLOW PROCESS FROM NODE 13102.00 TO NODE 13103.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

ELEVATION DATA: UPSTREAM(FEET) = 807.20 DOWNSTREAM(FEET) = 769.94  
CHANNEL LENGTH THRU SUBAREA(FEET) = 691.01 CHANNEL SLOPE = 0.0539  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.88

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.841

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	20.65	0.30	0.999	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.999

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 45.96

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.62

AVERAGE FLOW DEPTH(FEET) = 0.85 TRAVEL TIME(MIN.) = 2.49

Tc(MIN.) = 13.12

SUBAREA AREA(ACRES) = 20.65 SUBAREA RUNOFF(CFS) = 47.24

EFFECTIVE AREA(ACRES) = 29.26 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 29.3 PEAK FLOW RATE(CFS) = 66.93

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.06

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.06 FLOW VELOCITY(FEET/SEC.) = 5.23

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13103.00 = 1639.48 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 769.94 DOWNSTREAM(FEET) = 693.88

FLOW LENGTH(FEET) = 1563.10 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000

DEPTH OF FLOW IN 36.0 INCH PIPE IS 17.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 19.54

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 66.93

PIPE TRAVEL TIME(MIN.) = 1.33 Tc(MIN.) = 14.45

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13104.00 = 3202.58 FEET.

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FLOW PROCESS FROM NODE 13103.00 TO NODE 13104.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.45

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.663

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	28.00	0.30	0.750	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.750

SUBAREA AREA(ACRES) = 28.00 SUBAREA RUNOFF(CFS) = 61.45

EFFECTIVE AREA(ACRES) = 57.26 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88

TOTAL AREA(ACRES) = 57.3 PEAK FLOW RATE(CFS) = 123.69

\*\*\*\*\*

FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 693.88 DOWNSTREAM(FEET) = 645.69

FLOW LENGTH(FEET) = 1068.98 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.57

ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 123.69

PIPE TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 15.28

LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13105.00 = 4271.56 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13104.00 TO NODE 13105.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.28

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.568

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	35.28	0.30	0.867	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.867

SUBAREA AREA(ACRES) = 35.28 SUBAREA RUNOFF(CFS) = 73.30

EFFECTIVE AREA(ACRES) = 92.54 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.87

TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 192.10

\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 645.69 DOWNSTREAM(FEET) = 608.48

FLOW LENGTH(FEET) = 1127.55 MANNING'S N = 0.013

DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.41

ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 192.10

PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 16.16  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.16  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.500  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 37.68 0.30 0.889 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.889  
SUBAREA AREA(ACRES) = 37.68 SUBAREA RUNOFF(CFS) = 75.74  
EFFECTIVE AREA(ACRES) = 130.22 AREA-AVERAGED Fm(INCH/HR) = 0.26  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.88  
TOTAL AREA(ACRES) = 130.2 PEAK FLOW RATE(CFS) = 262.15

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FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

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FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 15.1

>>>>DEFINE MEMORY BANK # 2 <<<<

PEAK FLOWRATE TABLE FILE NAME: S30.DNA  
MEMORY BANK # 2 DEFINED AS FOLLOWS:  
STREAM Q Tc Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (ACRES) NODE  
1 2413.49 36.12 0.30( 0.24) 0.81 1996.3 13000.00  
2 2345.31 38.13 0.30( 0.24) 0.81 2016.1 13010.00  
TOTAL AREA(ACRES) = 2016.1

\*\*\*\*\*

FLOW PROCESS FROM NODE 13025.00 TO NODE 13026.00 IS CODE = 14.0

>>>>MEMORY BANK # 2 COPIED ONTO MAIN-STREAM MEMORY<<<<

MAIN-STREAM MEMORY DEFINED AS FOLLOWS:  
STREAM Q Tc Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (ACRES) NODE  
1 2413.49 36.12 0.30( 0.24) 0.81 1996.3 13000.00  
2 2345.31 38.13 0.30( 0.24) 0.81 2016.1 13010.00  
TOTAL AREA(ACRES) = 2016.1

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FLOW PROCESS FROM NODE 13026.00 TO NODE 13106.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 662.66 DOWNSTREAM(FEET) = 608.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 3098.88 CHANNEL SLOPE = 0.0175  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.22  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.484  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 75.28 0.30 0.755 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.755  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2456.09  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.80  
AVERAGE FLOW DEPTH(FEET) = 3.22 TRAVEL TIME(MIN.) = 4.03  
Tc(MIN.) = 40.16  
SUBAREA AREA(ACRES) = 75.28 SUBAREA RUNOFF(CFS) = 85.20  
EFFECTIVE AREA(ACRES) = 2071.57 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 2091.4 PEAK FLOW RATE(CFS) = 2413.49  
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.19 FLOW VELOCITY(FEET/SEC.) = 12.72  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 2413.49 40.16 1.484 0.30( 0.24) 0.80 2071.6 13000.00  
2 2345.31 42.21 1.448 0.30( 0.24) 0.80 2091.4 13010.00  
NEW PEAK FLOW DATA ARE:  
PEAK FLOW RATE(CFS) = 2413.49 Tc(MIN.) = 40.16  
AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA(ACRES) = 2071.57

\*\*\*\*\*

FLOW PROCESS FROM NODE 13105.00 TO NODE 13106.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

\*\* MAIN STREAM CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 2413.49 40.16 1.484 0.30( 0.24) 0.80 2071.6 13000.00  
2 2345.31 42.21 1.448 0.30( 0.24) 0.80 2091.4 13010.00  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\* MEMORY BANK # 1 CONFLUENCE DATA \*\*  
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
1 262.15 16.16 2.500 0.30( 0.26) 0.88 130.2 13100.00  
LONGEST FLOWPATH FROM NODE 13100.00 TO NODE 13106.00 = 5399.11 FEET.



\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2027.04	16.16	2.500	0.30 ( 0.24)	0.81	963.6	13100.00
2	2556.54	40.16	1.484	0.30 ( 0.24)	0.81	2201.8	13000.00
3	2484.13	42.21	1.448	0.30 ( 0.24)	0.81	2221.6	13010.00
TOTAL AREA (ACRES) =		2221.6					

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 2556.54 Tc (MIN.) = 40.159  
EFFECTIVE AREA (ACRES) = 2201.79 AREA-AVERAGED Fm (INCH/HR) = 0.24  
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA (ACRES) = 2221.6  
LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13106.00 = 19274.64 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13106.00 TO NODE 13107.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 608.48 DOWNSTREAM (FEET) = 584.29  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1650.20 CHANNEL SLOPE = 0.0147  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.55

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.445

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	190.45	0.30	0.755	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.755

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2660.95

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.39

AVERAGE FLOW DEPTH (FEET) = 3.54 TRAVEL TIME (MIN.) = 2.22

Tc (MIN.) = 42.38

SUBAREA AREA (ACRES) = 190.45 SUBAREA RUNOFF (CFS) = 208.83

EFFECTIVE AREA (ACRES) = 2392.24 AREA-AVERAGED Fm (INCH/HR) = 0.24

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80

TOTAL AREA (ACRES) = 2412.1 PEAK FLOW RATE (CFS) = 2591.55

GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 3.49 FLOW VELOCITY (FEET/SEC.) = 12.27

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13107.00 = 20924.84 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2155.27	18.52	2.316	0.30 ( 0.24)	0.80	1154.1	13100.00
2	2591.55	42.38	1.445	0.30 ( 0.24)	0.80	2392.2	13000.00
3	2534.07	44.45	1.408	0.30 ( 0.24)	0.80	2412.1	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 2591.55 Tc (MIN.) = 42.38

AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA (ACRES) = 2392.24

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13107.00 TO NODE 13108.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 584.29 DOWNSTREAM (FEET) = 563.78  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1061.67 CHANNEL SLOPE = 0.0193  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.34

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.422

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	314.12	0.30	0.939	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.939

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2752.76

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.74

AVERAGE FLOW DEPTH (FEET) = 3.34 TRAVEL TIME (MIN.) = 1.29

Tc (MIN.) = 43.67

SUBAREA AREA (ACRES) = 314.12 SUBAREA RUNOFF (CFS) = 322.40

EFFECTIVE AREA (ACRES) = 2706.35 AREA-AVERAGED Fm (INCH/HR) = 0.25

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82

TOTAL AREA (ACRES) = 2726.2 PEAK FLOW RATE (CFS) = 2865.04

GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 3.42 FLOW VELOCITY (FEET/SEC.) = 13.93

LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13108.00 = 21986.51 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2592.23	19.86	2.212	0.30 ( 0.25)	0.83	1468.2	13100.00
2	2865.04	43.67	1.422	0.30 ( 0.25)	0.82	2706.4	13000.00
3	2796.44	45.74	1.385	0.30 ( 0.25)	0.82	2726.2	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 2865.04 Tc (MIN.) = 43.67

AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2706.35

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13108.00 TO NODE 13109.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 563.78 DOWNSTREAM (FEET) = 541.61  
CHANNEL LENGTH THRU SUBAREA (FEET) = 1657.28 CHANNEL SLOPE = 0.0134  
GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0

"Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030

\*ESTIMATED CHANNEL HEIGHT (FEET) = 3.87  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.383  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 203.63 0.30 0.785 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.785  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2970.19  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 12.45  
 AVERAGE FLOW DEPTH (FEET) = 3.87 TRAVEL TIME (MIN.) = 2.22  
 Tc (MIN.) = 45.89  
 SUBAREA AREA (ACRES) = 203.63 SUBAREA RUNOFF (CFS) = 210.29  
 EFFECTIVE AREA (ACRES) = 2909.98 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82  
 TOTAL AREA (ACRES) = 2929.8 PEAK FLOW RATE (CFS) = 2979.98  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.88 FLOW VELOCITY (FEET/SEC.) = 12.47  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13109.00 = 23643.79 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 2770.45 22.14 2.089 0.30 ( 0.25) 0.83 1671.8 13100.00  
 2 2979.98 45.89 1.383 0.30 ( 0.25) 0.82 2910.0 13000.00  
 3 2903.13 47.98 1.346 0.30 ( 0.24) 0.82 2929.8 13010.00  
 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 2979.98 Tc (MIN.) = 45.89  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.82 EFFECTIVE AREA (ACRES) = 2909.98

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13109.00 TO NODE 13110.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 541.61 DOWNSTREAM (FEET) = 509.94  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 2016.96 CHANNEL SLOPE = 0.0157  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.81  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.339  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 283.06 0.30 0.791 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.791  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3120.25  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.36  
 AVERAGE FLOW DEPTH (FEET) = 3.80 TRAVEL TIME (MIN.) = 2.52  
 Tc (MIN.) = 48.40  
 SUBAREA AREA (ACRES) = 283.06 SUBAREA RUNOFF (CFS) = 280.55

EFFECTIVE AREA (ACRES) = 3193.04 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3212.9 PEAK FLOW RATE (CFS) = 3144.25  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.82

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.82 FLOW VELOCITY (FEET/SEC.) = 13.39  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13110.00 = 25660.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER  
 NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE  
 1 3007.72 24.69 1.956 0.30 ( 0.25) 0.82 1954.9 13100.00  
 2 3144.25 48.40 1.339 0.30 ( 0.24) 0.81 3193.0 13000.00  
 3 3058.44 50.52 1.302 0.30 ( 0.24) 0.81 3212.9 13010.00  
 NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE (CFS) = 3144.25 Tc (MIN.) = 48.40  
 AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA (ACRES) = 3193.04

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13110.00 TO NODE 13111.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====  
 ELEVATION DATA: UPSTREAM (FEET) = 509.94 DOWNSTREAM (FEET) = 461.07  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 3058.95 CHANNEL SLOPE = 0.0160  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.89  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.276  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 USER-DEFINED - 248.05 0.30 0.783 -  
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3260.46  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 13.63  
 AVERAGE FLOW DEPTH (FEET) = 3.88 TRAVEL TIME (MIN.) = 3.74  
 Tc (MIN.) = 52.14  
 SUBAREA AREA (ACRES) = 248.05 SUBAREA RUNOFF (CFS) = 232.42  
 EFFECTIVE AREA (ACRES) = 3441.09 AREA-AVERAGED Fm (INCH/HR) = 0.24  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA (ACRES) = 3460.9 PEAK FLOW RATE (CFS) = 3196.96  
 GIVEN CHANNEL BASE (FEET) = 50.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.84 FLOW VELOCITY (FEET/SEC.) = 13.53  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13111.00 = 28719.70 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  
 STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	3085.76	28.46	1.802	0.30 ( 0.25)	0.82	2203.0 13100.00
2	3196.96	52.14	1.276	0.30 ( 0.24)	0.81	3441.1 13000.00
3	3108.17	54.30	1.241	0.30 ( 0.24)	0.81	3460.9 13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 3196.96 Tc(MIN.) = 52.14  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3441.09

\*\*\*\*\*

FLOW PROCESS FROM NODE 13111.00 TO NODE 13112.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 461.07 DOWNSTREAM(FEET) = 452.77  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1781.78 CHANNEL SLOPE = 0.0047  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 5.50  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.223

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	179.91	0.30	0.694	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.694  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3279.11  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.96  
 AVERAGE FLOW DEPTH(FEET) = 5.50 TRAVEL TIME(MIN.) = 3.32  
 Tc(MIN.) = 55.46

SUBAREA AREA(ACRES) = 179.91 SUBAREA RUNOFF(CFS) = 164.29  
 EFFECTIVE AREA(ACRES) = 3621.00 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3640.9 PEAK FLOW RATE(CFS) = 3196.96  
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 5.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 5.43 FLOW VELOCITY(FEET/SEC.) = 8.89  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13112.00 = 30501.48 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3114.11	31.80	1.694	0.30 ( 0.24)	0.81	2382.9	13100.00
2	3196.96	55.46	1.223	0.30 ( 0.24)	0.81	3621.0	13000.00
3	3108.17	57.64	1.188	0.30 ( 0.24)	0.81	3640.9	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 3196.96 Tc(MIN.) = 55.46  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3621.00

\*\*\*\*\*

FLOW PROCESS FROM NODE 13112.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 452.77 DOWNSTREAM(FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1625.01 CHANNEL SLOPE = 0.0155  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.92  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.191

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	155.96	0.30	0.836	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.836  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3262.93  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.49  
 AVERAGE FLOW DEPTH(FEET) = 3.92 TRAVEL TIME(MIN.) = 2.01  
 Tc(MIN.) = 57.47

SUBAREA AREA(ACRES) = 155.96 SUBAREA RUNOFF(CFS) = 131.93  
 EFFECTIVE AREA(ACRES) = 3776.96 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
 TOTAL AREA(ACRES) = 3796.8 PEAK FLOW RATE(CFS) = 3223.67  
 GIVEN CHANNEL BASE(FEET) = 50.00 CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.89 FLOW VELOCITY(FEET/SEC.) = 13.45  
 LONGEST FLOWPATH FROM NODE 13010.00 TO NODE 13222.00 = 32126.49 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3200.10	33.81	1.643	0.30 ( 0.24)	0.81	2538.8	13100.00
2	3223.67	57.47	1.191	0.30 ( 0.24)	0.81	3777.0	13000.00
3	3120.61	59.66	1.155	0.30 ( 0.24)	0.81	3796.8	13010.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 3223.67 Tc(MIN.) = 57.47  
 AREA-AVERAGED Fm(INCH/HR) = 0.24 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.81 EFFECTIVE AREA(ACRES) = 3776.96

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 3796.8 TC(MIN.) = 57.47  
 EFFECTIVE AREA(ACRES) = 3776.96 AREA-AVERAGED Fm(INCH/HR) = 0.24  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.808  
 PEAK FLOW RATE(CFS) = 3223.67

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3200.10	33.81	1.643	0.30 ( 0.24)	0.81	2538.8	13100.00
2	3223.67	57.47	1.191	0.30 ( 0.24)	0.81	3777.0	13000.00
3	3120.61	59.66	1.155	0.30 ( 0.24)	0.81	3796.8	13010.00

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 17.0 Release Date: 07/01/2010 License ID 1527

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S32 \*  
\* Rational Method Hydrology Analysis - 100-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S32.DAT  
TIME/DATE OF STUDY: 15:41 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.800
- 2) 10.00; 3.258
- 3) 15.00; 2.590
- 4) 20.00; 2.201
- 5) 25.00; 1.940
- 6) 30.00; 1.740
- 7) 40.00; 1.487
- 8) 50.00; 1.310
- 9) 60.00; 1.150
- 10) 90.00; 0.940
- 11) 120.00; 0.798
- 12) 180.00; 0.647
- 13) 360.00; 0.452
- 14) 1440.00; 0.187

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13200.00 TO NODE 13201.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 298.57  
ELEVATION DATA: UPSTREAM(FEET) = 1069.04 DOWNSTREAM(FEET) = 1005.76

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.410  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.440  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.67	0.30	1.000	0	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 1.89  
TOTAL AREA(ACRES) = 0.67 PEAK FLOW RATE(CFS) = 1.89

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13201.00 TO NODE 13202.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1005.76 DOWNSTREAM(FEET) = 896.98  
CHANNEL LENGTH THRU SUBAREA(FEET) = 747.55 CHANNEL SLOPE = 0.1455  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.29  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.892  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.64  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.74  
AVERAGE FLOW DEPTH(FEET) = 0.27 TRAVEL TIME(MIN.) = 3.33  
Tc(MIN.) = 12.74  
SUBAREA AREA(ACRES) = 7.42 SUBAREA RUNOFF(CFS) = 17.31  
EFFECTIVE AREA(ACRES) = 8.09 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 8.1 PEAK FLOW RATE(CFS) = 18.87  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.38

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.38 FLOW VELOCITY(FEET/SEC.) = 4.66  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13202.00 = 1046.12 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 896.98 DOWNSTREAM(FEET) = 840.27  
FLOW LENGTH(FEET) = 1789.59 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 10.0 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.83  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 18.87  
PIPE TRAVEL TIME(MIN.) = 2.52 Tc(MIN.) = 15.26  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13203.00 = 2835.71 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13202.00 TO NODE 13203.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.26  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.570  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 38.89 0.30 0.731 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.731  
SUBAREA AREA(ACRES) = 38.89 SUBAREA RUNOFF(CFS) = 82.27  
EFFECTIVE AREA(ACRES) = 46.98 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78  
TOTAL AREA(ACRES) = 47.0 PEAK FLOW RATE(CFS) = 98.80

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 840.27 DOWNSTREAM(FEET) = 782.97  
FLOW LENGTH(FEET) = 992.54 MANNING'S N = 0.013  
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 36.000  
DEPTH OF FLOW IN 36.0 INCH PIPE IS 21.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.90  
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 98.80  
PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 15.98  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13204.00 = 3828.25 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13203.00 TO NODE 13204.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.98  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.514  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 83.09 0.30 0.645 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.645  
SUBAREA AREA(ACRES) = 83.09 SUBAREA RUNOFF(CFS) = 173.51  
EFFECTIVE AREA(ACRES) = 130.07 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 130.1 PEAK FLOW RATE(CFS) = 269.93

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 31

-----  
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<  
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 782.97 DOWNSTREAM(FEET) = 692.52  
FLOW LENGTH(FEET) = 2046.57 MANNING'S N = 0.013  
DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.1 INCHES  
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.93  
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1  
PIPE-FLOW(CFS) = 269.93  
PIPE TRAVEL TIME(MIN.) = 1.32 Tc(MIN.) = 17.30  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13205.00 = 5874.82 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13204.00 TO NODE 13205.00 IS CODE = 81

-----  
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.30  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.411  
SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 88.51 0.30 0.679 -  
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.679  
SUBAREA AREA(ACRES) = 88.51 SUBAREA RUNOFF(CFS) = 175.85  
EFFECTIVE AREA(ACRES) = 218.58 AREA-AVERAGED Fm(INCH/HR) = 0.21  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69  
TOTAL AREA(ACRES) = 218.6 PEAK FLOW RATE(CFS) = 433.79

\*\*\*\*\*

FLOW PROCESS FROM NODE 13205.00 TO NODE 13206.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 692.52 DOWNSTREAM(FEET) = 605.24  
CHANNEL LENGTH THRU SUBAREA(FEET) = 2704.69 CHANNEL SLOPE = 0.0323  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.23  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.129

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	163.73	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 571.91  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.07  
AVERAGE FLOW DEPTH(FEET) = 3.16 TRAVEL TIME(MIN.) = 4.07  
Tc(MIN.) = 21.37  
SUBAREA AREA(ACRES) = 163.73 SUBAREA RUNOFF(CFS) = 275.87  
EFFECTIVE AREA(ACRES) = 382.31 AREA-AVERAGED Fm(INCH/HR) = 0.23  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.76  
TOTAL AREA(ACRES) = 382.3 PEAK FLOW RATE(CFS) = 654.22  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.39

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 3.39 FLOW VELOCITY(FEET/SEC.) = 11.50  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13206.00 = 8579.51 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13206.00 TO NODE 13207.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 761.07  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.08  
AVERAGE FLOW DEPTH(FEET) = 4.13 TRAVEL TIME(MIN.) = 4.10  
Tc(MIN.) = 25.47  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 213.59  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 796.14  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.22

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	143.41	0.30	0.888	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.888  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 761.07  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.08  
AVERAGE FLOW DEPTH(FEET) = 4.13 TRAVEL TIME(MIN.) = 4.10  
Tc(MIN.) = 25.47  
SUBAREA AREA(ACRES) = 143.41 SUBAREA RUNOFF(CFS) = 213.59  
EFFECTIVE AREA(ACRES) = 525.72 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80  
TOTAL AREA(ACRES) = 525.7 PEAK FLOW RATE(CFS) = 796.14  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 4.22 FLOW VELOCITY(FEET/SEC.) = 10.22  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13207.00 = 11058.66 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 883.29  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.96  
AVERAGE FLOW DEPTH(FEET) = 4.07 TRAVEL TIME(MIN.) = 2.42  
Tc(MIN.) = 27.89  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 174.28  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 924.71  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.17

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	123.56	0.30	0.858	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.858  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 883.29  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.96  
AVERAGE FLOW DEPTH(FEET) = 4.07 TRAVEL TIME(MIN.) = 2.42  
Tc(MIN.) = 27.89  
SUBAREA AREA(ACRES) = 123.56 SUBAREA RUNOFF(CFS) = 174.28  
EFFECTIVE AREA(ACRES) = 649.28 AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81  
TOTAL AREA(ACRES) = 649.3 PEAK FLOW RATE(CFS) = 924.71  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.040  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
DEPTH(FEET) = 4.17 FLOW VELOCITY(FEET/SEC.) = 12.10  
LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13207.00 TO NODE 13220.00 IS CODE = 1

-----  
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
TIME OF CONCENTRATION(MIN.) = 27.89  
RAINFALL INTENSITY(INCH/HR) = 1.82  
AREA-AVERAGED Fm(INCH/HR) = 0.24  
AREA-AVERAGED Fp(INCH/HR) = 0.30  
AREA-AVERAGED Ap = 0.81  
EFFECTIVE STREAM AREA(ACRES) = 649.28  
TOTAL STREAM AREA(ACRES) = 649.28  
PEAK FLOW RATE(CFS) AT CONFLUENCE = 924.71

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13210.00 TO NODE 13211.00 IS CODE = 21

-----  
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.51  
ELEVATION DATA: UPSTREAM(FEET) = 949.80 DOWNSTREAM(FEET) = 828.64

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.525  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.713  
SUBAREA Tc AND LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
NATURAL FAIR COVER  
"OPEN BRUSH" - 1.96 0.30 1.000 0 8.53  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 6.02  
TOTAL AREA(ACRES) = 1.96 PEAK FLOW RATE(CFS) = 6.02

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13211.00 TO NODE 13212.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 828.64 DOWNSTREAM(FEET) = 767.94  
CHANNEL LENGTH THRU SUBAREA(FEET) = 652.49 CHANNEL SLOPE = 0.0930  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.50

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.111

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.95	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.22

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.22

AVERAGE FLOW DEPTH(FEET) = 0.46 TRAVEL TIME(MIN.) = 2.58

Tc(MIN.) = 11.10

SUBAREA AREA(ACRES) = 11.95 SUBAREA RUNOFF(CFS) = 30.23

EFFECTIVE AREA(ACRES) = 13.91 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 13.9 PEAK FLOW RATE(CFS) = 35.19

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 5.04

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13212.00 = 967.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13212.00 TO NODE 13213.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 767.94 DOWNSTREAM(FEET) = 706.43  
CHANNEL LENGTH THRU SUBAREA(FEET) = 967.91 CHANNEL SLOPE = 0.0635  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.03

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.717

SUBAREA LOSS RATE DATA(AMC II):  
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
USER-DEFINED - 27.07 0.30 1.000 -  
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 64.75  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.48  
AVERAGE FLOW DEPTH(FEET) = 0.99 TRAVEL TIME(MIN.) = 2.94  
Tc(MIN.) = 14.05  
SUBAREA AREA(ACRES) = 27.07 SUBAREA RUNOFF(CFS) = 58.90  
EFFECTIVE AREA(ACRES) = 40.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 41.0 PEAK FLOW RATE(CFS) = 89.16  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.19 FLOW VELOCITY(FEET/SEC.) = 6.07

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13213.00 = 1934.91 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13213.00 TO NODE 13214.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 706.43 DOWNSTREAM(FEET) = 659.31  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.11 CHANNEL SLOPE = 0.0497  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.42

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.456

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	18.09	0.30	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 106.73

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.91

AVERAGE FLOW DEPTH(FEET) = 1.41 TRAVEL TIME(MIN.) = 2.67

Tc(MIN.) = 16.72

SUBAREA AREA(ACRES) = 18.09 SUBAREA RUNOFF(CFS) = 35.11

EFFECTIVE AREA(ACRES) = 59.07 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 59.1 PEAK FLOW RATE(CFS) = 114.64

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.47 FLOW VELOCITY(FEET/SEC.) = 6.04

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13214.00 = 2883.02 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13214.00 TO NODE 13215.00 IS CODE = 56



-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 659.31 DOWNSTREAM(FEET) = 628.91  
CHANNEL LENGTH THRU SUBAREA(FEET) = 970.24 CHANNEL SLOPE = 0.0313  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.16

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.242

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	71.42	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 177.12

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.87

AVERAGE FLOW DEPTH(FEET) = 2.12 TRAVEL TIME(MIN.) = 2.75

Tc(MIN.) = 19.47

SUBAREA AREA(ACRES) = 71.42 SUBAREA RUNOFF(CFS) = 124.83

EFFECTIVE AREA(ACRES) = 130.49 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 130.5 PEAK FLOW RATE(CFS) = 228.07

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.43 FLOW VELOCITY(FEET/SEC.) = 6.32

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13215.00 = 3853.26 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13215.00 TO NODE 13216.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 628.91 DOWNSTREAM(FEET) = 598.39  
CHANNEL LENGTH THRU SUBAREA(FEET) = 922.63 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.57

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.108

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	36.33	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 257.64

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.68

AVERAGE FLOW DEPTH(FEET) = 2.55 TRAVEL TIME(MIN.) = 2.30

Tc(MIN.) = 21.78

SUBAREA AREA(ACRES) = 36.33 SUBAREA RUNOFF(CFS) = 59.13

EFFECTIVE AREA(ACRES) = 166.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 166.8 PEAK FLOW RATE(CFS) = 271.50

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.63 FLOW VELOCITY(FEET/SEC.) = 6.77

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13216.00 = 4775.89 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13216.00 TO NODE 13217.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 598.39 DOWNSTREAM(FEET) = 568.48  
CHANNEL LENGTH THRU SUBAREA(FEET) = 636.40 CHANNEL SLOPE = 0.0470  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.55

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.038

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	42.51	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 304.76

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.93

AVERAGE FLOW DEPTH(FEET) = 2.55 TRAVEL TIME(MIN.) = 1.34

Tc(MIN.) = 23.11

SUBAREA AREA(ACRES) = 42.51 SUBAREA RUNOFF(CFS) = 66.51

EFFECTIVE AREA(ACRES) = 209.33 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 209.3 PEAK FLOW RATE(CFS) = 327.53

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.64 FLOW VELOCITY(FEET/SEC.) = 8.10

LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13217.00 = 5412.29 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 56

-----  
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 568.48 DOWNSTREAM(FEET) = 505.65  
CHANNEL LENGTH THRU SUBAREA(FEET) = 1896.50 CHANNEL SLOPE = 0.0331  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.16

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.846

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	73.24	0.30	0.951	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.951  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 378.98  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 7.44  
 AVERAGE FLOW DEPTH( FEET) = 3.13 TRAVEL TIME( MIN.) = 4.25  
 Tc( MIN.) = 27.36  
 SUBAREA AREA( ACRES) = 73.24 SUBAREA RUNOFF( CFS) = 102.85  
 EFFECTIVE AREA( ACRES) = 282.57 AREA-AVERAGED Fm( INCH/HR) = 0.30  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99  
 TOTAL AREA( ACRES) = 282.6 PEAK FLOW RATE( CFS) = 394.05  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 3.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 3.19 FLOW VELOCITY( FEET/SEC.) = 7.53  
 LONGEST FLOWPATH FROM NODE 13210.00 TO NODE 13220.00 = 7308.79 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13217.00 TO NODE 13220.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION( MIN.) = 27.36  
 RAINFALL INTENSITY( INCH/HR) = 1.85  
 AREA-AVERAGED Fm( INCH/HR) = 0.30  
 AREA-AVERAGED Fp( INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.99  
 EFFECTIVE STREAM AREA( ACRES) = 282.57  
 TOTAL STREAM AREA( ACRES) = 282.57  
 PEAK FLOW RATE( CFS) AT CONFLUENCE = 394.05

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	924.71	27.89	1.825	0.30( 0.24)	0.81	649.3	13200.00
2	394.05	27.36	1.846	0.30( 0.30)	0.99	282.6	13210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1313.36	27.36	1.846	0.30( 0.26)	0.86	919.6	13210.00
2	1313.40	27.89	1.825	0.30( 0.26)	0.86	931.8	13200.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE( CFS) = 1313.40 Tc( MIN.) = 27.89  
 EFFECTIVE AREA( ACRES) = 931.85 AREA-AVERAGED Fm( INCH/HR) = 0.26  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86  
 TOTAL AREA( ACRES) = 931.8  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13220.00 = 12793.21 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13220.00 TO NODE 13221.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM( FEET) = 505.65 DOWNSTREAM( FEET) = 478.94  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 1949.14 CHANNEL SLOPE = 0.0137  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 5.31  
 \* 100 YEAR RAINFALL INTENSITY( INCH/HR) = 1.729

SUBAREA LOSS RATE DATA( AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	108.50	0.30	0.637	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp( INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.637  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW( CFS) = 1388.48  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 12.70  
 AVERAGE FLOW DEPTH( FEET) = 5.31 TRAVEL TIME( MIN.) = 2.56  
 Tc( MIN.) = 30.44

SUBAREA AREA( ACRES) = 108.50 SUBAREA RUNOFF( CFS) = 150.16  
 EFFECTIVE AREA( ACRES) = 1040.35 AREA-AVERAGED Fm( INCH/HR) = 0.25  
 AREA-AVERAGED Fp( INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.84  
 TOTAL AREA( ACRES) = 1040.3 PEAK FLOW RATE( CFS) = 1383.25  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 5.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 5.29 FLOW VELOCITY( FEET/SEC.) = 12.70  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13221.00 = 14742.35 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1380.36	29.92	1.743	0.30( 0.25)	0.84	1028.1	13210.00
2	1383.25	30.44	1.729	0.30( 0.25)	0.84	1040.3	13200.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE( CFS) = 1383.25 Tc( MIN.) = 30.44  
 AREA-AVERAGED Fm( INCH/HR) = 0.25 AREA-AVERAGED Fp( INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.84 EFFECTIVE AREA( ACRES) = 1040.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13221.00 TO NODE 13222.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM( FEET) = 478.94 DOWNSTREAM( FEET) = 427.51  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 2078.70 CHANNEL SLOPE = 0.0247  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 4.67  
 \* 100 YEAR RAINFALL INTENSITY( INCH/HR) = 1.674

SUBAREA LOSS RATE DATA( AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED - 87.26 0.30 0.699 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.699  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 1440.74  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 15.94  
 AVERAGE FLOW DEPTH (FEET) = 4.67 TRAVEL TIME (MIN.) = 2.17  
 Tc (MIN.) = 32.62  
 SUBAREA AREA (ACRES) = 87.26 SUBAREA RUNOFF (CFS) = 114.98  
 EFFECTIVE AREA (ACRES) = 1127.61 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83  
 TOTAL AREA (ACRES) = 1127.6 PEAK FLOW RATE (CFS) = 1446.69  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.030  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 4.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 4.68 FLOW VELOCITY (FEET/SEC.) = 15.96  
 LONGEST FLOWPATH FROM NODE 13200.00 TO NODE 13222.00 = 16821.05 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1444.32	32.09	1.687	0.30 (0.25)	0.83	1115.4	13210.00
2	1446.69	32.62	1.674	0.30 (0.25)	0.83	1127.6	13200.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 1446.69 Tc (MIN.) = 32.62  
 AREA-AVERAGED Fm (INCH/HR) = 0.25 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.83 EFFECTIVE AREA (ACRES) = 1127.61

=====  
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1127.6 TC (MIN.) = 32.62  
 EFFECTIVE AREA (ACRES) = 1127.61 AREA-AVERAGED Fm (INCH/HR) = 0.25  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.828  
 PEAK FLOW RATE (CFS) = 1446.69

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1444.32	32.09	1.687	0.30 (0.25)	0.83	1115.4	13210.00
2	1446.69	32.62	1.674	0.30 (0.25)	0.83	1127.6	13200.00

=====  
 END OF RATIONAL METHOD ANALYSIS

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* San Juan Creek Watershed Study - Single Area Model \*  
\* San Juan Creek - Regional Watershed S35 \*  
\* Rational Method Hydrology Analysis - 100-Year Expected Value \*  
\*\*\*\*\*

FILE NAME: S35.DAT  
TIME/DATE OF STUDY: 15:41 04/15/2013

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00  
SPECIFIED MINIMUM PIPE SIZE(INCH) = 36.00  
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

\*USER-DEFINED TABLED RAINFALL USED\*  
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.800
- 2) 10.00; 3.258
- 3) 15.00; 2.590
- 4) 20.00; 2.201
- 5) 25.00; 1.940
- 6) 30.00; 1.740
- 7) 40.00; 1.487
- 8) 50.00; 1.310
- 9) 60.00; 1.150
- 10) 90.00; 0.940
- 11) 120.00; 0.798
- 12) 180.00; 0.647
- 13) 360.00; 0.452
- 14) 1440.00; 0.187

\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:  
1. Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)

2. (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)  
\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN  
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.00 TO NODE 13500.50 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 548.43  
ELEVATION DATA: UPSTREAM(FEET) = 1183.47 DOWNSTREAM(FEET) = 1065.00

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 11.955  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.997  
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	5.11	0.30	1.000	0	11.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
SUBAREA RUNOFF(CFS) = 12.40  
TOTAL AREA(ACRES) = 5.11 PEAK FLOW RATE(CFS) = 12.40

\*\*\*\*\*  
FLOW PROCESS FROM NODE 13500.50 TO NODE 13501.00 IS CODE = 56  
-----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 1065.00 DOWNSTREAM(FEET) = 1033.15  
CHANNEL LENGTH THRU SUBAREA(FEET) = 431.71 CHANNEL SLOPE = 0.0738  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.52  
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.756  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.87	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.22  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.98  
AVERAGE FLOW DEPTH(FEET) = 0.51 TRAVEL TIME(MIN.) = 1.81  
Tc(MIN.) = 13.76  
SUBAREA AREA(ACRES) = 8.87 SUBAREA RUNOFF(CFS) = 19.60  
EFFECTIVE AREA(ACRES) = 13.98 AREA-AVERAGED Fm(INCH/HR) = 0.30  
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 30.90  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0  
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 4.47  
LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13501.00 = 980.14 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13501.00 TO NODE 13502.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 1033.15 DOWNSTREAM(FEET) = 990.26  
CHANNEL LENGTH THRU SUBAREA(FEET) = 948.63 CHANNEL SLOPE = 0.0452  
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 0.93

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.406

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	16.82	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 46.88

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.39

AVERAGE FLOW DEPTH(FEET) = 0.91 TRAVEL TIME(MIN.) = 3.60

Tc(MIN.) = 17.37

SUBAREA AREA(ACRES) = 16.82 SUBAREA RUNOFF(CFS) = 31.88

EFFECTIVE AREA(ACRES) = 30.80 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 30.8 PEAK FLOW RATE(CFS) = 58.38

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.03

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.03 FLOW VELOCITY(FEET/SEC.) = 4.72

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13502.00 = 1928.77 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13502.00 TO NODE 13503.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.26 DOWNSTREAM(FEET) = 956.06

CHANNEL LENGTH THRU SUBAREA(FEET) = 940.98 CHANNEL SLOPE = 0.0363

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.50

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.180

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	46.02	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 97.35

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.16

AVERAGE FLOW DEPTH(FEET) = 1.46 TRAVEL TIME(MIN.) = 3.04

Tc(MIN.) = 20.41

SUBAREA AREA(ACRES) = 46.02 SUBAREA RUNOFF(CFS) = 77.86

EFFECTIVE AREA(ACRES) = 76.82 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 76.8 PEAK FLOW RATE(CFS) = 129.97

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.71 FLOW VELOCITY(FEET/SEC.) = 5.65

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13503.00 = 2869.75 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13503.00 TO NODE 13504.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 956.06 DOWNSTREAM(FEET) = 889.48

CHANNEL LENGTH THRU SUBAREA(FEET) = 2131.31 CHANNEL SLOPE = 0.0312

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.13

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.879

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	58.46	0.30	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 171.61

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.81

AVERAGE FLOW DEPTH(FEET) = 2.09 TRAVEL TIME(MIN.) = 6.12

Tc(MIN.) = 26.52

SUBAREA AREA(ACRES) = 58.46 SUBAREA RUNOFF(CFS) = 83.08

EFFECTIVE AREA(ACRES) = 135.28 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 135.3 PEAK FLOW RATE(CFS) = 192.25

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.22 FLOW VELOCITY(FEET/SEC.) = 6.01

LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13504.00 = 5001.06 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13504.00 TO NODE 13505.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 889.48 DOWNSTREAM(FEET) = 848.10

CHANNEL LENGTH THRU SUBAREA(FEET) = 1661.97 CHANNEL SLOPE = 0.0249

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.58

\* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.707  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	49.30	0.30	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 223.48  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.79  
 AVERAGE FLOW DEPTH (FEET) = 2.55 TRAVEL TIME (MIN.) = 4.78  
 Tc (MIN.) = 31.30  
 SUBAREA AREA (ACRES) = 49.30 SUBAREA RUNOFF (CFS) = 62.43  
 EFFECTIVE AREA (ACRES) = 184.58 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 184.6 PEAK FLOW RATE (CFS) = 233.74  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.62  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.62 FLOW VELOCITY (FEET/SEC.) = 5.85  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.00 = 6663.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13505.00 TO NODE 13505.50 IS CODE = 56

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 848.10 DOWNSTREAM (FEET) = 811.10  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1234.61 CHANNEL SLOPE = 0.0300  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.63  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.626  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.35	0.30	0.811	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.811  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 258.23  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.44  
 AVERAGE FLOW DEPTH (FEET) = 2.63 TRAVEL TIME (MIN.) = 3.19  
 Tc (MIN.) = 34.50  
 SUBAREA AREA (ACRES) = 39.35 SUBAREA RUNOFF (CFS) = 48.97  
 EFFECTIVE AREA (ACRES) = 223.93 AREA-AVERAGED Fm (INCH/HR) = 0.29  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97  
 TOTAL AREA (ACRES) = 223.9 PEAK FLOW RATE (CFS) = 269.28  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 2.69  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 2.69 FLOW VELOCITY (FEET/SEC.) = 6.51  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13505.50 = 7897.64 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13505.50 TO NODE 13506.00 IS CODE = 56

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 811.10 DOWNSTREAM (FEET) = 781.00  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1415.98 CHANNEL SLOPE = 0.0213  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.12  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.526  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	54.33	0.30	0.738	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.738  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 301.17  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.95  
 AVERAGE FLOW DEPTH (FEET) = 3.12 TRAVEL TIME (MIN.) = 3.97  
 Tc (MIN.) = 38.46  
 SUBAREA AREA (ACRES) = 54.33 SUBAREA RUNOFF (CFS) = 63.78  
 EFFECTIVE AREA (ACRES) = 278.26 AREA-AVERAGED Fm (INCH/HR) = 0.28  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.92  
 TOTAL AREA (ACRES) = 278.3 PEAK FLOW RATE (CFS) = 312.81  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.18  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.18 FLOW VELOCITY (FEET/SEC.) = 6.02  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.00 = 9313.62 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13506.50 IS CODE = 56

-----  
 >>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 -----  
 ELEVATION DATA: UPSTREAM (FEET) = 781.00 DOWNSTREAM (FEET) = 743.17  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1542.62 CHANNEL SLOPE = 0.0245  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.24  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.444  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	61.33	0.30	0.783	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.783  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 346.19  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.51  
 AVERAGE FLOW DEPTH (FEET) = 3.23 TRAVEL TIME (MIN.) = 3.95  
 Tc (MIN.) = 42.41  
 SUBAREA AREA (ACRES) = 61.33 SUBAREA RUNOFF (CFS) = 66.75  
 EFFECTIVE AREA (ACRES) = 339.59 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90

TOTAL AREA (ACRES) = 339.6 PEAK FLOW RATE (CFS) = 359.16  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.29  
  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.29 FLOW VELOCITY (FEET/SEC.) = 6.58  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13506.50 = 10856.24 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.50 TO NODE 13520.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 743.17 DOWNSTREAM (FEET) = 717.04  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1370.93 CHANNEL SLOPE = 0.0191  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.62  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 1.378  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	39.86	0.30	0.848	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.848  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 379.32  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.09  
 AVERAGE FLOW DEPTH (FEET) = 3.61 TRAVEL TIME (MIN.) = 3.75  
 Tc (MIN.) = 46.16  
 SUBAREA AREA (ACRES) = 39.86 SUBAREA RUNOFF (CFS) = 40.31  
 EFFECTIVE AREA (ACRES) = 379.45 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.89  
 TOTAL AREA (ACRES) = 379.5 PEAK FLOW RATE (CFS) = 379.26  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 3.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 3.61 FLOW VELOCITY (FEET/SEC.) = 6.09  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13506.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:  
 TIME OF CONCENTRATION (MIN.) = 46.16  
 RAINFALL INTENSITY (INCH/HR) = 1.38  
 AREA-AVERAGED Fm (INCH/HR) = 0.27  
 AREA-AVERAGED Fp (INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.89  
 EFFECTIVE STREAM AREA (ACRES) = 379.45  
 TOTAL STREAM AREA (ACRES) = 379.45  
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 379.26

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13510.00 TO NODE 13511.00 IS CODE = 21  
 -----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 903.68  
 ELEVATION DATA: UPSTREAM (FEET) = 1216.90 DOWNSTREAM (FEET) = 1022.78

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 14.615  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.642  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "GRASS"	-	6.66	0.30	1.000	0	14.62

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 SUBAREA RUNOFF (CFS) = 14.04  
 TOTAL AREA (ACRES) = 6.66 PEAK FLOW RATE (CFS) = 14.04

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13511.00 TO NODE 13512.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 1022.78 DOWNSTREAM (FEET) = 954.27  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1027.63 CHANNEL SLOPE = 0.0667  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.74  
 \* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.332  
 SUBAREA LOSS RATE DATA (AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	25.40	0.30	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30  
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 37.36  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.63  
 AVERAGE FLOW DEPTH (FEET) = 0.71 TRAVEL TIME (MIN.) = 3.70  
 Tc (MIN.) = 18.31  
 SUBAREA AREA (ACRES) = 25.40 SUBAREA RUNOFF (CFS) = 46.46  
 EFFECTIVE AREA (ACRES) = 32.06 AREA-AVERAGED Fm (INCH/HR) = 0.30  
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA (ACRES) = 32.1 PEAK FLOW RATE (CFS) = 58.64  
 GIVEN CHANNEL BASE (FEET) = 10.00 CHANNEL FREEBOARD (FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT (FEET) = 0.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH (FEET) = 0.92 FLOW VELOCITY (FEET/SEC.) = 5.38  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13512.00 = 1931.31 FEET.

\*\*\*\*\*

FLOW PROCESS FROM NODE 13512.00 TO NODE 13513.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 954.27 DOWNSTREAM(FEET) = 872.45
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.42 CHANNEL SLOPE = 0.0425
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 1.72
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.007

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 90.23 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 128.25

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.93

AVERAGE FLOW DEPTH(FEET) = 1.63 TRAVEL TIME(MIN.) = 5.41

Tc(MIN.) = 23.72

SUBAREA AREA(ACRES) = 90.23 SUBAREA RUNOFF(CFS) = 138.59

EFFECTIVE AREA(ACRES) = 122.29 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 122.3 PEAK FLOW RATE(CFS) = 187.83

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.01

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 2.01 FLOW VELOCITY(FEET/SEC.) = 6.66

LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13513.00 = 3857.73 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13513.00 TO NODE 13514.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 872.45 DOWNSTREAM(FEET) = 813.12
CHANNEL LENGTH THRU SUBAREA(FEET) = 1895.66 CHANNEL SLOPE = 0.0313
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 2.77
\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.802

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 135.65 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 279.68

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.69

AVERAGE FLOW DEPTH(FEET) = 2.71 TRAVEL TIME(MIN.) = 4.72

Tc(MIN.) = 28.45

SUBAREA AREA(ACRES) = 135.65 SUBAREA RUNOFF(CFS) = 183.39

EFFECTIVE AREA(ACRES) = 257.94 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 257.9 PEAK FLOW RATE(CFS) = 348.72
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060
\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.04 FLOW VELOCITY(FEET/SEC.) = 7.13

LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13514.00 = 5753.39 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13514.00 TO NODE 13515.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 813.12 DOWNSTREAM(FEET) = 773.74
CHANNEL LENGTH THRU SUBAREA(FEET) = 1926.15 CHANNEL SLOPE = 0.0204
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.75

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.652

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 109.30 0.30 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 415.27

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.40

AVERAGE FLOW DEPTH(FEET) = 3.72 TRAVEL TIME(MIN.) = 5.01

Tc(MIN.) = 33.46

SUBAREA AREA(ACRES) = 109.30 SUBAREA RUNOFF(CFS) = 133.04

EFFECTIVE AREA(ACRES) = 367.24 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 367.2 PEAK FLOW RATE(CFS) = 447.01

GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0

"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 3.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 3.86 FLOW VELOCITY(FEET/SEC.) = 6.54

LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13515.00 = 7679.54 FEET.

\*\*\*\*\*
FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 773.74 DOWNSTREAM(FEET) = 717.04
CHANNEL LENGTH THRU SUBAREA(FEET) = 2279.49 CHANNEL SLOPE = 0.0249
GIVEN CHANNEL BASE(FEET) = 10.00 CHANNEL FREEBOARD(FEET) = 0.0
"Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060

\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.22

\* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.524

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN



USER-DEFINED - 231.44 0.30 1.000 -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 574.62  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 7.52  
 AVERAGE FLOW DEPTH( FEET) = 4.17 TRAVEL TIME(MIN.) = 5.05  
 Tc(MIN.) = 38.51  
 SUBAREA AREA(ACRES) = 231.44 SUBAREA RUNOFF(CFS) = 255.05  
 EFFECTIVE AREA(ACRES) = 598.68 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00  
 TOTAL AREA(ACRES) = 598.7 PEAK FLOW RATE(CFS) = 659.77  
 GIVEN CHANNEL BASE( FEET) = 10.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 2.000 MANNING'S FACTOR = 0.060  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 4.47

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 4.47 FLOW VELOCITY( FEET/SEC.) = 7.80  
 LONGEST FLOWPATH FROM NODE 13510.00 TO NODE 13520.00 = 9959.03 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13515.00 TO NODE 13520.00 IS CODE = 1  
 -----

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<  
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<  
 =====

TOTAL NUMBER OF STREAMS = 2  
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:  
 TIME OF CONCENTRATION(MIN.) = 38.51  
 RAINFALL INTENSITY(INCH/HR) = 1.52  
 AREA-AVERAGED Fm(INCH/HR) = 0.30  
 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 1.00  
 EFFECTIVE STREAM AREA(ACRES) = 598.68  
 TOTAL STREAM AREA(ACRES) = 598.68  
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 659.77

\*\* CONFLUENCE DATA \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	379.26	46.16	1.378	0.30( 0.27)	0.89	379.5	13500.00
2	659.77	38.51	1.524	0.30( 0.30)	1.00	598.7	13510.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO  
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1017.88	38.51	1.524	0.30( 0.29)	0.96	915.3	13510.00
2	960.16	46.16	1.378	0.30( 0.29)	0.96	978.1	13500.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:  
 PEAK FLOW RATE(CFS) = 1017.88 Tc(MIN.) = 38.51  
 EFFECTIVE AREA(ACRES) = 915.25 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 978.1  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.00 = 12227.17 FEET.

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.00 TO NODE 13520.50 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM( FEET) = 717.04 DOWNSTREAM( FEET) = 700.00  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 2019.22 CHANNEL SLOPE = 0.0084  
 GIVEN CHANNEL BASE( FEET) = 30.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 3.86  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.428  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.965  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1116.96  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY( FEET/SEC.) = 7.00  
 AVERAGE FLOW DEPTH( FEET) = 3.84 TRAVEL TIME(MIN.) = 4.81  
 Tc(MIN.) = 43.32  
 SUBAREA AREA(ACRES) = 193.31 SUBAREA RUNOFF(CFS) = 198.12  
 EFFECTIVE AREA(ACRES) = 1108.56 AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 1171.4 PEAK FLOW RATE(CFS) = 1136.73  
 GIVEN CHANNEL BASE( FEET) = 30.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 3.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH( FEET) = 3.88 FLOW VELOCITY( FEET/SEC.) = 7.04  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13520.50 = 14246.39 FEET.

\*\* PEAK FLOW RATE TABLE \*\*

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1136.73	43.32	1.428	0.30( 0.29)	0.96	1108.6	13510.00
2	1060.17	51.07	1.293	0.30( 0.29)	0.96	1171.4	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1136.73 Tc(MIN.) = 43.32  
 AREA-AVERAGED Fm(INCH/HR) = 0.29 AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96 EFFECTIVE AREA(ACRES) = 1108.56

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13520.50 TO NODE 13521.00 IS CODE = 56  
 -----

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<  
 =====

ELEVATION DATA: UPSTREAM( FEET) = 700.00 DOWNSTREAM( FEET) = 661.95  
 CHANNEL LENGTH THRU SUBAREA( FEET) = 1622.36 CHANNEL SLOPE = 0.0235  
 GIVEN CHANNEL BASE( FEET) = 30.00 CHANNEL FREEBOARD( FEET) = 0.0  
 "Z" FACTOR = 3.000 MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT( FEET) = 3.02  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.381  
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	193.31	0.30	0.965	-

LAND USE            GROUP    (ACRES)    (INCH/HR)    (DECIMAL)    CN  
 USER-DEFINED       -        129.79      0.30        0.897       -  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.897  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1201.70  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.20  
 AVERAGE FLOW DEPTH(FEET) = 3.02    TRAVEL TIME(MIN.) = 2.65  
 Tc(MIN.) = 45.97  
 SUBAREA AREA(ACRES) = 129.79        SUBAREA RUNOFF(CFS) = 129.94  
 EFFECTIVE AREA(ACRES) = 1238.35    AREA-AVERAGED Fm(INCH/HR) = 0.29  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.96  
 TOTAL AREA(ACRES) = 1301.2        PEAK FLOW RATE(CFS) = 1220.02  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 3.04    FLOW VELOCITY(FEET/SEC.) = 10.25  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13521.00 = 15868.75 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1220.02	45.97	1.381	0.30( 0.29)	0.96	1238.4	13510.00
2	1128.89	53.78	1.250	0.30( 0.29)	0.95	1301.2	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1220.02    Tc(MIN.) = 45.97  
 AREA-AVERAGED Fm(INCH/HR) = 0.29    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.96    EFFECTIVE AREA(ACRES) = 1238.35

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 13521.00 TO NODE 13522.00 IS CODE = 56

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<  
 >>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 661.95    DOWNSTREAM(FEET) = 632.19  
 CHANNEL LENGTH THRU SUBAREA(FEET) = 2746.01    CHANNEL SLOPE = 0.0108  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040  
 \*ESTIMATED CHANNEL HEIGHT(FEET) = 3.99  
 \* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 1.284  
 SUBAREA LOSS RATE DATA(AMC II):  

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	278.60	0.30	0.905	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.905  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1347.00  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.09  
 AVERAGE FLOW DEPTH(FEET) = 3.97    TRAVEL TIME(MIN.) = 5.66  
 Tc(MIN.) = 51.63  
 SUBAREA AREA(ACRES) = 278.60        SUBAREA RUNOFF(CFS) = 253.95  
 EFFECTIVE AREA(ACRES) = 1516.95    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.95  
 TOTAL AREA(ACRES) = 1579.8        PEAK FLOW RATE(CFS) = 1365.67  
 GIVEN CHANNEL BASE(FEET) = 30.00    CHANNEL FREEBOARD(FEET) = 0.0  
 "Z" FACTOR = 3.000    MANNING'S FACTOR = 0.040

\*ESTIMATED CHANNEL HEIGHT(FEET) = 4.00  
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:  
 DEPTH(FEET) = 4.00    FLOW VELOCITY(FEET/SEC.) = 8.12  
 LONGEST FLOWPATH FROM NODE 13500.00 TO NODE 13522.00 = 18614.76 FEET.

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1365.67	51.63	1.284	0.30( 0.28)	0.95	1517.0	13510.00
2	1241.97	59.58	1.157	0.30( 0.28)	0.94	1579.8	13500.00

NEW PEAK FLOW DATA ARE:  
 PEAK FLOW RATE(CFS) = 1365.67    Tc(MIN.) = 51.63  
 AREA-AVERAGED Fm(INCH/HR) = 0.28    AREA-AVERAGED Fp(INCH/HR) = 0.30  
 AREA-AVERAGED Ap = 0.95    EFFECTIVE AREA(ACRES) = 1516.95

=====

END OF STUDY SUMMARY:  
 TOTAL AREA(ACRES) = 1579.8    TC(MIN.) = 51.63  
 EFFECTIVE AREA(ACRES) = 1516.95    AREA-AVERAGED Fm(INCH/HR) = 0.28  
 AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.947  
 PEAK FLOW RATE(CFS) = 1365.67

\*\* PEAK FLOW RATE TABLE \*\*  

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1365.67	51.63	1.284	0.30( 0.28)	0.95	1517.0	13510.00
2	1241.97	59.58	1.157	0.30( 0.28)	0.94	1579.8	13500.00

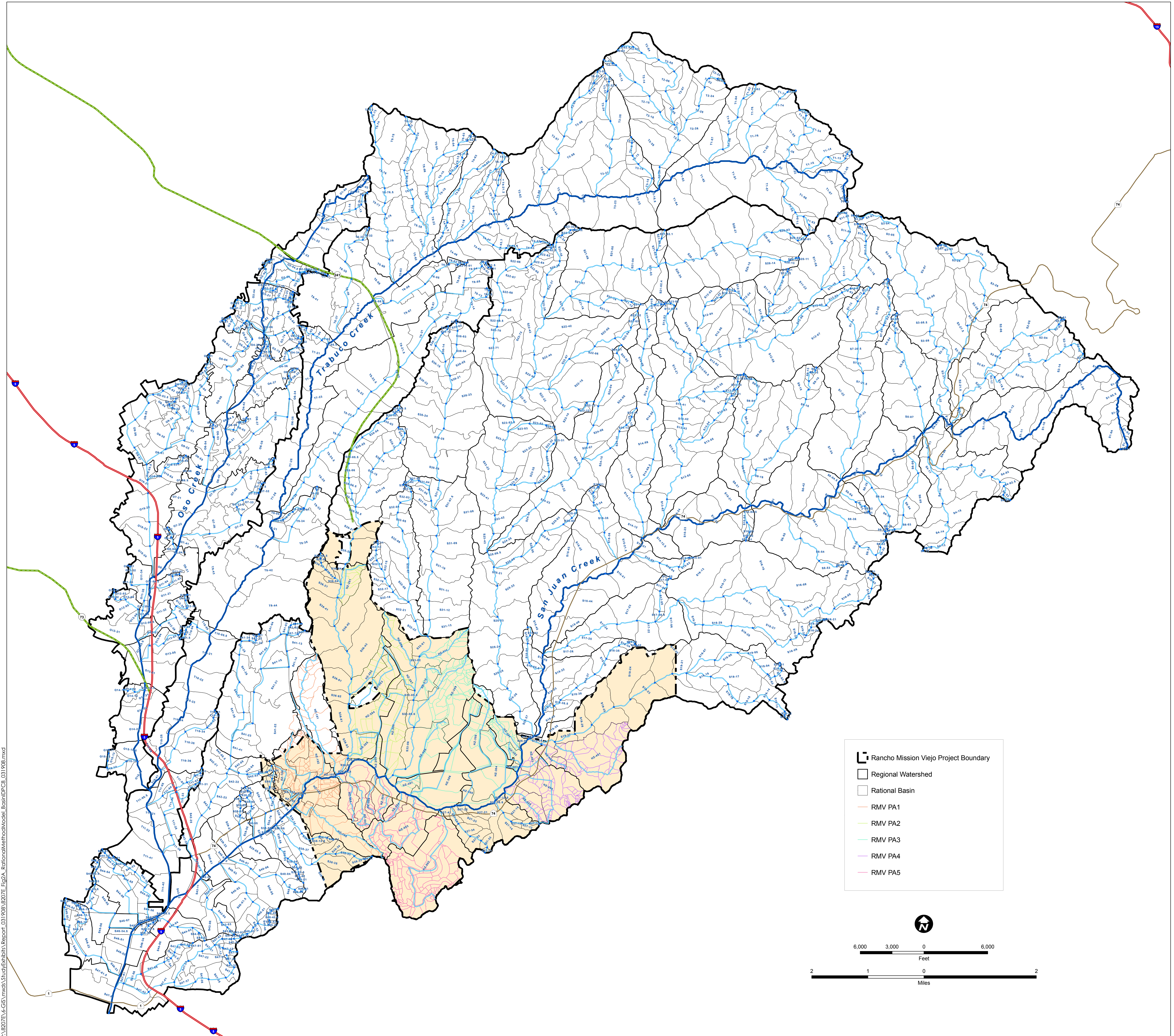
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END OF RATIONAL METHOD ANALYSIS





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- Rancho Mission Viejo Project Boundary
- Regional Watershed
- Rational Basin
- RMV PA1
- RMV PA2
- RMV PA3
- RMV PA4
- RMV PA5

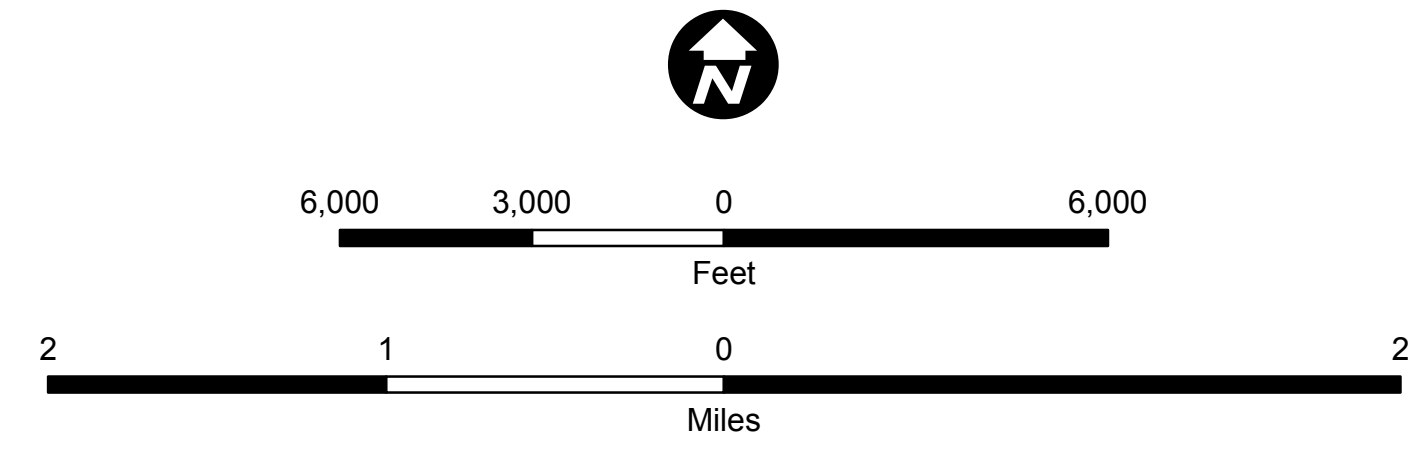
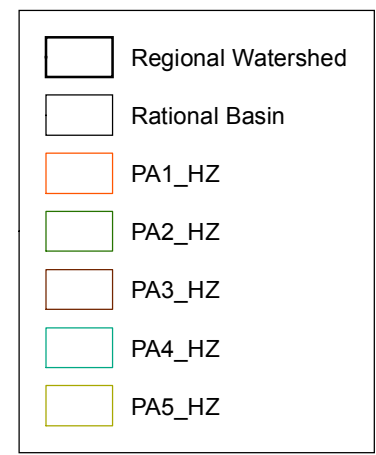
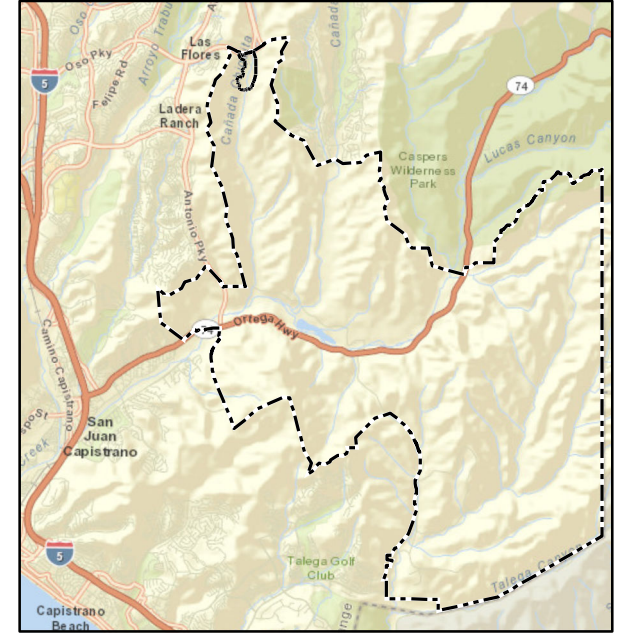
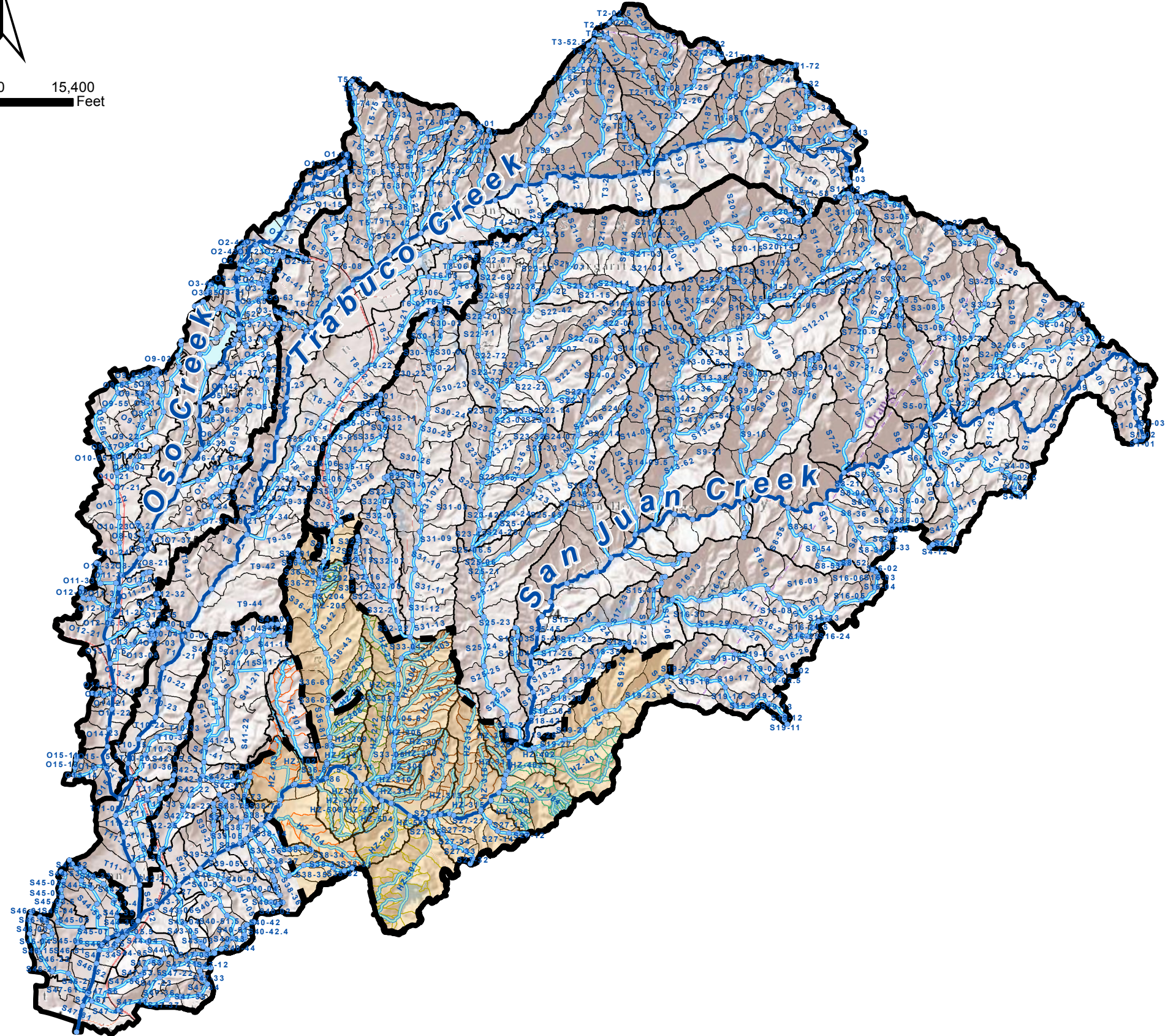
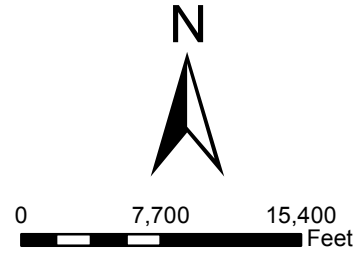


EXHIBIT	SAN JUAN CREEK - WATERSHED STUDY	TITLE	RATIONAL METHOD MODEL - BASIN ID
2A	ORANGE COUNTY	JOB NO.	CA
SCALE 1"=3000'	DESIGNED CD	JOB	
DRAWING CD	CHECKED CD	DATE	03/20/08
DATE	JOB NO.	JOB NO.	8827.E

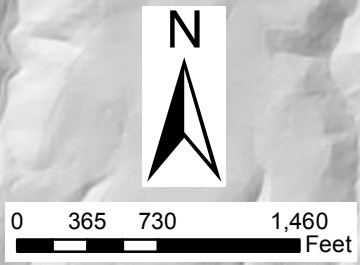
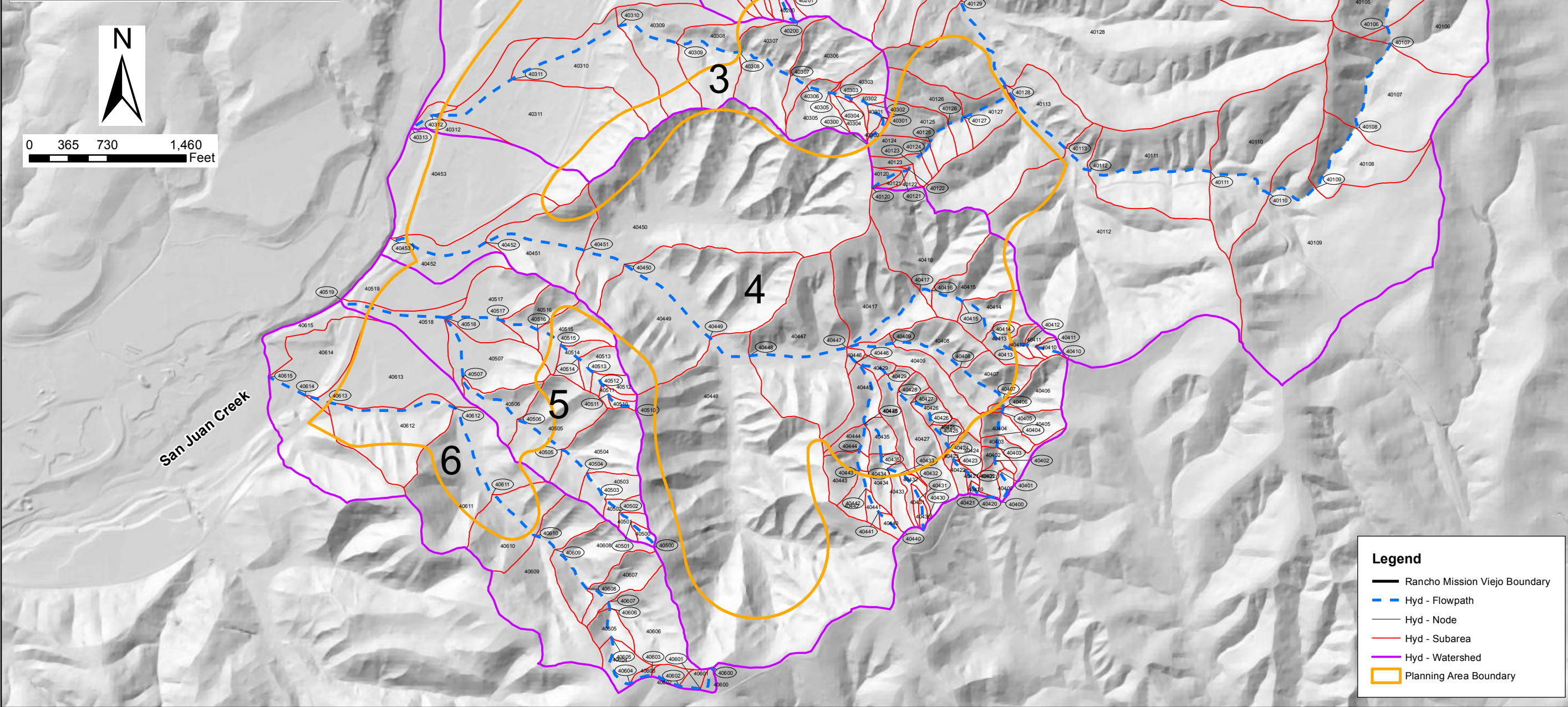
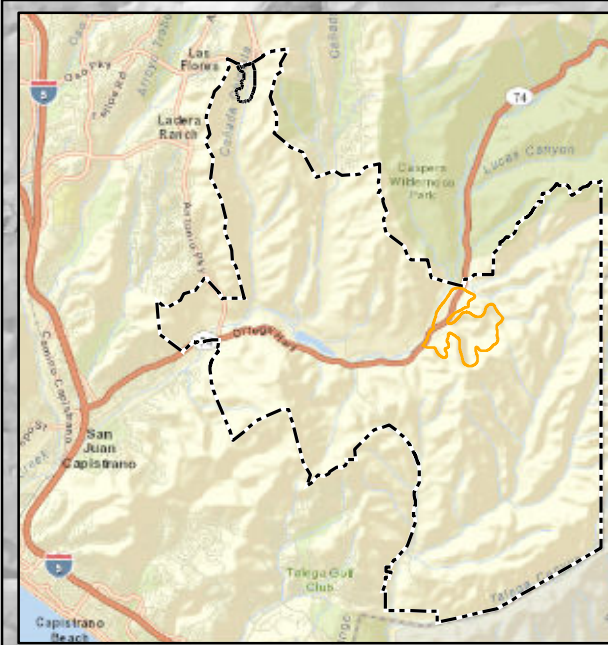






**Figure 9-9**  
EXISTING RATIONAL  
METHOD WATERSHED MODEL SUB AREA ID



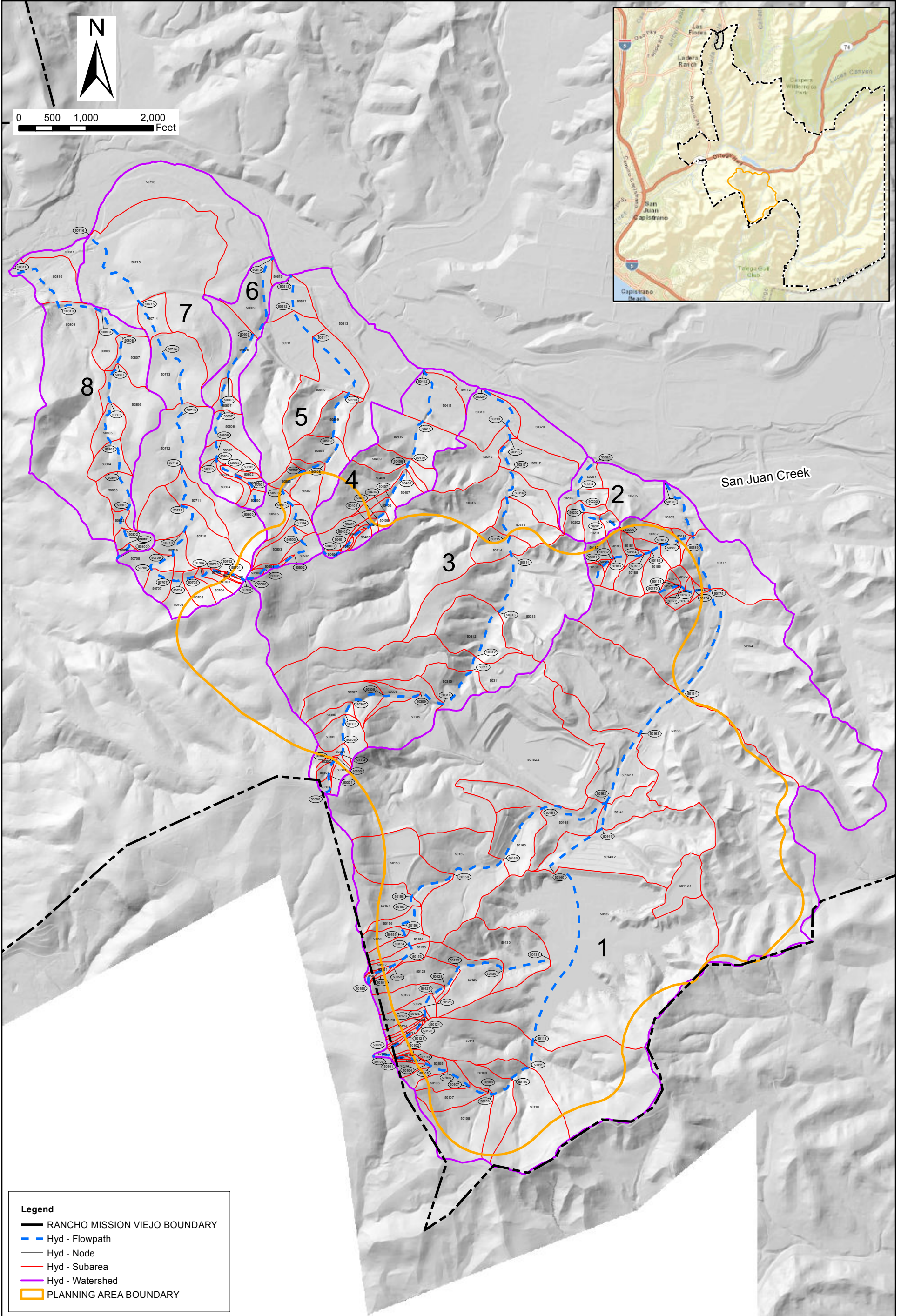


- Legend**
- Rancho Mission Viejo Boundary
  - Hyd - Flowpath
  - Hyd - Node
  - Hyd - Subarea
  - Hyd - Watershed
  - Planning Area Boundary

PA 4 Existing Topography

**Figure 10-3**





**Legend**

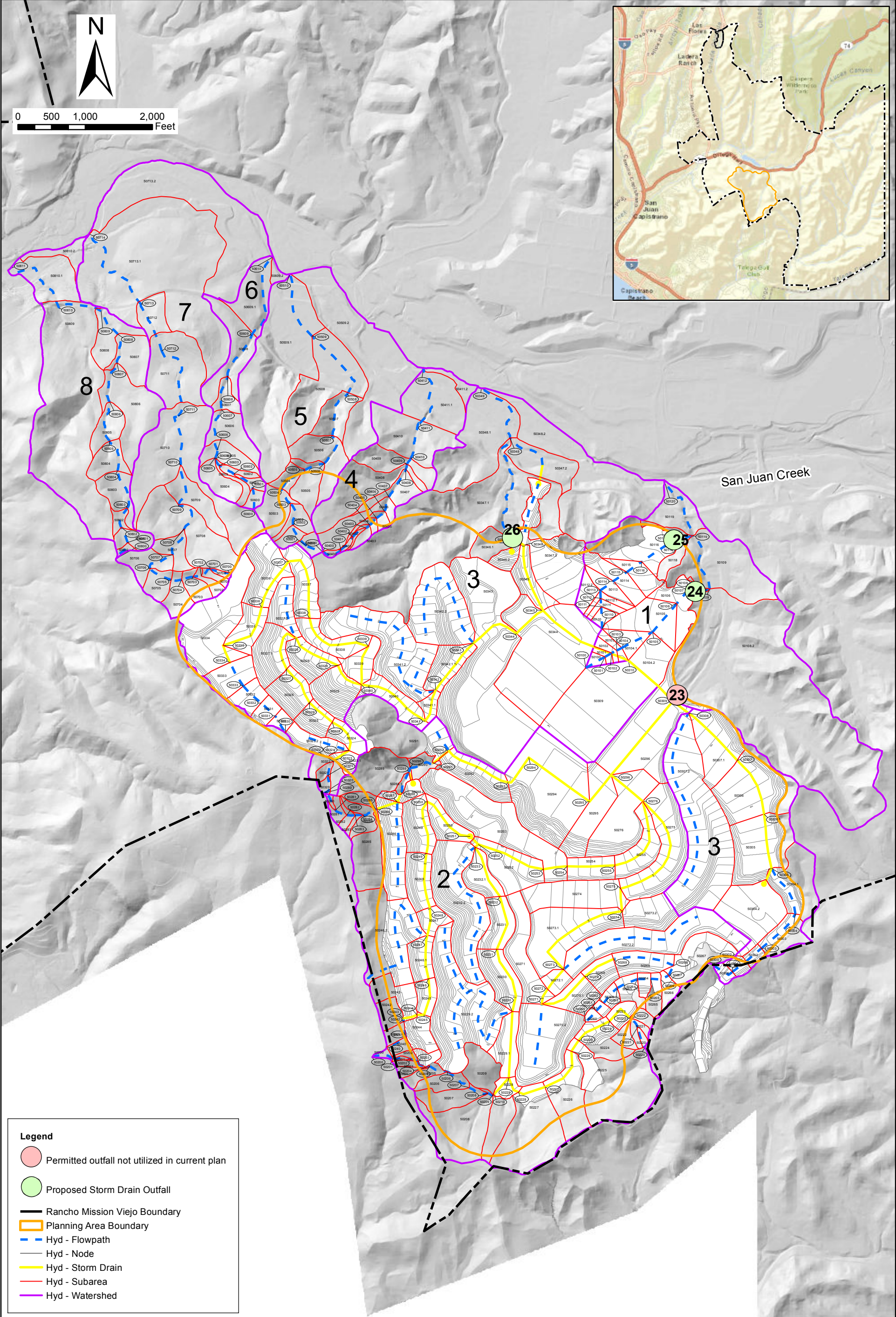
- RANCHO MISSION VIEJO BOUNDARY
- - Hyd - Flowpath
- Hyd - Node
- Hyd - Subarea
- Hyd - Watershed
- ▭ PLANNING AREA BOUNDARY

**Rancho Mission Viejo  
ROMP**

**PA 5 Existing Topography  
Figure 10-4**



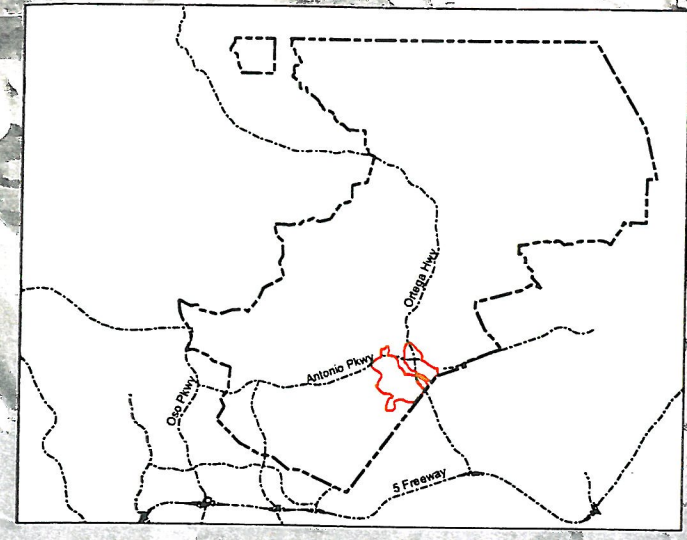
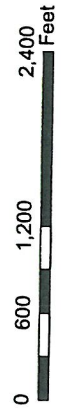
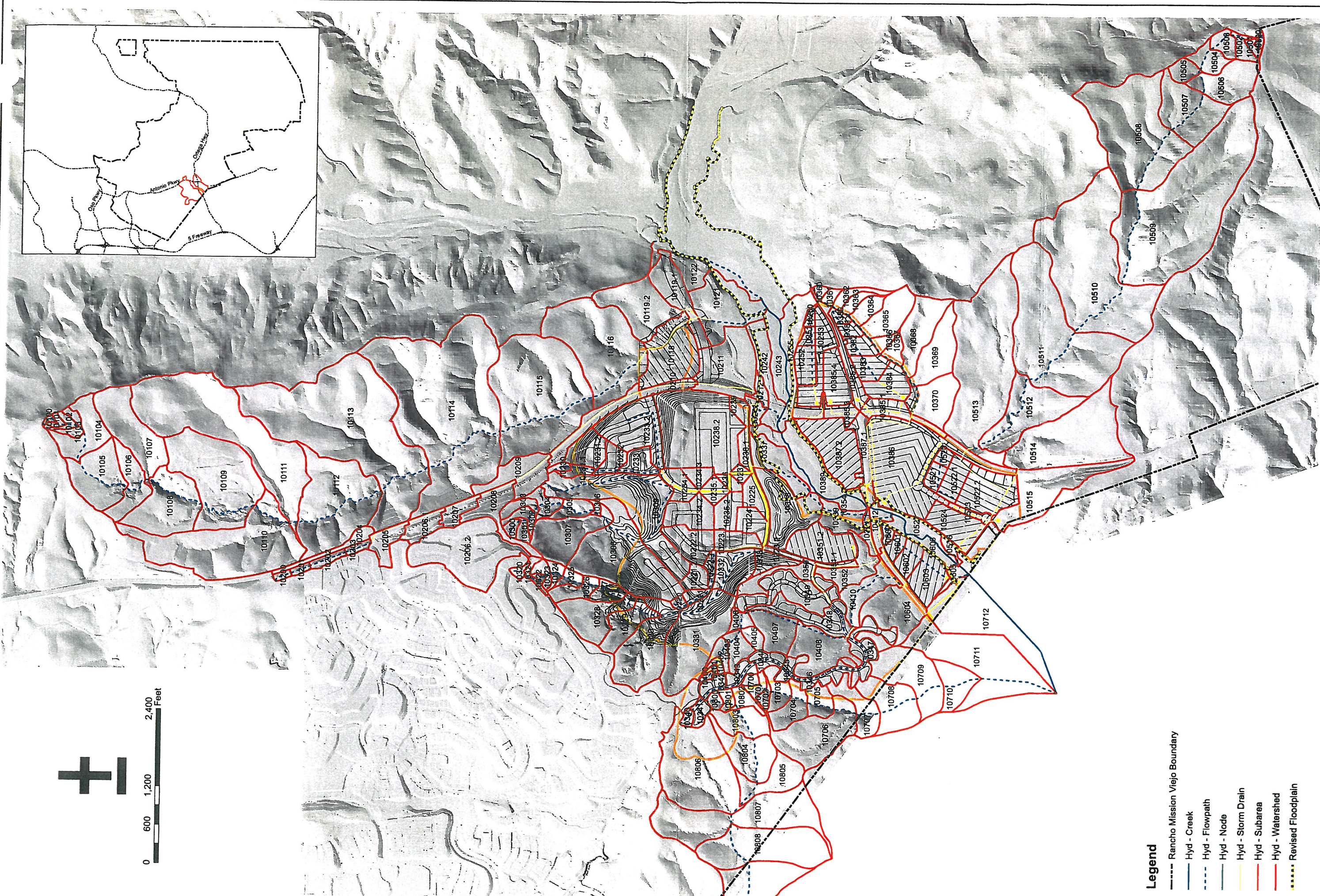




**Legend**

- Permitted outfall not utilized in current plan
- Proposed Storm Drain Outfall
- Rancho Mission Viejo Boundary
- Planning Area Boundary
- - - Hyd - Flowpath
- Hyd - Node
- Hyd - Storm Drain
- Hyd - Subarea
- Hyd - Watershed





- Legend**
- Rancho Mission Viejo Boundary
  - Hyd - Creek
  - - - Hyd - Flowpath
  - Hyd - Node
  - Hyd - Storm Drain
  - Hyd - Subarea
  - Hyd - Watershed
  - ..... Revised Floodplain

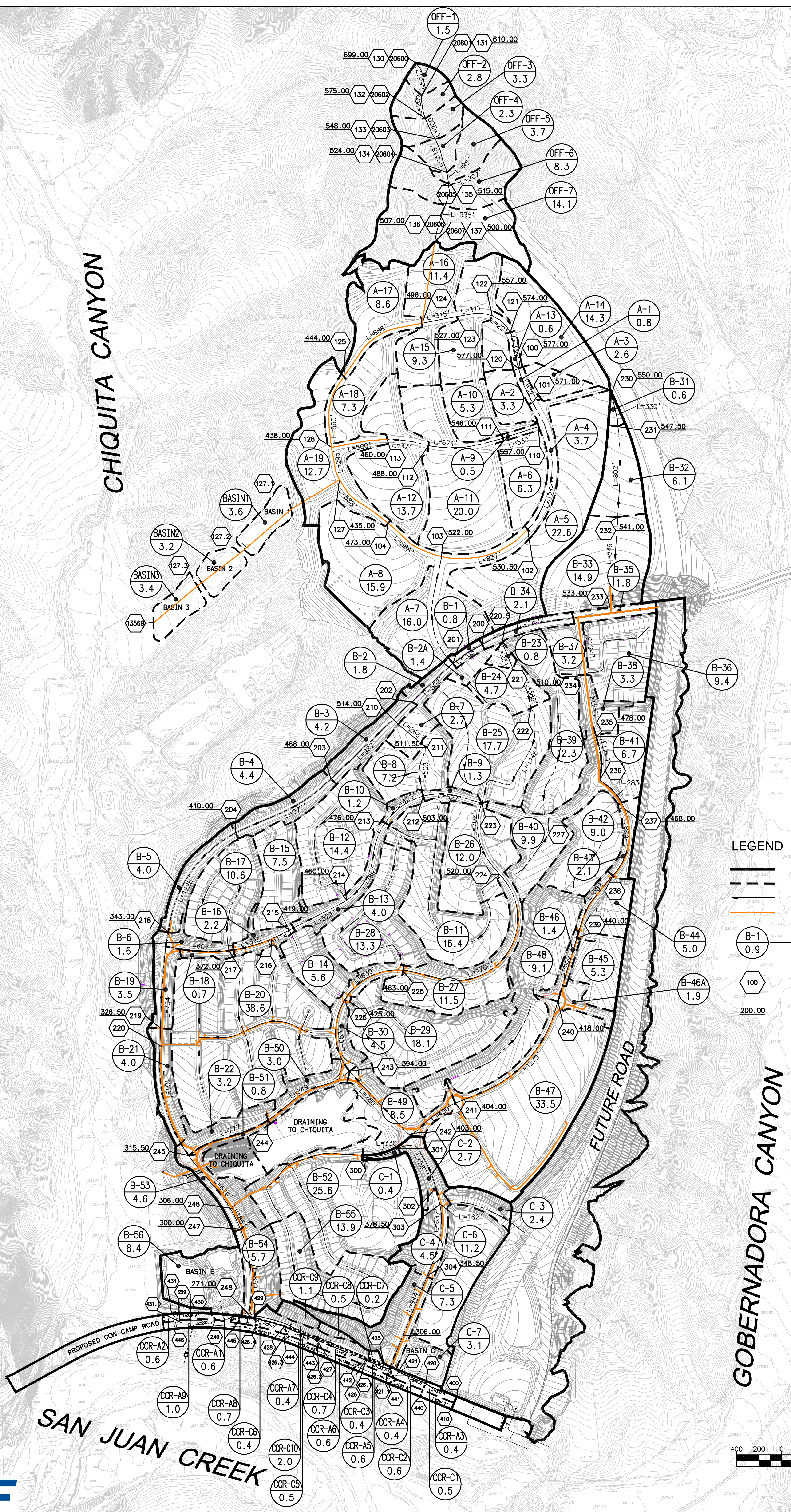


CHIQUITA CANYON

GOBERNADORA CANYON

SAN JUAN CREEK

FUTURE ROAD



**LEGEND**

	DRAINAGE BOUNDARY
	SUBAREA BOUNDARY
	FLOW PATH
	PA2 PROPOSED STORM DRAIN
	SUBAREA DESIGNATION AREA (ACRES)
	HYDROLOGY NODE
	NODE ELEVATION

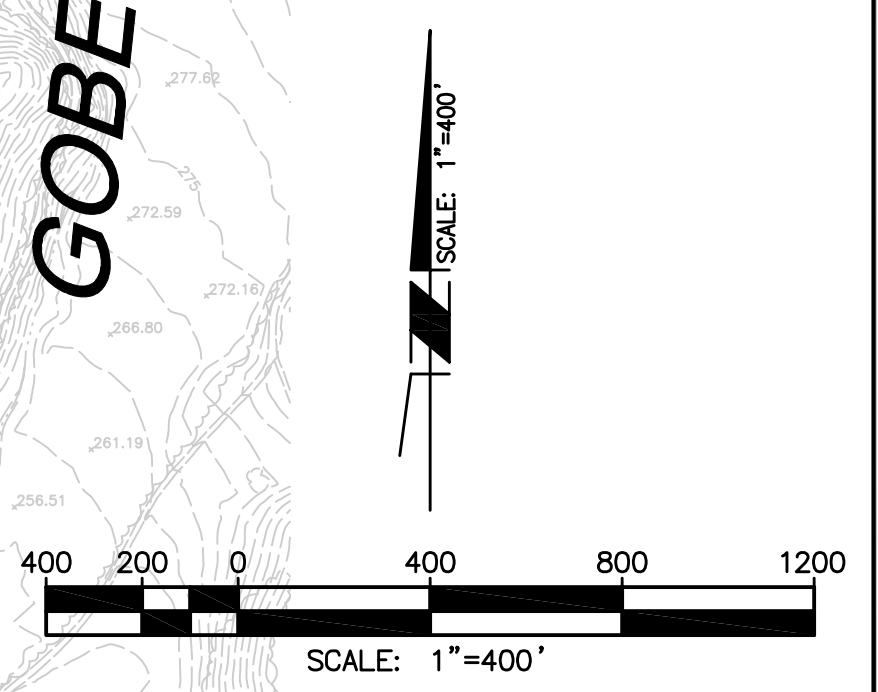


EXHIBIT 2  
RANCHO MISSION VIEJO  
PA-2 DEVELOPMENT LOCAL HYDROLOGY MAP

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